SEPA

Our Ref: 460/040/030/020
Your Ref: CD/2411NFLA/SS

M P Henton
Director Environmental
Strategy

Carol Dickson
Secretary
NFLA Scotland
Glasgow City Council
Chief Executive's Department
City Chambers
Glasgow G2 1DU

09 December 1998

Dear Ms Dickson

EXERCISE SHORT SERMON 1997

My apologies for the delay in responding to your letters regarding Exercise Short Sermon 1997, and the concepts of Best Practical Environmental Option.

I thank you for your interest in SEPA's response in the above exercise. It was a unique exercise in some ways as it did allow an opportunity to apply BPEO to an hypothetical accident scenario.

You asked for clarification on the concepts of BPEO applied and other factors involved in deciding to "sink" the casualty submarine in the exercise.

The main consideration in the exercise scenario considered was how to minimise the potential resultant environmental contamination from a rapidly degenerating reactor core. The core had breached the reactor shell and was resting against the hull of the submarine. It was clear that the reactor would soon fall through the submarine hull due to the heat of the core and result in a water-hydrogen explosion with potentially Chernobyl-like consequences, leading to far-reaching contamination of both land and sea. Sinking the submarine before total breach of the hull allowed the core to be contained and cooled before the integrity of the hull was damaged and any explosion occurred. The intention was to then to further contain the submarine hull with construction of a physical barrier to contain the limited leakage occurring and drastically reduce environmental contamination.

SEPA have not prepared a detailed report on this issue but obviously this exercise has highlighted issues which will be taken into account when developing our emergency plans.

HEAD OFFICE
Erskine Court
The Castle Business Park
STIRLING FK9 4TR
Tel: 01786 457700
Fax: 01786 446885

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FASLANE NUCLEAR ACCIDENT EXERCISE SHORT SERMON 18-20 NOV 97

Outline of exercise

The exercise started shortly before 9 am on Tuesday 18th November with a simulated fire on the nuclear powered submarine HMS Sovereign which was berthed at Faslane. Alarms were sounded and emergency services were sent to the scene. Personnel within the base were told to go to their shelter positions.

Artificial wind conditions were imposed. The exercise wind direction changed during the course of Tuesday morning, initially coming from the South, then from the North. Evacuation took place using the North Gate between 12 noon and 2 pm. Announcements over the tannoy made it clear that at this stage it was a "Category 2" accident, which means that there had been a release of radiation inside the submarine, but not into the atmosphere.

At 3 pm there was a release of radiation from the submarine into the atmosphere. This was a slow release which continued for hours afterwards. Nuclear Monitoring Teams were deployed in landrovers but were not wearing the protective clothing which they would have required in a real accident.

On Tuesday almost the entire Faslane base was involved in the exercise. On Wednesday and Thursday the exercise was only conducted on paper at the Clyde Off Site Centre at Rhu.

The combination of gamma radiation coming from the hull and the release of radioactive dust into the atmosphere meant that from Tuesday afternoon onwards no-one could get near the submarine. Various ideas were discussed at the Off Site Centre. The first solution was to fly over the submarine in a helicopter and drop bags of water onto the reactor compartment. This was deemed to have been tried and failed. So the Navy proposed bringing a warship alongside to fire shells at the submarines ballast tanks and sink it. In the paper exercise this course of action was agreed and carried out.

We were told that the Off Site Centre decided that there would be a total restriction on all foodstuffs grown within 150 kilometres downwind of Faslane. As the exercise wind was coming from the North, this would have affected agricultural areas in Renfrewshire and Ayrshire.

Comments

Potassium Iodate Tablets

The scenario of the exercise ducked the problem of how to distribute PITs effectively. The exercise assumed that there would be a period of 6 hours between the alert being sounded and there being a release of radiation to the atmosphere. Clearly in these circumstances it could be possible to distribute PITs, give advice to take shelter or evacuate. So far we do not know what decisions were made about this.

The main problem is how do you get PITs to people, particularly children, quickly enough if you don't have several hours warning. There is a danger that this exercise may create the impression that the procedures are adequate, when they are not.

Shelling a nuclear submarine

We were told by some of the civil nuclear participants that they were horrified at the idea of shelling the submarine. Andy Moore, Assistant Director Nuclear Accident Response at the MoD, said that "sinking the submarine was the course that offered the best protection of the public. The trade off between the

deposition of radioactive material on land and in water was fully considered."

There are three concerns about shelling nuclear submarines:

(1) Those involved in the exercise must have been facing a major nuclear hazard to have taken this option. The MoD frequently repeats that even in the worst case the hazards from a nuclear submarine accident would not be on the scale of Chernobyl. To consider shelling a submarine they must have been facing very significant radioactive contamination.

(2) Shelling and sinking the submarine both carry risks of making matters worse. Once a situation was reached in which no-one could go near the submarine, information about what was actually happening on the vessel and particularly inside the reactor would be limited. Shelling could set of an explosion. Flooding the reactor with sea water could also set off a steam explosion.

(3) A sunk submarine would remain a long term radiation hazard to the Clyde estuary. All the towns and cities in the estuary, including Glasgow, would be affected. In addition to the direct dangers from radiation there would also be serious consequences for tourism and other economic considerations.

Other Developments

A Panorama film crew were filming during the exercise. The programme which was broadcast did not use this footage, but did highlight cases of submariners and dockyard workers who had contracted cancer from working on nuclear submarines. It also made it clear that external monitoring for radiation was not in itself sufficient because radiation inhaled and injested by workers was a greater hazard.

In a recent answer in Parliament the MoD said that there have been 500 occassions since 1980 when reactors on nuclear submarines have been shut down because of possible defects. Many of those occurred at sea.

Further Action

(1) We still do not know the full details of the exercise. We could ask for copies of reports on the exercise from participants, including Renfrewshire Council, MoD, NRPB, Argyll and Clyde Health Board, .. A & B

(2) There are issues concerning nuclear submarine accidents which were not addressed in the exercise - including how to distribute PITs if there is a no-warning accident and how to respond to an accident at sea. Further questions have to be asked about this.

EXERCISE SHORT SERMON

The largest ever nuclear accident exercise will take place at Faslane submarine base from 18th to 20th November 1997. Exercise Short Sermon will simulate a limited release of radioactive material into the atmosphere from the reactor of a nuclear submarine.

The exercise will involve evacuating 4,000 people from Faslane base and decisions being made on measures to protect the public in the surrounding area. However the exercise will not simulate the worst possible accident, which could affect most of Scotland.

What the MoD say about Exercise Short Sermon

Mystic Mod ?

"We will always get advanced warning if something was to go wrong" Andy Moore MoD [1]

The Navy must think that the public are incredibly naive, if they expect us to believe this. There are some accident scenarios in which the situation would deteriorate slowly over several hours and where the Navy would be able to anticipate a disaster, but there are many other scenarios in which a disaster could happen in minutes or seconds.

- An explosion: Each nuclear submarine carries around 14 torpedoes, each of which is designed to sink a submarine. Vanguard class submarines also carry 12 - 16 Trident missiles. The rocket fuel in each missile is 50 tonnes of high explosive. In addition to which are the nuclear warheads on top. An explosion could also result from a collision with another vessel. Thousands of tonnes of explosives are transported by sea through Loch Long each year to and from Glen Douglas ammunition depot. Oil tankers also frequent the loch.
- An earth tremor: The shiplift at Faslane would not withstand an earthquake and so has not been given full safety clearance. It is used to lift fully armed Trident submarines out of the water.
- A fire: Any fire on a nuclear submarine is a serious incident. A fire could quickly get out of control in the close confines of a submarine.

The MoD are assuming that these kinds of accidents can't happen and that they will *always* get advanced warning. They are now saying that they will always have a few hours notice, enough time to distribute potassium iodate tablets to the local population, before there was a disaster. The Armed Forces Minister Dr John Reid has said in letters to MPs:

"It is planned that potassium iodate tablets would be distributed before any release of radioactive material had occurred at a time determined by monitoring the condition of the reactor."[2]

However the Navy themselves have admitted in the past that there could be a sudden accident, with no advanced notice. The 1983 Safety Scheme for Faslane said that in some circumstances there could be an accident in which there was a radiological hazard external to the nuclear plant, without there having been an earlier stage which could give them warning.[3]

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[1] Andy Moore, Assistant Director Nuclear Accident Response Centre, MoD, reported in Helensburgh Advertiser, 23 Oct 97.

[2] Letter from Dr John Reid Armed Forces Minister to Dennis Canavan MP, 31 Oct 97. The same phrase has been used in letters from Dr Reid to George Foulkes MP, Tony Worthington MP and Alex Falconer MEP.

[3] Clyde Public Safety Scheme 1983 p 3-3.

An unblemished record ?

"There has never been an accident involving a nuclear powered submarine reactor which has led to, or come anywhere near leading to, any release of radioactive contamination to the environment" Dr John Reid, Armed Forces Minister.[4]

There are four Russian (K8, K219, K278, K27) and two American nuclear submarines (USS Thresher, USS Scorpion) currently on the sea bed following major accidents. A nuclear armed missile exploded on Russian submarine K219 on 6th October 1986. The reactor on Russian submarine K 314 exploded on 10th August 1985, at least ten people died and radiation was scattered across Siberia.[5]

"In 40 years we have never had an accident" Commander Eric Thompson, Faslane[6]

The Navy has had a long string of accidents on nuclear submarines. The most recent being the release of radioactive coolant from the reactor of HMS Turbulent in early November 1997. The two most serious known accidents were:

- 2nd May 1976. There was a major fire on the nuclear submarine, HMS Warspite, when the vessel was visiting Liverpool. The fire lasted for 5 hours and it took 2 years to repair the submarine.
- 30th April 1992. There was a serious fire on HMS Turbulent at Devonport. One sailor was not wearing a face mask when he needed to carry out an essential safety task, probably to shut down the reactor. He was only able to do this when another sailor handed over his breathing aparatus.

A technical article in the Navy's own journal makes it clear that the risks of an accident on a submarine are greater than at a civil power station:

"Submarine propulsion systems because of their size, mobility and the hostile environment in which they must operate, are exposed to substantially greater risks than land-based nuclear power stations; accident situations are appreciably more numerous because of the possibilities of collision, fire sinking, grounding and stranding, sea-effect, and so on." [7]

What will happen during the exercise ?

Conduct of Exercise Short Sermon within Faslane

An accident will be simulated on a nuclear powered submarine. Emergency services from the base and from outside will be called to the scene, where they would need to have a high degree of protection.

Probably just before lunchtime on Tuesday 18th, an alarm will tell everyone inside the base to take shelter. A massive and complex operation will then take place to evacuate 4,000 people who are inside the base. The Emergency Planning Officer at Faslane has described Short Sermon as

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[4] Letter from Dr John Reid to Dennis Canavan MP, 31 Oct 97.

[5] Naval Accidents 1945 - 1988, WM Arkin & J Hanler, Neptune Papers No3; The Russian Northern Fleet - Nuclear Submarine Accidents, Bellona.

[6] Commander Eric Thompson, Director of Clyde Naval Base, reported in the Scotman 13 Nov 97.

[7] "Royal Navy Requirements and Achievements in Nuclear Training", Journal of Naval Science, Vol 4, No 3.

"perhaps the most intense exercise ever held by NARO (Nuclear Accident Response Organisation) ... All departments, lodger units, ships and submarines alongside will be affected by it. Play within the base will be total with very few exceptions."

Conduct of Exercise Short Sermon outside Faslane

A new version of the Clyde Public Safety Scheme (CLYDEPUBSAFE) has just been published by the Navy. It is assumed that this will form the blueprint for this Exercise.

Units will be despatched to carry out monitoring to find out the levels of radiation both inside and outside the base. They will be told what figures to radio in to their headquarters. Making sense of these readings will take time - in a similar exercise at Devonport in 1993 it took 24 hours to collate all the notional radiation monitoring information.

Apart from monitoring it is unlikely that any real public protection measures will take place outwith the base during Exercise Short Sermon. However emergency services, local authority and other representatives will meet to make decisions on paper about what response would be needed. They will staff the Clyde Off Site Centre at Rhu. Previous exercises involved Strathclyde Regional Council. It remains to be seen how well Argyll and Bute Council will respond to an exercise of this magnitude.

There will also be involvement at higher levels of Government including Whitehall. George Robertson, the Secretary of State for Defence will be kept informed of progress during the exercise.

Argyll and Bute Council will assume that the radioactive fallout would affect an area downwind of the accident in an arc 15 degrees either side of the direction of the wind. (It is likely that the scenario for the exercise will dictate which way the wind will blow). The public are not expected to participate in Exercise Short Sermon. However the civil authorities are expected to decide on paper that the following should happen:

Preplanned countermeasures Zone This is the area within 2 kms downwind of the accident. Garelochhead, Shandon and parts of the Rosneath peninsula are within 2 kms of Faslane. Garelochhead Primary School and Garelochhead Outdoor Education Centre are described as *vulnerable communities* as they could be inside this zone. In the exercise it will probably be decided that everyone in this zone would be advised to take shelter and issued with Potassium Iodate Tablets (PITs - see below). It may be decided that everyone in this zone would have to be evacuated.

Extendibility Zone This is the area within 10 kms downwind of the accident. Helensburgh (population 16,000), Rhu, Clynder, Cove and Kilcreggan are all within 10 kms of Faslane. In the exercise it may be decided that some or all of the people in this zone would also be advised to take shelter and be issued with PITs.

Wider area Restrictions on food grown on contaminated land would "extend far beyond the area over which other safety measures are required" and could apply over a long period of time. This would result in widespread disruption of farming.

In the type of accident simulated during Exercise Short Sermon contamination of drinking and sea water could be an additional problem. Public and private water supplies could be contaminated over a large area. The catchment areas for water supplies for the Rosneath peninsula, Helensburgh, Dumbarton, Greenock and Dunoon are all close to Faslane. The catchment area for Glasgow's main water supply is 20 kms from Faslane. It is likely that radiation from Faslane would be detected in water supplies downwind of a nuclear accident.

An accident on a nuclear submarine would also pollute the sea with radioactive fall-out. This would be dispersed over a wide area and drift with tide and currents. There would be a long term build up of radioactivity in sediments and mudflats.

CLYDEPUBSAFE lists Glasgow Royal and Glasgow Western as two hospitals which could be expected to receive irradiated casualties. Vale of Leven and Inverclyde hospitals are also mentioned although it is noted that if casualties are sent there radiation monitoring services should be arranged. Ambulance and hospital workers could be exposed to radiation in dealing with casualties from a nuclear accident.

Does Exercise Short Sermon simulate the worst that could happen ?

Naval training manuals which were classified are now in the public domain. They make it clear that the type of accident being simulated in Exercise Short Sermon is not the worst case. The worst case accident is a *reactor containment failure accident.* This would actually affect a large part of Scotland.

The manuals from Greenwich College show the radiation doses people could receive. Applying the Site Specific Intervention Levels in the CLYDEPUBSAFE to these radiation doses shows that:

Evacuation - everyone within 30 kms downwind of the accident should be evacuated from their homes. For an accident at Faslane this could mean evacuating Alexandria, Dumbarton, Clydebank, Greenock or Dunoon.

Shelter & PITs - everyone within 120 kms downwind should be told to take shelter and issued with PITs. This could apply to a very large part of Scotland. Not only the people of Glasgow but even those living in Edinburgh or Dundee could be seriously affected..

There are no publicly available plans which detail how the emergency services would respond to an accident of this magnitude. Exercise Short Sermon is likely to illustrate the severe difficulties that there would be in trying to respond to a relatively small nuclear accident. In the worst case the emergency services would be totally overwhelmed. For example, the distribution of PITs around Garelochhead within 2 hours of an accident would be very difficult to achieve. There are no arrangements in place for even attempting to distribute them across a large part of Scotland in this timescale.

Taking account of the fact that an accident could happen not just at Faslane, but anywhere frequented by nuclear submarines, it is clear that the whole of Scotland is at risk.

The true scale of a nuclear disaster is illustrated by the fact that on 3rd May 1986 a significant amount of radioactive fall-out was detected in raindrops in Govan, over 2,300 kms from the Chernobyl reactor which was on fire at the time.

Distribution of Potassium Iodate Tablets

Prevention of thyroid cancer

At least 500 children living in Eastern Europe have suffered from thyroid cancer because of the nuclear accident at the Chernobyl.[8] There will continue to be more cases for another 30 years. Young children were found to be particularly sensitive to the effects of radiation and the cancers among children have been more aggressive than the cancers among adults. [9]

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[8] Open letter by Dr Keith Baverstock, WHO, 28 Apr 95.

[9] Thyroid effects, ED Williams et al. (http://www.iaea..or.at/worldatom/).

At Chernobyl, radioactive iodine was released into the atmosphere. An accident on a nuclear submarine could also result in radioactive iodine being dispersed. The iodine is absorbed by the thyroid, which is a gland in the neck. This can lead to thyroid cancer. The younger a child is, the smaller his or her thyroid is likely to be and the more sensitive it is to radiation. An infant thyroid is ten times more sensitive to the effects of radiation than that of an adult.[10]

It is possible to protect children and adults from exposure to radioactive iodine. This can be done by taking a tablet which contains iodine in another form, potassium iodate. The tablets are 98 % effective if taken an hour before exposure, 90% effective if taken at the time of exposure, but only 50 % effective if taken 3 or 4 hours after exposure.[11] Several days after the Chernobyl accident millions of children in Eastern Europe were given these tablets, but it was too late. The sooner the tablets are taken after an accident the more effective they will be. If it takes several hours to distribute the tablets then more children will be exposed to radiation, and more will develop cancer.

So long as only the recommended dose is taken there is very little risk from side effects from these tablets. There were no reported adverse effects among the 10.5 million children who were issued with tablets after Chernobyl and the risk of severe detriment to the general public is "vanishingly small" (1 in 10 million).[12]

Health boards around the Clyde hold stocks of the Potassium Iodate Tablets and the current plan is that if there was an accident on a nuclear submarine, then they would be distributed. But by then it would be too late. A recent survey of current practice amongst health boards in Britain concludes that pre distribution offers the most effective protection.[13]

At a minimum these Potassium Iodate tablets should be distributed in advance to schools and nursery schools within 2 km of a possible accident. There is also a strong case for wider distribution of these tablets to all households. At the Navy's other nuclear submarine base, Devonport, there has been widespread distribution of these tablets to schools and households.

<u>Comparison of arrangement at Devonport and Faslane</u>

Schools
Around Devonport tablets have been pre distributed to 17 schools. No tablets have been pre distributed to any schools near Faslane.

Households
At Devonport, West of the River Tamar tablets have been issued to all households by Cornwall Health Board. East of the river Plymouth Health Board distributed leaflets to 17,500 homes. These leaflets asked if people wanted to be issued with tablets. Following this tablets have been issued to 1,700 homes. No tablets have been issued to near Faslane. [14]

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[10] WHO Guidelines on the use of stable iodine after nuclear accidents, Dr Keith Baverstock, Implications of short term countermeasures after a nuclear accident, NEA 1995, p 17.
[11] Factors influencing choice of countermeasures, M Morrey NRPB and C Potter HSE, Implications .. , NEA, p 126; also RXMED information sheet on thyro-block tablets.
[12] Effectiveness and risks of stable iodine prophylaxis, PJ Waight, Implications .., NEA, p 74.
[13] Survey carried out on behalf of North Essex Health Authority 1997.
[14] Plymouth Evening Herald 23/7/96 and information from Plymouth Dump Information Group.

It must be emphasised that Potassium Iodate Tablets are not a cure all. They only counter one particular radiation risk - that of iodine 131 to the thyroid. The tablets do not provide any protection from other forms of radiation which could result in cancer.

Response to an accident occurring on a submarine at sea in the Clyde Estuary

The object of the Clyde Public Safety Scheme is to safeguard the public from a nuclear submarine accident *in the Clyde Area.* [15] The Scheme includes specific plans for listed submarine berths, not only at Faslane but also at Coulport, Loch Goil, Campbeltown, Rothesay and Loch Striven. However there are no specific plans for dealing with a nuclear accident on a submarine while it is at sea in the estuary. Nuclear submarines travel several times a week passing Dunoon, Gourock and Helensburgh. This is far more frequent than visits to Loch Striven, Rothesay or Campbeltown. But yet there is no attempt to detail provisions for these areas.

According to the Safety Scheme there should be *pre planned* countermeasures which can be put into effect within 2 kms of the scene of an accident. There are some plans for the area within 2 kms of berths, but no plans for areas within 2 kms of where submarines sail past. In the event of an accident the civil authorities should be told to implement shelter and Potassium Iodate Tablet distribution within the 2 km zone.

At Devonport tablets have been pre distributed and this should be done in areas around the Clyde, at least to schools and nursery schools. In the appendix is a list of schools and nurseries around Gareloch. Similar lists should be drawn up for Gourock, Dunoon and other coastal areas. The list includes pre-school groups because of the particular importance of distribution of Potassium Iodate Tablets to the youngest age group.

The Clyde Public Safety Scheme also describes an "Extendibility Zone" within which countermeasures might be considered. This extends for 10 kms around the potential scene of an accident. Maps are attached which should how the 2 km ~~and 10 km~~ zones should be applied around navigation channels frequently used by submarines

Within the immediate area of an accident there is a 550 m "Automatic Countermeasures Zone" from which everyone would be immediately evacuated except the emergency services.
There are also a number of places which are within 550 m of navigation channels used regularly by nuclear submarines. These include Kilcreggan, Rosneath, Rosneath Castle caravan park, Rhu spit and Kidston Park. Kilcreggan is particularly at risk as there is a Degaussing Range 600 m from the shore which is used very regularly by nuclear submarines.

Conclusion

The hazards from nuclear submarines are so great that the only way in which to protect the public from the hazard is to remove it.

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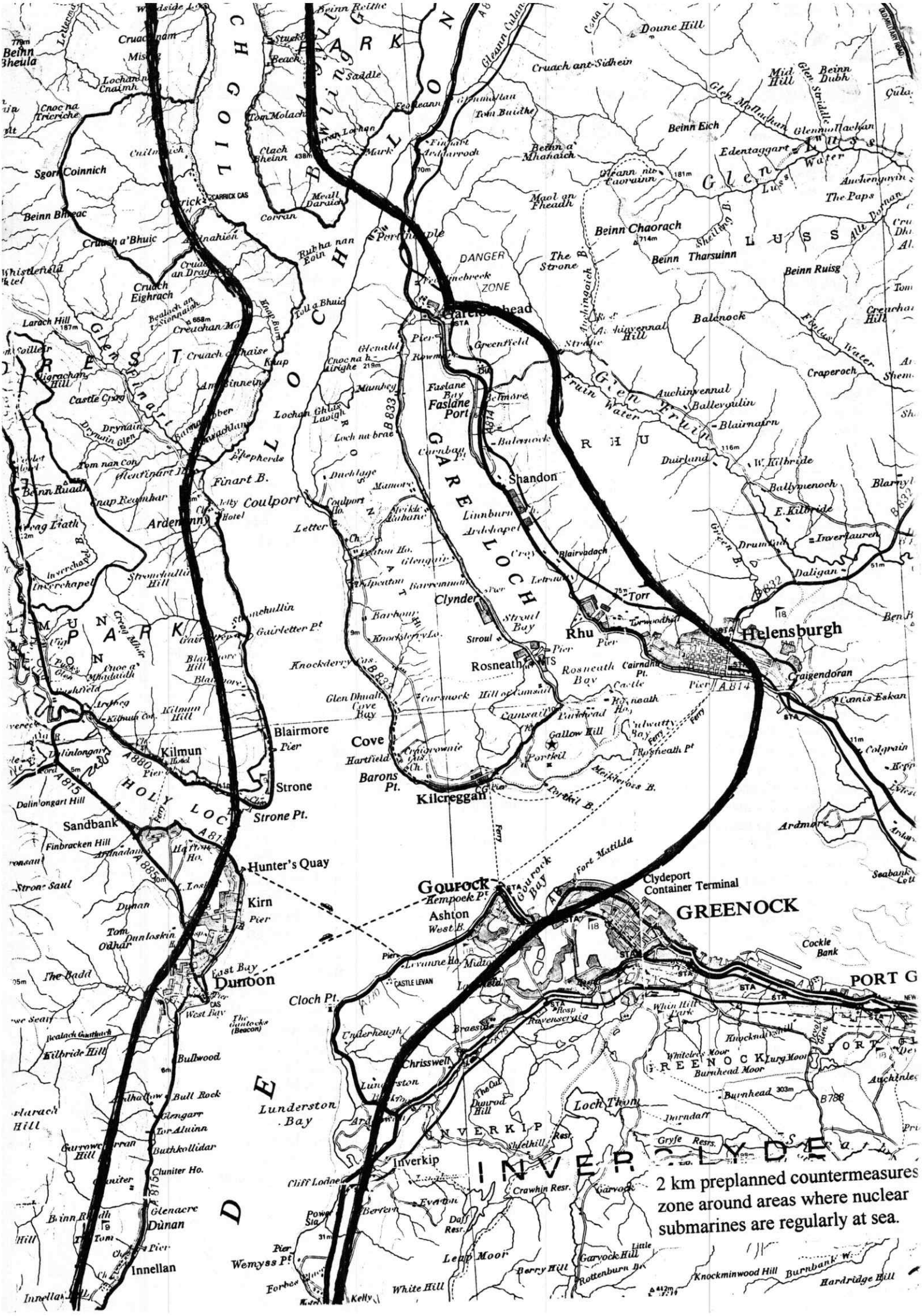
[15] Clyde Public Safety Scheme, July 1997, letter of promulgation, p iii.

Appendix: Schools & nurseries around Gareloch near a potential nuclear submarine accident

School / Nursery	*Distance from Faslane base*	*Age Group*	*When in use*
Clyde Naval Base Faslane			
Tiny Tots playgroup	< 500m	3-5	am Mon - Fri
Garelochhead			
Childsplay Nursery	2.2 km	6 wks - 5 yrs	8 am - 5 pm Mon - Fri
Garelochhead Toddler Group	1.9 km	up to 3 yrs	am Mon, Wed & Fri
Garelochhead Playgroup	2 km	3 - 5	am Mon-Fri
Garelochead Primary	2 km	5 - 12	all day Mon-Fri
Garelochead Outdoor Centre	1.8 km	11 - 17	all day Mon-Sun, incl holidays
School / Nursery	*Distance from channel*	*Age Group*	*When in use*
Rosneath			
Rosclyn Little Tykes	650 m	up to 3 yrs	pm Tues & Thu
Rosneath Primary	650 m	5 - 12	all day Mon-Fri
Cove & Kilcreggan			
Kintergarten SINA	350 m	3 - 5	all day Mon-Fri
Cove & Kilcreggan Toddler Gp	600 m	up to 3 yrs	pm Tues, am Thu
Cove & Kilcreggan Playgroup	600 m	3 - 5	am Mon, Wed & Fri; pm Mon
Kilcreggan Primary	650 m	5 - 12	all day Mon-Fri
Rhu			
Rhu & Shandon Toddler Group	750 m	up to 3 yrs	pm Mon & Wed
Kanga Rhu Playgroup	750 m	3 - 5	am Mon-Fri
Rhu Primary	750 m	5 - 12	all day Mon-Fri
Blairvadach Outdoor Centre	550 m	11 - 17	all day Mon-Sun incl holidays
Helensburgh			
Kirkmichael Nursery	2.7 km	3 - 5	all day Mon-Fri
Braehead Kindergarten	2.2 km	3 - 5	
Mulberry Bush Nursery	1.8 km	6 mns - 5 yrs	all day
Stepping Stones	1.6 km	2 1/2 - 5 yrs	am Mon-Fri; pm Tues-Thu.
Kirkmichael Toddler Group	2.7 km	up to 5 yrs	am Tues & Thu
Park Church Toddler Group	1.8 km	up to 3 yrs	am Tues & Wed
St Michaels Toddler Group	1.2 km	up to 3 yrs	am Tues
St Columbas Toddler Group	1.6 km	up to 3 yrs	am Wed
Bethesda Toddler Group	1.5 km	up to 3 yrs	am Wed & Fri
Tiny Tots Toddler Group	1.5 km	up to 3 yrs	am Tues & Fri; pm Wed
Drumfork Toddler Group	3 km	up to 3 yrs	am Mon-Wed
Ardencaple Playgroup	800 m	3 - 5	all day Mon-Fri
Colgrain Playgroup	3 km	3 - 5	all day Mon-Fri
Drumfork Playgroup	3 km	3 - 5	all day Mon-Fri
St Brides Playgroup	1.5 km	3 - 5	am Mon-Wed & Fri
Kirkmichael Playgroup	2.7 km	3 - 5	am Mon, Wed & Fri
West Kirk Playgroup	1.5 km	3 - 5	am Mon, Tues, Thu & Fri
Hermitage Primary	1.8 km	5 - 12	all day Mon-Fri
Colgrain Primary	2.6 km	5 - 12	all day Mon-Fri
John Logie Baird Primary	2.7 km	5 - 12	all day Mon-Fri
St Josephs Primary	2.5 km	5 - 12	all day Mon-Fri
Hermitage Academy	2.5 km	11 - 17	all day Mon-Fri
Parklands Special Needs School	2 km	3 - 17	all day Mon-Fri
Lomond School	1.7 km	3 - 17	all day Mon-Fri

A similar list should be drawn up for schools/nurseries in Gourock, Greenock, Dunoon & other coastal areas.


DANGER ZONE
2 km preplanned countermeasures zone around areas where nuclear submarines are regularly at sea.

Received 23/12/97

From: A G Moore, Assistant Director, Nuclear Accident Response
MINISTRY OF DEFENCE, Room 7106
Main Building, Whitehall, London SW1A 2HB

Telephone (Direct dial) 0171 218 7580
(Switchboard) 0171 218 9000
(Fax) 0171 218 2342

Mr K Owen
DIG
71 Copse Road
Plympton
Plymouth PL7 1QB

Your reference

Our reference
D/NucPol/6/1/1
Date
17 December 1997

Dear Mr Owen

Thank you for your letters of 26 November 1997 to George Robertson and John Reid concerning Exercise **SHORT SERMON**, the contents of which are noted. I have been asked to reply. You will no doubt already be aware that Dr Reid participated in this exercise.

I should say first that there has never been an accident involving a nuclear powered submarine reactor which has led to, or come anywhere near leading to, any release of radioactive materials to the environment. We are confident that the continued application of stringent safety procedures will continue to prove effective in preventing any such accident.

Nevertheless, we meet fully the legal requirement to have comprehensive contingency plans for dealing with the very unlikely event of an accident. The plans include the response to the release of radioactive materials from a reactor.

In such circumstances, our primary consideration is to safeguard public health and safety. The plans recognise the roles of emergency services, local and health authorities in this respect. All options are considered to achieve maximum protection of the public.

In the particular, and simulated, circumstances of Exercise **SHORT SERMON**, all participants agreed that sinking the submarine was the course that offered the best protection of the public. The trade-off between the deposition of radioactive material on land and in water was fully considered. Further work was done, within the exercise, to explore the steps necessary to stabilize the submarine and minimise the further release of radioactive materials into the water.

I hope this is helpful.

Yours sincerely

AG Moore

From: A G Moore, Assistant Director, Nuclear Accident Response
MINISTRY OF DEFENCE, Room 7106
Main Building, Whitehall, London SW1A 2HB

Telephone (Direct dial) 0171 218 7580
(Switchboard) 0171 218 9000
(Fax) 0171 218 2342

Mr K Owen
DIG
71 Copse Road
Plympton
Plymouth
PL7 1QB

Your reference

Our reference
D/NucPol/6/1/1
Date
13 Feb 98

Dear Mr Owen

You sent identical letters on 23 January to George Robertson and John Reid enclosing my letter of 17 December. I have again been asked to reply to both letters.

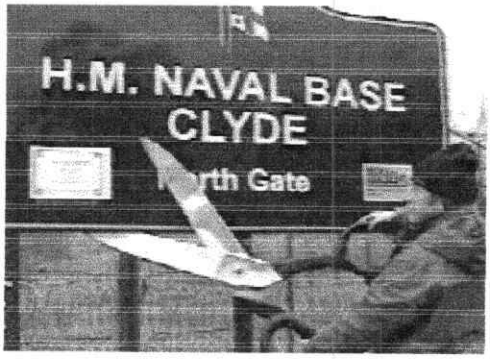
As I stated in my earlier letter, an accident resulting in the release of radioactive material is a highly unlikely event. Notwithstanding this, and in meeting legal requirements, we make assessments of the possible consequences in order to inform our generic response plan and to enable us to provide immediate advice about public health measures. However, even if an accident did occur, the actual consequences to the local environment would depend on a range of circumstances prevailing at the time (for example the weather). Studies in detail over such a range of possibilities would be unlikely to be useful to those facing the actual situation. It is for this reason that our contingency plans, in conjuction with those of other relevant agencies, aim to ensure that the necessary information and the key decision makers (including many outside MoD) are brought rapidly together. The trade-off that I mentioned previously would then be considered in the context of the actual circumstances (or those simulated for an exercise).

The nominal method used to "sink" the submarine in the particular circumstances posed in Exercise SHORT SERMON 97, was to puncture the ballast tanks by firing medium calibre rounds from a minesweeper. The ballast tanks are underneath the outer casing of the submarine and outside the pressure hull. Safety issues, such as you mention in your letter, were considered with the aim, once again, of finding the optimum solution.

Yours sincerely

Scottish CND News

Scottish CND awards Faslane the "cut the crap" award during exercise Short Sermon.



REPORT ON EXERCISE SHORT SERMON 18 - 20 NOVEMBER 1997

The following is an account of the scenario which was played out during the nuclear submarine accident exercise:

At 08.35 am on Tuesday 18th November there was a fire onboard the nuclear powered submarine, HMS Sovereign which was berthed at Faslane. At some time shortly after this the sirens sounded in the base and all personnel were told to go to their shelter positions.

The evacuation of the workforce took place between 12 noon and 2 pm. This was really carried out, but at a leisurely pace. Announcements over the tannoy made it clear that at this stage it was a "Category 2" accident, which means that there had been a release of radiation inside the submarine, but not into the atmosphere.

At 3 pm there was a release of radiation from the submarine into the atmosphere. This was a slow release which continued for hours afterwards.

The combination of gamma radiation coming from the hull and the release of radioactive dust into the atmosphere now meant that no-one could get near the submarine. Those involved in the exercise were discussing what they should do to try to bring the situation under control. The first solution was to fly over the submarine in a helicopter and drop bags full of water onto the reactor compartment. This was deemed to have failed. They decided they would need to try to get the submarine under the water. So the Navy proposed that they bring a warship alongside the submarine, fire high explosive shells at it, and sink it !! Apparently this is what then happened (only in the paper exercise - not for real).

We also heard that they decided that there would have to be a total restriction on all foodstuffs grown within 150 kilometres downwind (South) of the accident.

Dr John Reid the Armed Forces Minister visited the exercise headquarters on Wednesday afternoon.

Comments

The scenario of the exercise meant that they gave themselves at least six hours to prepare for a release of radiation into the atmosphere, which only occurred at 3 pm on Tuesday. In reality there could be a release within seconds or minutes. Potassium Iodate Tablets should be taken by the local people before they are exposed to radiation - they got round the dilemma of how to do this, by delaying the release of radiation.

The proposal to fire shells at the submarine was apparently greeted with horror by some of the civil nuclear industry people taking part in the exercise. This could well have caused the major disaster which they were trying to avoid. It also suggests that they were contemplating a full scale release of all the nuclear material from the reactor - which would be similar to the

Chernobyl disaster and beyond what the emergency plans can cope with.

The exercise wind direction meant that the wind was blowing towards the emergency headquarters at Rhu. It is hard to imagine that in the real world the local authority representatives, journalists, and the Armed Forces Minister would all have travelled to this centre, only 3 miles downwind of the accident.

Only days before the exercise the Navy were dealing with a real accident. On or around Thursday 6th November radioactive coolant leaked from the reactor of HMS Turbulent at sea in the North Atlantic. 130 crew members had to be tested for radiation. The real attitude of the Navy was to tell no-one. The story only surfaced more than a week later in the local Plymouth papers. Meanwhile they now have the problem of what to do with HMS Turbulent which is at Devonport naval base in the middle of Plymouth.

Scottish CND News