TORNESS STATION PROCEDURE

EMERGENCY PLANNING SERIES

RADIATION (EMERGENCY PREPAREDNESS AND PUBLIC INFORMATION) REGULATIONS

Hazard Identification and Risk Evaluation (HIRE) Report for Torness Power Station

Procedural Compliance
QA Grade 2 Reference Use

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PREFACE

The nuclear industry in the UK has a long history of safe operation. The safety standards used in the design, construction, operation and maintenance of nuclear installations reduce to a very low level the risk of accidents, which could have a consequence for the general public. Nonetheless, prudence requires the preparation of plans for dealing with such events. The Nuclear Installations Act, which is used to control the activities on civil nuclear installations in the UK, requires under the license granted that adequate emergency arrangements are in place.

The UK, as a member state of the EU, introduces legislation to implement Council Directives. To implement the articles on intervention in case of radiation emergency in Council Directive 96/29/Euratom on the basic Safety Standards Directive for the protection of the health of workers and the general public against the dangers arising from ionising radiation (the BSS96 Directive) the Radiation (Emergency Preparedness and Public Information) and Ionising Radiation Regulations 1999 have been made under the HSWA 1974 (except REPPIR Regulation 17 which is made under the European Communities Act 1972).

Emergency Preparedness for accidents that may affect members of the public involves many external oragnisations, such as the local authorities and emergency services. The REPPIR have been developed alongside two other pieces of legislation, the Control of Major Hazards Regulations and the Pipeline Safety Regulation It is considered beneficial to responding organisations if legislative requirements for emergency preparedness, which affect them, are similar for different industries. Also some operators are active in more than one of these major hazard sectors.

The introduction of the Radiation Emergency Preparedness and Public Information Regulations [REPPIR] does not replace the requirements of the Nuclear Installations Act, but consolidates and enhances the approaches already taken to emergency planning for accidents at Torness.

The principle hazard to the public from most accidents at nuclear power stations will be the release of materials that emit ionising radiation. The risk to people and the health effects from exposure to ionising radiation have been the subject of intensive study and research for many decades. The results of this work have been used by the International Commission on Radiological Protection [ICRP] to make recommendations on the principles to be adopted for protection against ionising radiation and a system of dose limitation, both for people exposed to radiation at work and for members of the public in the event of accidents.

Everyone is exposed continuously to natural sources of radiation. Many people receive additional low doses of radiation from artificial sources such as medical X-rays. The principle harmful effect of small doses of radiation is to increase the possibility in cancer in later years, but very high doses can lead to other serious illnesses in the short term. Although a direct relationship between radiation dose and harmful effects has been observed only in people exposed to relatively high doses of radiation, for the purposes of radiological protection it is assumed that any dose of radiation, however small, carries with it some risk to health. In making its recommendation on annual limits of radiation dose to workers and members of the public the ICRP has used this cautious assumption.

The Health Protection Agency – Centre for Radiation, Chemical and Environmental Hazards [HPA-CRCE] (formerly HPA-RPD), an independent statutory body within the UK, has specified Emergency Reference Levels [ERL] using the ICRP recommendations on intervention. ERLs are levels of radiation dose to the public which would justify introducing a given countermeasure to stop people receiving such a radiation dose. The application of the various countermeasures – evacuation, sheltering and the issue of stable iodine tablets and the control of foodstuffs and water supplies – are based on these ERLs. The HPA-CRCE has balanced the risk from the potential radiation exposures and those that may be associated with the implementation of any of these countermeasures.

In the event of an emergency provision is required under current legislation for the following five aspects to be included in the emergency response:-

a) The control of the accident at the site

b) The assessment of the actual and potential accident consequences and alerting the relevant authorities and the public

c) Introduction of countermeasures to mitigate the consequences as regards [i] individuals who could be affected in the short term and [ii] longer-term effects such as the contamination of food supplies, land and adjoining waters

d) Information to the public affected or likely to be affected by the event

e) The return to normal conditions

The Emergency Plan in place for Torness is currently approved as adequate to deal with the items above. The Emergency Plan is based on fault study analysis and is drawn up against the foreseeable accidents for the site. The most likely scenario at a nuclear plant would be expected to develop slowly or gradually from some initiating fault. The first concern is always to avoid any exposure to the public to radiation and therefore to rectify the fault before there is any danger to the public outside the site. Nevertheless, as soon as the fault occurs, the question of emergency action has to be considered and pre-determined actions, which might eventually lead to notification of off site agencies and the public, would begin. Emergency actions to protect the public may therefore be initiated in circumstances where the accident does not develop to a stage that has significant off site consequences.

Currently the emergency actions are based on (a) foreseeable accidental releases and (b) the principle of extendibility for release beyond the design basis accidents.

a) The foreseeable accidental releases helps defined a zone closely surrounding the installation, the Detailed Emergency Planning Zone [DEPZ], within which arrangements to protect the public by introducing countermeasures are planned in detail.

b) Emergency Plans need to be capable of responding to accidents which, although extremely unlikely, could have consequences beyond the boundaries of the DEPZ- extendibility. The measures that are required to extend the detailed arrangements can not be precisely planned because the nature and potential of accidents can vary, for example according to weather conditions, and the exact response would be based on an assessment made at the time. The response may make use of local and national plans prepared to deal with a wide range of emergencies.

In an emergency those who normally provide services/carry out protective functions for the public will continue to do so, but in a co-ordinated manner which has been carefully planned and rehearsed. A considerable number of different authorities will be engaged, each applying its expertise to the situation as it develops. This off site emergency response depends on:

a) Co-ordination, both locally and nationally, between centres which will be dealing with public protection and information and those dealing with the incident on the site and

b) In particular both a local and national facility for co-ordinating information and for making public the best assessments that be made.

The national response for dealing with a nuclear accident follows the key principles applied by Government in responding to any civil emergency. Firstly, the initial response should be at a local level where control of an accident and its most immediate effects can be dealt with effectively. Secondly, there should be a single lead department to ordinate the Government's response at the national level. For nuclear emergency planning the lead department is the Department of Energy and Climate Change (DECC) with the Scottish Government carrying out this function in response to nuclear sites located within Scotland.

Over the lifetime of Torness the Emergency Plan has been rehearsed and tested during numerous emergency exercises, both on site and off site, to the satisfaction of the Nuclear Installations Inspectorate, the industry regulators. The Emergency Plan is regularly reviewed in consultation with the emergency services at Emergency Planning Consultative Committees (EPCC).

1 INTRODUCTION

This document is the report to the Health and Safety Executive (HSE) of the hazard identification and risk evaluation for the Torness licensed site as required under regulation 6(4) of The Radiation (Emergency Preparedness and Public Information) Regulations 2001.

Section 2 gives the location and brief description of the site. Section 3 lists the major radionuclide hazards on site and Section 4 the safety controls designed to ensure that they are no major releases of radioactivity from the site. The sequences that could lead to a release of radioactivity from site are described in Section 5 and the implications of such releases in Section 6. Section 7 gives a summary and presents some conclusions.

This is the third HIRE review that has taken place for Torness. Since the last review in April 2008 there have been no material changes in the work with ionising radiation. Therefore, it is considered that the original hazard identification and risk evaluation are still valid and no amendments to the Emergency Arrangements are required under Regulation 5 of REPPIR.

2 LOCATION AND ENVIRONMENT

Name and Address of Operator:
British Energy Generation Ltd
Barnwood
Barnett Way
Gloucester GL34 3RS

Site Names and Address:
Torness Power Station
East Lothian, Scotland
EH42 1QS

Torness is a Nuclear Licensed site located on the east coast of Scotland 7Km (4 miles) south east of Dunbar. Its NGR location is NT745E NT752N. The Nuclear Licensed Site occupies 74.4 hectares (183.7acres) Torness is one of the second generation of nuclear power stations built in the UK and has two AGR reactors. The site's activity is electricity generation for export to the National Grid.

The operation of the site is subject to regular safety inspection and approvals by the HSE's Nuclear Installations Inspectorate (NII). Sources of radioactivity stored on site are controlled via the IRR 1999 or the NI Act. Radioactive wastes are either discharged to the environment in a controlled and regulated manner or disposed as solid waste to authorised repositories. Aquatic discharges are via effluent treatment process that minimises the radioactivity levels including the discharge line. Gaseous releases do occur from AGR reactors in normal operation due to, for example, small discharges from the pressure circuit, or from operationally necessary releases of coolant. The permitted discharges and waste disposals are managed in accordance RSA93, and are governed by Authorisations issued by SEPA.

The site has been operational since 1989.

The power station is situated in an area predominantly occupied by agriculture land. Within a 1Km radius of the site there is caravan park of Thorntonloch to the south.

The local population within the 3 Km DEPZ is approximately 400.

The prevailing wind direction is from the south west.

The Local Authority is East Lothian Council.

3 RADIOACTIVE SUBSTANCES ON SITE

The greater part of the radioactive substances present on site is contained in the irradiated nuclear fuel. In its unirradiated state (i.e. as brought onto site) the fuel contains very little radioactivity. However, exposure to the nuclear chain reaction and the radioactive decay of the products of that chain reaction causes the fuel to become highly radioactive. The radioactivity of fuel increases with irradiation in the reactor but decays when removed from the reactor. Fully loaded the reactors contain x tonnes of fuel per reactor (2 reactors on site).

There is other radioactive material on site although the quantities are very much less than is present in the reactor fuel. Potentially important inventories include coolant gases and liquids and radioactive waste.
In addition to these sources, radioactivity will also be present by activation of structural materials. Structures that contain sufficient radioactivity to exceed the levels specified in Schedule 2 of the Regulations include:

- i) graphite moderator
- ii) internal reactor structures
- iii) reactor concrete pressure vessel and liner

However, the activity is fixed in the structures and would be unlikely to contribute significantly to any release to the environment, even in the case of a severe accident.

4 SAFETY CONTROLS

The design of the plant is based upon the fundamental requirement of safety, to do all that is reasonably practicable to minimise radiological exposure, risk of plant failure and the initiation of abnormal operational events. Any nuclear plant licensed and commissioned in the UK must be supported by a safety case. This demonstrates that the plant is safe in normal operation, that the design is robust enough to ensure that any departures from normal operation do not immediately lead to accidents and that adequate provisions are made to intercept, recognise and mitigate the consequences of an event that may develop into accidents.

Protective systems are installed which detect and deal with deviations from the operating norm, thus preventing the deviations escalating to major accidents. These systems are carefully designed to operate under fault conditions and by incorporating **redundancy**[1]**, diversity**[2] and **segregation**[3] segregation there is minimal dependencies between safety functions. Further mitigation action can be applied by operators to minimise the consequences of any deviation. Hence there is a philosophy of having defence in depth in all nuclear plant by preventing accidents, so far as is reasonably practicable, to ensure the safety of all people in and around the plant.

The primary safety design principle for reactors is to contain the radioactive material and provided adequate radiation shielding. This can include using radioactive materials in a form that intrinsically retains radioactivity in the operating range of temperatures and environments. Providing extra containment barriers to restrict the release of any radioactivity that does escape from its normal state. These barriers can be passive or dynamic, e.g. pressure vessels or containment buildings, filtered ventilation systems, decontamination processes, facilities designed to allow work with radioactive material without it contaminating the normal working areas or the wider environment. Barriers of suitably dense material are used when radiation shields are required. The maintainability and fault tolerance of these safeguards is included in the design process.

[1]Redundancy - In this context redundancy means there must be more than one system capable of doing the job so that if one fails or is under maintenance the job is still done.

[2]Diversity - In this context diversity requires that the different systems are designed in different ways or work on different principles so that if there is a design or build fault on one system it does not affect the effectiveness of the others. The job would still be done.

[3] Segregation - Systems must be segregated by either distance or engineered structures in such a way as to greatly reduce the likelihood that they could all be damaged by the same external event.

4.1 Engineering Controls

The fuel is designed to contain the vast majority of the fission products produced by the nuclear chain reaction. Should a fuel element fail, activity would be released into the pressurised reactor coolant circuit, which would be expected to retain almost all of the activity. Particulate and chemically activated carbon filters are used in an appropriate manner to minimise or remove radioactive released into the coolant circuit.

All safety equipment is carefully designed, built to a quality plan, thoroughly tested and examined during commissioning, operated under carefully considered operational rules, maintained during operation according to a maintenance schedule and operated within specification by trained staff. The safety justifications for the equipment and its operation are prepared by suitably qualified and experienced personnel and subjected to careful review both internally and external to the Company. A Nuclear Safety Committee containing external experts as well as Company representatives considers all new safety equipment or changes in the operating rules. This committee expects proposed modifications or developments submitted, to have been subjected to rigorous independent nuclear safety assessment.

4.2 Systematic Analysis

A systematic review process identifies the factors that could potentially lead to a major release of radioactivity. This process provides a comprehensive schedule of internal and external initiating events; the probabilities and consequences of each are considered. The process can identify areas of the plant, or operational actions, where improvements could be made to enhance safety, such as, reducing the likelihood of an initiating event, detecting onset of failures, preventing situations developing or mitigating the consequences.

Substantial efforts are devoted to underwriting the integrity of the reactor pressure vessel, for example, by doing all that is reasonably practicable to avoid the initiating event occurring, or minimise its likelihood to demonstrate that its failure is not credible. Also, procedures are invoked to minimise the likelihood of damage being caused by other activities, such as constraints on lifting heavy loads over an operating reactor.

Having done all that is reasonably practicable to prevent the initiating event from occurring there may still be some identified events with the potential to develop and result in a release of radioactivity. In these cases it will be necessary to provide further protection to enhance safety. The safety philosophy requires that the protection provided to be commensurate with the risks involved. Thus for potentially serious events there must be both redundancy and diversity in the methods used to identify the initiation of the fault and to bring the system back into a safe condition. These safety systems must also be segregated so that the likelihood of them all being damaged at the same time is reduced.

4.3 Detection and Mitigation

Faults are detected by the continuous monitoring of such parameters as the temperature and pressure at various points in the reactor and supporting equipment, the reactor power, radiation levels, flow rates and electrical circuits. If these parameters diverge beyond their accepted range then either an alarm will be shown on the operator's desk requiring attention or the system will automatically trigger devices to shutdown or "trip", the reactor.

Diversity and redundancy in fault detection are provided by at least two independent systems designed to detect the onset on any fault that would initiate the shutdown systems. Having independent systems that can each rapidly shutdown the nuclear chain reaction provides diversity and redundancy for the function of shutting down the reactor.

Following a reactor trip heat continues to be generated, primarily from the decay of radioactive nuclides, it is important that fuel temperatures are sustained within safe operating limits. This heat is removed from the reactor core by the passage of primary coolant (carbon dioxide), just as when the reactor is at power. The coolant can be driven by the circulators operating on either main or standby motors, or by natural circulation.

In normal operation the water in the secondary coolant system heat exchangers, or "boilers", is turned to steam, which drives the turbines to generate electricity. The need to remove heat from the primary -reactor cooling- circuit must be maintained during shut down. By design, sufficient heat can be removed by the operation of a least one of the heat exchangers, or "boilers", of the secondary coolant system. There are two systems for supplying water to a heat exchanger, a main water feed/supply system and a backup/emergency feed system.

4.4 Management System

All designs for and modifications of, nuclear plant are subjected to detailed safety reviews of the engineered systems and the operating/maintenance procedures. When relevant this extends to reviewing changes to organisational structures and resources. Independent expertise is used to check major changes with the whole process of achieving safety are scrutinised by the Nuclear Safety Committee.

The site licence requires that the responsibilities of each member of the station management team are defined within a quality assurance programme for matters that affect nuclear safety. The structure of the management team and the responsibilities of its members are summarised below.

The Station Director is responsible for the safe operation of Torness. This includes an overall responsibility for ensuring that adequate numbers are staff are present on site to operate the reactors and ancillary plant in a safe manner, carry out the initial response to an emergency and that these staff are suitably qualified and experienced. The station is organised into nine departments, Operations, Maintenance, Technical and Safety, Work Management, Supply Chain, Training, Finance, System Health and Human Resources Of these departments, Work Management, Maintenance, Supply Chain and Operations report directly to the Plant Manager who has the responsibility for their day to day operation. The Plant manager is directly accountable to the Station Director. Training, Finance, Human Resources, System Health and Technical and Safety report directly to the Station Director.

The Operations Manager is responsible to the Plant Manager for the safe operation and maintenance of the 2 reactors and all associated plant, including the un-irradiated fuel store and the fuel discharge route. Thus, the greater part of the responsibility for controlling radioactive substances rests with the Operations Manager. The Operations Manager is supported in this respect by the Technical and Safety Manager, who is directly responsible to the Station Director for providing nuclear safety assessments, environmental monitoring and advice on radiation protection, quality assurance programme and industrial safety. The Maintenance Manager is directly responsible to the Plant Manager for ensuring that adequate maintenance and repairs are carried out on plant and equipment.

Additional services for Torness are provided by the Central Technical Organisation (CTO) including Asset Management, Central Engineering Support, Design Authority, Lifetime and Fleet Programmes, Projects and Supply Chain, Finance and Human Resources support services are provided. Technical and Safety provide Environmental Regulation and Oversight, Nuclear Fuel and Liabilities and Nuclear Inspection and Oversight (NIO).

4.5 Staffing

Each department has a team of personnel, all of whom are suitably qualified and experienced for the work which they are expected to perform. The minimum required manning levels are fully documented in the departmental instructions.

A continuous shift system is operated at Torness which ensures that there are adequate staff resources available at all times to operate the site safely and to deal with any emergency situation which might arise. The level of staffing has been underwritten by a human factors assessment which was undertaken as part of the probabilistic safety assessment.

4.6 Procedures

It is a requirement of the Nuclear Site Licence that adequate quality assurance arrangements are made and implemented for all matters that may affect safety. These arrangements are specified in the top tier of a multi-tiered system, and define the requirements for procedures and instructions across the site. The lower levels are described below.

The top tier requirements for procedures and instructions are further developed on a departmental or system basis. Each system or department leader is responsible for the preparation and issue of sufficient instructions to enable work carried out to maintain safety, is adequately controlled.

Conditions for the safe operation of the plant are provided by the Technical Specifications (LC 23). The work needed to maintain the plant in a safe and reliable condition is specified in the Maintenance Schedules.

4.7 Regulatory Control

The Nuclear Industry is regulated by the NII which has at least one inspector assigned for each licensed site. These inspectors have the right to inspect any equipment or procedure at short notice and the right to require the Company to provide information. The NII can direct the shutdown of any process that it considers unsafe.

The NII require that the safety of plant and operations is considered in a systematic manner at all stages from planning, building, operating and decommissioning and that the safety case is subject to both continuous review and formal periodic review.

Any significant changes in procedures, plant or management structure has to be approved by the NII before the event, in accordance with nuclear site licence arrangements.

4.8 Emergency Organisation

Torness has on-site emergency arrangements that ensure that suitably qualified and experienced people are available at all times to respond to any events that cause the reactors or other equipment to deviate from their normal operating conditions. The provision of emergency arrangements can further mitigate the probability of a major release of radioactivity to the environment. Should a release of radioactivity occur,
the off site emergency arrangements are focus on implementing countermeasures to prevent the exposure of the public to radiation.

The local Fire and Ambulance services form part of an integrated response to a site emergency. Mitigation actions carried out by the fire service would include fire fighting, performing minor repairs search and rescue and support to teams carrying out tasks. These tasks may be carried out with or without wearing Breathing Apparatus depending on the risks involved. In providing assistance it is expected that emergency exposures may be required for Fire service intervention staff because of the proximity or duration of tasks to sources of radiation. Due to the nature of their role, it is not expected that emergency exposures would be required for Police personnel.

The emergency plans, both on-site and off-site, for {station} are approved by the NII and exercised regularly. Consultation and development of best practice in emergency planning for nuclear sites is discussed at meetings involving key stakeholders, such as, the Department of Energy and Climate Change (DECC) led Nuclear Emergency Planning Liaison Group (NEPLG) providing national guidance and co-ordination, Nuclear Emergency Arrangements Forum (NEAF) chaired by the NII for operators to share practices and locally the Emergency Planning Consultative Committee.

5 POTENTIAL HAZARD SEQUENCES

The majority of potential faults identified by analysis will not result in any release of radioactivity, by virtue of the prevention and protection provisions described above. For a significant release of radioactivity from a nuclear reactor to be possible it is necessary that there are failures in each of the barriers between the hazardous radioactive materials present inside the nuclear fuel and the outside environment. These barriers include the fuel itself, the cladding material that surrounds the fuel and the coolant circuit boundary. Given that all of these barriers are breached, then some radioactive materials released from the fuel could be transported out of the reactor and then dispersed into the atmosphere.

Currently, the extent of emergency plans for AGR reactors is based on foreseeable accidental releases. This defined the maximum credible accidental release against which it was considered reasonable to prepare detailed emergency plans. For emergency planning purposes the foreseeable accidental releases assumes that during a fault some fuel fails and a release pathway occurs allowing radiation to escape uncontrolled into the environment. This, despite the reactor systems design to shut the reactor down under fault conditions; maintain sufficient cooling to prevent any damage of fuel and retain releases of radioactivity into the enclosed reactor system.

Systematic analysis has identified that various internal and external initiating events could result in a radiation accident leading to releases of radioactivity and potential radiation emergencies. These initiating events include failed fuel, failure in containment, fires and fuel movement operations.

The safety case demonstrates that all reasonable steps are taken to reduce the likelihood of these faults and to reduce the consequences should they be initiated.

There is a potential for unplanned criticality of the reactor to occur during refuelling, due either to the withdrawal of neutron absorber or the insertion of excess reactivity. Loading of fuel is carried out in compliance with written operating instructions that incorporate criticality controls designed to prevent such inadvertent criticality. Notwithstanding the existence of these administrative controls, automatic protection against such an event is provided. During all refuelling operations, designated control rods are withdrawn from the core and connected to the main guardline. These would be tripped into the core if criticality were to occur, and terminate the event.

The movement and storage of unirradiated fuel is controlled by criticality safety assessments and operational controls which give a high level of protection against an unintended nuclear chain reaction outside of the reactor.

The potential also exists for reactivity faults during power raising. As above, the protection systems are designed to detect such faults, and to provide a safe shutdown of the reactor.

6 IMPLICATIONS

It is recognised that despite the careful and systematic manner in which nuclear operations are conducted and the multiple layers of protection, there remains the remote possibility of an accidental release from Torness which may result in a member of the public receiving a radiation dose in excess of Schedule 1 of the Regulations.

The extent of the area affected by any nuclear accident depends on the nature of the accident and the weather conditions at the time. The nature of the accident determines the amount of radioactive material, the isotopic composition and physical form of the release. The weather conditions determine which direction the activity moves and how rapidly it sis dispersed.

Probabilistic methods have been used to determine the most likely release scenarios that would impact the public and justify the need for off site emergency arrangements. Table 1 shows predictions of the distances out to which urgent countermeasures may be appropriate to protect the public in the event of a reasonably foreseeable release from Torness. These distances are based on the Emergency Reference Levels (ERLs) produced by the HP-CRCE. The weather conditions assumed for these calculations were Pasquil category D and wind speed 5m.s-1. Category D corresponds to a period with little sun and significant cloud cover. It occurs about 50% of the time in inland UK. 5m.s-1 is the average wind speed under these conditions.

Countermeasure	Dose Limits Lower ERL	Dose Limits Upper ERL	Distance downwind that lower ERL limit may be exceeded
Shelter (CED)	3mSv	30mSv	<800m
Shelter (Organ)	30mSv	300mSv	<1000 m
Evacuation (CED)	30mSv	300mSv	<200 m
Evacuation (Organ)	300mSv	3000mSv	<200m
Stable Iodine	30mSv	300mSv	<1000m

Table 1: Downwind Distance for which countermeasures may be justified

Accidental releases from the site could occur over periods varying from a few seconds to several days depending on the circumstances and the level of damage. Most faults leading to significant off-site release would be expected to continue for a matter of hours.

In the unlikely event of a release of radioactive material from Torness the dose to the general public could be reduced by the appropriate imposition of countermeasures. These may include: Sheltering, staying indoors, with doors and windows closed and ventilation systems turned off, provides protection from external radiation from airborne and deposited material; the issue of potassium iodate, which reduces the uptake of radioiodine by the thyroid gland, instructions to shelter, which reduces the inhalation dose and cloud doses; evacuation, which removes the people from the area to prevent exposure. Controls may be also applied to locally produced food under instructions from the Food Standards Agency. Since food production techniques can concentrate some radioisotopes it is likely that food bans will be implemented over a wider area than evacuation or shelter instructions.

In light of the potential hazards there is a Detailed Emergency Planning Zone (DEPZ) around Torness extending 3km. The DEPZ was originally identified as 1km from design of the station; however from commissioning of the reactor plant the DEPZ has always been 3km. It is not considered reasonable foreseeable that persons beyond this zone would be exposed to a dose high enough to require urgent countermeasures to be justified applied or 5mSv in the 12 month period following a release of radioactivity from Torness. Restrictions on the sale of food may be applied over a larger area than the DEPZ.

The timely imposition of countermeasures would require the existence of an off-site emergency plan. It is therefore considered that there would be merit in maintaining such a plan.

7 SUMMARY

This Assessment report demonstrates that the systems on site are carefully designed, built and operated in a manner that should ensure safe operation making a major release of radioactivity from the Torness very unlikely. Internal and external review process of safety take place and ultimately, the NII as regulator, has legal powers to demand improvements and to shutdown unsafe operations.

Even so it is considered prudent to have adequate emergency plans to protect the general public from the potential harm that could be caused in the event of a reasonable foreseeable release of activity.

The assessment of accidents predicts that unprotected, members of the public out to a range of about 800m could be exposed to doses of 5mSv in the 12 month from reference releases. Implementing shelter and potassium iodate tablets as prompt countermeasures could be justified to reduce the dose uptake by the general public in this area. Food restrictions initiated by the Food Standards Agency may be justified over a wider area. Whilst evacuation is unlikely to be justified beyond the site fence for a reasonably foreseeable radiation emergency it is considered prudent that facilities are available to provide welfare to personnel temporarily excluded or restricted from the area affected and for the provision of a reassurance monitoring service for people within the affected area.

It is recommended that detailed off-site emergency plans be maintained:-

1) To ensure the timely and orderly administration of the countermeasures above within the DEPZ

2) Outline emergency plans are maintained to monitor and implement appropriate countermeasure beyond the DEPZ to 15km as indicated in HSE Report "Outline Emergency Planning for License Nuclear Power Stations"

Figure 1: Map of DEPZ for Torness Power Station