Environmental Assessment
Scoping Report

Proposed New Generating Units at Tilbury Power Station

March 2007
Preface
The UK currently benefits from a diverse electricity generation mix which reduces the UK’s dependency on a single fuel type and helps to maintain a secure electricity supply. The importance of climate change is widely recognised, and RWE npower believe that coal fired generation can continue to play an important role in the UK’s energy system, provided that its environmental impact can be managed effectively. The new generation of supercritical coal fired boilers fulfils this role by ensuring reduced carbon emissions and providing a significant improvement in efficiency.

The proposed new plant at Tilbury will consist of two 800MW high efficiency supercritical coal-fired units, with an efficiency of approximately 45%. This equates to a reduction in CO$_2$ of 22% per unit of electricity generated, when compared to the existing units at Tilbury. This Scoping Report is an early stage in the Environmental Impact Assessment (EIA) process and is designed to ensure that the environmental studies undertaken provide all the relevant information required for the assessment. Once the full EIA has been undertaken an application for the proposed development will be made to the Secretary of State for Trade and Industry under Section 36 of the Electricity Act 1989. It is currently anticipated that the application will be made in the second half of 2008.

A wide ranging consultation programme will be undertaken to inform regulators, local communities and other stakeholders of the proposed development.

The new supercritical plant would be constructed within RWE npower’s current land holding and the existing station will still be able to operate whilst the new units are being constructed. If consent is obtained it is anticipated that site enabling works for the construction of the new units would commence in 2009, with the station fully commissioned at the end of 2014. It is anticipated that the decommissioning of Tilbury B would commence in mid 2014 and be completed by around mid 2015.

This Environmental Assessment Scoping Report has been submitted to the Department of Trade and Industry, and is produced in accordance with the requirements of the Electricity Works (Environmental Impacts Assessment (England and Wales) Regulations 2000.

Copies of the Scoping Report can downloaded from the following website www.npowermediacentre.co.uk/generation, or obtained by writing to RWE npower using the contact details below:

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1. Introduction

The existing Tilbury ‘B’ Power Station, located on the north bank of the Thames Estuary, has been opted-out of the Large Combustion Plant Directive (LCPD, 2001/80/EC). As a result, the plant will be authorised to operate for a further 20,000 hours beyond 1st January 2008, following which closure will be enforced. The LCPD aims to reduce acidification, ground level ozone and particles throughout Europe by controlling emissions of sulphur dioxide (SO$_2$), nitrogen oxides (NO$_x$) and dust (particulate matter (PM)) from large combustion plants (LCPs). Pollutants such as SO$_2$ and NO$_x$ are major contributors to acid deposition, which acidifies soils and freshwater bodies, damages plants and aquatic habitats, and corrodes building materials.

RWE npower are proposing to retain a generating capability at Tilbury by developing a new Station which would have a generating capacity of approximately 1600 megawatts (MW). This would involve constructing modern and considerably more efficient supercritical boilers and steam turbines as part of a new station. Modern emission controls will also be installed; Selective Catalytic Reduction (SCR) for removal of nitrogen oxides (NO$_x$) and Flue Gas Desulphurisation (FGD) for removal of sulphur dioxide (SO$_2$). It has been determined that in line with Government objectives to combat climate change, any such development should be Carbon Capture Ready (CCR).

The new generating units will be subject to an application for consent to the Secretary of State for Trade and Industry under Section 36 of the Electricity Act 1989. This scoping report has been produced in accordance with the requirements of the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 and presents the approach to be adopted in assessing the impacts associated with this project.

1.1. Background Information

RWE npower, a division of the RWE Group since 2002, is a leading integrated UK energy company. In August 2004 RWE Innogy changed the name of the company to RWE npower reflecting the commitment to the established retail brand in the UK. npower is one of the UK’s largest energy suppliers with around 6 million customer accounts.

RWE npower currently operates a portfolio of 9GW of fossil-fuel fired plant (coal, gas and oil) in England and Wales. The coal-fired generation (Aberthaw, Didcot A and Tilbury) accounts for just over 4.5GW. Tilbury Power Station currently has a generating capacity of approximately 1400MW and can power up to 1.4 million homes, playing an essential role in providing secure energy supplies for the UK.

npower renewables, RWE npower's renewable energy business, currently operates a wind power portfolio of over 400MW and a hydro portfolio of approximately 60MW. npower Cogen is the Combined Heat and Power (CHP) division of RWE npower, with 14 plants in the UK and Republic of Ireland and a capacity of more than 2,000MW (heat and power).

1.2. The Need for the Development

The existing Tilbury Power Station has been opted out of the Large Combustion Plant Directive (LCPD), and it will therefore be required to close by 31st December 2015. Further implications arising from LCPD include a limitation on running hours to 20,000 hours after 1st January 2008. Current predictions suggest that closure will occur around 2012/13. In addition, a large number of existing coal, oil and nuclear plant will close in the years up to 2020 as they reach the end of their operational life.

Over this period it is anticipated that the demand for electricity will continue to increase despite efforts made to increase energy efficiency. In total the UK is likely to need around 25GW of new electricity generation capacity by 2025, equivalent to more than 30% of today’s existing capacity (Dti, 2006). This is shown in Figure 1.1, which also highlights the reduction in generating capacity from existing coal fired power stations post 2012.
The UK currently benefits from a diverse electricity generation mix; 37% is generated by gas-fired power stations, 34% from coal, 20% from nuclear, 5% from renewables and the remainder from other sources (Dti 2006). This diverse generation mix reduces the UK’s dependency on a single fuel type and helps to maintain a secure electricity supply. It is anticipated that the UK is set to become more reliant on imported natural gas with imported supplies contributing 80 – 90% of the expected consumption by 2020. For this reason it will be increasingly important for a diverse range of energy sources for electricity generation to be maintained.

The importance of climate change is widely recognised and coal fired generation can continue to play an important role in the UK’s energy system, provided that its environmental impact can be managed effectively. The new generation of supercritical coal fired boilers fulfils this role by ensuring reduced carbon emissions and providing a significant improvement in efficiency.

RWE npower have applied for consent to build a new 2000MW gas fired power station on the site of the former Pembroke Power Station.

Consent is also held for a new gas fired station on the site of the former Staythorpe Power Station near Newark in Nottinghamshire.

npower renewables is a leading UK renewable energy generator committed to developing and operating wind farms, biomass and hydro plant that generate sustainable and environmentally-friendly electricity. The current wind power portfolio of over 400MW includes the UK’s first major offshore wind farm at North Hoyle, a 60MW project located 7-8km off the North Wales coast. Our hydro team is a leading developer of small-scale hydroelectric schemes and currently operate some 60MW of hydro plant in the UK. npower renewables are also investigating opportunities for the development of marine renewable technologies such as wave and tidal.

### 1.3. Legislative Background

#### 1.3.1. UK Wide

The Government has four long-term goals for energy policy:

- To put the UK on a path to cut carbon dioxide emissions by 60% by 2050, with real progress by 2020;
- To maintain reliable energy supplies;
- To promote competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and to improve UK productivity; and
- To ensure that every home is adequately and affordably heated.

In November 2005 the Prime Minister announced a major review of the country’s progress on achieving these goals. The Review was launched by Malcom Wicks (former Minister for Energy) and more recently has been led by Alistair Darling, Secretary of State for Trade and Industry. The Review concluded with the publication of ‘The Energy Challenge’, Energy Review Report 2006, Department of Trade and Industry, July 2006. This is due to be followed by a White Paper in 2007.

The Government believes that coal has a role to play in the UK generating mix and in the Energy Review it is stated that:
‘To have a long-term future coal needs to tackle its heavy carbon emissions. But coal-fired generation technology is becoming cleaner and carbon capture and storage (CCS) offers the promise of genuinely low carbon electricity generation from fossil fuels’.

The review states that the Government will convene a coal forum to bring together coal-fired generators, coal producers and suppliers, power plant suppliers, trade unions, small businesses and other parties in order to help them to find solutions to secure the long-term future of coal-fired power generation and UK coal production. The forum will facilitate dialogue within the industry and work towards a framework consistent with government energy policy goals to secure the long-term contribution of coal-fired power generation and optimise the use of economical coal reserves in the UK.

In order to support and underpin planning policy and legislation the government is in the process of producing a number of Planning Policy Statements (PPS) to gradually replace the existing Planning Policy Guidelines (PPG). A number of these have already been produced or are in draft and cover issues such as planning and pollution control, waste, flooding, housing and retail development. Where appropriate these will be taken into consideration during the EIA.

1.3.2. Regional and Local Government Policy and Planning

Tilbury Power Station, situated in the Borough of Thurrock Council, is within the Thames Gateway, which was announced as a key growth area in the Government’s Communities Plan ‘Building for the Future’, launched in February 2003. The Thames Gateway is therefore an area of national importance.

The draft Regional Spatial Strategy (RSS) for the East of England (RSS14) – ‘Draft East of England Plan’ contains a range of policies on jobs, housing and the environment. This draft plan proposes 18,500 dwellings and 26,000 jobs between 2001 and 2021 within Thurrock which is part of the Thames Gateway South Essex Regeneration and Growth area identified in the plan. The RSS has been subject to independent examination and will become part of the statutory development plan on formal adoption in 2007.

The draft East of England plan also identifies, within Thurrock, a Regeneration Hub and Strategic Employment Zone. Thurrock is also in the Thames Gateway South Essex Partnership with other local authorities and stakeholders. This partnership has produced its own vision for South Essex and is preparing strategies for issues covering employment, transport and waterfront development.

The Thurrock Thames Gateway Development Corporation (TTGDC) was appointed by the Government to specifically prepare a regeneration plan for the Borough and secure a comprehensive framework to bring about sustainable growth and regeneration of Thurrock. On 12 October 2005 the TTGDC became the local planning authority for planning applications for certain levels of development. The proposed supercritical coal power station at Tilbury would fall into this category.

1.3.3. Consent Requirements

The new generating units will be subject to an application for consent to the Secretary of State for Trade and Industry under Section 36 of the Electricity Act 1989. The Act provides that, on granting the Section 36 consent, the Secretary of State may direct that planning permission for the development shall be deemed to be granted.

Depending on the final project design and construction requirements there may be a requirement for additional consents to be obtained. These may include consent under the Food and Environment Protection Act (FEPA) 1985, the Water Resources Act 1991, and the Coast Protection Act 1949.

Under Section 5 of the Food and Environment Protection Act 1985 a licence is required from the Secretary of State for the Environment, Food and Rural Affairs for the placing of materials in the marine environment during construction and related actions. The primary objectives of the legislation are to protect both the marine ecosystem
and human health, and to minimise interference and nuisance to other legitimate users of the sea.

If structures are required to be erected in a watercourse forming part of a designated main river, consent will be required from the Environment Agency under Section 109 of the Water Resources Act (WRA) 1991. This will be a requirement if there are works associated with the jetty during the development of the new units. Also under the WRA, a licence is required from the Environment Agency for the abstraction of water from any sources of supply. In this case a licence would be required for the continued abstraction of cooling water from the River Thames.

A permit from the Environment Agency (a ‘PPC permit’) will be required under the Pollution Prevention and Control (England and Wales) regulations 2000, to operate an installation in which combustion activities of over 50MW thermal rated capacity are undertaken. This permit is required to authorise exhaust gas emissions to the air and cooling water and other process discharges to the Thames, as well as regulating other matters including raw material (including water) use, noise and waste from the installation.

Under sections 85 and 88 of the Water Resources Act 1991 it is an offence to cause or knowingly permit the discharge of any poisonous, noxious or polluting matter or any solid waste matter to enter controlled waters except in accordance with a discharge consent or PPC permit. However, this would not extend to surface water discharges during construction or discharges of treated sewage effluent. Separate discharge consents would be applied for to cover these elements.

Consent will be required under Section 34 of the Coast Protection Act 1949 in respect of works carried out below high water mark. This may include the cooling water intake and outfall and any dredging works required associated with the proposed development.

The Habitats Directive was transposed into UK Law by the Conservation (Natural Habitats &c) Regulations 1994, as amended (Habitats Regulations). This requires an appropriate assessment to be conducted by the ‘competent authority’ before a plan or project that is likely to have a significant effect on designated or candidate Special Protection Areas (SPA) or Special Areas of Conservation (SAC), can be given consent, permission or other authorisation. The Appropriate Assessment of the implications for the site must be undertaken in view of that site’s conservation objectives.

1.4. Scoping

Scoping is an early stage in the environmental impact assessment process and is designed to ensure that the environmental studies undertaken provide all the relevant information required for the assessment. Scoping is the process of determining the content and extent of the matters which should be covered in the environmental information to be submitted to the competent authority for projects which are subject to EIA. The scoping process is designed to allow consultees to input into the EIA process for a particular project.

1.5. Reporting

It is important that the results of the environmental impact assessment are made available to all with a genuine interest in the potential effects of the development. The Environmental Statement should be accurate and technically detailed, whilst at the same time easily comprehensible to those with a non-technical background. This will be facilitated by including a non-technical summary.

The Environmental Statement will include:

- A description of the proposals;
- A description of the surrounding environment;
- An outline of the assessment methodologies adopted;
- The results of the assessment of environmental impacts (the topics to be addressed will include: Air Quality, The Aquatic Environment, Terrestrial Ecology, Ground Conditions & Flood Risk, Noise, Transport and Navigation, Cultural Heritage, Landscape and Visual Impacts, and Socio-economic impacts);
- Proposals for mitigation and monitoring where appropriate for each of the above topics; and
- A non-technical summary.
2. The Proposed Development

2.1. Introduction
This section provides a high level description of the proposed project based on the information available at the time of writing. It should be noted that the design process for the generating station is at an early stage, and therefore many of the detailed parameters of the project are yet to be determined.

2.2. The Proposed Plant
The proposed new plant at Tilbury will consist of two 800MW high efficiency supercritical coal-fired units. At present it is proposed that a ‘once-through’ circulation system will be employed. This is a key design feature of supercritical boilers, in which the water and steam generated in the furnace waterwalls passes through only once. Supercritical conditions are generated when the boiler pressure increases above a pressure of 221.2 bar. Above this pressure the two phases of steam and water are replaced by a single supercritical fluid. The benefits of supercritical technology include:

- Increased efficiency
- Lower emission levels
- Greater operating flexibility

Supercritical boilers have the potential to operate at cycle efficiencies in the order of 46%. As a result of the increased efficiency less fuel is consumed per kilowatt-hour (kWh) which in turn results in a corresponding decrease in emissions per kWh.

There are currently no supercritical coal fired units in the UK. The current fleet of coal fired power stations is typical of the large sub-critical turbine plants built in the 1960s to 1980s. Newer supercritical plant that has been constructed in Europe and Asia are known to achieve efficiencies in the range of 42-46% compared to the current 35-38% in the UK.

The efficiency of Tilbury B is currently 35% averaged over the three operational units. At present it is anticipated that the efficiency of the new plant will be in the order of 45%. Using this figure and assuming 100% coal burn and 85% load factor, the CO₂ production (per 800MW unit) would be 4.5Mte per annum (pa). This compares to approximately 5.8Mte pa at 35% efficiency, and equates to a reduction in CO₂ of 22% per unit of electricity generated. Assuming a heat input from biomass (palm kernel expeller, PKE) of 10%, the CO₂ emissions per unit of electricity generated is effectively reduced from 4.5Mte pa to approximately 4.0Mte pa. This equates to a reduction in CO₂ from coal of a further 460kte, or 10%.

The location of the proposed new generating units at Tilbury is well situated in terms of providing electricity to a densely populated region of the UK which has a high energy demand. It is believed that the generation capacity in the South East needs to be maintained, or increased, in order to reduce reliance on the national transmission network where possible and minimise efficiency losses through the transmission system. It is proposed that the new station will be connected to a new 400kV substation currently being planned by National Grid.

The new supercritical plant would be constructed within the current land holding for the existing station, as shown on Figure 2.1. It is proposed that the new plant is constructed to the west/north-west of the existing power plant. The existing station can then still operate whilst the new units are being constructed. If consent is obtained it is anticipated that site enabling works for the construction of the new units would commence in 2009. The first of the two new units would then come online at the end of 2013 with the station fully commissioned at the end of 2014. It is anticipated that the decommissioning of Tilbury B would commence in mid 2014 and be completed by around mid 2015.
Figure 2.1 Proposed Site Layout Plan for the new units at Tilbury
The demolition of Tilbury B will be subject to a separate EIA to evaluate the potential impacts associated with this activity. There is a requirement as part of the IPPC application and permitting process to submit a site closure plan to the Environment Agency for approval. This will consider the end of life for the new units and will be undertaken in due course.

2.3. Emissions Control

The atmospheric emissions from the proposed plant will be compliant with the requirements of the Pollution Prevention and Control Act 1999 and the Large Combustion Plants Directive (LCPD) 2001/80/EC. The aim of the LCPD is to reduce acidification, ground level ozone and particulates throughout Europe by controlling emissions of sulphur dioxide (SO$_2$), oxides of nitrogen (NO$_x$) and dust (particulate matter (PM)) from large combustion plants. The proposed plant at Tilbury will employ flue gas cleaning equipment, utilising the Best Available Techniques (BAT) to ensure that emissions are reduced to an appropriate level. A schematic showing the proposed plant is shown in Figure 2.2.

NO$_x$ emissions will be controlled through use of a Selective Catalytic Reduction (SCR) system applied to the flue gas stream. Ammonia vapour is used as the reducing agent and is injected into the flue gas stream, passing over a catalyst, reducing the NO$_x$ to nitrogen and water. Emission reductions of up to 90% can be achieved using this process. There are 3 possible positions for the SCR reactor: “high dust” between the economiser and the air heater; “low dust” between the electrostatic precipitators (ESP) and the FGD; and, “tail-end” after the FGD plant. It is anticipated that the high dust SCR configuration will be the selected option for the new plant at Tilbury. The operating temperature for this system is usually between 320°C and 420°C.

The flue gas will also be treated using Flue Gas Desulphurisation (FGD) to control sulphur dioxide emissions. It is anticipated that at Tilbury this will comprise a limestone gypsum wet scrubbing process where the alkali (limestone slurry) removes and neutralises the SO$_2$ to form a gypsum product. The concentration of SO$_2$ in the flue gas stream can be reduced by up to 98% using this technology.

The warm flue gas enters the absorber and the gas is scrubbed with the recirculating limestone slurry to remove SO$_2$. This produces calcium sulphite and the chemical reaction is completed by sparging air into the base of the absorber to convert the calcium sulphite into calcium sulphate (gypsum). The cleaned flue gas then exits the absorber through demisters prior to discharge through the stack.

The gypsum produced will be of high quality and can be sold commercially for use in plasterboard manufacture.

During normal operation there is a build up of impurities in the process liquor, and the system is therefore purged with water to reduce contaminants. Liquid effluents from the process will be treated to a high standard before being discharged.

It is proposed that particulate emissions are controlled through use of electrostatic precipitators which would have the capability of removing approximately 99.7% of particulates from the flue gas stream. Particulate laden flue gases are passed horizontally between collecting plates where an electrical field creates a charge on the particles. The particles are then attracted towards the collecting plates, where they accumulate and are removed from the gas stream.

It is the intention that the ash produced will be of high quality and marketed to the construction industry for the production of construction materials such as cement.
Figure 2.2 Supercritical Boiler Schematic (2 x 800MW)
2.4. Materials Handling
At present Tilbury Power Station receives all its supply of coal by ship. Vessels up to 75,000 tonnes deadweight (DWT) are able to berth by the Power Station jetty. It is anticipated that coal supplies for the new station will also utilise the jetty (upgraded if required). It is assumed that on site coal storage will be provided for a minimum of 45 days supply in addition to the capability of receiving deliveries via the jetty.

The resultant Pulverised Fuel Ash (PFA) from the power stations combustion activities will be collected and stored on site prior to sale. Improvements in boiler combustion mean that the quality of the PFA produced from the proposed boilers should be high, with less than 7% carbon in ash. Thus there should be good potential to market and sell all of the PFA produced to the construction materials sector. The majority of PFA would therefore be removed from site in a dry form in dry dust tankers. It is possible that any unsold PFA would be transported by road to landfill offsite, although options for further disposal on-site or adjacent to the site will be explored.

Furnace Bottom Ash (FBA) is principally used in block manufacture and it is anticipated that the vast majority of FBA produced from the new units would be sold into this market.

It is assumed that the limestone required for the FGD process will be brought to site by self discharging ship (15,000 DWT), although transportation by road or rail will also be investigated.

Gypsum produced as a by-product of the FGD process is likely to be stored in a building rather than in silos as this allows for a more effective segregation of product. The feasibility of transportation by road, rail and sea going vessel will be assessed. UK and European markets for gypsum sales will be explored with any remaining by-products disposed of in a licensed landfill.

2.5. Biomass Co-firing
As part of the proposed development it is anticipated that a capability of up to 10% biomass co-firing (by heat) will be considered. This will be subject to the outcome of the review of the Renewables Obligation currently being undertaken by the Government.

There are a wide range of carbon neutral biomass fuels that could be used to co-fire a new supercritical boiler plant. Biomass fuels such as sawdust, wood pellets, PKE, Olive, Shea and Wheat Straw would all be possible fuels. Each has its own combustion characteristics that would require consideration at the design stage. Taking the efficiency of the proposed plant at 45% and a heat input from PKE of 10%, the CO$_2$ emissions per unit of electricity generated is effectively reduced from 4.5Mte pa to 4.0Mte pa. This equates to a reduction in CO$_2$ from coal of 460kte, or 10%.

2.6. Carbon Capture Ready
The removal of CO$_2$ from flue gases on this scale is currently unproven. However, it is recognised that technological progress and changes in the regulatory framework are likely to occur within the lifetime of the development. As a minimum the new plant will be designed such that it is ‘carbon capture ready’.

2.7. Combined Heat and Power (CHP)
Guidance has been issued for developers bringing forward proposals for new power stations for decision by the Secretary of State for Trade and Industry under section 14(1) of the Energy Act 1976 and/or section 36 of the Electricity Act 1989.

Government believes it is highly preferable, from a climate change and fuel efficiency perspective, for the waste heat from large power stations to be put to beneficial use where possible. Developers are expected to explore opportunities to use CHP fully, including community heating, when developing proposals for new power stations. This guidance will be followed for the proposed development at Tilbury.
3. Existing Environment

3.1. Site Location and Surrounding Land Use

The existing power station lies in a predominantly industrialised area on the north bank of the Thames Estuary to the east of London. To the north and east of the site are the West Tilbury marshes. The Anglian Water sewage treatment works is adjacent to the western boundary of the site. The site has river frontage to the Thames which includes a substantial jetty through which fuel supplies are currently delivered. Tilbury town is located to the north west of the power station and falls within the wards of Tilbury St Chads and Tilbury Riverside and Thurrock Park. The combined population for these wards based on the 2001 census data was 12,121.

Road access to the site is generally good from the A13 via the A1089 to Tilbury Docks and then single carriageway to the power station entrance. There is no rail connection on site at present however the Barking-Tilbury-Pitsea line passes the north-western corner of the site.

The station is actively involved in the local community and supports local educational initiatives, environmental projects and also encourages visits to the site from schools and other groups from Essex and South East London. The site is located 1.7km from the South Thames Estuary and Marshes Site of Special Scientific Interest (SSSI) and 2.2km from the Thames Estuary and Marshes Special Protection Areas (SPA / Ramsar) site. These are discussed in further detail in section 4.5. Tilbury Energy and Environment Centre is located within the grounds of the power station which provides school groups with an opportunity to study the wildlife and the station during site visits. Approximately 6000 students from around 150 schools and colleges visit the centre annually. The grounds of the environment centre are largely designated as a Local Wildlife Site (LWS).

Located to the east of the power station is the London Gateway, the proposals for which include the construction of a world-class port and a large business park. London Gateway Port and Park will be developed at the former Shell Haven oil refinery, a 1,500 acre site in Thurrock. It is considered that the business centre will create up to 14,500 jobs and related training opportunities and provide a catalyst for further regeneration in Thurrock.

The Port of Tilbury, located 1.3km west of the site boundary was acquired by Forth Ports Plc in 1995. The port handles a wide range of import and export traffic including containers, pipe work, pallets, heavy lifts and rolling cargoes. The port therefore operates a variety of modern handling equipment including container cranes, conventional quay cranes and mobile plant. The Port of Tilbury also operates the London Cruise Terminal and a wide range of short-sea and deep-sea destinations are covered by the regular container services.

Littlebrook Power Station, located on the south bank of the River Thames 9.3km to the west of Tilbury B is also operated by RWE npower. Littlebrook is an oil fired station comprising 3 x 685MW units, although at present only 2 of the units are operational.

3.2. Development History of the Site

The construction of Tilbury A began in 1951 and the 1st unit was synchronised to the grid in 1956. Although initially commissioned as a coal fired power station the boilers were converted to burn oil before coming into full commercial operation. Six generating units were built, the last coming on-stream in 1957. Tilbury A was then able to produce 360MW of power. In 1981 Tilbury A effectively ceased to operate and the station boilers and turbine hall were demolished in 1999.

The construction of Tilbury B Power Station began in April 1961, with Unit 7 synchronised to the grid for the first time in March 1967. The station was commissioned in 1968 and fully operational by September 1969. Tilbury B comprises 3 x 350MW and 1x 359MW coal fired units, along with four 17.5MW gas turbines which can generate electricity for black start purposes when the site is disconnected from the national grid. Units 7 and 10 were mothballed in 1998, although Unit 10 was recommissioned in 2001. The coal jetty was extended in 2004 and a new berth pocket was dredged to enable larger Panamax vessels loaded with approximately 65,000 tonnes of coal to be brought alongside.
Figure 3.1 Designated Sites within 10km of Tilbury Power Station
4. Proposed Scope of the Environmental Impact Assessment

4.1. General Approach

The Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 state that an Environmental Statement (ES) is required for an application to develop a generating station, the construction (or operation) of which will require a Section 36 consent, and which is a non-nuclear generating station with a heat output of 300 megawatts (MW) or more.

The ES should provide a factual description of the development and should be prepared based on the relevant techniques and knowledge available at the time. The following information will be included in the ES:

- A description of the proposed development including information on the site, design and size of the development.
- A description of the environmental aspects likely to be significantly affected by the development (directly or indirectly), and the data required to identify and assess the main effects. The aspects considered will include:
  - Flora
  - Fauna
  - Soil
  - Water
  - Air
  - Landscape
  - Cultural Heritage
  - Population
  - Climate
- A description of the measures proposed to reduce, prevent or where possible, offset any significant adverse effects on the environment.
- A non technical summary of the main findings of the ES.

4.2. Planning Context

To fully understand how the proposed development may impact upon relevant planning policies a review of the planning context related to the proposed new units at Tilbury will be completed. The site falls within the area covered by the Thurrock Unitary Development Plan (UDP) (deposit version). The strategic policy relating to Energy Generation given within the UDP states that proposals for new energy generation developments will be permitted where appropriate provided that certain criteria are met. These include (amongst others) that:

- there is an identified need for the facility in the Borough;
- there will be no materially adverse environmental impact on the surrounding area;
- there is an existing power transmission line of sufficient capacity to serve the development; and
- the development complies with other relevant policies in the plan.

Other relevant documents include the Thames Gateway Planning Framework (RPG9a) (1995), and the Regional Planning Guidance for the South East (RPG9) (2001). The Thames Gateway embodies the vision for the area extending from Docklands in London to Tilbury in Essex and the Isle of Sheppey in Kent, an area previously known as the East Thames Corridor. RPG9a refers to specific regions within the Thames Gateway and the location the proposed new units is covered by ‘Essex Thames-side’. The guidance contained within this document will be reviewed in relation to the development proposals.

Thurrock council is currently working on its Local Development Framework (LDF). The objectives and strategy for the development of the whole area of the borough will be set out in the Core Strategy and Policies for Control of Development (Development Plan Document) DPD. The first step in developing the new Spatial Plans for Thurrock is underway following production of the “issues and options” consultation document in July 2006. It is anticipated that the “Preferred Option” DPD will be issued for consultation in early 2007. The strategic options
developed through this process will be considered where appropriate during the EIA process for the proposed development.

The Spatial Plan will be supported by a range of geographically focused Area Master Plans. Initially, these will focus on the following communities: Purfleet; Lakeside & West Thurrock; Grays Town Centre; Aveley and South Ockendon; Tilbury and Chadwell St Mary. It is understood that the Master Plan for Tilbury and Chadwell St Mary will be undertaken in the coming months and where possible RWE npower will work in conjunction with TTGDC and Thurrock Council to ensure that this is taken into account where appropriate.

Under the transitional arrangements adopted structure and local plans retain development plan status. Further work on the Thurrock UDP has been suspended following commencement of the Local Development Documents preparation. However it is noted that the UDP (Deposit Draft) will remain a material consideration in the determination of planning applications until it is formally withdrawn.

The Government has identified the Thames Gateway as a growth area that will need to include high quality multifunctional green space alongside the new housing and employment developments that are expected. The Thames Gateway South Essex Greengrid Strategy has provided the strategic framework for the Greengrid at a sub-regional scale. The proposed development will therefore take into account the principles identified in the Greengrid Strategy for Thurrock.

It is recognised that Thurrock Council has adopted as supplementary planning guidance, ‘The Essex Guide to Environmental Assessment’ prepared by the Essex Planning Officers Association. This document will be reviewed and referred to during the EIA for the proposed development as appropriate.

4.3. Air Quality

Tilbury Power Station currently operates under Integrated Pollution Control (IPC) legislation, and has recently applied for a permit to operate under the Integrated Pollution Prevention and Control (IPPC) regime. IPPC embodies an approach broadly similar to IPC but takes on a wider range of environmental impacts with a view of integrated permitting. The objectives are realised through application of Best Available Techniques (BAT).

The existing site is subject to air quality controls and has an established Air Quality Management Plan (AQMP). As part of this plan the power station has two local air quality monitoring sites which provide information on background air concentrations. This baseline data will be used to inform the assessment of potential air quality impacts associated with the proposed station, with reference to the UK Air Quality Strategy Objectives as appropriate. Predictions of any potential impacts on local air quality will be made using the computer based atmospheric dispersion model ADMS.

It is currently proposed that atmospheric emissions from the new 800MW units will occur via two new stacks, one servicing each of the units. Initial modelling outputs indicate that the stacks could be between 165m and 225m in height although this will depend on the target air quality strategy level that is required to be achieved. For comparison, the existing stacks at Tilbury B are approximately 170m high.

Atmospheric emissions from the proposed new units will be compliant with the new plant standards as stipulated in the Large Combustion Plant Directive (LCPD) as follows:

- $\text{NO}_x < 200 \text{mg/Nm}^3 @ 6\% \text{O}_2$
- $\text{SO}_x < 200 \text{mg/Nm}^3 @ 6\% \text{O}_2$
- Particulate emission < 30 mg/Nm$^3 @ 6\%\text{O}_2$

The assessment of atmospheric emissions will also consider atmospheric deposition, in particular of acid gases, in order to determine any potential effects on sensitive habitats, including Natura 2000 sites.
4.4. Water Quality

During the initial design phase of the development key decisions will be made regarding the precise technology employed and the way in which it is operated. These in turn will influence the potential aquatic impacts of the plant, both in construction and operation. At present the preferred option is to utilise water from the Thames estuary for ‘direct’ cooling of the power station. It is also assumed that water abstracted from the Thames Estuary will be used for operational processes including FGD. This could require installation of a desalination plant to ensure that the appropriate water quality can be achieved.

The assessment of potential impacts on the aquatic environment will demonstrate that the proposed plant offers an efficient use of water resources and that the abstraction of the water resource is environmentally acceptable. It will also be demonstrated that the equipment and operation constitute site specific BAT such that they eliminate emissions subject to BAT and that the residual environmental impacts are deemed acceptable. Taking direct cooling as a base case, with 45% efficiency and 10% heat input from PKE, the efficiency with natural draft cooling would drop to 44% and with mechanical draft cooling it would be reduced to 41.5%. The CO₂ increase as a result would be 100kte and 350 kte pa respectively.

It is proposed that the intake and outfall arrangement associated with the existing station is reused for the new units. To ensure that this is appropriate a review of their design and performance will be undertaken. An assessment of the potential impacts on water quality will commence with a review of available literature sources for the water body. Following consultation with key stakeholders appropriate modelling will be undertaken to determine the potential for impact on the aquatic environment associated with the proposed development. It is likely that the modelling will include:

- Water levels, currents, and evaluation of shear stresses
- Thermal (plume and long term accumulation of heat)
- Dilution assessment
- Suspended solids
- Metals and PAHs (as required, for FGD emissions)

Numerous data sets will need to be interrogated to gain the level of detailed information required for the model definition. Where appropriate data is not available it may be necessary to undertake limited field work specifically for the assessment of the proposed development.

Due to the high thermal efficiency of the proposed new station it is anticipated that the cooling water discharge temperature will be lower than that of the existing station.

The boundaries for the modelling will be defined to ensure that key receptor locations which are potentially impacted by the new station development are included in the assessment. Consultation with the relevant stakeholders will be undertaken to ensure that the model parameters are considered appropriate for the assessment.

The output of the aquatic modelling will be used to assess any potential impacts on both water quality and key ecological features. A baseline understanding of the aquatic ecology surrounding the proposed power station will be developed and where appropriated dedicated field surveys will be undertaken. Details of proposed surveys are provided in the following section.

4.5. Ecology

The Power Station site at Tilbury is located 2.2km from the Thames Estuary and Marshes Special Protection Area (SPA) and Ramsar site. The SPA includes both marine areas (i.e. land covered continuously or intermittently by tidal waters) and land which is not subject to tidal influence. The site is known to support internationally important populations of avocet (Recurvirostra avosetta) and hen harrier (Circus cyaneus). Other non qualifying species that regularly occur on the site include common tern (Sterna hirundo), Bewick’s swan (Cygnus columbianus bewickii), golden plover (Pluvialis apricaria) and ruff (Philomachus pugnax).

In addition to the internationally important populations, the Thames Estuary qualifies for its wintering waterfowl assemblage, regularly
supporting over 20,000 birds. The species of interest include ringed plover (*charadrius hiatricula*), grey plover (*pluvialis squatarola*) dunlin (*calidris alpine alpine*) knot (*C. canutus islandica*) black-tailed godwit (*limosa limosa*) and redshank (*tringa tetanus tetanus*).

Mudflats are extensive within the estuary and are a rich source of invertebrates which provide feeding grounds for wintering avocet, dunlin, knot and black-tailed godwit.

There are a number of additional Natura 2000 sites within 20km of the site, as listed in Table 4.1 which also includes SSSI’s within 10km of the proposed development.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Designation</th>
<th>Distance to PS (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Thames Estuary &amp; Marshes</td>
<td>SSSI</td>
<td>1.7</td>
</tr>
<tr>
<td>Mucking Flats and Marshes</td>
<td>SSSI</td>
<td>2.9</td>
</tr>
<tr>
<td>Globe Pit</td>
<td>SSSI</td>
<td>4.5</td>
</tr>
<tr>
<td>Shorne &amp; Ashenbank Woods</td>
<td>SSSI</td>
<td>4.7</td>
</tr>
<tr>
<td>Hangman’s Wood &amp; Dene Holes</td>
<td>SSSI</td>
<td>4.7</td>
</tr>
<tr>
<td>Bakers Hole</td>
<td>SSSI</td>
<td>5.0</td>
</tr>
<tr>
<td>Grays Chalk Pit</td>
<td>SSSI</td>
<td>5.9</td>
</tr>
<tr>
<td>Great Crabbles Wood</td>
<td>SSSI</td>
<td>6.3</td>
</tr>
<tr>
<td>Swanscombe Skull Site</td>
<td>SSSI</td>
<td>6.3</td>
</tr>
<tr>
<td>Lion Pit</td>
<td>SSSI</td>
<td>6.8</td>
</tr>
<tr>
<td>West Thurrock Lagoon &amp; Marshes</td>
<td>SSSI</td>
<td>7.2</td>
</tr>
<tr>
<td>Cobham Woods</td>
<td>SSSI</td>
<td>7.3</td>
</tr>
<tr>
<td>Darenth Wood</td>
<td>SSSI</td>
<td>8.2</td>
</tr>
<tr>
<td>Chattenden Woods</td>
<td>SSSI</td>
<td>8.3</td>
</tr>
<tr>
<td>Halling to Trotticliffe Escarpment</td>
<td>SSSI</td>
<td>8.5</td>
</tr>
<tr>
<td>Purfleet Chalk Pits</td>
<td>SSSI</td>
<td>9.5</td>
</tr>
<tr>
<td>Vange &amp; Fobbing Marshes</td>
<td>SSSI</td>
<td>9.8</td>
</tr>
<tr>
<td>North Downs Woodlands</td>
<td>SAC</td>
<td>9.9</td>
</tr>
<tr>
<td>Peters Pit</td>
<td>SAC</td>
<td>13.7</td>
</tr>
<tr>
<td>Medway Estuary &amp; Marshes</td>
<td>SPA/Ramsar</td>
<td>12.0</td>
</tr>
<tr>
<td>Thames Estuary &amp; Marshes</td>
<td>SPA/Ramsar</td>
<td>2.2</td>
</tr>
</tbody>
</table>

There are also features of ecological interest located within the site boundary. These are summarised in the Table 4.2.
<table>
<thead>
<tr>
<th>Generalised area</th>
<th>Basic habitats</th>
<th>Examples of priority BAP species/ habitats;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilbury Energy &amp; Environment Centre (TEEC) grounds (including Gatehouse pond and ditch; and, arboretum)</td>
<td>Grasslands of various categorisation; three ponds; marsh/reed beds; wooded copses and scrub; planted arboretum.</td>
<td>Water Vole&lt;br&gt; Hornet Robberfly&lt;br&gt; Brown-banded Carder Bee&lt;br&gt; Grass Snake&lt;br&gt; Adder&lt;br&gt; Black Redstart</td>
</tr>
<tr>
<td>TEEC grounds largely designated as a Local Wildlife Site (LWS).&lt;br&gt; Four species of reptile present: Adder, Grass Snake, Slow Worm and Common Lizard&lt;br&gt; Foraging area for Barn Owls and Badger(s)&lt;br&gt; Ponds and ditches support Great Silver Water Beetle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old Lytag site</td>
<td>Brownfield habitat: Lichen Heath, developing upon industrial aggregates (Lytag; Clinker and Ash) also upon previous warehouse hard standings; ‘Steppe’ characteristic mosaics of habitat; North of site: acid grassland; seasonally wet areas forming saltmarsh habitat.</td>
<td>Seasonally wet ditches may support Water Vole&lt;br&gt; Some BAP invertebrates have been recorded on the site;</td>
</tr>
<tr>
<td>Area south of old Lytag site, north of old degreasing plant area)</td>
<td>Some pioneer heathland</td>
<td>Possible extension of BAP invertebrate species, foraging/breeding area.</td>
</tr>
<tr>
<td>Ash fields (established capped and uncapped with top-soil)</td>
<td>Tree copses; scrub; annually cut grassland.</td>
<td>- Hornet Robberfly is possible as East Tilbury marshes adjacent to the Ash fields, support a large population of this BAP species.</td>
</tr>
<tr>
<td>Old degreasing plant</td>
<td>Disused building (has been recently worked upon during 2006).</td>
<td>Possibly Black Redstart</td>
</tr>
<tr>
<td>Old Tilbury-A site and buildings</td>
<td>Areas of hard-standing; seasonally wet areas; patches of scrub and vegetation.</td>
<td>Possibly Black Redstart</td>
</tr>
</tbody>
</table>

1 BAP: Biodiversity Action Plan species and habitats prioritised for Thurrock; Essex and/or the UK.
<table>
<thead>
<tr>
<th>Generalised area</th>
<th>Basic habitats</th>
<th>Examples of priority BAP(^1) species/ habitats;</th>
<th>Additional species and notes of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilbury-B site buildings</td>
<td>Working industrial site.</td>
<td>Possibly Black Redstart</td>
<td>- Peregrine Falcons breed and forage across the site. Black Redstarts have also been known to breed within the grounds. Barn Owls and possibly Bats in some areas.</td>
</tr>
<tr>
<td>Former SINC(^2) area along the Station approach road</td>
<td>Scrub; rank grassland; ditches; railway sidings; some concrete hard standings.</td>
<td>Hornet Robberfly</td>
<td>Barn Owl foraging area.</td>
</tr>
<tr>
<td>Coalfield drainage ditches</td>
<td>Possibly saline water.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coalfield extension field</td>
<td>Seasonally wet areas; gravel covered by Pulverised Fuel Ash (PFA); edged by railway sidings and patches of scrub.</td>
<td>Possibly Water Voles</td>
<td>Possible Ringed Plover habitat; also Barn Owl foraging area, possibly Badger foraging area.</td>
</tr>
<tr>
<td>Fenced off area North of TEEC grounds, south of old Lytag site</td>
<td>Rank grassland; scrub and ditches.</td>
<td>Possibly Water Voles</td>
<td>Possibly Hornet Robberfly</td>
</tr>
<tr>
<td>Wildflower meadow development</td>
<td>Cleared area of brambles and rank vegetation, to develop a strip of wildflower meadow. Some established and young trees also present.</td>
<td>Hornet Robberfly</td>
<td></td>
</tr>
</tbody>
</table>

\(^2\) SINC: Sites of Importance for Wildlife Conservation
Throughout the EIA process consideration will be given to the relevant planning policies for the surrounding area. For example, under the Thurrock Unitary Development Plan (2003), policy USP9 relating to Nature Conservation, Biodiversity and Wildlife states the following:

“All types of wildlife habitat, with particular emphasis on the designated international and national sites of nature conservation value, will be protected and enhanced wherever possible.

Support will be given to proposals that increase the net environmental capital and enhance the biological diversity of the Borough.

Where appropriate, new development will be planned and landscaped so as to be beneficial to wildlife. Land management practices relating to landscape features of major wildlife importance will be encouraged.”

There are also policies relating specifically to designated sites:

**NEN12 Internationally Important Sites**

“Proposals for development or land use which may affect a European Site, or a proposed European Site or a Ramsar site will be subject to the most rigorous examination. Development or land use change not directly connected with or necessary to the management of the site and which is likely to have significant effects on the site (either individually or in combination with other plans or projects) and which would affect the integrity of the site, will not be permitted unless the authority is satisfied that:

- There is no alternative solution; and
- There are imperative reasons of over-riding public interest for the development or land use change. Where the site concerned hosts a priority natural habitat type and/or a priority species, development or land change will not be permitted unless the authority is satisfied that it is necessary for reasons of human heath or public safety or for beneficial consequences of primary importance for conservation.”

**NEN13 Development Affecting Sites of Special Scientific Interest**

“Development will only be permitted within or around Sites of Special Scientific Interest where it can be shown that there would be no damage to nature conservation or other interests. In any case where all or part of an SSSI is de-notified, the Council will assess whether the site meets the criteria necessary to be designated as a County Wildlife Site and will afford it the appropriate level of continued protection.

Where development is permitted the Council will consider the use of conditions or planning obligations to ensure the protection and enhancement of the site’s nature conservation interest.”

**Regional Planning Guidance RPG9A** refers to the need, within Thames Gateway, to promote improvement to the quality of the environment. Consideration will also be given to the suggested core strategic objectives contained within the Thurrock Local Development Framework “Issues and Options” Consultation document. For the natural environment the following objectives have been put forward:

**SO12** Protect and enhance the natural and historic built environment including biodiversity, landscape character, conservation areas, heritage value and open space through positive improvement.

**SO13** Develop the Green Grid network of biodiversity sites, green infrastructure and open spaces linking existing and new communities, the urban areas to countryside and access to the river.

Thurrock Council has produced a draft Biodiversity Action Plan that identifies the key biodiversity priorities for the borough. One of the main aims of this is to encourage developers and planners to integrate biodiversity improvements into new development.

It is proposed that to confirm the baseline ecological setting on site a Phase 1 habitat survey is undertaken on land which may be affected directly or indirectly by the development proposals. This will allow for the identification and classification of the habitats present, and will provide the necessary information required to determine the species...
specific surveys which need to be undertaken. Information will also be obtained from local wildlife groups, RSPB and BTO where appropriate. The assessment will follow recognised best practice guidance such as the Institute of Ecology and Environmental Management's Guidelines for Ecological Impact Assessment.

It is proposed that a new purpose built energy and environment centre will be constructed as part of the new station development. The location of this will be determined in conjunction with the finalisation of the site layout. Mitigation and enhancement measures will be proposed where appropriate such that the ecological interest of the site can be at least maintained, if not improved.

The thermal discharge associated with the new 800MW units at Tilbury will need to be assessed in relation to the potential impacts on the surrounding environment. It should be noted that there has been a thermal discharge at this location for a long period of time and the impact of removing this effect if generation at the site ceases may also need to be assessed. Relevant water quality standards and objectives will be considered when evaluating any potential impacts on key ecological features. It is likely that this will include an assessment of the potential impacts on the Thames Estuary & Marshes SPA in terms of habitat and feeding grounds on which the protected species rely.

The marine ecology in the area includes the benthic and epibenthic habitats and species associated with the intertidal and subtidal areas. Previous surveys conducted prior to the extension of the jetty identified the dominant habitats in the intertidal areas to include *Fucus vesiculosus* (brown algae) on mid-eulittoral mixed substrata on the mid to lower shore. The dominant species identified on the lower shore were the polychaete worm *Hediste (Nereis) diversicolor* (ragworm) which was abundant, with the occasional small amphipod crustacean *Corophium volutator* present in the firmer sediments. Surveys of the subtidal ecology have shown that the habitat and community type was fairly uniform and the epifaunal sample analysis identified that the area has an abundant crustacean component of limited diversity.

The EIA will consider existing data sources and, where required, further surveys of the benthic and epibenthic habitats will be undertaken such that an assessment of the potential impacts can be made.

The Thames Estuary is believed to support approximately 121 species of fish including species of conservation interest such as smelt (*osmerus eperlanus*) the sea lamprey (*petromyzon marinus*) and salmon (*salmo salar*). Fish migration is also important in the estuary and a wide range of species are known to use the estuary as a spawning ground and nursery ground. Existing data sources will be interrogated to inform the environmental impact assessment, and further surveys will be undertaken where appropriate.

### 4.6. Noise

Both construction and operational noise impacts will be considered during the EIA. The methods presented in British Standard BS 4142 (1997), Method for rating industrial noise affecting mixed residential and industrial areas, will be used to assess the potential noise impacts during the operation of the new station. It is understood that an important factor when assessing noise impacts is the amount by which the new noise exceeds the background noise level. It is therefore recommended that baseline noise measurements are undertaken against which the noise predictions for the plant can be assessed. The methodology for such an assessment and the noise monitoring locations will be agreed with the Local Planning Authority. Construction noise, including traffic, vibration, and piling where appropriate, will also be assessed.

The relevant recommendations given in BS 5228, Noise Control on Construction and Open Sites will be adhered to for the assessment of noise during construction. Recommendations for any mitigation required will also be put forward where required such that any residual impacts are reduced to an acceptable level.

The guidance offered in Planning Policy Guidance Note 24 (PPG24) will also be taken into account during the assessment of potential noise impacts associated with the development.
4.7. Transport & Navigation
It is anticipated that the increase in road traffic associated with development of the new station will peak during the construction phase. During operation it is proposed that fuel deliveries will be received by sea going vessel. A feasibility study to investigate the suitability of transportation by road, rail or sea for all raw materials and by-products will be instigated.

An assessment of the current traffic flows in the vicinity of the development will be made to determine a baseline against which the potential impacts during construction and operation can be made. The approach will follow standard guidelines such as the ‘Guidelines for Traffic Impact Assessment’ (Institution of Highways and Transportation), and relevant policies within the Thurrock Council Local Transport Plan 2006-2011 will be referred to where appropriate. The approach for the assessment and the requirement for any mitigation measures due to the increase in traffic flow will be agreed with Thurrock Council highways department.

An assessment of the potential impact on navigation will be undertaken as part of the EIA. This will take into account the potential increase in vessel movements associated with the operation of the new station and consideration will also be given to any works required which may effect the navigable channels such as dredging activities or works associated with the jetty. The approach for the assessment will be developed following consultation with Port of London Authority.

4.8. Flood Risk
Thurrock is situated on the north bank of the River Thames to the east of the Dartford Tunnel and London Tidal Barrage. This stretch of the Thames is bordered by tidal flood plains. To protect the area against seasonal high tides and freak surge tides, a network of flood defences have been built along Thurrock’s coast, including a flood defence wall in front of the power station at Tilbury.

The flood defence wall runs along the north bank of the River Thames in front of the existing power station at Tilbury. The wall is constructed from concrete, with a concrete toe and rock revetment in places, and was reconstructed after the floods of 1953. It is maintained by the Environment Agency and is believed to offer a 1 in 500 to 1 in 1000 protection level. The whole of the site boundary for Tilbury Power Station is shown on the Environment Agency’s indicative floodplain map as being within the 1 in 200 year flood plain. However, the indicative flood plain maps do not take account of existing flood defences.

![Environment Agency Flood Map for Tilbury Power Station](image)

**KEY:**
- Flooding from rivers or sea without defences
- Flood defences
- Areas benefiting from flood defences

An assessment of the site will be undertaken to determine the potential risk of flooding. This will include a topographical survey of the site to aid determination of any mitigation measures which may be required. The Environmental Impact Assessment will take account of relevant local polices in addition to the requirements set out in Planning Policy Statement 25: Development and Flood Risk (which replaced PPG25 in Dec 2006).
4.9. Waste Materials
As discussed in section 2.4 a range of waste materials and by-products will be generated from the proposed power station. These include Pulverised Fuel Ash and high grade gypsum. It is anticipated that PFA from the supercritical boilers would be of high quality and that there would be a good potential to sell all of the PFA produced. The majority of PFA would therefore be removed from site in a dry form in dry dust tankers for transportation to customers. It is likely that any unsold PFA would be transported by road to landfill offsite, although options for disposal on or adjacent to the site will be evaluated.

It is believed that there will be a suitable market for the gypsum by-product from the FGD process as it can be used in the manufacture of plasterboard. This would be used as an alternative to mined or imported gypsum. It is proposed that gypsum is transported away from site via road in enclosed containers and any surplus materials will be disposed of in a licensed landfill.

4.10. Landscape and Visual Amenity
Tilbury Power Station is located in a largely industrial setting with a sewage works adjacent to the western site boundary and Tilbury Docks 1.3km to the west. Tilbury Town is situated to the north west of the site boundary. A landscape and visual impact assessment will be undertaken in order to assess the potential impacts of the proposed development on the surrounding landscape and visual amenity area. The proposed new units are anticipated to be approximately 110m high, with the associated stack in the region of 200m high.

The site is located within the Greater Thames Estuary Character Area 81 of the Character Map of England. The area has also been subject to a Landscape Character Assessment completed on behalf of Thurrock Council. The study defined a range of landscape character types and character areas. The site lies within the Character Area C5, Tilbury Marshes and the overall character is described thus:

"The Character area is located in the south east of Thurrock adjacent to the River Thames. To the north the area is bounded by the Chadwell Escarpment urban fringe LCA which rises abruptly from the level marshland landscape. A broad wedge of the character area penetrates the Urban Landscape between the settlements of Chadwell St Mary and Tilbury. In general Tilbury Marshes LCA consists of level, low lying, drained alluvial marshland under predominately arable farmland but with small concentrations of rough grazing land around Little Thurrock, Tilbury Fort and Goshems Farm. The closure pattern is defined by straight ditches and dykes creating predominantly rectilinear field shapes particularly in the west of the character area where the influence of the Chadwell Escarpment LCA is not as strong. Within the east fields are larger with irregular boundaries. In the south of the area adjacent to the River Thames there are two markedly different landmark buildings that visually articulate the long settlement period of this landscape and its changing function. The existing building at Tilbury Fort originated as a British Castle and was used as a defence throughout its history until the late 19th century. Tilbury Power Station is a 1400 megawatt coal fired power station. Its concrete chimneys are visible from many locations within Thurrock and Kent Thames – side. A tight network of pylons and power lines emerges north from the power station across Tilbury Marshes LCA."

The potential visual impact of the development will be determined through both desk and field based assessments. The extent of the survey area and location of viewpoints to be assessed will be agreed following consultation with the Local Planning Authority. Indicative photomontages will be produced from key viewpoints determined throughout the assessment to provide a representation of the anticipated impacts of the proposed development.

The relevant policies relating to landscape character and amenity within the Thurrock UDP and Local Development Framework will be considered during the assessment process. These include:

**USP7 Landscape Character and Amenity (UDP)**
The varied landscape character of the Borough will be conserved, and its amenity enhanced where appropriate, by ensuring that any new development:
- respects its landscape setting
- protects and maintains existing features and elements that contribute to the distinctiveness of the local landscape; and
- makes a positive contribution to the character of the local landscape area.

Development will not be permitted where the proposals would fail to meet these criteria or would have an adverse effect on the character of local landscape areas or local historical landscapes.

**SO12 (Suggested core strategy strategic objectives, Thurrock LDF)**
Protect and enhance the natural and historic built environment including biodiversity, landscape character, conservation areas, heritage value and open space through positive improvement.

The proposed development will be constructed on land to the west of the existing power station. There will be a period of time when both the old and new power stations are present on site. The existing station will shut down once the new supercritical plant becomes operational but the combined visual impact of the two stations will need to be considered despite the limited period of time for which this situation will occur. Figure 4.2 shows the currently operating station at Tilbury and Figure 4.3 shows an initial photomontage based on an indicative plant layout for the new generating units. The assessment will also consider the visual impact of construction and demolition activities in addition to the potential visual impact of the new station.

It is proposed that the methodology used for the landscape and visual assessment will follow the Guidelines for Landscape and Visual Impact Assessment (GLVIA) as published by the Landscape Institute and Institute for Environmental Management and Assessment, 2002.
Fig 4.2 Photograph showing the current Generating Station at Tilbury
Figure 4.3 Photomontage showing the proposed new units at Tilbury
4.11. Cultural Heritage

There is a strong industrial heritage in Essex, and in the Borough of Thurrock, particularly in the field of power generation. The Tilbury site has recently celebrated 50 years of power generation, while more recently Coryton Power Station was constructed and commissioned in 2001/2. There has also previously been a power station situated at West Thurrock, which was decommissioned in 1993.

Within the borough of Thurrock there are approximately 240 Listed Buildings and 15 Scheduled Ancient Monuments. There are also 7 Conservation Areas which are under on-going review. Two known sites of archaeological importance in the vicinity of the proposed development include Tilbury Fort and Coalhouse Fort.

Tilbury Fort, located to the west of the proposed development, was built to protect the approach up the Thames to London from enemy ships. Replacing an earlier Tudor fort, it is one of the largest and best preserved examples of seventeenth century military engineering in England.

Coalhouse Fort is a Victorian coastal defence fort set in parkland next to the river Thames at East Tilbury. The fort was completed in 1874, on the site of previous gun batteries, and has kept much of its original architectural form. It is considered to be one of the finest examples of an armoured casemated fort in the United Kingdom.

A desk based assessment will be undertaken to evaluate the potential for archaeological and cultural heritage features within the area of the proposed development. The methodology for such an assessment will be defined following consultation with English Heritage and the relevant officer at the Local Planning Authority.

4.12. Ground Conditions

The whole of the development site is overlain with artificial and made ground from the development of the old Tilbury A power station and the existing Tilbury B station. The made ground comprises mainly ash and is believed to be in the order of 1-3m thick. Beneath the made ground is Quaternary alluvium or tidal river/creek deposits laid down by the river Thames. These deposits comprise estuarine silts and clays with layers of peat and are in the order of 10-15 meters thick. The alluvium deposits overlay sand and gravel of early river terrace deposits of the Thames, some 3-7m thickness. The chalk bedrock is typically 20-22m below ground and is in the order of 100m thick.

The chalk is classed as a major aquifer which is used for a regional potable water supply. However, the upper chalk is subject to saline intrusion in this area and therefore the groundwater directly beneath the site is probably non-potable.

There are some areas of surface water within the site boundary, principally surface drains and a small lake which has been developed as a wildlife site which is located to the east of the existing gatehouse. The nearest watercourse is the River Thames, located approximately 0.1km south of the site and is likely to be in hydraulic continuity with the underlying aquifer.

Prior to the construction of the Tilbury ‘A’ power station the site was marshland. The current station had a licence to dispose of pulverised fuel ash, oil, ash sludge and inert waste. Waste licensing records also indicate that the station had a licence to dispose of inert (construction) wastes on the site.

In terms of historic contaminative uses, the only significant land use is the Anglian Water sewage treatment works to the immediate west of the site boundary. This has been in existence since at least 1916. No other contaminative uses have been identified within 250m of the site boundary.

An assessment will be undertaken to determine the potential for any existing land contamination and to identify the need for any remediation requirements. The EIA will take account of the policies and recommendations set out in Planning Policy Statement 23 (Planning and Pollution Control). The potential for the release or mobilisation of
contaminants during the demolition of the existing station will also be considered during the assessment process.

4.13. Socio-economic Effects

Thurrock has a diverse and thriving economy with logistics and distribution and retailing as major employment sectors. A major port and employment development is proposed at the former Shell Haven refinery site. The emerging Regional Planning Guidance for the East of England (RSS14) and South Essex Thames Gateway Partnership framework reinforces current trends by promoting Thurrock as a world leading logistics centre. The East of England Plan makes many proposals to contribute to the quality of life and work in the region including housing, economic development, the environment, infrastructure and transport.

The suggested core strategy objectives for employment (economy and jobs) set out within the issues and options consultation document for the Thurrock LDF are as follows:

**SO2:** Increase prosperity and employment growth in Thurrock whilst ensuring a sustainable balance between housing and jobs growth across the borough by integration and phasing with transport and community infrastructure provision.

**SO3:** Support indigenous business, attract inward investment and diversify the economy to provide improved skills and jobs for local people by providing for land and sites of appropriate type and location.

The population of Thurrock has grown rapidly since 1991 at more than twice the regional and national rate. The 2005 mid year population estimate was 146,600, with 92,300 of working age. Based on the working age population 80.4% were economically active at this time and the unemployment rate for Thurrock was 4.1%.

Tilbury power station currently employs approximately 260 staff and up to 100 contractors. An additional 1000 contractors join the workforce during major maintenance outages. These jobs will be lost if the development of the new generating units does not go ahead. The managers, professional engineers and technicians who work at the station are highly skilled and the average salaries of the workforce are above the national average. The proposed phasing of the new station being constructed prior to the demolition of the existing station will provide the opportunity for the skills base required for the running of the station to be maintained. There will be a considerable number of jobs created during the construction phase of the new units and during the demolition of the existing station. Indirect benefits will also be realised as a result of the proposed development due to increased expenditure with local businesses and services. The overall impact of the construction and operation of the new power station on socio-economic status of the region will be assessed as part of the Environmental Impact Assessment for the proposed development.

4.14. Cumulative Impacts

The potential for cumulative impacts will be assessed during the EIA process and consideration will be given to existing or reasonably foreseeable future developments. The combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor will also be considered where appropriate. The developments or activities to be considered will be agreed by extensive and ongoing consultation with statutory and non-statutory consultees throughout the assessment.

4.15. Health, Safety and Security

RWE npower strongly believes that the protection of the public, employees, business partners and customers from ill health or injury are fundamental to its business philosophy.

RWE npower takes such responsibilities very seriously and is committed to providing a safe, secure and healthy working environment for everyone involved in its business. The workplace will be used to promote a high standard of overall health and well-being for all those employed.
The design, procurement, construction, commissioning and operation of the new power station will include processes and modern best practices that will ensure the statutory responsibilities of the company for the health and safety of all its employees and others affected by its activities are maintained. Plant and equipment will be kept in a condition which is safe and without risk to health and be examined and tested in accordance with statutory requirements.

The EIA will take into account aspects of the Construction (Design and Management) Regulations where appropriate.

5. Summary
The production of this Scoping Report is an early stage in the environmental impact assessment process and is designed to ensure that the environmental studies undertaken provide all the relevant information required for the assessment. It has been determined that the EIA for the proposed new units will include assessment of the following topic areas: air quality, the aquatic environment, terrestrial ecology, ground conditions & flood risk, noise, transport and navigation, cultural heritage, landscape and visual impacts, and socio-economic impacts.

It is proposed that a wide ranging consultation programme will be undertaken to inform regulators, local communities and other stakeholders of the proposed development. The feedback and comments received will be considered during the EIA for the proposed new units where appropriate.
6. References

Draft East of England Plan: Draft revision to the Regional Spatial Strategy (RSS) for the East of England Regional Assembly, December 2004

Guidance on Background Information to Accompany Section 14(1) of the Energy Act 1976 and Applications under Section 36 of the Electricity Act 1989 (Dti, December 2006)


Thurrock Local Development Framework: Local Development Scheme, August 2006

Thurrock Unitary Development Plan, Thurrock Council, 2003