

# **NRTE Vulcan**

## **Off-Site Emergency Plan**



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## INTRODUCTION

The plan outlines the roles and responsibilities of the emergency services and other agencies, and summarises their expected response to an incident at the Vulcan Naval Reactor Test Establishment.

This plan is intended as an initial response document only. Once an incident has developed, each agency would then refer to their own generic plan to ensure that their own area of responsibility is fulfilled.

This plan has been prepared with regard to and in compliance with the Radiation (Emergency Preparedness and Public Information) Regulations 2001 (REPPiR) by Highland Council Emergency Planning in collaboration with Rolls Royce and the Royal Navy.

The following Organisations and Agencies were consulted as part of the plan compilation and production process.

DSRL Dounreay  
Food Standards Agency  
Health Protection Agency  
Scottish Fire and Rescue Service  
Maritime and Coastguard Agency  
NHS Highland  
Police Scotland  
NRTE Vulcan  
Office for Nuclear Regulation  
Orkney Islands Council  
Scottish Ambulance Service  
Scottish Environment Protection Agency  
Scottish Government  
Scottish Water

## **SECTION 1: AIM AND OBJECTIVES**

### **1.1 AIM**

The aim of this plan is to set out the initial arrangements for dealing efficiently with an incident involving the nuclear reactor or the handling of nuclear fuel at Vulcan NRTE.

### **1.2 OBJECTIVES**

The principle objectives of the plan are:

- To clarify the roles of the participating agencies through defined responsibilities.
- To ensure procedures are in place and remain relevant and appropriate and, therefore, meet both the relevant regulations and responding agencies requirements in order to achieve the aim of this plan.

## SECTION 2: HAZARD IDENTIFICATION AND RISK EVALUATION (HIRE) REPORT

### 2.1 HAZARD IDENTIFICATION AND RISK EVALUATION (HIRE) REPORT

#### 2.1.1 Introduction

The Radiation (Emergency Preparedness and Public Information) Regulations 2001 require a Hazard Identification and Risk Evaluation (HIRE) to be undertaken for any premises containing more than the quantity of radioactive material specified in the Regulations. This document is the Report of Assessment of the HIRE of the Vulcan Naval Reactor Test Establishment (Vulcan NRTE). The Report of Assessment, together with such supporting information as deemed necessary, is provided in order to assess the risk to the health or safety of persons who could be affected by the work with ionising radiation undertaken at Vulcan NRTE.

NOTE: Some sections of this report of assessment necessarily contain information in an abbreviated form and with limited technical detail. This has been done in the interests of national defence and public security and with the agreement of the Health and Safety Executive (HSE) who have exercised their powers under Regulation 16 (6) of REPPiR. The HSE have access to fuller and more detailed classified information to satisfy themselves on the acceptability of this assessment.

#### 2.1.2 Location and Environment

2.1.1.1 **Operator Name:** Naval Superintendent, Vulcan NRTE

2.1.1.2 **Operator Address:** Vulcan NRTE  
Dounreay  
THURSO  
Caithness  
KW14 7TY

2.1.1.3 **Site Address:** Vulcan NRTE  
Dounreay  
THURSO  
Caithness  
KW14 7TY

#### 2.1.3 History

Construction began on site in 1957 with the first reactor operational in 1965.

The Vulcan Naval Reactor Test Establishment (NRTE) is a Ministry of Defence (MoD) establishment housing the prototype nuclear propulsion plants of the type operated by the Royal Navy in its nuclear submarine fleet.

For over 45 years Vulcan has been the cornerstone of the Royal Navy's nuclear propulsion programme, testing and proving the operation of four generations of reactor core. Its reactors have significantly led the operational submarine plants in terms of operating hours, proving systems, procedures and safety.

Rolls-Royce, who design and procure all the reactor plants for the Royal Navy from their Derby headquarters, operate Vulcan on behalf of the MoD and employ around 260 staff there. The Nuclear Propulsion Team Leader who administers the site, is represented by the Naval Superintendent who acts as the MoD Head of Establishment and is 'Authorised' for operation of the entire site, including the nuclear plant. He is supported by a team of naval staff.

The name Vulcan comes from the Roman god of craftsmen – whose main tool was fire. He used it to alloy precious metals and to mould jewellery and weapons. The history was not lost on the British and the name was first used for a British fire ship in 1691 at the battle of Barfleur.

The Motto for Vulcan: Vis fortibus arma – “Strength is a weapon of the brain” is particularly applicable to the naval nuclear programme.

Nuclear technology, at a stroke, transformed submarines from slow underwater vessels able to operate at a few knots submerged for up to a day, to warships capable of over 20 knots with the ability to stay underwater for months, operating unseen and undetected.

Vulcan has adopted many different roles in support of the UK's submarine fleet over the years, including:

- A test bed for evolving reactor technology;
- A proving plant for sea-going equipment;
- A training facility for nuclear submarine engineers;
- A test rig for the investigation of loss of coolant conditions;
- A refurbishment and test facility for submarine reactor cooling pumps.

The UK naval nuclear programme demonstrates design, construction and testing to the highest levels.

#### **2.1.4 General Description**

2.1.4.1 The Vulcan NRTE carries out evaluation of the safety, reliability and performance of the Naval Reactor Plant and components of that plant, prior to introduction in Royal Navy Submarines. The site is comprised of a number of facilities, the majority of which do not hold radioactive material. The site is located on the north coast of Scotland approximately 15km from the town of Thurso. The site lies approximately 20m above sea level. The meteorological conditions are typical for the north coast of Scotland with a prevailing north-westerly wind and above average UK rainfall.

2.1.4.2 The local authority responsible for the area surrounding the Vulcan NRTE is Highland Council.



## **2.2 SITE ACTIVITIES**

- 2.2.1** The facilities within the Vulcan NRTE site containing more than the quantity of radioactive material specified in Schedule 2 of the Regulations are detailed in Table 1. A HIRE has been conducted for the site and it has been assessed that the Shore Test Facility (STF) has the potential to lead to a radiation emergency, albeit with an extremely low probability.

## **2.3 SAFETY ASSESSMENT PROCESS**

### **2.3.1 Introduction**

The Technical Authority for the Naval PWR, Rolls-Royce, is charged with producing a Facility Safety Case (FSC) for the Shore Test Facility. This safety case is based on deterministic and probabilistic safety assessment of the PWR and its associated systems. The FSC is independently peer reviewed and then undergoes Independent Nuclear Safety Assessment (INSA) by AMEC (formerly Serco Assurance). They produce a Nuclear Safety Clearance Document which is formally reviewed by the Defence Nuclear Safety Regulator (DNSR) supported by suitably qualified and experienced independent experts.

When satisfied, the Defence Nuclear Safety Regulator (DNSR) issues a Safety Clearance Letter to MoD's Naval Reactor Plant Approval Authority who authorise the operation of the Shore Test Facility.

### **2.3.2 Authorisation of the Vulcan Naval Reactor Test Establishment**

The Vulcan NRTE, as a Ministry of Defence establishment, is not subject to licensing under the Nuclear Installations Act. However, the MoD operates a parallel nuclear regulatory function through an internal regulator, the DNSR, which utilises a similar system that mirrors the Office for Nuclear Regulation's licensing approach. It permits nuclear activities to take place on the site and authorises operations at the Vulcan NRTE. This is known as Site Authorisation. The Naval Superintendent is appointed as the Site Authorisee. The Site's Authorisation encompasses the Site Safety Management Arrangements and the authority to operate all facilities. Each Facility is supported by a Facility Safety Case (FSC) demonstrating compliance with MoD Authorisation conditions which are equivalent to ONR licensing conditions.

### **2.3.3 Safety Controls and Engineering Design**

There are engineered and procedural safeguards to prevent and mitigate any accident scenario. All equipment is robustly designed, constructed to a high specification and undergoes through examination, testing and regular, planned, routine, scheduled maintenance. Operation of all equipment is conducted according to rigorous operating procedures, by suitably qualified and experienced staff. The safety justifications for the equipment, its operation and any changes to these are subject to internal and external review.

### **2.3.4 Site Safety Management, Staffing and Training**

The safety responsibilities of all personnel are defined in Site Safety Management Documentation. All personnel at Vulcan NRTE are suitably qualified and experienced for the work that they are expected to perform. A Nuclear Training Requirements Plan specifies that requisite qualifications and experience for each role. A continuous process of audit and review is used to ensure that procedures remain current and effective. Minimum manning levels have been assessed and are documented in Site Safety Management Documentation. The Site Safety Management Systems ensure that there are adequate staff and resources available at all times to enable safe plant operation and provide a robust emergency response capability.



## **2.4 HAZARD IDENTIFICATION AND RISK EVALUATION**

### **2.4.1 Introduction**

The Radiation (Emergency Preparedness and Public Information) Regulations define the terms “radiation accident” and “radiation emergency”. A radiation accident requires immediate action to prevent or reduce the exposure to ionising radiation of employees or other persons; a radiation emergency is an event that is likely to result in a member of the public being exposed to ionising radiation, as defined in the Regulations. Hence a radiation accident may, but will not necessarily, result in a radiation emergency.

### **2.4.2 Shore Test Facility**

The HIRE for the Shore Test Facility has identified a number of scenarios with an extremely low probability of leading to an off-site release of radioactive material. A radiation emergency, as defined within the Regulations, can result from this facility, although it is an exceptionally unlikely event.

A range of potential accident scenarios have been analysed, the majority of which would not result in a release of radioactivity by virtue of the engineering and procedural safeguards described previously. The analysis considered those factors which could lead to a loss of cooling capability, as well as those which could give rise to an unintended self-sustaining nuclear chain reaction or the loss of control of an intended self-sustaining chain reaction.

Accidental releases from the site could occur in exceptional circumstances over periods varying from a few hours to several days, depending on the circumstances and the level of damage.

In order to develop an accident response strategy, the analysis has considered the probability of each accident sequence occurring and the consequences of the fission product release resulting from that sequence.

A two stranded approach has then been used to determine an appropriate strategy: an analysis of the probability and magnitude of any radiation exposure given that a radiation accident has been declared; and an analysis of the optimum countermeasure strategy for protection of individuals from any potential radiation exposure. Both analyses have considered all of the identified accident sequences. The appropriateness of introducing countermeasures has been determined on the basis of published advice from the ONR. This multi-faceted approach has resulted in a recommended accident response strategy based on a range of accident scenarios and analyses.

## 2.5 IMPLICATIONS FOR RADIATION EMERGENCIES

In the improbable event of a radiation emergency, the likely exposures to those members of the public within the zone extending 2km from the location of the plant could exceed 5 mSv. It is very unlikely that exposures in excess of 5 mSv could be received beyond this zone, however a small number of low probability scenarios have been identified with more significant consequences. In deriving the recommended countermeasures strategy, due account has been taken of all identified accident scenarios, however improbable.

The recommended response strategy to a radiation emergency would be implemented in two stages. Immediate countermeasures are set out within the Emergency documentation, affecting only those personnel within the 550m automatic countermeasure zone. Implementation of the recommended off-site response would affect individuals in the detailed emergency planning zone out to approximately 2km from Vulcan NRTE. Both the on-site and off-site plans would be implemented as precautionary measures prior to the detection of any release of radioactivity

Controls may be also applied to locally produced food under instructions from the Food Standards Agency, based on food intervention levels required by EC Regulations.

## 2.6 CONCLUSIONS

A hazard identification and risk evaluation has been conducted for each of the facilities at Vulcan NRTE holding radioactive materials, as required by the Regulations. These assessments have indicated that one facility on the site has the potential to lead to a radiation emergency, albeit with an extremely low probability.

The probabilities and consequences of the full range of potential accidents have been analysed and a response strategy developed to address them. To cope with the unlikely event of a radiation emergency, Vulcan NRTE has a Site Emergency Plan in place detailing the on-site response. The appropriateness of implementing countermeasures off-site has been assessed in the light of national and international legislation and guidance, and a precautionary strategy has been recommended to a distance of approximately 2km from the site. The recommended detailed emergency planning zone is shown on the map at Page 9.

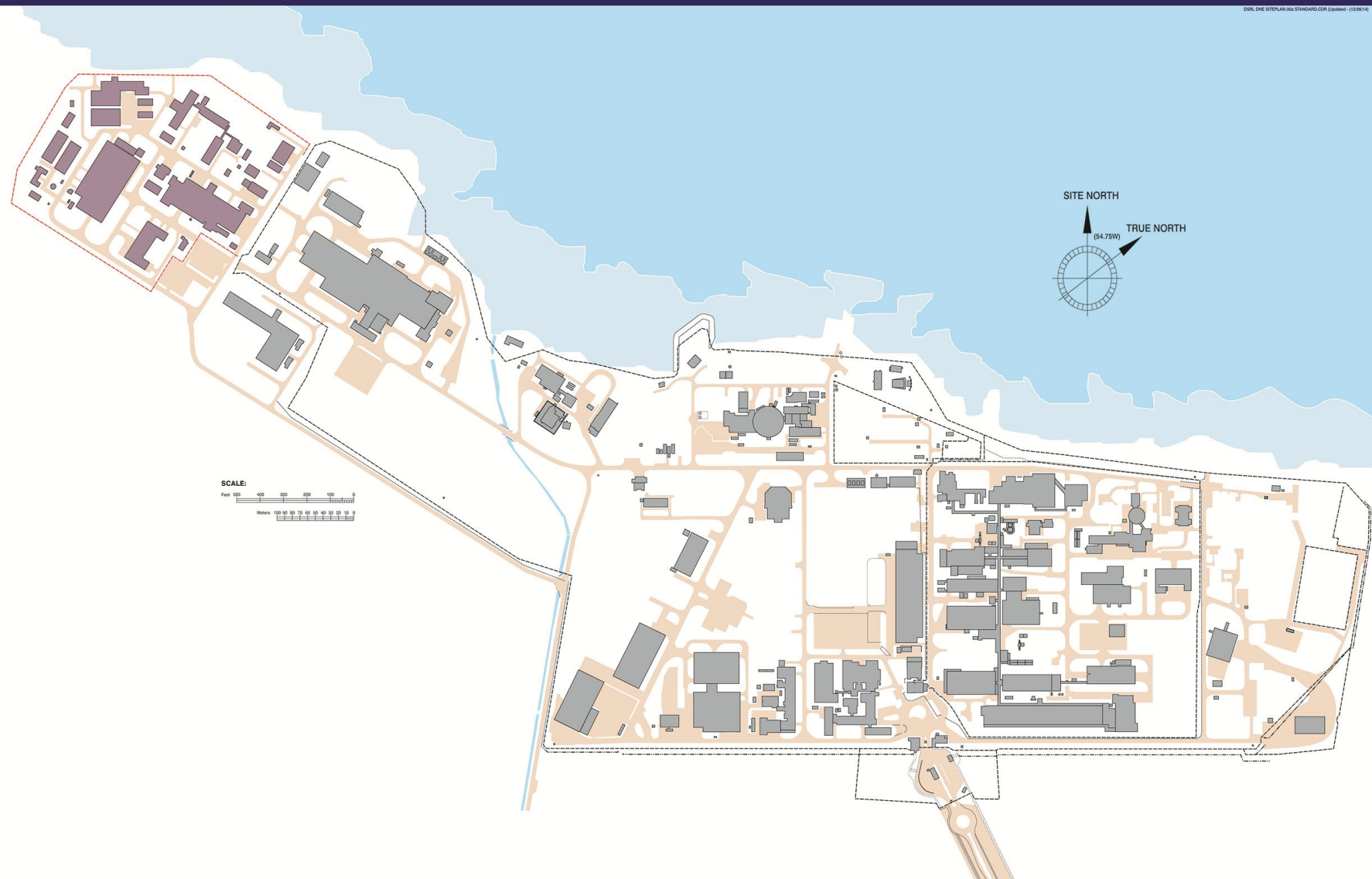
Emergency Planning for the Vulcan NRTE is addressed by multi-agency meetings. This enables the co-ordinated response strategy to be regularly reviewed and updated as required.

Vulcan NRTE has in place engineered and procedural safeguards to prevent a radiation accident from occurring, and to limit the consequences of any accident which could occur. The safety management systems at Vulcan NRTE are robust, appropriate and regularly reviewed. Personnel are suitably qualified and experienced to control the radioactive materials held on the site. A programme of internal and external reviews and audits is in place to ensure that safety standards, management and implementation remain appropriate and robust.

# Dounreay Site Plan (including NRTE Vulcan)



DON, THE SITEPLAN-Site STANDARD.COM (2009/14)



## SECTION 3: GENERAL INFORMATION

### 3.1 INTRODUCTION

Vulcan Naval Reactor Test Establishment (NRTE) is a Ministry of Defence (MoD) establishment, housing a prototype nuclear propulsion plant of the type operated by the Royal Navy in nuclear submarines.

Vulcan lies on the north coast of Scotland in the county of Caithness, just to the west of the DSRL site at Dounreay.

Grid References:    Digital    :    2977 9667  
                         OS         :    NC 977 667

The MoD leases the eight-hectare site from the Nuclear Decommissioning Authority (NDA), who provides many supporting services, such as mains electricity and water.

The Vulcan NRTE site is accessed from the A836 Thurso to Bettyhill road, which passes within one kilometre of the main gate. The site is bordered by a high security fence and access to the site is controlled at the main front gate.

The nearest centres of population to Vulcan NRTE are the village of Old Reay at 2 km and the villages of Reay at 3 kilometres and Shebster at 5 kilometres (See Maps at Pages 50 and 51).

### 3.2 ADMINISTRATION

The Head of Establishment and the Officer authorised to sanction plant operations on site by the MoD Regulator is the Naval Superintendent Vulcan (NSV), who is the senior Royal Navy Officer and is of Commander rank. The NSV has a naval staff who oversee all site operations. Control is exerted by the Ministry who have involvement in all decision making processes involving plant operations.

Rolls-Royce are contracted to operate and maintain the nuclear reactor plant on behalf of the MoD.

### 3.3 BACKGROUND

For more than forty years of operation, Vulcan has been a cornerstone of the Royal Navy nuclear propulsion programme. The site has adopted many different roles to support the submarine fleet. Vulcan is, or has been, all of the following:

- A test bed for evolving reactor technology.
- A lead plant for new seagoing plant and equipment.
- A training facility for nuclear submarine operators.
- A test rig for investigation of loss of coolant conditions.
- A refurbishment and testing facility for submarine reactor cooling pumps.

## SECTION 4: ACCIDENTS AND COUNTERMEASURE ZONES

### 4.1 DEFINITION OF REACTOR ACCIDENT

A nuclear reactor accident is defined as, **'a hazardous condition which requires the implementation of urgent countermeasures to protect the public.'**

The only reactor accident that can result in a hazard to personnel outside the site boundary is one which leads to reactor fuel plate damage and a subsequent release of fission products from the containment boundary.

Note: It is impossible for an incident in a pressurised water reactor to result in a "nuclear"-type explosion.

### 4.2 CATEGORIES OF REACTOR ACCIDENT

There are two emergency categories:

- (a) Reactor Safety Alert (RSA) – An abnormal event which poses a potential threat to, or causes serious concern for, reactor plant safety. This is a technical event occurring within the submarine reactor plant or associated systems. (Note; This is a technical event occurring within the submarine reactor plant or its associated systems but it is currently being dealt with through Standard or Emergency Operating Procedures and is still under control by the site operator.
- (b) Off Site Nuclear Emergency (OSNE): a hazardous condition which requires the implementation of urgent countermeasures to protect the public. The following qualifiers are applicable to an Off-Site Nuclear Emergency.
  - (1) Radiation Hazard Confirmed: an Off-Site Nuclear Emergency in which a radiation hazard has been detected (OSNE(RHC)).
  - (2) Release of Radioactive Material Confirmed: an Off-Site Nuclear Emergency in which a release of radioactive material to the environment has been detected (OSNE(RRMC)).

### 4.3 FUEL HANDLING ACCIDENT

A Fuel Handling Accident resulting in a confirmed release of radioactive material to the environment could only occur as an issue during reactor refuel, defuel or fuel movement operations or during post-irradiation examination/storage of used fuel in a pond.

However, although the possibility of a release exists and is extremely low, the safety cases for the above processes demonstrate that a criticality accident is not credible and that the only identified credible accidents are associated with a loss of shielding and possible fuel fragmentation.

There would, therefore, be no significant release of radioactive materials off-site and the main hazard associated with a fuel handling accident would therefore be enhanced gamma radiation levels in and around the areas of the accident. Protective measures would be instigated as necessary locally to protect the operators and workforce but it is not envisaged that countermeasures to protect the general public would be necessary as a result of a fuel handling accident.

## 4.4 COUNTERMEASURE ZONES

Vulcan NRTE has identified four countermeasure zones.

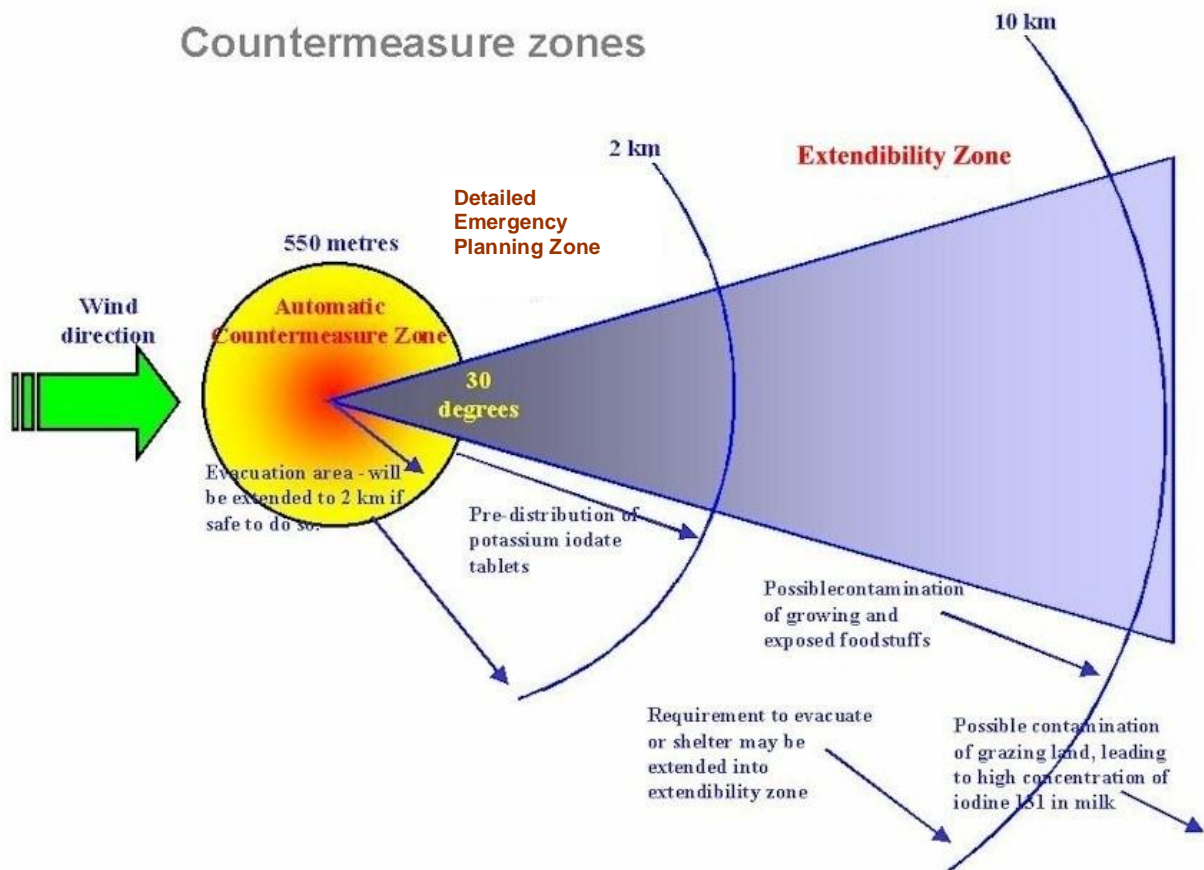
**Exclusion Zone:** This is the area in which people would be at greatest risk from the hazards of an accident i.e. the immediate vicinity of the accident.

**Automatic Countermeasures Zone:** This is the zone beyond the Exclusion Zone in which automatic actions would commence immediately on the declaration of an Off-Site Nuclear Emergency. This is a circular zone with a radius of 550 metres centred on the building in which the reactor is housed; at Vulcan this zone is defined as that part of the Vulcan Site delineated by the boundary fence i.e. does not include the car park, approach roads or foreshore area. All Vulcan personnel within this zone have been given instructions on what they should do in the event of an accident. If these instructions are followed, no-one within the Automatic Countermeasures Zone will exceed any of the upper level emergency reference levels of radiation dose, and the majority will not exceed any of the lower ones. Within the Automatic Countermeasure Zone all non-essential individuals are mustered at Shelter Stations as soon as an OSNE is declared and prior to subsequent evacuation. Individuals are not given stable iodine when they evacuate as they will be evacuated to a safe distance before a radiation hazard is confirmed. A small number of key personnel within the Emergency Response Team (ERT) may remain in or re-enter this zone and may be required to take stable iodine and wear protective clothing, if necessary and when instructed. Any individual within this area (or re-entering) will be controlled and must have specific authorisation.

**Detailed Emergency Planning Zone:** Extends to 2km around the building housing the reactor. Research indicates that there are clear benefits in recommending countermeasures beyond the automatic countermeasure zone into the Detailed Emergency Planning Zone following the declaration of an OSNE thereby allowing the opportunity to implement countermeasures before there is a confirmed off-site hazard, i.e. before reaching an OSNE(RHC) or OSNE(RRMC).

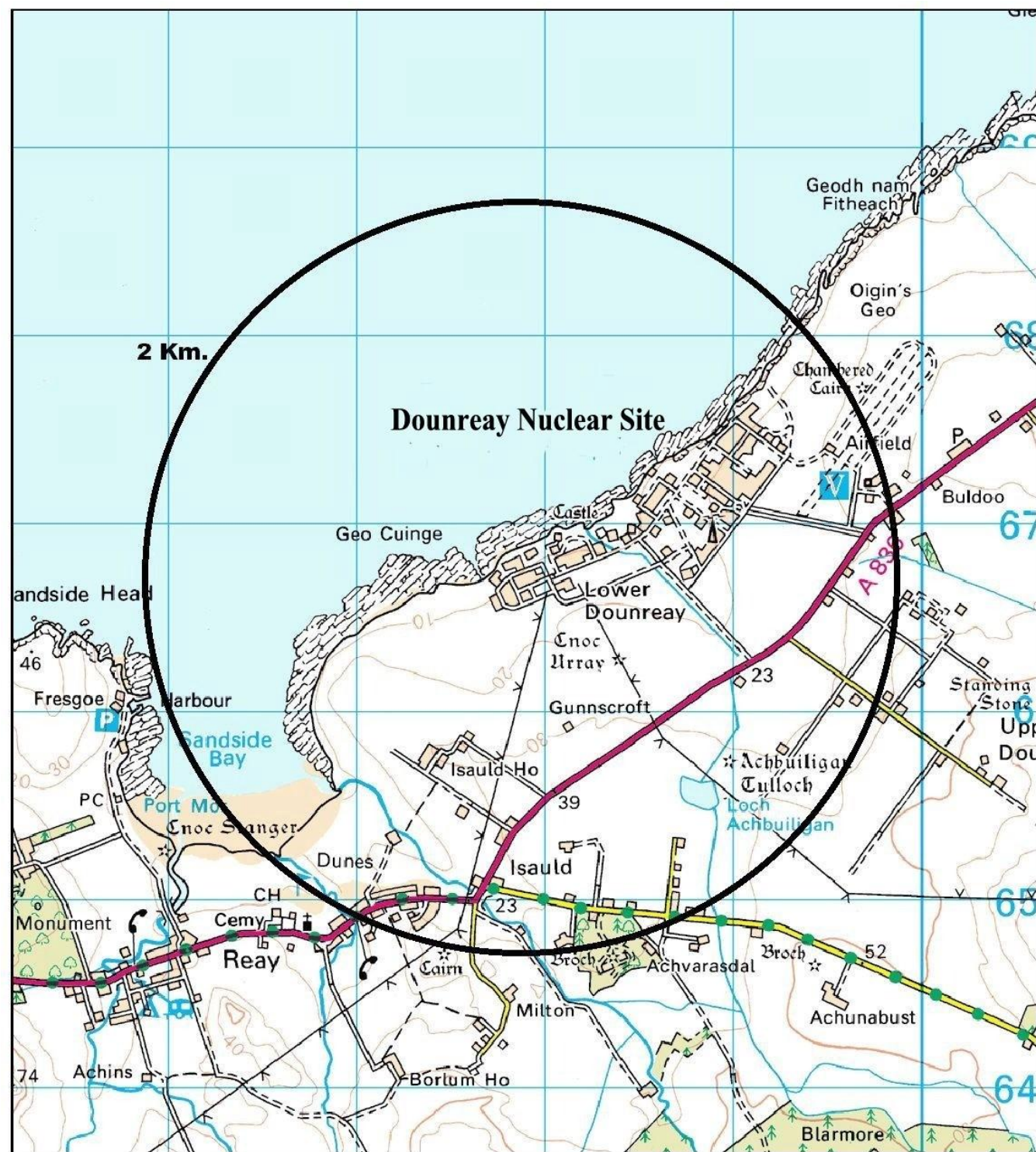
**Extendibility Zone:** Extends out to 10 km around the building housing the reactor. Countermeasures within this zone are not likely to be of an immediate concern, but are more likely to be implemented as the incident develops. Planning within this zone should establish broad principles and countermeasures, such as advice in relation to food stuffs, including milk products.


## Countermeasure zones





MAP OF VULCAN NRTE COUNTERMEASURE ZONE (DEPZ)






**The Highland Council**  
Comhairle na Gàidhealtachd  
*SEISING The Highland Community*

## Pre-planned Countermeasure Zone

( REPPIR )



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## 4.5 SHELTERING

Initial sheltering of population is beneficial in a number of ways but it may also have some disadvantages especially if a prolonged period of time in shelter is predicted. It allows Local Authorities to plan subsequent evacuation, if necessary, from known areas of shelter and provides until that time, shelter to the population “if” a release were to occur during the period prior to evacuation being possible.

When sheltering is considered appropriate, advice would be given to stay indoors with doors and windows shut and all ventilation/air conditioning shut off. This advice would be relayed to the general public by employing the following means:

- Broadcast messages being passed by local television and radio networks – STV, BBC TV (Scotland), Moray Firth Radio 97.4 FM, 102.5 VHF, 1107 KHZ, BBC Radio Scotland 92.4 – 94.7 VHF, 810 MW and Superstation 105.4 FM.

## 4.6 STABLE IODINE TABLETS (POTASSIUM IODATE TABLETS)

If stable non-radioactive iodine, in the form of Stable Iodine Tablets (SITs) also known as Potassium Iodate Tablets (PITs), is taken before or within a few hours of the inhalation of radioactive iodine, the vast excess of stable iodine from the tablet will substantially reduce the radiation dose to the thyroid gland.

Stable Iodine Tablets (SITs) also known as Potassium Iodate Tablets (PITs) have been pre-distributed to all householders within and just beyond the DETAILED Emergency Planning Zone, i.e. up to 2.5 km from the Vulcan site (see map on page 16).

Advice on the appropriate dose, and methods of administration, has been issued by NHS Highland and accompanies the pre-distributed tablets.

SITs will not be taken by any Vulcan personnel on Site during a Reactor Safety Alert.

Upon declaration of an Off-Site Nuclear Safety Emergency, any personnel required to remain on site after evacuation should be issued with SITs, but will only be instructed to consume them upon declaration of an Off-Site Nuclear Emergency (Radiation Hazard Confirmed). A supply of SITs for this purpose is kept in the VECC.

For individuals within the Detailed Emergency Planning Zone a different policy exists. Should an emergency progress to Off-Site Nuclear Emergency – Radiation Hazard Confirmed, then a pre-agreed press statement will be released by NCFOC on the authority of the Vulcan Incident Commander which will instruct all individuals within the Detailed Emergency Planning Zone (ie. those to whom SITs have been pre-distributed) to open the container and take SITs in accordance with the instructions contained within.

These arrangements have been agreed with the NHS Highland and differ from the established MoD policy, which states that only personnel in the downwind sector out to 2 km will be instructed to take SITs at the declaration of an Off-Site Nuclear Emergency – Radiation Hazard Confirmed. The main reasons for this difference in policy are:

- (a) The relatively small population within 2 km of the Vulcan Site.
- (b) It is much easier to instruct the taking of SITs by all those to whom they have been pre-distributed than it is to instruct their consumption by only a smaller number of specific people dependent upon the weather conditions prevailing on the day.
- (c) The risk of side effects to a small number of persons who may take the SITs when they are not essential is outweighed by the risk of persons suffering ill effects by not taking the SITs when required to do so.

#### Countermeasures around Vulcan NRTE include:

- Sheltering
- Stable Iodine Tablets (SITs) also known as Potassium Iodate Tablets (PITs)
- Evacuation
- Control of foodstuffs and water supplies

## 4.7 EVACUATION OF LOCAL POPULATION

Following the receipt of an OSNE declaration from Vulcan NRTE, the local population will be advised to shelter initially and tune to appropriate media stations for further information. They will also be advised that they should prepare for evacuation in accordance with the public information booklet.

This comprehensive information booklet is issued to all local residents within the Public Information Zone (PIZ). This booklet describes those aspects of the Dounreay emergency arrangements that apply to them as local residents. The booklet is issued under the requirements of REPIIR 2001 and explains what local residents must do in the event of an emergency and how they should prepare for an evacuation.

Due to the relatively small numbers affected within the DEPZ and the predicted timescales involved before a release from the site could be expected to occur, consideration should be given to early evacuation of the public external to the site; a countermeasure that is endorsed by both Police Scotland and The Highland Council. Evacuation procedures would be commenced following advice and discussions with the Vulcan Incident Commander at the Vulcan Emergency Control centre (VECC).

Evacuation prior to any release commencing protects the general public predominantly against any radiation from fission products that may have been deposited on the ground or may be present within the surrounding atmosphere. Any sectors requiring to be evacuated are unlikely to extend beyond 2 km and, consequently, numbers to evacuate would be small.

Evacuation is a Police responsibility and the decision to proceed with this rests with the Chief Constable/Overall Incident Commander, on the basis of technical and health advice received.

**Note:** Evacuation of the Vulcan Site is the responsibility of the Vulcan Incident Commander and Vulcan Site Controller.

Members of the public within the area to be evacuated would have the necessary information relayed to them by the following means:

- Broadcast messages being passed by local television and radio networks – STV, BBC TV (Scotland), Moray Firth Radio 97.4 FM, 102.5 VHF, 1107 KHZ, Superstation 105.4 FM and BBC Radio Scotland 92.4 – 94.7 VHF, 810 MW.

**Note :** Responding agencies will only deploy personnel into areas to be evacuated if it is safe to do so. However, the Police commander may decide, if the circumstances and resources allow, to supplement any public messages with door-to-door visits to advise/warn residents.

Arrangements are in place, in association with The Highland Council, to provide transport for any members of the public who require it. It is envisaged that the vast majority would self-evacuate using their own vehicles.

Members of the public being evacuated would be directed to one of the designated screening units for reassurance monitoring, and, if necessary, for decontamination.

## 4.8 CONTROL OF FOODSTUFFS AND WATER SUPPLIES

Contamination of exposed and growing foodstuffs may occur downwind. Though this is not likely to form an acute hazard during the first few hours, there could be an ingestion hazard, for example from leafy vegetables, and countermeasures may extend over a wider area for a longer time than evacuation or sheltering. Similarly, pasture may be contaminated downwind and efficient grazers such as cows and goats can graze a considerable area each day. Some radioisotopes (such as radioiodine) concentrate in milk so there must be arrangements to prevent the consumption of milk which is known to be, or likely to be, contaminated to a higher than acceptable level. The Food Standards Agency will assess any ingestion hazards and advise on necessary countermeasures and arrangements to protect the safety of the food chain.

**Water Supplies:** Mains water supplies are most unlikely to be affected in any way. To reassure the public, however, sampling of main services and open reservoir water supplies will be arranged by Scottish Water. In some areas, however, water is drawn from private wells, natural springs or running water, and, therefore, there may be a risk of water being contaminated. For this reason, a general ban on the use of water in the area may have to be considered until sampling has been carried out. The responsibility for imposing a ban lies with Health Protection Scotland.

## 4.9 RADIOLOGICAL PROTECTION

**Health Hazard:** Everyone is exposed continuously to many sources of differing radiation on a daily basis. The average annual dose in the United Kingdom from radiation of natural and artificial origin is about 2150 microSieverts, approximately 87% of which comes from natural sources, 13% from artificial sources and 0.1% from controlled releases from the nuclear industry.

The principal harmful effect of radiation exposure is to increase the possibility of cancer in later years, but very high radiation doses can lead to short term or immediate health effects.

Radiation dose is measured in a unit called the Sievert (Sv). The Sievert is a large unit, and for personal monitoring purposes it can be divided into milliSieverts (mSv), which is 1/1,000<sup>th</sup> of a Sv and microSievert (µSv), which is 1/1,000,000<sup>th</sup> of a Sv.

**Radiation and Protection Standards:** Radiological protection in the UK is based on recommendations laid down by the International Commission on Radiological Protection. These recommendations have been endorsed by the Health Protection Agency and form the basis for current legislation in this country. For the purpose of radiological protection, people are divided into two categories:

- 'radiation workers' : adults who are exposed to radiation in their work; and
- 'others': individuals who are not engaged in radioactive work and children, etc.

Under normal daily conditions, the dose limit to the whole body for 'radiation workers' exposed to radiation is 20 milliSieverts per year or 0.020 Sieverts. This level also applies to some emergency personnel, such as the Police and Ambulance Officers who may be involved in the response to an emergency. For 'others' the dose limit is 1 milliSievert per year or 0.001 Sievert (See Appendix 5 B).

Under emergency conditions, some limits for individuals undertaking essential tasks or life-saving operations within the emergency may be increased under guidelines set out within the Radiation (Emergency Preparedness and Public Information) Regulations (REPPPIR) but these will be fully controlled and authorised and must be individually justified on a risk *versus* benefit basis (See Appendix 5B for further details).



## 4.10 METHODS OF PROTECTION

**Time, Distance and Shielding:** The amount of radiation dose to which a body might be exposed can be significantly reduced by the introduction of simple time, distance and shielding measures. The longer a person is exposed to a dose of radiation, the higher the total dose that will be accumulated.

The intensity of radiation from a radioactive source decreases with increasing distance. A simple rule is that by doubling the distance from the source the radiation level is reduced to one quarter and by trebling the distance the radiation level is reduced to one ninth. Similarly, the shorter the time the person is exposed to a source of radiation the smaller will be the dose received.

By introducing appropriate shielding between the person and the radiation source, the dose being accumulated is reduced depending on the shielding being used. Different materials have different properties in respect of reducing the amount of radiation to penetrate through, e.g. shelter within a modern brick-built house will give additional protection against fission products deposited around the area and will reduce the dose accumulated by the individual compared to being in the open.

**Protective Clothing:** In order to provide protection to personnel responding to an off-site incident involving a radiological hazard, adequate clothing will be required. This will include; an oversuit with integral hood, industrial gloves and wellington boots, which will provide body surface protection for the wearer.

**Respirators:** The standard equipment is a face mask respirator, together with individual instructions for use, which, if fitted correctly, will provide protection against the inhalation of radioactive particles.

## 4.11 ADVICE, MONITORING AND USE OF EQUIPMENT

Personnel from all the responding organisations will only enter a contaminated area in urgent or life threatening situations. Before entering any such area, advice will be sought from the Vulcan Incident Commander at the Vulcan Emergency Control Centre (VECC) and the monitoring team, as to what protective clothing should be worn and which countermeasures should be implemented. This equipment will be provided by DSRL/Vulcan.

Ideally, no personnel from any organisation should enter the contaminated area unless accompanied by a member of one of the monitoring teams. Personnel leaving the contaminated area will be advised as to which radiation screening unit they should attend, along with his/her vehicle.

Cordon points will be well outwith any contaminated or potentially contaminated area, and therefore Police Officers on duty at these points will **not** require to wear protective clothing as a matter of routine.

## SECTION 5: STATES OF ALERT AND ACTIVATION OF EMERGENCY ARRANGEMENTS

### 5.1 INTRODUCTION

- 5.1.1 The design, manufacture and operation of reactor plants are extremely carefully supervised and controlled to reduce the risk of any form of accident to the absolute minimum. However, should such an accident occur, the effect would, at worst, be a release over a 24-hour period of a radioactive cloud of gaseous and volatile fission products, the most significant of which is radioactive iodine. It is emphasised that it is **impossible** for a reactor accident to result in an atomic bomb type explosion

### 5.2 DEFINITION

- 5.2.1 An emergency will be declared on the occurrence of any accident causing, or likely to cause, the release and spread of radioactive material in such a way that there would be interference with the normal activities of the public.

### 5.3 EMERGENCY CATEGORIES

- 5.3.1 There are two emergency categories:

- (a) Reactor Safety Alert (RSA) – An abnormal event which poses a threat to, or causes serious concern for, reactor plant safety. This is a technical event occurring within the submarine reactor plant or associated systems. This does not constitute a reactor accident.
- (b) Off Site Nuclear Emergency (OSNE) – A hazardous condition which requires the implementation of urgent countermeasures to protect the public. The following additional qualifiers are applicable to an Off-Site Nuclear Emergency:
  - (1) Radiation hazard confirmed: an Off-Site Nuclear Emergency in which a radiation hazard has been detected (OSNE(RHC)).
  - (2) Release of radioactive material confirmed: an Off-Site Nuclear Emergency in which a release of radioactive material to the environment has been detected (OSNE(RRMC)).

## SECTION 6: ENTRY/RE-ENTRY TO CONTROLLED AREAS

### 6.1 PROCEDURES

**6.1.1** It is essential that all personnel requiring access to the following areas are managed correctly and are not allowed unauthorized and uncontrolled access through any cordon: See Map Page 31.

**6.1.2** The following authorities or groups of personnel could be reasonably expected to require access in the timescales as indicated below. It is emphasised that although personnel may require access through a cordon for official and authorised duties they may not be required to approach or enter a hazardous area. Nevertheless, full management and control procedures are required for all access through a cordon:

a. **Immediate Emergency Response – Reactor Safety Alert (RSA)**

- (1) Emergency Monitoring Team.
- (2) Police.
- (3) Fire Service.
- (4) Ambulance.
- (5) Medical Staff.
- (6) Support and technical staff.

b. **Intermediate Response Phase (Hours to Days) – Off Site Nuclear Alert (OSNE)**

- (1) Emergency Monitoring Teams.
- (2) Police.
- (3) Fire Service.
- (4) Support and technical staff.
- (5) Relevant Civil Authorities.

c. **Recovery Phase**

- (1) Radiation Monitoring Teams (All authorities).
- (2) Police.
- (3) Support and technical staff.
- (4) Relevant civil authorities.

**6.1.3** The following Access Control Procedures are required to be implemented:

a. **Emergency Rapid Access**

This is required for essential emergency procedures only, eg. firefighting, saving of life, radiation monitoring, implementation of immediate Automatic Countermeasures.

- (1) Ensure rapid access.
- (2) Personnel will be briefed at the Forward Control Point on the location of the hazardous areas (if present), the designated safe route INTO and OUT of the area and safety requirements whilst in the area. Confirmation of all requirements may be obtained from the Health Physicist.



- (3) Personnel are to be issued with a Thermoluminescent Dosemeter (TLD badge).
- (4) Personnel are to be issued with a Personal Electronic Dosemeter (PED).
- (5) Personnel are to be issued with Personal Respiratory Equipment face mask.
- (6) Personnel will be required to wear suitable protective clothing.
- (7) Personnel are to be instructed to maintain communications with the required control.
- (8) The VECC control are to be informed of any access commencing.
- (9) The time of ENTRY and EXIT of all personnel to and from the area is to be recorded at the Forward Control Point.

**NOTE:** The Fire Service, Monitoring Teams and Ambulance Crew may attend the access cordon already in possession of pre-issued equipment and briefing. In this case ensure a rapid safety briefing is issued and allow rapid entry to the area whilst recording all required details.

b. **All subsequent authorised access.**

- (1) All entries are to be authorised by the Site Controller at the Forward Control Point in liaison with the Health Physics Advisor.
- (2) The PERMIT TO ENTER CONTROL ZONE Authorisation Form is to be completed and signed at all sections before access is authorised. The Radiation Safety information is to be obtained from the MoD Health Physicist. This authorisation form is required to be signed by the MoD Health Physicist, the Site Controller at the Forward Control Point and the individual person requiring access.
- (3) Personnel are to be briefed at the Forward Control Point on the location of the hazardous areas (if present), the designated safe route INTO and OUT of the area and all safety requirements whilst in the area.
- (4) Personnel are to be issued with Thermoluminescent Dosemeter (TLD badge).
- (5) Personnel are to be issued with a Personal Electronic Dosemeter (PED).
- (6) Personnel are to be issued with Personal Respiratory Equipment face mask.
- (7) Personnel are to be instructed to maintain communications with the required control.
- (8) The VECC are to be informed of the access commencing.
- (9) The time of ENTRY and EXIT of all personnel to and from the areas to be recorded at the Forward Control Point.

**For Information**

Vulcan defines the briefing room at the VECC as the Forward Control Briefing Room.

## 6.2 RADIATION DOSES - LIMITS

- 6.2.1** The Health Protection Agency (Radiation Protection Division) (HPA(RPD)) recommends that for each countermeasure an Action Level is selected which is appropriate to the particular site. For each countermeasure a lower and upper Emergency Reference Level (ERL) has been specified. Doses which have already been received through normal occupational sources, are not relevant to these considerations.
- 6.2.2** All authorities involved in a response to a nuclear accident may have pre-determined radiation dose limits stricter than those recommended in Section 4 and specific radiological protection requirements. The specific requirement of each authority is to be implemented (See Appendix 5 B).

## 6.3 RECORDS TO BE KEPT

Comprehensive records are to be kept by all authorities involved in a nuclear accident, in order that the necessary information may be available for a subsequent inquiry to the cause and effects. The records are also needed to assist in dealing with any claims which may arise in connection with loss, damage or injury attributable to the accident. In particular, the following information is required.

- (a) Times of reports or orders being given or received.
- (b) Times when other authorities are informed of occurrences.
- (c) Details of persons exposed to any hazard and doses received, if possible, in addition to their movements within affected areas.
- (d) Decisions taken and the information on which these decisions were based.
- (e) Weather conditions.
- (f) Information on the causes and effects.
- (g) Authorisation for access to controlled area.
- (h) Details of personnel entering controlled area.

**All Authorities and Agencies are required to forward copies of these records to the Police Scotland Headquarters as soon as possible after an accident.**

## SECTION 7: COMMAND AND CONTROL

### 7.1 INTRODUCTION

In order to achieve a combined and co-ordinated response to a major incident the capabilities of the emergency services should be closely linked with those of the Local Authority and other agencies, following the principles of integrated emergency management.

The management framework should always embody the same principles irrespective of its cause or nature but remain flexible to individual circumstances. The response can be divided into three levels – Operational, Tactical and Strategic – the Principles of Command and Control.

The requirement to implement one or more of the management levels will be dependent upon the nature of the incident.

### 7.2 OPERATIONAL LEVEL

The scene immediately after disaster has struck is likely to be confused. To bring some order to this confusion it is important that the emergency services established control over the immediate area and build up arrangements for co-ordinating the contributions to the response. Experience has shown that an effective response depends on the timely receipt of accurate and complete information and on sound decisions being made and appropriate actions set in train at the onset.

It is generally accepted that the first member of an emergency service to arrive on the scene should not immediately become involved with the rescue but should make a rapid assessment of the disaster and report to their own control.

The emergency services will concentrate on their specific tasks within their areas of responsibility. Should it be necessary, consideration should be given to assigning control for a specific task or area to a designated officer of the emergency services or particular agency subsequently called to the scene.

The command of the resources belonging to any agency and applied within a geographical area, or used for a specific purpose, will be retained by that agency. Each agency must liaise fully and continually with the others employed in the same area to ensure an effective and combined effort.

If appropriate, the Police will normally act as the co-ordinator of this response at the scene. These arrangements will usually be adequate for the effective resolution of most incidents. However, for more serious incidents which require significantly greater resources it may be necessary to implement additional levels of management.

### 7.3 VULCAN EMERGENCY CONTROL CENTRE (VECC)

The operational and tactical level of command and control will be set up at the Vulcan Emergency Control Centre (VECC), located within Vulcan NRTE. It is not normal practice to send Liaison Officers from other agencies to the VECC, with the exception of a Police Scotland Liaison Officer

The primary functions of the VECC is to provide:

- (a) On-Site operational level of command and control for the Site Controller and his support team. The Site Controller is responsible for directing all activities on the Vulcan Site.
- (b) On-Site tactical level of command for the Incident Commander and his support team. In the immediate period following declaration of an Off-Site Nuclear Emergency, and until the Military Co-ordinating Authority (MCA) and his support team are established at the SCC, the Incident Commander will assume responsibility for liaising with and providing advice in respect of the incident to Local Authorities, the MoD and other Central Government departments.

## 7.4 EMERGENCY RADIOLOGICAL INCIDENT CENTRE (ERIC)

The Emergency Radiological Incident Centre at DSRL will support Vulcan by assessing the nature and extent of the radiological release and providing countermeasures advice. All readings from both on-site monitoring and from the off-site monitoring teams are collated at the Emergency Radiological Incident Centre (ERIC) before it is passed directly to the VECC. ERIC is also on the DSRL site and not only assesses the incoming raw data, but also passes on countermeasures advice.

## 7.5 TACTICAL LEVEL

The tactical level of command exists to determine priority in allocating resources, to plan and co-ordinate when a task will be undertaken and to obtain other resources as required. Most, but not all, of the tactical functions will be discharged at the scene of the incident. Some agencies, particularly Local Authorities, will prefer to operate from their administrative offices and will normally send a representative to the scene to liaise with the Incident Officer.

When more than one agency is operating at the tactical level there must be consultation between the various Incident Officers. These Incident officers should not become directly involved with the activities at the scene but concentrate on the overall general management. In order to achieve effective co-ordination, an interagency meeting should be held at regular intervals attended by each Incident Officer. The establishment of inter-service communication links will support the running of the incident at the scene. The Police will maintain a written record and normally act as the co-ordinating agency.

## 7.6 STRATEGIC LEVEL

### Strategic Co-ordinating Group (SCG)

The purpose of the strategic level of management is to formulate the overall policy in which the response to a major incident will be made.

A Strategic Co-ordinating Group (SCG) may be established which will be involved with ensuring priorities for demands by the tactical level of command are met, as well as setting out the plans for a return to normality once the incident had been brought under control. Tactical decisions are not the responsibility of this group.

The SCG will also be aware of its wider responsibilities which may encompass a central government interest, handling requests for advice and assistance from individual services and agencies and formulating a media strategy.

The Chairing and establishment of an SCG is a police responsibility during the emergency phase of any response and the group will comprise a nominated member from each agency involved. Each person must be able to make executive decisions in respect of resources within their agency and have the authority to seek the aid of other agencies in support of the role.

The SCG should be based at an appropriate pre-planned location, normally away from the noise and confusion of the scene. As it is a Police function to chair this group, the strategic level of management will be located at Inverness.

### Strategic Co-ordinating Group (SCG) Chairman (Supported by Staff Officer and Minute Secretary)

Role of the SCC Chairman:

The SCG Chairman will harmonise the integration of the expertise of all the agencies involved, with the object of effectively bringing the incident to a successful conclusion.

During the emergency phase of an incident at Vulcan NTRE, the Chief Constable/Deputy Chief Constable of Police Scotland, or a senior Officer nominated by him, will fulfil the role of the SCG Chairman. On declaration of the end to the emergency phase of the incident and the recovery phase commencing, the Chief Executive of The Highland Council will then assume the role and responsibilities of the SCG Chairman with the transfer of co-ordination being by mutual agreement and recorded in writing.

The Chairman will be responsible for calling and chairing the Strategic Co-ordinating Group meetings in the SCC. The SCG Chairman is also responsible for ensuring that a record of any decisions is taken and displayed for the information of all agencies in the SCC. The Chairman, in consultation with the Military Co-ordinating Authority (MCA), will decide which agencies will be represented on the Strategic Co-ordinating Group with representatives from each agency being kept to a minimum but appropriate to the business in hand.

## **7.7 STRATEGIC CO-ORDINATING CENTRE (SCC)**

The Strategic Co-ordinating Centre (SCC) is the location to which the majority of Agencies responding to the emergency would send representatives to assist in the overall strategic-level response and will be located at Police Headquarters, Old Perth Road, Inverness. The main functions of the SCC are:

- To manage the strategic level of response to the incident:
- To relieve the load on the affected site, by taking responsibility for all activities not directly concerned with rectifying the situation at the site.
- To provide a central liaison and information exchange point for relevant organisations.
- To ensure that an adequate flow of information and specialist technical advice on the incident is provided to the emergency services, local and central government and to the media and public.
- To provide technical assistance to the site and co-ordinate off-site radiological monitoring activities.

The SCC would be set up as quickly as possible after an OSNE incident has been declared. All responding organisations should ensure that within their initial actions representatives from their organisation attend the SCC at Police Headquarters, Inverness, as soon as possible. The representatives should be of appropriate standing and able to make strategic decisions. They would normally bring their Emergency Planning Officers, or equivalent, as advisers.

All services and agencies will initially receive technical advice from the Vulcan Incident Commander (Naval Superintendent Vulcan), via the VECC. Once the Nuclear Emergency Back-Up Support Team (NEBUST) from Faslane arrives at the Strategic Co-ordinating Centre, Inverness, advice to all the agencies will be through the Military Co-ordinating Authority (MCA).

### **Agencies Located at the Strategic Co-ordinating Centre (SCC)**

The following people and agencies would be located within the SCC at Inverness. Summaries of their roles and responsibilities are included.

**Military Co-ordinating Authority:** The Military Co-ordinating Authority (MCA) will be in overall administrative control of all Ministry of Defence departments and agencies during any post-accident procedures, following an accident at Vulcan NRTE. The MCA will provide authoritative advice to Police Scotland and other authorities, particularly in matters concerning the off-site response. During the early response phase to an accident at Vulcan NRTE, advice will be provided by the Naval Superintendent Vulcan, or his deputy, as Vulcan Incident Commander in the VECC until staff from the Naval Base Clyde Nuclear Emergency Back Up Support Team (NEBUST) assemble at the Strategic Co-ordinating Centre (SCC), Inverness. Once the NEBUST have their designated staff in place at Inverness, the responsibility for provision of advice will transfer from the Vulcan Incident Commander to the MCA. This transfer of responsibility for the provision of advice is to be agreed by the SCC Police Chairman.

**Scottish Government Senior Liaison Representative:** The role of the government liaison representative will be to provide link with Ministers and government departments in Edinburgh. This person will normally be a senior departmental officer. This government liaison representative will also provide a direct link with the Scottish Government Resilience Room, which will be convened in Edinburgh. The Scottish Government Rural Payments and Inspections Directorate (SGRPID) will be represented at the SCC and has extensive powers to control the production and supply of contaminated, or potentially contaminated, food, and can invoke restrictions on the movement of foodstuffs, milk and livestock.

**DSRL Dounreay (DSRL):** Dounreay Site Restoration Ltd will provide support to the MCA including health physics data and other information.

**Health Protection Agency (HPA) – Centre for Radiation, Chemical and Environmental Hazards (HPA(CRCE)):** The CRCE will advise government departments and other organisations on radiological protection and assessment of radiological hazards. Officers from the Radiation Protection Division will liaise with their emergency control room, passing data for predicting the outcome of the release and its consequences. The CRCE will be responsible for co-ordinating the long-term monitoring and analysis in the wider area beyond the emergency planning zone, and they will contribute to long term advice on measures to protect the public.

**The Food Standards Agency:** The Food Standards Agency (FSA) is a Non-Ministerial Government Department; a UK-wide body which in Scotland is represented by FSA Scotland, as food safety is a devolved responsibility. The Agency's responsibilities include advising on and protecting all aspects of food safety. The Agency, acting in conjunction with SGRPID and Local Authorities can exercise powers to control the production and supply of contaminated food, and to restrict the movement of foodstuffs, crops and livestock.

**Office for Nuclear Regulation:** Under the Health and Safety at Work Act 1974, and supporting legislation, the Health and Safety Executive's Office for Nuclear Regulation is responsible for ensuring that nuclear operators make appropriate arrangements to respond to a nuclear emergency. During an emergency, ONR will provide technical and regulatory support both locally and from its Emergency centre in Bootle.

**Police Scotland:** Police Scotland will be responsible for the co-ordination of the emergency services and other organisations responding to any matters with off-site implications during the emergency phase of an incident at Vulcan NRTE.

**Scottish Fire and Rescue Service:** Scottish Fire and Rescue Service will have responsibility for all on-site fire fighting and rescue, utilising DSRL Fire Service resources as required.

**Scottish Ambulance Service:** Scottish Ambulance Service will be responsible for the initial treatment for off-site casualties and thereafter, transportation of casualties to the designated hospitals. Scottish Ambulance Service will also provide on-site support by transporting casualties from the site. If requested by the Local Authority, Scottish Ambulance Service will assist in the transportation of the disabled/elderly from an affected area in the event of an evacuation.

**NHS Highland:** NHS Highland is responsible for making arrangements with designated hospitals for the treatment of casualties, both irradiated and non-irradiated, and the provision of radiation screening facilities and advice to the public. The Director of Public health is also responsible for the issue of and advice to take Stable Iodine Tablets (SIT's) (also known as Potassium Iodate Tablets (PITs)). NHS Highland is also responsible for the provision of all adult social care.

**The Highland Council:** The Highland Council is responsible for the provision of emergency transport, accommodation, feeding of the public affected and the co-ordination of the recovery phase of an incident at Vulcan NRTE.

**Scottish Environment Protection Agency:** The Scottish Environment Protection Agency is a single independent environment protection agency and their responsibilities will include monitoring radioactive discharges and waste and enforcement of countermeasures. They have a special responsibility for advising water authorities on the control of potable water. They will be supported in this matter by the Radiological Incident Monitoring Network.

### **Information flow within the Strategic Co-ordinating Centre.**

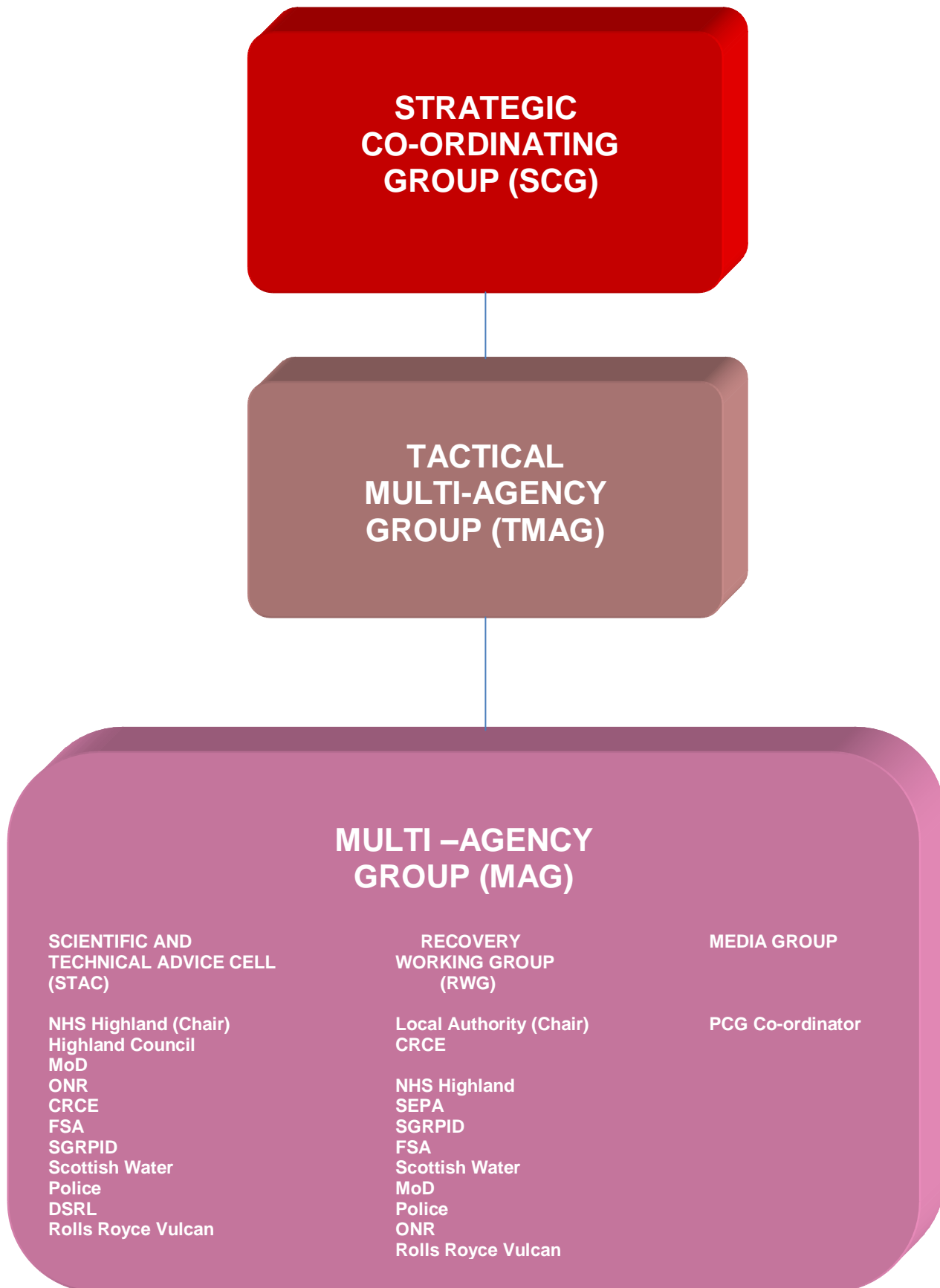
To ensure that all strategic information passed between the agencies present within the SCC is recorded and co-ordinated a Message/Action system will be administered by the Strategic Administration Team (SAT).

The Message/Action system is paper based and agencies attending the SCC will be briefed on the use of the system. An SCC Information Booklet outlining the role of the SCC and its facilities, the role of the agencies located within the SCC, the instructions for the Message/Action system and a list of useful telephone numbers is available to all agencies.

As part of the message/Action system the following information 'boards' are set up within the SCC, giving agencies immediate access to relevant information:

- Summary Board (copies of all message/Actions raised)
- Press Release Board (copies of all press releases)
- Minutes Board (copies of all minutes from the Strategic Co-ordinating Group meetings)





## SECTION 8: MEDIA MANAGEMENT

### 8.1 INTRODUCTION

The task of dealing with media pressure at the scene of a major incident with off-site implications is primarily the responsibility of the Police. Media personnel will arrive at the scene of an incident at Vulcan NRTE very quickly, as they will often have heard of the disaster at the same time as the emergency services. They will expect to have instant access to the facilities they require and an instant response to their request for information and briefings. If these demands are not anticipated, media representatives are likely to add to the confusion.

### 8.2 PRE-PREPARED PRESS STATEMENTS

Pre-prepared press statements have been agreed between Vulcan NRTE and the responding organisations. The Vulcan Incident Commander will assess the nature and likely rate of development of the incident and authorise the duty officer at Police Scotland's Force Operations Centre (PSFOC) to release the appropriate Media Statements as follows:

- (a) [Initial Statement 1](#) – If an event has occurred which has led to an Off Site Nuclear Emergency.
- (b) [Supplementary Statement 2](#) – On declaration of an Off-Site Nuclear Emergency - Radiation Hazard Confirmed.

#### Initial Statement 1

If the Vulcan Incident Commander has information to confirm that the incident has attained the level of OSNE, then the advice to the duty officer at Police Scotland Force Operations Centre will be to release the following press statement.

**Note: Police Scotland are to be reminded that no amendment is to be made to this statement without authorisation from the Vulcan Incident Commander.**

***'An incident occurred at (time, day and date) at Vulcan Naval Reactor Test Establishment, which is located adjacent to the DSRL Dounreay site, but is a separate establishment. Emergency services have been alerted and are currently responding. As a precaution we are advising members of the public within 2 km of the site, including residents in Buldoo, Achvarasdal, Upper Dounreay and Old Reay to take shelter, the instructions for which are:***

- ***go indoors and stay there but also prepare to be evacuated,***
- ***close all doors, windows and ventilators,***
- ***switch off any ventilation or air conditioning systems which draw air from outside the building,***
- ***do not try to collect children from school, the school authorities will look after them,***
- ***food and produce that has been stored uncovered and outside, and water from private supplies should not be consumed until advised otherwise.***

***Keep tuned to one of the following TV or Radio channels: STV, Moray Firth Radio – 97.4 FM, 102.5 FM, 1107 KHZ, BBC Radio Scotland – 92.4 to 94.7 VHF, 810 MW and an update will be given when further information becomes available.'***

#### Supplementary Statement 2

Further press statements will be developed as part of the press strategy within the media cell at the Strategic Co-ordinating Centre, Police Headquarters, Inverness. However, should the situation worsen, to that of an OSNE (Radiation Hazard Confirmed), then the following statement is to be

released by the duty officer at Police Scotland Force Operations Centre when authorised by the Vulcan Incident Commander.

**Note: Police Scotland are to be reminded that no amendment is to be made to this statement without authorisation from the Vulcan Incident Commander.**

***'Further to the press release of (time), and on the advice of the Director of Public Health, members of the public within 2km of the Vulcan NRTE site who have previously been issued with Stable Iodine Tablets (SITs) also known as Potassium Iodate Tablets (PITs) should now take them, in accordance with the accompanying written instructions. Members of the public previously advised to do so should continue to remain indoors.'***

### 8.3 FORWARD MEDIA INFORMATION POINT

The Forward Media Information Point (FMIP) Thurso, will act as a focal point for journalists, camera crews and photographers who want to get as close as possible to the site. It will offer shelter from the weather, a base from which to file copy and somewhere to receive copies of any media releases sent out from the MBC. News organisations and journalists will be advised that there will be no spokespersons available at this facility, and all enquiries should be referred to the Media Cell at the Strategic Co-ordinating Centre in Inverness.

The main functions of the FMIP are to;

- Co-ordinate the media response at a local level,
- Provide copies of all media statements,
- Provide information packs,
- Provide 'pooling' arrangements for on-site visits.

Following the initial press release, prior to the MBC becoming operational, organisations should, where possible, consult the Public Communications Policy Group (PCPG) Co-ordinator before issuing media statements, to ensure that clear, accurate and non-conflicting information is provided.

### 8.4 MEDIA BRIEFING CENTRE

The Media Briefing Centre (MBC) for any major incident occurring at Vulcan with off-site consequences will be in Inverness. The MBC will be set up simultaneously with the Strategic Co-ordinating Centre (SCC). This will be the strategic level of response to the media.

A number of advantages are gained by setting up the MBC as soon as possible:

- It provides the media representatives with a known source for the most accurate and up to date information which the authorities can make available.
- Once spokespersons have been nominated, smooth flows of information can soon be established, compared and co-ordinated.
- Any potential conflicts in approach by partner agencies can be identified and dealt with.
- Once set up, all press conferences should take place within these premises, with appropriate personnel being transported to the MBC from the SCC by Police Scotland.

A MBC Manager will be appointed by the PCPG Co-ordinator, who will be responsible for the smooth running of the MBC. Close liaison will be necessary between the Strategic Co-ordinating Centre and the Media Briefing Centre, and robust communications will be essential.

**Note:** The Media Briefing Centre should continue to be available after the local authority takes over the co-ordinating role from the police and for as long as necessary.

## 8.5 MEDIA MANAGEMENT

The PCPG Co-ordinator, acting under the Strategic Co-ordinating Group Chairman's authority, will be responsible for ensuring co-ordination of all media matters until there is a handover. The handover phase of a major incident includes the handover of responsibility for all media matters. A multi-agency approach to the media will be practised, with media representatives from all participating organisations based in the media cell at the Strategic Co-ordinating Centre (SCC) and the Media Briefing Centre (MBC). No statement will be given to the media without having first been vetted by the Police led media cell, in consultation with the appropriate members of the Strategic Co-ordinating Group. Media statements will be distributed to all agencies at the Strategic Co-ordinating Centre (SCC) and the Media Briefing Centre (MBC). Press statements will also be displayed at the SCC and the MBC.

Media representatives from the organisations operating within the Strategic Co-ordinating Centre will be expected to work as part of a co-ordinated team, issuing joint statements.

The timing of media briefings will be agreed by the Strategic Co-ordinating Group Chairman and will take into consideration the views of all agencies, media interest and any media deadline, e.g. different time zones, which may apply.

The Strategic Co-ordinating Group Chairman and the Military Co-ordinating Authority (MCA) should, as far as is reasonably practicable, be informed beforehand of the content of any media statement.

Spokespersons at media briefings will be kept to a minimum. Spokespersons will be agreed in advance by the Strategic Co-ordinating Group Chairman and the MCA, as appropriate, in the light of developments and the interests of the media, and taking into consideration the views of the other agencies. The Strategic Co-ordinating Group Chairman will nominate the appropriate police press spokesperson, according to the status of the emergency, and will take on that role personally, when necessary.

Efforts should be made to provide a continuous supply of information (with spokesperson being available, as appropriate) in order to recognise the needs of the broadcast media who will be the main recipients.

## **SECTION 9 : ROLES AND RESPONSIBILITIES**

### **9.1 ROLES AND RESPONSIBILITIES OF THE MINISTRY OF DEFENCE**

#### **MoD Nuclear Emergency Organisation (MoD HQ NEO)**

- (a) To co-ordinate the response of all MoD authorities.
- (b) To record and co-ordinate all reports and data from the accident site.
- (c) To prepare and co-ordinate briefings of all government departments.
- (d) To prepare and provide reports for the Defence Nuclear Emergency Organisation (DNEO).
- (e) To prepare and provide material for public and media information and briefings.

#### **Military Co-ordinating Authority (MCA)**

- (a) Overall command of all local MoD resources and post-incident responses and procedures following an Off Site Nuclear Emergency being declared at Vulcan. The responsibility for controlling the immediate situation On-Site is delegated to the Vulcan Incident Commander.
- (b) Liaison with the local civil authorities and providing them with all relevant information and advice on the actions they should take.
- (c) Responding to the media in consultation with the Police.
- (d) Co-ordination and provision of support requested by the Incident Officer
- (e) Reporting to MoD HQ NEO.

#### **Vulcan Incident Commander (Naval Superintendent or Deputy)**

- (a) Responsible to the MCA for co-ordinating all activities on site from the Vulcan Emergency Control Centre (VECC).
- (b) In the immediate post-accident period, and until the MCA is established at the Strategic Co-ordinating Centre Inverness, the Vulcan Incident Commander will assume initial responsibility for:
  - Liaison with and providing advice to local authorities.
  - Liaison with the MoD and other Central Government Departments.
  - The supervision and completion of automatic responses.
  - The minimisation of radioactive releases using the appropriate containment measures.
  - The identification of requirements for further, non-automatic countermeasures.
  - The provision of information to the local population.

### **Site Controller (Provided by Rolls Royce)**

- (a) Responsible to the Incident Commander for directing all activities on the Vulcan Site.
- (b) Initial informing of all external and supporting agencies and authorities.
- (c) Establish the scope of the accident.
- (d) Minimising the consequences of the accident.
- (e) Ensuring automatic countermeasures are implemented.
- (f) Ensuring casualties receive medical attention.
- (g) Ensuring unauthorised persons do not enter the area.
- (h) Managing the muster of personnel at Shelter Stations and evacuation of the Site at OSNE.
- (i) Ensuring that all personnel who are authorised to enter the area are subject to full health physics control.
- (j) Ensuring that reliefs are provided for essential personnel.
- (k) Conducting dynamic or documented Risk/benefit assessments for the conduct of interventions.
- (l) Authorising individual emergency radiation exposure levels.

## **9.2 ROLES AND RESPONSIBILITIES OF DSRL DOUNREAY**

9.2.1 The DSRL Dounreay response to an escalation of a Vulcan incident, once the site alert sounds, would have the entire emergency response organisation brought into force.

9.2.2 In responding to a Vulcan incident, the DSRL Dounreay responsibilities are summarised as follows:

- (a) Manning of the Dounreay Emergency Control Centre (DECC) to ensure that the safety of all personnel on the Dounreay site is carried out.
- (b) Provide assistance and support to the Vulcan team at both the operational and tactical levels.
- (c) Rescue and treatment of casualties through provision of the Dounreay Fire and Rescue Service to the Vulcan Site.
- (d) Manning of the Emergency Radiological Incident Centre (ERIC) to ensure that countermeasures advice is available.

### 9.3 ROLES AND RESPONSIBILITIES OF POLICE SCOTLAND

9.3.1 Responding to emergencies is a normal feature of the work of the police service. The normal roles and responsibilities of the police encompass the protection of life and property. The Chief Constable is also responsible in the emergency phase of response to any major incident for the control and co-ordination of the emergency services and other agencies.

9.3.2 In responding to an incident at a nuclear establishment the police responsibilities may be summarised as follows:

- (a) The saving of life in conjunction with the other emergency services.
- (b) Co-ordination of the emergency services and other organisation during the emergency phase of the incident. This applies to all three levels of response, operational, tactical and strategic. The Strategic Co-ordinating Centre would be opened at Police Headquarters, Inverness, to allow all the strategic decision makers for the agencies involved to assemble and make arrangements for the effective management of the emergency response via the Strategic Co-ordinating Group.
- (c) The protection and preservation of the scene.
- (d) The investigation of the incident in conjunction with other investigating bodies, where applicable.
- (e) The collation and dissemination of casualty information.
- (f) Identification of the dead on behalf of the Procurator Fiscal who is the principal investigator when fatalities are involved.
- (g) Assist The Highland Council with the restoration of normality at the earliest opportunity.
- (h) To initiate the cascade call out system to alert essential services to either deploy or standby.
- (i) Co-ordination of the media response during the emergency phase.

9.3.3 To comply with the principles of the European Convention of Human Rights Act 1998, Northern Constabulary will carry out their responsibilities to protect individual's rights. If there is a requirement to interfere with the rights of an individual, it will only be done:

- where the law allows, and
- where it is necessary to protect the rights and freedoms of others, prevent crime and disorder, to protect the health and morals of others, in the interests of national security or public safety; and
- the means used to achieve an objective will balance the general interests of the community against the rights of the individual and will use the least intrusive option available to meet the objective.

9.3.4 The identified actions for Police Scotland staff have been written in an open and transparent manner, however, should there be a requirement to disclose any or part of the information contained therein, CONFIDENTIAL information may be withheld.

9.3.5 The principal legislation pertaining to Police Scotland's actions are:

- Ionising Radiations Regulations 1999
- Management of Health and Safety at Work Regulations 1999.



## **9.4 ROLES AND RESPONSIBILITIES OF SCOTTISH FRS**

- 9.4.1 Responding to emergencies is a normal feature of the work of the Fire and Rescue Service. The normal roles and responsibilities of the Fire and Rescue Service are derived from its long experience in firefighting and rescue operations and encompass the saving of life and the protection of property.
- 9.4.2 In responding to an incident at DSRL Dounreay the Scottish Fire and Rescue Service responsibilities may be summarised as follows:
- (a) Liaison with co-located DSRL and other responding personnel to develop a strategy to prevent the further escalation of the incident by tackling fires, dealing with released chemicals and radioactive material and other hazardous situations;
  - (b) The rescue of trapped casualties;
  - (c) Liaison with the Medical Incident Officer and other medical services with regard to the provision of assistance at ambulance loading points and the priority evacuation of injured persons;
  - (d) Participation in investigations as appropriate and preparing reports and evidence for inquiries;
  - (e) Stand-by if necessary during the non-emergency recovery phase to ensure continued safety at and around the site.

## **9.5 ROLES AND RESPONSIBILITIES OF SCOTTISH AMBULANCE SERVICE**

- 9.5.1 The purpose of the Service is to provide immediate care to patients at the scene of an incident and care during transportation to, from and between healthcare facilities. To supplement road transport, the Service operates and controls an integrated air ambulance service using fixed-wing aircraft and helicopters.
- 9.5.2 In the case of an incident requiring decontamination of people exposed to hazardous substances in the community, the Service would assume responsibility for the triage and decontamination of those affected, as an extension of normal operational or major incident procedures.
- 9.5.3 The role of the Ambulance Service can be summarised as follows:
- The saving of life and the provision of immediate care to patients at the scene of the incident and in transit to hospital.
  - The alerting of hospital services, immediate care GPs and other relevant NHS agencies.
  - The management of decontamination for people affected by hazardous substances, prior to evacuation from the scene.
  - The evacuation of the injured from the scene in order of medical priority.
  - Arranging and ensuring the most appropriate means of transport for the injured to the receiving hospital.
  - The supply of patient care equipment to the scene of a major incident.
  - The transport of appropriate medical staff and their equipment to the scene of a major incident.
  - Alerting and co-ordinating the work of the Voluntary Aid Societies acting in support of the ambulance service at the incident site.
  - The provision and maintenance of communications equipment for medical staff and appropriate Voluntary Aid Society personnel at the scene of a major incident.
  - The restoration of normality.

## **9.6 ROLES AND RESPONSIBILITIES OF MARITIME AND COASTGUARD AGENCY**

- 9.6.1 The Maritime and Coastguard Agency is an Executive Agency of the Department of the Environment, Transport and Regions.
- 9.6.2 The Maritime and Coastguard Agency is responsible for:
- Minimising loss of life amongst seafarers and coastal users.
  - Responding to maritime emergencies 24 hours a day.
  - Developing, promoting and enforcing high standards of marine safety.
  - Minimising the risk of pollution of the marine environment from ships and, where pollution occurs, minimising the impact on UK interests.

## 9.7 ROLES AND RESPONSIBILITIES OF NHS HIGHLAND

9.7.1 NHS Highland will normally be alerted to a major incident by the Police and/or Scottish Ambulance Service.

9.7.2 NHS Highland's Major Incident and Emergencies Plan will ensure:

- A planned and prepared response to notifications of a major incident or major emergency
- Availability of Medical Incident Officer (MIO) to attend the incident site
- Provision of immediate health care needs of casualties
- Provision of a site medical team if appropriate
- Early notification of the incident to :
  - the Consultant in Charge of Accident and Emergency at the receiving hospital;
  - the appointment of a Hospital Controller at the receiving hospital;
  - an NHS Highland media adviser;
  - the Director of Public Health, or his representative;
  - the Chief Executive of NHS Highland;
  - The Scottish Government Health Department.

9.7.3 Specifically in relation to a radiation/contamination incident the Director of Public Health or his representative will;

- Advise the Consultant at Raigmore Hospital, Accident and Emergency Department, of anticipated radiation exposed/contaminated casualties.
- Advise NHS Highland's Radiation Protection Advisor of known circumstances and anticipated consequences of the incident.
- Respond appropriately to the Incident category.
  - **OSNE** – receive notification from Police Scotland.
  - Proceed to Police Headquarters, Inverness, to represent NHS Highland on a Strategic Co-ordinating Group.
- Establish and Chair a Scientific and Technical Advice Cell (STAC).
- Consider and prepare for distribution and/or consumption advice regarding Stable Iodine Tablets (SITs) also known as Potassium Iodate Tablets (PITs), as one of the available countermeasures.

### 9.7.4 Stable Iodine (Potassium Iodate) Tablets

Stable Iodine Tablets (SITs) also known as Potassium Iodate Tablets (PITs) have been pre-distributed to residents within the 2km pre-planned countermeasure zone. Reserve supplies of Stable Iodine Tablets (SITs) are held at various locations (see Page 15).

### 9.7.5 Contaminated Casualties

Radiation contaminated casualties may be transferred by ambulance from the scene either to Caithness general Hospital, Wick or to Raigmore Hospital, Inverness, based upon clinical need. This will be assessed by the Ambulance Incident Officer/Medical Incident Officer at the scene. Where the treatment of contaminated casualties with life-threatening injuries is urgent, medical personnel will take all possible measures to avoid being exposed to radiation.

## **9.8 ROLES AND RESPONSIBILITIES OF THE HIGHLAND COUNCIL**

- 9.8.1 It is likely that a number of Council Services would become involved in a major incident at Vulcan.
- 9.8.2 In responding to an incident the local authority's responsibilities may be summarised as follows:
- (a) The selection of Reception Centres and the arrangements for the transportation and reception of local residents in the event of evacuation from the area at risk. Refer to Emergency Support Centres Plan.
  - (b) To provide assistance and resources to the emergency services as requested by them.
  - (c) To liaise with the emergency services engaged at the scene.
  - (d) Co-ordination of the responding organisations during the recovery phase of the incident.
  - (e) Refer to Highland and Islands Strategic Co-ordinating Group - Recovery Guidance Document for the Highland and Islands Councils.

## **9.9 ROLES AND RESPONSIBILITIES OF SCOTTISH WATER**

- 9.9.1 In responding to an incident at Vulcan NRTE Scottish Water responsibilities may be summarised as follows:
- Assess the risk of contamination of the public water supply.
  - Arrange and co-ordinate sampling and analysis of public water supplies in conjunction with SEPA/Health Protection Agency.
  - Assemble information on the level of contamination of public water supplies.
  - Assess the risk to the public health from contaminated water supplies in conjunction with the NHS Boards.
  - Take measures to minimise the risk to public health from contaminated water supplies.
  - Provide advice to customers on public water supplies in accordance with Public Health Guidelines.
  - Where there is a failure in the public water supply, Scottish Water will arrange for alternative supplies of drinking water.

## **9.10 ROLES AND RESPONSIBILITIES OF SEPA**

- 9.10.1 SEPA is the public body responsible for environmental protection in Scotland and has powers to prevent, minimise or reduce pollution of the environment and take action in accordance with environmental legislation.
- 9.10.2 As a Category 1 responder in the terms of the Civil Contingencies Act 2004, SEPA will co-operate with other responder organisations in supporting the response to, and recovery from, any incident or emergency.
- 9.10.3 SEPA is responsible for the regulation of the Radioactive Substances Act 1993. Under the Act SEPA is responsible for the authorisation of radioactive discharges and disposals from the site.
- 9.10.4 SEPA will formally investigate an emergency on the site (working jointly with ONR as appropriate).
- 9.10.5 SEPA maintains an independent monitoring regime for radioactivity in the environment around the site and following an incident may instigate environmental sampling and monitoring in support of its regulatory function. SEPA will also provide advice on any necessary mitigation and recovery measures.
- 9.10.6 SEPA also has a regulatory role on the site in terms of The Waste Management Licensing Regulations 1994 and will provide advice on waste management issues. SEPA will regulate the disposal of any radioactive wastes and other wastes arising as a result of an incident and, if appropriate, will provide advice on the development and delivery of a decontamination strategy.
- 9.10.7 SEPA also has regulatory roles on the site in terms of The Water Environment (Controlled Activities) (Scotland) Regulations 2005, The Pollution Prevention and Control (Scotland) Regulations 2000 and associated legislation.
- 9.10.8 SEPA maintains and operates the RIMNET system in Scotland and will ensure that SEPA's monitoring data is added to the RIMNET system.

## **9.11 ROLES AND RESPONSIBILITIES OF THE SCOTTISH GOVERNMENT**

- 9.11.1 The development of resilience in Scotland is based on the doctrine of Integrated Emergency Management (IEM). The aim of IEM is to develop flexible and adaptable arrangements for dealing with emergencies, whether foreseen or unforeseen. It is based upon a multi-agency approach and the effective co-ordination of those agencies. When the scale or complexity of an emergency is such that some degree of central government co-ordination or support becomes necessary, Scottish Government will activate its emergency response arrangements.

## **9.12 ROLES AND RESPONSIBILITIES OF ORKNEY ISLANDS COUNCIL**

- 9.12.1 In the event of a major incident at Vulcan NRTE the Orkney Islands Council roles and responsibilities may be summarised as follows:
- Assist in any notification of the public;
  - Provide assistance and resources to the local emergency services if required;
  - Liaise with the emergency services, government departments and other relevant organisations;
  - Co-ordinate the recovery phase of the incident and/or effects in the Orkney Islands.

## **9.13 ROLES AND RESPONSIBILITIES OF NHS ORKNEY**

9.13.1 Responding to medical emergencies is a normal feature of the Orkney Health Board. The normal work of the Orkney Health Board encompasses primary health care and the protection of public health.

9.13.2 Responding to an incident at Vulcan NRTE, NHS Orkney's responsibilities may be summarised as follows:

- Care of those affected by the incident;
- Provision of public health advice;
- Provision of psychological support to people who may be affected by the incident.

## **9.14 ROLES AND RESPONSIBILITIES OF THE FOOD STANDARDS AGENCY**

9.14.1 The Food Standards Agency's role will be to ensure that the public is protected from contaminated food following a nuclear emergency. Specific responsibilities are as follows:

- To determine the level of any contamination of the food chain.
- To take action to ensure that food contaminated to unacceptable levels does not enter the food chain.
- To provide advice and information to the public and relevant organisations.
- To take legal measures to prevent unacceptably contaminated food entering the food chain by the implementation of emergency restriction orders under the Food and Environment Protection Act 1985. Such orders are commonly referred to as FEPA Orders, and they restrict the supply, movement or sale of produce from an affected area.
- To ensure, in conjunction with SGRPID and other relevant organizations, the enforcement of any emergency orders.
- To ensure, in conjunction with the Scottish Environment Protection Agency and Local Authorities, the safe disposal of contaminated food.
- To ensure that subsequent remediation takes account of food safety issues.

## **9.15 ROLES AND RESPONSIBILITIES OF THE OFFICE FOR NUCLEAR REGULATION**

- 9.15.1 ONR's response will be led and managed by the ONR Response Centre Director. The ONR response centre is the Redgrave Court Incident Suite
- 9.15.2 ONR will ascertain the facts surrounding the emergency, assess the safety of the affected site, including the operator's proposed actions. Provide independent information/advice. Formulate ONR Strategy and response.

### **ONR Site Team will:**

- Represent ONR at or near the site.
- Ascertain the facts on the emergency including establishing the adequacy of actions taken to secure a safe plant state and the advice given to authorities off-site,
- Submit routine reports on event to the ONR Response Centre.

### **ONR Strategic Co-ordinating Centre (SCC) Team will:**

- Consider all aspects of the emergency which affect the site;
- Provide advice to the Strategic Co-ordinating Centre (SCC) Management Team;
- Provide advice and support to the ONR Response Centre Director.

## **9.16 ROLES AND RESPONSIBILITIES OF THE HEALTH PROTECTION AGENCY (HPA) CENTRE FOR RADIATION, CHEMICAL AND ENVIRONMENTAL HAZARDS (CRCE)**

- 9.16.1 In the event of a major incident at NRTE Vulcan, HPA's role and responsibilities are summarised as follows:
- Advise the MCA, STAC, RWG, TMAG and SCG on radiological protection issues and countermeasures to protect the public in both the emergency and recovery phases.
  - Assess the radiological impact of the incident to the public.
  - Provide support to NHS Highland in activities to monitor members of the public for radioactive contamination and radiation exposure.
  - Support SEPA in its environmental monitoring role.
  - Through HPA's Monitoring Co-ordination Team at its Chilton Headquarters co-ordinate off-site monitoring beyond the sites responsibilities using monitoring resources that are made available to it by other organisations.
  - Provide public information on radiation, its effects and the radiological impact of the incident within the context of this plan and in co-operation with the SCC and MBC and within frameworks set out in Dealing with Disasters Together and the NEPLG Consolidated Guidance.



## **SECTION 10: CONSEQUENCE MANAGEMENT**

The response to most major incidents will essentially be in two phases.

### **10.1 EMERGENCY RESPONSE PHASE**

The emergency response phase covers the actions taken to immediately minimise the consequences of the incident to the local populace and the environment. This phase will normally be co-ordinated by the Chief Constable.

### **10.2 RECOVERY PHASE**

The recovery phase is harder to define due to the extensive variety of potential circumstances resulting from an incident.

It is normally defined as the extended period, beyond the emergency response phase, when actions are taken to protect the public and the environment from longer term risks and promote an early return to normal life. In certain circumstances this may not necessarily equate to a restoration of pre-accident conditions.

The boundary between the two phases cannot be rigidly defined and preparations for the recovery from an incident, in terms of consequence management, form an integral part of this emergency response plan.

This phase will be co-ordinated by the Chief Executive, Highland Council.

### **10.3 AIMS OF CONSEQUENCE MANAGEMENT**

To initiate preparations, as an integral part of this Emergency Response Plan to mitigate the initial effects of the incident and facilitate the transition to and actions required during any recovery phase.

To protect the public and the environment from longer term risks and promote an early return to “normal” life.

## TERMS OF REFERENCE FOR CONSEQUENCE MANAGEMENT

### 10.4 PRINCIPLES OF JUSTIFICATION AND OPTIMISATION

The principles applying to recovery activities as a result of any incident should follow these recommendations:

- (a) “the proposed intervention should do more good than harm, ie. the reduction in detriment should be sufficient to justify the harm and costs, including social costs, of the intervention, **(the justification of intervention)**”.
- (b) “the form, scale and duration of the intervention should be optimised such that the benefit of the intervention should be maximised **(the optimisation of intervention)**”.

Generally, Consequence Management should:

- propose options for consideration and prepare plans for their implementation;
- identify priorities, timescales and costs for the options being considered;
- identify a strategy for public consultation and involvement;
- advise on, and assess, recovery monitoring so as to ensure that objectives and targets are being achieved;
- identify the extent and nature of any contamination;
- identify options and strategies for clean-up and disposal of wastes;
- identify where applicable, options and strategies for long term re-location/re-housing of evacuees;
- maintain records and costs of recovery actions and provide briefing and information as necessary.

### 10.5 ORGANISATION OF CONSEQUENCE MANAGEMENT

During the Emergency Response Phase, the command and control of the incident will be as documented.

A Recovery Working Group (RWG) will be established during this phase to initiate actions and prepare for the longer term effects of the incident.

### 10.6 LIAISON

The group will initially input directly with the command and control organisation in the SCC and prepare to continue to operate through the recovery phase where they will integrate into the consequence management organisation under the Chairmanship of the Chief Executive of Highland Council.

### 10.7 CHAIRMANSHIP OF THE RECOVERY WORKING GROUP (RWG)

The Group will be chaired by:

Highland Council

### 10.8 LOCATION

When called together, the group will operate initially within the SCC.

## **10.8 MEMBERSHIP**

### **Composition of the Group**

There will be a core membership and depending on the nature of the incident additional representatives from the optional members list will be seconded.

#### **Core Members**

Environmental Health, Highland Council (CHAIR)

Police

NHS Highland

SEPA

MoD

Operator (Rolls-Royce)

Food Standards Agency (FSA)

ONR

SGRPID

#### **Optional Members**

Forestry Commission

Health & Safety Executive (HSE)

Housing Service, Highland Council

Marine and Coastguard Agency (MCA)

National Farmers Union (NFU)

ScotRail

Scottish Government Rural Payment Inspections Directorate (SGRPID)

Scottish Natural Heritage (SNH)

Scottish Society for the Prevention of Cruelty to Animals (SSPCA)

Scottish Water

Trading Standards, Highland Council

Utilities (gas, electricity, telephone etc)

Waste Management, Highland Council

Membership of the Recovery Working Group will be kept under review, by the Chairman, as the number of organisations needing to be involved will change as work progresses.

## 10.9 ISSUES DURING THE RECOVERY PHASE

Issues during the recovery phase may include:

**a. Immediate concerns:**

- (1) Areas affected.
- (2) Number/types of properties (residential, schools, businesses).

**b. Priority actions:**

- (1) At risk groups (elderly, disabled, schools, etc)
- (2) Cordons/security/public access to contaminated areas.
- (3) Public health issues (Health Authority)
- (4) Media/press advice.

**c. Decontamination/clean-up issues:**

- (1) Recovery category countermeasures options (Health Protection Agency /Cats A-C)
- (2) Decontamination options (Health Protection Agency)
- (3) MoD support:
  - A. Specialist plant, equipment and manpower.
  - B. Disposal of radioactive waste.
  - C. Cost control mechanisms.

**d. Relocation Issues:**

- (1) Identification of affected properties.
- (2) Priorities/timescales.
- (3) Livestock and personal effects.
- (4) Emergency housing implications (external LA support).

**e. Long-term relocation considerations:**

- (1) Accommodation.
- (2) LA support arrangements (benefits/counselling etc).
- (3) Update bulletins (PR).
- (4) Phased reoccupation priorities.
- (5) Demolition of seriously contaminated homes (rebuild implications).
- (6) Collation of evidence for public enquiry.
- (7) Appeal funds.
- (8) VIP visits/memorial services (Royals etc).

- f. **Miscellaneous Issues:**
- (1) Finance/compensation claims.
  - (2) Effects on tourism.
  - (3) Specialist helplines.

## 10.10 EFFECTIVENESS OF RECOVERY COUNTERMEASURES

Health Protection Agency advice on recovery countermeasures recognises the following categories of measures:

- a. **Category A** Those measures that are moderately dose-effective, incur relatively little disruption or resource, and which can be completed soon after the accident.
- b. **Category B** Those measures that are more strongly dose-effective, but which incur significant disruption and/or resources, or can only be carried out over protracted periods.
- c. **Category C** Those measures that are either poorly dose-effective or only moderately dose-effective and incur significant disruption and/or resources.

## 10.11 DECONTAMINATION MEASURES

The effect of decontaminating a particular surface on the dose received by an individual is dependent upon the contribution of that surface to the individual's total dose. The importance of a surface in contributing to dose depends on a number of factors. These include the relative deposition into different surfaces, how fast activity weathers off the surface, where it is redistributed to and where people spend their time. Some of the measures are listed below.

- (a) **Vacuum Sweeping & Fire Hosing.** Among the lowest cost countermeasures. They also have the advantage that they could be carried out relatively quickly, with little subsequent disruption to the population.
- (b) **Grass Cutting & Collection.** This is most effective following deposition under dry conditions, as a larger proportion of the deposited activity is intercepted by the grass. The effectiveness of this technique will depend on the length of the grass at the time of deposition, being less effective for recently mown grass, and on its implementation before substantial rain falls.
- (c) **Soil Removal, Ploughing, Rotovating & Digging.** This can lead to relatively large dose reductions, of the order of 40-60%. The choice of measure would depend on the size of the individual areas affected.
- (d) **Tree Felling/Shrub Removal.** This procedure can lead to some reduction in dose in the first year, following dry deposition, but is generally only potentially worthwhile in certain specific situations (ie. Where deposition has occurred in spring or summer under dry conditions and where there is a high density of trees and shrubs around buildings).
- (e) **Restricted Access Measures.** The dose-effectiveness of restricted access measures will depend upon both the potential exposure rate and the length of time individuals would spend in an area if restrictions were not imposed.

## SECTION 11: SCIENTIFIC & TECHNICAL ADVICE CELL (STAC)

- 11.1 Should a major incident require a Strategic Co-ordinating Group to be established, the Chair of that group would seek advice from a STAC, on health matters.
- 11.2 The Director of Public Health, or a nominee, will be responsible for establishing and chairing STAC, to address any threat to public health, including communicable disease, chemical, biological, radiological or nuclear incident hazards.
- 11.3 The Chair of the STAC will attend all Strategic Co-ordinating Group meetings, to present the Group's advice to the Chair of the SCG. This will require co-ordination of the timing and time management of each group.
- 11.4 The core representation on the STAC will be:

Director of Public Health or nominated deputy	- NHS Highland - Chair
Consultant in Public health Medicine	- NHS Highland
Environmental Health Officer	- Highland Council
Health Protection Agency – CRCEH	
FSA	
Office for Nuclear Regulation (ONR)	
SGRPID	
Scottish Water	

Additional members with particular expertise may be co-opted on to the group, to address issues arising from a specific threat.

- 11.5 The STAC will:
- take advice on health aspects of the incident from a range of experts, including Health protection Scotland
  - provide advice to the Chair of the Strategic Co-ordinating Group on the health consequences of the incident including those relating to evacuation or shelter
  - agree with the Strategic Co-ordinating Group, the advice to be given to the public on the health aspects of the incident, and the method of delivery
  - maintain a written record of decisions made by the STAC, and the reasons for those decisions
  - liaise with the Scottish Government Health Department, and other Health Boards
  - formulate advice to health professionals in hospitals, ambulance service and general practice
  - formulate advice on the strategic management of the health service response
  - instigate any health related investigation measures necessary
  - participate in the consequence management phase, and take responsibility for co-ordinating more detailed assessment of an immediate health impact.



## MAP SHOWING AREA FROM STRATHY TO THE DOUNREAY SITE



### Map showing area from Strathgy to the Dounreay Site (REPPiR)

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## MAP SHOWING AREA FROM DOUNREAY SITE TO THURSO



### Map showing area from Dounreay Site to Thurso (REPPiR)

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## APPENDIX 3 (A)

### PROCEDURE FOR CLAIMS FOR INJURY, DAMAGE OR LOSS

In the event of nuclear injury or damage arising during the operation of NRTE Vulcan, the following general arrangements will apply to the handling of claims or compensation:

- (a) The Ministry of Defence will deal with claims under the principles for nuclear injury or damage (including the sole and absolute liability of the operator) established by the Nuclear Installations Act 1965.
- (b) There is no set form for making claims. Full details of the circumstances will be required, and special instructions will be issued to the public as necessary. (Crown servants on duty should report any nuclear injury to their parent department).
- (c) Claims arising in connection with special public safety measures taken (eg. under arrangements made by representatives of Government Departments or Local Authorities in relation to milk, foodstuff, growing crops or animals), should be submitted in accordance with paragraph b. above and should be supported by detailed statements certified by the official or representative by whom instructions were issued or from whom instructions (e.g. as to disposal of produce) were received. There are statutory powers under FEPA to restrict the distribution of foodstuffs, authorised officers of local Authorities have powers under the Foods Safety Act 1990 to seize food intended for sale for human consumption but unfit for such sale and to bring it before a Sheriff or Justice of the Peace who may condemn it and order it to be destroyed or so disposed of as to prevent it being used for human consumption. It might not always be possible to deal with an emergency rapidly enough under these powers, and restrictions on the use and sale of foodstuffs, etc, will if necessary, be imposed by Governmental Administration action in co-operation with various local bodies and agencies. This action is covered by the statutory power contained in the Food and Environmental Protection Act 1985 which empowers the Scottish Ministers to investigate incidents involving an escape of substances (including radioactivity) and, if there is a possibility that the safety of food may be at risk, to make emergency Orders prohibiting various activities, including the movement of food or anything from which food could be derived, in designated areas of land or sea within Scottish fishery limits. Scottish Ministers may authorise investigation and enforcement to assist him in carrying out these functions.
- (d) Director of Public Health and other local Officers may be required to act on the instructions of the Naval Officer-in-charge or of the Regional Representative of the relevant Government Department. In doing so, they will be regarded as the agents of HM Government (with the support of the Ministry of Defence) in any matter of liability arising from the discharge of the duties involved.

## APPENDIX 3 (B)

### REGISTRATION OF CIVILIANS IN AN AREA AFFECTED BY RADIOACTIVITY

If radioactivity affects areas outside MoD property, it may be necessary to arrange for civilians in the affected area to register so that it is possible to prove their presence in an affected area in connection with subsequent compensation claims. If it is considered that the circumstances of any particular accident warrants this step, the Ministry of Defence will make the necessary arrangements for the forms to be made available through local post offices.

When the decision to issue registration forms is taken, release of the following public announcement will be authorised by the Ministry of Defence:

#### DRAFT PUBLIC ANNOUNCEMENT FOR PRESS AND BROADCASTING IN THE EVENT OF A NUCLEAR REACTOR ACCIDENT

“There has been an accident on the NRTE Vulcan Site operated by the Ministry of Defence which has led to a release of radioactivity affecting the following areas .....

Radioactivity can have effects which do not always show themselves immediately, and a person who considers that he or she may have been affected as a result of the radioactivity released can make a claim within 30 years of the accident.

Any person would, of course, have to prove that they were in the affected area at the time and this might be very difficult to do many years afterwards.

The Ministry of Defence has, therefore, set up a register, and anyone who was in the area at the time can apply to be registered. The inclusion of a name in the register will not **prove** that the person was here, but it will provide evidence that the person was, and this can be disputed only if other evidence was produced which showed that the person was not.

Anyone who was in the area between ..... and .....on ..... whether they lived there, or were there only temporarily, may apply for registration on a form, which can be obtained from any post office in the area for the next month or from the Ministry of Defence.

The following points should be particularly noted:

- (a) A separate form should be filled in for each person who wishes to register.
- (b) Forms can be obtained only from post offices in the affected area or from the Ministry of Defence.
- (c) The function of the post office in this matter is purely and simply that of a distributing agency.



## LETTER TO ALL OCCUPIERS OF AGRICULTURAL HOLDINGS PRODUCING MILK WITHIN THE MILK PRODUCING AREA

Tel No (as appropriate)

**Food Standards Agency**  
(Address as appropriate)

Date .....

Dear Sir

### **ACCIDENT ON THE VULCAN NRTE SITE – RESTRICTIONS ON THE USE OF MILK**

Your farm is within the area to which restrictions on the use of milk for human consumption has been applied.

Until further notice milk produced on your farm must not be used for human consumption, nor may it be processed for butter or cheese.

Your milk may/may not be fed to livestock.

If you sell directly to a milk wholesaler or dairy company the milk will be collected as usual and all contaminated milk will be disposed of. You will be paid for it as usual.

If you produce milk for your own consumption only, then you should dispose of it by burying it in a trench specially dug for the purpose. The trench should be dug below the level of the farm buildings and sufficiently deep to provide a soakway. Care should be taken to ensure that water supplies cannot be contaminated. Milk must not be discharged directly into streams.

If you normally produce and sell milk by retail directly, then SGRPID will arrange to collect and dispose of it during the period covered by the restrictions.

You will be informed by letter as soon as these restrictions can be removed. In the meantime, arrangements are in hand to import uncontaminated milk into the area for human consumption and supplies can be obtained from any milk retailer. Please notify your workers of this arrangement. While the restrictions on the use of milk lasts, dairy cows must not be moved or brought to your farm without special permission from this Department.

Personnel who suffer financial loss as a result of the foregoing instructions will be informed as soon as possible of arrangements made for their compensation.

Yours faithfully

## **STAND DOWN NOTICE TO FARMERS**

Tel No (as appropriate)

**Food Standards Agency**  
(Address as appropriate)

Date .....

Dear Sir

### **ACCIDENT ON VULCAN NRTE SITE – REMOVAL OF RESTRICTIONS MILK**

With reference to the restrictions on the use of milk produce on your farm given in the Departments letter of ..... I am pleased to inform you that so far as your farm is concerned there is no longer any danger resulting from the recent accident and the restrictions placed on milk produced on your farm are now lifted.

Similarly, the restrictions on movement of dairy cows to or from your farm are removed.

Yours faithfully

## NOTICE TO FISHERMEN AND OWNERS OF FISHING VESSELS

Tel No (as appropriate)

**Food Standards Agency**  
(Address as appropriate)

Date: .....

**Dear Sir/Madam**

### **ACCIDENT ON VULCAN NRTE SITE – RESTRICTIONS ON FISHING CLOSURE ORDER UNDER THE FOOD AND ENVIRONMENT PROTECTION ACT 1985**

I am writing to inform you that there has been an incident/accident on the Vulcan NRTE Site at (name of area or precise co-ordinates). As a consequence the Food Protection (Emergency Prohibitions) (Pollution of Fish) Order 199( ) came into force at ( ) hours on (date, month, year). The landing and use in the production of food or fish taken from the designated area after one minute past midnight on (date, month, year) is prohibited.

The Order designates an area within which fishing and taking fish is prohibited and prohibits the movement of fish out of that area (see maps/charts attached). Other restrictions are imposed throughout the United Kingdom including the use or supply of fish taken from that area.

You will be informed by letter as soon as these restrictions can be removed. Please ensure that the crew(s) of your vessel(s) are advised of these restrictions.

Yours faithfully

## APPENDIX 4 (D)

### NOTICE TO FISHERMEN AND OWNERS OF FISHING VESSELS

#### STAND DOWN NOTICE

Tel No (as appropriate)

**Food Standards Agency**  
(Address as appropriate)

Date:

Dear Sir/Madam

#### **ACCIDENT VULCAN NRTE SITE REMOVAL OF RESTRICTIONS ON FISHING**

I refer to the restrictions on fishing brought in by the Food Protection Emergency Prohibitions (Pollution of Fish) Order 199( ) details of which were given in the Agencies letter of.....

I am pleased to inform you that the restrictions of the taking and landing of fish from the designated area were lifted from one minute past midnight on (date, month, year).

Yours faithfully



**THESE SHOULD  
ONLY BE  
TAKEN IF TOLD  
TO DO SO**

## STABLE IODINE (POTASSIUM IODATE) TABLETS

### Nuclear Incidents

- If there is a nuclear incident various radioactive materials may be released. Most radioactive substances can be kept away from the body by sheltering – going indoors and shutting doors and windows.
- Radioactive iodine is one of the substances which may be released following a nuclear reactor accident. It can enter the body by breathing in contaminated air.
- Iodine, whether radioactive or in any other form quickly enters the bloodstream and travels to the thyroid gland in the neck where it remains for some time.

### Preventing Thyroid Cancer

- The increased risk of thyroid cancer can be greatly reduced by taking SITs. (This will ensure that your thyroid gland will absorb non-radioactive iodine and therefore will minimise any uptake of radioactive iodine).
- A significant number of children in the area around Chernobyl have developed thyroid cancer because they were not given SITs following the nuclear incident in 1986.

### Who should take SITs?

- The radioactive iodine level in the air can be measured and if it is raised you will be asked to take SITs.
- Everyone in the affected area (called the Pre-planned Countermeasures Zone) should take SITs as soon as possible once they are told to do so. Babies, babies, toddlers and children will get most benefit.
- By having SITs in your house there will be no delay should you be asked to take the tablets.
- Take the SITs dosage once only unless otherwise advised.

### **DOSAGE**

- |   |                       |
|---|-----------------------|
| • Adults (everyone aged 13 years and over)<br>(including pregnant women and women breast feeding) | - 2 tablets           |
| • Children aged 3 – 12 years  | - 1 tablet            |
| • Children aged 1 month – 2 years 11 months   | - Half a tablet       |
| • New-born babies (0 – 1 month)   | - Quarter of a tablet |

**NHS Highland and the Ministry of Defence will ensure that your supply of SITs will always be kept in date.**

### Side-effects of SITs

- The World Health Organisation has reviewed the use of SITs which were distributed extensively in Poland after the nuclear incident at Chernobyl. No serious side-effects were reported. There were some stomach upsets and skin rashes. The risk of getting one or the other of those side-effects was less than 1 in 10 million for children and less than 1 in 1 million for adults.

## APPENDIX 5 (B)

### DOSE LEVELS FOR EMERGENCY SERVICES PERSONNEL ATTENDING AT A RADIATION INCIDENT UNDER REPPIR

#### Scottish Fire and Rescue Service

Highland and Islands Fire and Rescue Service adopts the dose limits detailed within the Ionising Radiation Regulations 1999 (IRR) and The Radiation (Emergency Preparedness and Public Information) Regulations 2001 (REPPIR).

The maximum dose limits for firefighters as a result of the above is as follows

All Firefighters - 20mSv in any calendar year

Female Firefighters - 13mSv in any consecutive period of three months and no more than 20mSv in any calendar year.

In the event of a radiation emergency, regulation 15 of REPPIR allows for the 1999 Regulations to be disapplied for the purposes of intervention. However, the principles of the Health and Safety at Work Act 1974 still apply and dose rates should be ALARP (As Low As Reasonably Practicable) to deal with the incident.

Note. The Fire and Rescue Service would only apply the above exemption in exceptional circumstances and even then only when there was a radiation specialist available to provide expert advice.

#### Scottish Ambulance Service

Reference Level 1 – 1 mSv total per event. This is for staff who have not been identified for specialist roles or decontamination providers.

Reference Level 2 – 5 mSv per event. For staff who have volunteered to be involved in decontamination roles.

Effective dose: **100 mSv**

#### Police Scotland

No police staff are to be subjected to emergency exposures of radioactivity in the event of an incident. Therefore Police Scotland officers and staff will work to the public dose limit of:

Effective dose: **1 mSv**

## APPENDIX 6

### ABBREVIATIONS

CPHM	CONSULTANT IN PUBLIC HEALTH MEDICINE
DNEO	DEFENCE NUCLEAR EMERGENCY ORGANISATION
DPHM	DIRECTOR OF PUBLIC HEALTH MEDICINE
EC	EMERGENCY CENTRE
EPO	EMERGENCY PLANNING OFFICER
ERL	EMERGENCY REFERENCE LEVEL
FCP	FORWARD CONTROL POINT
FSA	FOOD STANDARDS AGENCY
GTA	GOVERNMENT TECHNICAL ADVISOR
HPA	HEALTH PROTECTION AGENCY
ICP	INCIDENT CONTROL POINT
IO	INCIDENT OFFICER
MBC	MEDIA BRIEFING CENTRE
MCA	MARITIME & COASTGUARD AGENCY
MCA	MILITARY CO-ORDINATING AUTHORITY
MIO	MEDICAL INCIDENT OFFICER
PSFOC	POLICE SCOTLAND FORCE OPERATIONS CENTRE
NDA	NUCLEAR DECOMMISSIONING AUTHORITY
NEBUST	NUCLEAR EMERGENCY BACK UP SUPPORT TEAM
NEMO	NUCLEAR EMERGENCY MONITORING ORGANISATION
NEMT	NUCLEAR EMERGENCY MONITORING TEAM
NERO	NUCLEAR EMERGENCY RESPONSE ORGANISATION
ONR	OFFICE FOR NUCLEAR REGULATION
OSNE	OFF SITE NUCLEAR EMERGENCY
OSNE (RHC)	OFF SITE NUCLEAR EMERGENCY (RADIATION HAZARD CONFIRMED)
OSNE (RRMC)	OFF SITE NUCLEAR EMERGENCY (RELEASE of RADIOACTIVE MATERIAL CONFIRMED)
PIZ	PUBLIC INFORMATION ZONE
PDA	PRE DETERMINED ATTENDANCE

REPPIR	RADIATION (EMERGENCY PUBLIC PREPAREDNESS AND INFORMATION) REGULATIONS
RSA	REACTOR SAFETY ALERT
RVP	RENDEZVOUS POINT
SAS	SCOTTISH AMBULANCE SERVICE
SCC	STRATEGIC CONTROL CENTRE
SGoRR	SCOTTISH GOVERNMENT RESILIENCE ROOM
SGRPID	SCOTTISH GOVERNMENT RURAL PAYMENTS & INSPECTIONS DIRECTORATE
SEPA	SCOTTISH ENVIRONMENT PROTECTION AGENCY
SMT	SITE MEDICAL TEAM
VECC	VULCAN EMERGENCY CONTROL CENTRE

## GLOSSARY OF TERMS

Approved Dosimetry Service. (ADS)	The legally approved service for the provision and processing of personal radiation monitoring devices.
Automatic Countermeasure Distance (ACMZ)	550 meters from the submarine. In the event of an accident all personnel within this distance are either evacuated outside it or sheltered within it prior to subsequent evacuation. These arrangements are automatic within a pre-arranged site plan, and include the administration of stable iodine.
Becquerel (Bq)	Unit of quantity of radioactive material. 1 Bq = 1 disintegration per second.
COMMCEN	Communications Centre. Centre for the passage and communication of information
COMMPAN	Communications Plan. Agreed plan for the distribution of key and informative information.
Contamination	Deposited radioactive particles.
Core	The region of a reactor containing fuel within which the fission reaction is occurring.
Crud	Radioactive impurity deposits inside a reactor or its coolant circuit.
Decontamination	Removal of radioactive material from a person or surface.
DEPZ	An area out to 2km from the site.
DNSR	Defence Nuclear Safety Regulator. The Ministry of Defence's nuclear regulator.
Dose of Radiation	Radiation doses may be the "absorbed dose" which is the amount of energy deposited in a unit made by ionising radiation's, or the "equivalent dose" in which the absorbed dose is multiplied by a radiation weighting factor and taking account of the varying degree of biological damage caused by different types of radiation.
Down Wind Sector	Normally refers to the sector 15° either side of the prevailing wind direction downwind of the site.
Effective Dose	An effective dose means the sum of the effective dose to the whole body from external radiation and the committed effective dose from internal radiation.
Emergency Reference Level (ERL)	Range of radiation doses below which countermeasures carry more risk than the dose and above which countermeasures are always required.

Exclusion Zone	The prototype reactor assembly area during an incident.
Fuel	The enriched uranium fabricated for use in the core. Fuel and cladding together comprise FUEL ELEMENTS.
Gamma Radiation	High energy electro-magnetic radiation of considerable penetrating power emitted by most radioactive substances.
Gamma Shine	The gamma radiation emanating from the reactor compartment of a submarine following a reactor accident.
Going Critical	The process of withdrawing the Control Rods from the reactor in a highly controlled manner to increase the rate of fission, hence power, until self-sustaining condition is reached.
Half-Life	Period of time within which half the nuclei in a sample of radioactive material undergoes decay.
HPA - CRCE	Health Protection Agency - Centre for Radiation Chemical and Environmental hazards.
IC	Incident Commander. Designated officer in command of the incident at specified levels and location.
Iodine	As Iodine 131, biologically hazardous fission product of short half-life (8 days) which tends to accumulate in the thyroid gland.
MCA	Military Co-ordinating Authority. Senior MoD officer at Strategic co-ordinating the MoD response.
NEBUST	Nuclear Emergency Back-up Support Team. Additional specialist support to Strategic following OSNE declaration.
NEMO	Nuclear Emergency Monitoring Organisation. Specialist support for the monitoring and sampling of radiation and contamination as a result of a nuclear emergency.
NERO	Nuclear Emergency Response Organisation. Collective description of the Agencies responding to a declared nuclear emergency.
Neutron	Uncharged particle, consistent of nucleus – ejected at high energy during fission, capable of being absorbed in another nucleus and bringing about fission.
OSNE	Offsite Nuclear Emergency. A hazardous condition which requires the implementation of urgent countermeasures to protect the public.
Pasquill	Weather categories.

PITS	Potassium Iodate Tablets – also known as Stable Iodine Tablets (SITs) to reduce the risks of radioactive Iodine.
Plume	Airborne contamination in downwind sector.
PWR	Pressurised Water Reactor. The type of reactors operated by the Ministry of Defence within nuclear submarines.
Radiation	Neutrons, Alpha and Beta particles or Gamma Rays which are emitted from radioactive substances.
Radioactivity	Behaviour of substance in which nuclei are undergoing transformation and emitting radiation. It is measured in the number of disintegrations per second.
RC	Reactor Compartment. Compartment containing the nuclear reactor and some of its associated support systems.
RPV	Reactor Pressure Vessel. Vessel containing the nuclear reactor and its components.
RSA	Reactor Safety Alert. An abnormal event which poses a potential threat to, or causes serious concern for, reactor plant safety.
RR	Rolls Royce. Technical Authority and reactor operator at NRTE.
Shielding	Material such as concrete, lead, special constructed polythene or water which attenuates radiation and reduces its intensity.
Shutdown	The reactor state when all the control rods are fully inserted.
Sievert (Sv)	Unit of both effective dose and equivalent dose.
SITs	Stable Iodine Tablets – also known as Potassium Iodate Tablets (PITs).
SLO	Site Liaison Officer. Liaison officer from the site with the responsibility of assisting in information and advice.
Steam Generator	Boiler in which hot coolant from the reactor core raises steam to drive propulsion machinery and turbo generators.
SRD	Safety and Reliability Directorate (AMEC).
STF	Shoreline Test Facility. Reactor Building within NTRE housing the reactor and its associated systems.



Sub-Critical	A reactor is sub-critical when the fission rate is insufficient to maintain a self-sustaining chain reaction.
TLD	Thermoluminescent Dosimeter - a radiation monitoring device for use by individual personnel or for monitoring the environment.
Whole Body Radiation Dose	The total radiation dose to the body received from all sources.