



MINISTRY OF DEFENCE

DEFENCE NUCLEAR SAFETY REGULATOR

NUCLEAR WEAPON REGULATOR

[Redacted S.40]

DNSR/04/18/10/5

See distribution

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EXERCISE SENATOR 2011 – ASSESSMENT

References:

- A. JSP471: Defence Nuclear Accident Response.
- B. JSP538: Regulation of the Nuclear Weapons Programme.
- C. D/NM12/76 Exercise Senator 2011 DNSR Assessed Objectives dated 6 Sep 11.

1. This assessment is provided in accordance with the Ministry of Defence policy on nuclear accident response set out in Reference A and with DNSR regulatory requirements (Reference B).

2. The exercise was a demonstration of the arrangements for responding to an accident involving the road transport of nuclear weapons conducted principally in the Strathclyde region over three days 13-15 September 2011. It was conducted in a number of phases including separate alerting and weapon handling serials, an exercise of the immediate convoy and civil emergency service response, an exercise of the multi-agency strategic response and an exercise of MOD weapon/debris recovery activities. This represented an ambitious attempt to gain the maximum benefit from the time and resources committed; the complex evolution, with compromises inevitably required, was satisfactorily managed and full credit is due.

3. Preliminary verbal assessments were provided on completion of each phase of the exercise. Many aspects of the response worked well showing good maintenance of capability; these included the emergency phase response, recovery activities and the contribution of the Radiation Monitoring Group (particularly welcome after an overdue return to such exercises). Two issues requiring improvement emerged: the lack of physical MOD presence, in support of the police and other agencies, over the initial hours at the strategic co-ordinating location; and the specialist support provided to the Scientific & Technical Advice Cell. However, it is confirmed that the agreed objectives (Reference C) were demonstrated and that the response showed the authorisee's ability to cope in such circumstances.

5. Details of the assessment, aligned with the agreed objectives, are at Annex A; a summary of the Findings is at Annex B. The final wording of the Findings and the response to them should be agreed with DNSR-ITa at an early stage. Any other issues requiring clarification may be referred to me.

6. This assessment is inevitably focussed on areas for improvement, but this is not to overlook the wholehearted commitment and the high level of knowledge, flexibility and enthusiasm of all participants which were all the more creditable in view of the extremely challenging weather conditions when setting up and for the first day of the exercise.

Signed on original

Annexes:

- A. Exercise SENATOR 2011 – Detailed Assessment.
- B. Exercise SENATOR 2011 Assessment – Findings and Observations.

Distribution:

Action:

SW PT – Hd

Information:

SW PT – SAM DepHd

SW PT – LM DepHd

DefSy – NucSyEP&AH

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DNSR-IT

DNSR-ITa

EXERCISE SENATOR 2011 – DETAILED ASSESSMENT

DOCUMENTED ARRANGEMENTS

1. The documentation has been subject to significant amendment as the arrangements have developed. Although generally up to date, it appears that changes affecting the 'approved' arrangements (currently JSP 483 Vol 3) have not in all cases been submitted for DNSR approval. This requirement (from AC 11) needs to be recognised and the current document submitted for formal DNSR approval.

Finding (TRF 0184): Any changes to approved emergency response arrangements are to be submitted to DNSR for approval prior to implementation.

2. One area which has not been addressed is the outstanding requirement to review the hazard assessment and thereby the technical justification for the extant public protection advice. This is outstanding from a number of previous exercises and now requires urgent attention.

Finding (TRF 0185)¹: The hazard assessment for the transport operation, and thereby the justification for the extant public protection advice, has not been reviewed.

3. The Convoy and Station Nuclear Accident Response Team Immediate Response Force Manual (Issue 3, Nov 2010) refers only to the use of Solid State Alpha Monitors for HEU monitoring, and not the recently issued IS610U.

EXERCISE PLANNING AND MANAGEMENT

4. Exercise planning was effective in engaging the civil authorities, taking full account of their aims and objectives, and gaining very large scale commitment from them. However, the level of detailed planning (of timelines etc.) was not sufficient to support the totality of exercise play and presented difficulties for distaff in resolving issues without a source of reference. While such information would inevitably need adjustment in the light of player actions, its inadequacy led, for example, to:

- very late agreement of the exercise objectives with DNSR, essentially at the end of the planning process rather than at the beginning;
- the absence of MCA telecon support to the police strategic commander prior to MCA deployment on the basis that this had been demonstrated in the separate alerting exercise but failing to recognise the difficulties created for the initial multi-agency response;
- use (within the constrained context of an exercise) of a separate Media Briefing Centre (MBC - Pitt Street) remote from the Strategic Headquarters (GOLD - East Kilbride) [it is accepted that this is the Strathclyde Police plan for a real event];
- mis-direction of the multi-agency Public Communications Group (PCG) to MBC rather than GOLD which delayed any effective media response by several hours (whilst a civil emergency services (CES) specific responsibility, the planning group had not cross-checked this point);

¹ This Finding may replace all previous Findings on this topic, but the record of the longevity of the issue should not be lost.

- insufficient challenge by the exercise media during press conferences, thereby missing an opportunity for useful training for the multi-agency responders and making it difficult to assess the ability of the MOD spokesman to respond under realistic pressure;
- insufficient scenario development overnight on Day 1 (eg. on the stability of the weapons and monitoring information) to allow the GOLD response to develop [distaff did well to provide necessary injects in order to facilitate GOLD play];
- use of a dry deposition monitoring plot while specifying real-world (in the event very wet) weather conditions; this presented difficulties for specialist agencies seeking to model the release, unrealistic conclusions and resulting confusion.

5. While it is recognised that exercise planning is a multi-agency responsibility, MOD has clear interests in overseeing the process to the extent necessary to ensure an outcome which effectively exercises all the capabilities deployed.

Observation (TRO 0111): More systematic arrangements are required for exercise planning, particularly when engaging with many agencies.

6. Effective use was made of limited space at HMS GANNET to simulate the exercise accident location on the M74; in particular, the confinement of the response area was representative of motorway conditions. The accident scene and deployment of casualties and traffic was well constructed to present a realistic challenge to responding forces. The accident video was excellent, but arguably should have been restricted to only those who would have seen the event.

7. The planning and staging of the casualty/medical play was less than optimal for an aspect with known sensitivities. There was no script for the casualty play and no specialist distaff making it difficult for remaining distaff and assessors to keep track of what was happening. The scenario had 7 P1 and P2 casualties, but no P3s, which would normally be expected to outnumber the more serious casualties. Whilst it is appreciated that the casualties were provided by *Amputees in Action*, 7 traumatic amputations in a road crash scenario is highly improbable.

Observation (TRO 0112): Specialist distaff should be involved in the planning and staging; a detailed casualty script should be provided.

8. Exercise managers were pro-active in making best efforts to hot-staff solutions to the planning shortfalls identified above. On the positive side, the daily updates were well judged and served effectively to orientate the players on overnight developments, and there was a good response to the players' recovery activity in order to gain maximum benefit. Set against this there were a number of inappropriate distaff injects during the initial emergency phase response which led to artificial distraction of convoy response forces. A shortage of distaff at BRONZE on Day 2 (whilst focussing on GOLD play) led to player actions being progressed without guidance. As a result players made assumptions on prevailing conditions (for example, the presence or levels of contamination) and opportunities were lost for testing the response more fully.

THE RESPONSE

Alerting

9. Alerting was demonstrated in a separate exercise, and the initial alert to the police (including information by fax) was also demonstrated during the main exercise. Within the SSC at Aldermaston, comprehensive checklists provided a sound basis for the response and were well used. These were supplemented by a detailed understanding of what was required which enabled sensible judgements to be made on the evolving priorities rather than just working through the checklists. All necessary information (contacts etc.) and facilities were to hand in order to expedite

the response. The lack of a stateboard within the SSC did not inhibit the initial response, but it could become more significant as the SSC evolves into its reach-back role.

10. Within the MCA Cell at Abbey Wood there was a rapid response to the SSC's alert. The NARO office was set up quickly and efficiently run by the administration staff, and key executives booked in as they arrived before going to their assigned desks. Each executive had a grab bag which contained written instructions and check sheets for their role, and these were well used. The MCA kept his team up to date through regular briefings, and information was quickly and accurately entered onto the stateboards which were kept up to date. The team was able to complete its preparations and obtain transport to Filton just over 2 hours after the initial alert, well within indicative timings.

11. The sole concern in the alerting process was about the initial fax message sent to police headquarters. This was preceded by the planned telecon, but it is still critical that the written confirmation is specifically formatted to grab attention and highlight the key messages (on public protection etc). The current format and content does not achieve this, including, for example, several pages of apparently extraneous material. Given developments in mapping and messaging technology, it is considered that fax may no longer be the most appropriate means for communicating such a message.

Finding (TRF 0186): The arrangements for providing the initial written alert to the police are not adequate.

Emergency phase response

Casualty Handling

12. The initial response to the casualties from Royal Marine (RM) convoy personnel was rapid and appropriate. The casualties were quickly located and immediate first aid was appropriately applied, the only reservation being that no cervical protection was used when extracting two casualties from cars. Following this there were periods when the response became disorganised, and it was less than clear who was in charge at the scene. Discussion with Scottish Ambulance Service (SAS) personnel resulted in considerable delay in developing a plan to manage the (contaminated) casualties. Once it became clear that SAS would not transfer two serious casualties directly to hospital, the RM and the MDP made a rapid decision to "crash the cordon" and conduct the transfer in MOD vehicles. This is considered to have been an appropriate decision in view of the delay².

Observation (TRO 0113): Provision of cervical collars and training in their use for cervical immobilisation would enhance casualty care in these types of scenarios.

13. There was significant further delay in getting SAS agreement to send their paramedics into cordon or to receive casualties. The issue was escalated to Incident Commanders with appropriate emphasis from convoy personnel but without adequate resolution³.

In-cordon Actions and Monitoring

14. Fire-fighting and reconnaissance actions in-cordon were effectively conducted, although the presence of weapon debris was not identified; good discipline and self-protection were evident. Members of the public were suitably corralled and cared for although no information handouts were provided to them. The resulting in-cordon situation was satisfactorily briefed to the Incident Commander.

15. The Yellow Monitor was quick to move forward and rapidly found a release of radioactive material, well within expected timescales, which enabled an early confirmed status to the Cat 2

² It was understood that receipt of a contaminated casualty formed part of the NHS plan for the exercise.

³ Another serious casualty was declared dead due to the extended delay; decontamination of other casualties was conducted some two hours after startex.

declaration. Although not deployed for real the White Monitors were properly briefed and later demonstrated an understanding of their task, with routes being planned and distaff-injected monitoring results being reported for input into NERIMS.

Cordon Control

16. Liaison with the CES fell primarily to the Escort Commander; a proactive approach worked well with the fire service, less so with the ambulance service despite a clear brief on the hazards present. The cordon line was slow to be established, but appropriate use of topography prevented significant loss of control.

17. Monitoring the ground before setting up the Temporary Control Post (TCP) was thorough, but the TCP was ready when needed and in advance of other facilities on site. TCP operation was effective and demonstrated understanding of the processes together with effective help being given to the ambulance service which also evidenced improved knowledge and equipment.

Command, Control and Media

18. Immediate drills were implemented quickly and effectively which enabled basic information on the event to be established and passed to Task Control. Other notifications and actions were confirmed, effectively monitored and prompted where necessary. Further information was recorded and forwarded as necessary, enabling a full status to be built up on the stateboard and the SSC to be kept updated. A cross-cordon brief was taken and assimilated, although the sketch map and video were not utilised to any degree.

19. The police (who in Strathclyde accompany the convoy) sought an early face-to-face brief, and this was achieved less than 25 minutes after the accident. The MOD Incident Commander (IC – the Convoy Commander) was very clear in identifying civil police primacy, his priority for public safety and re-stating the public protection advice. He also demonstrated very good understanding of the hazards, consequences, intake routes, protective equipment, access routes etc. All of this was repeated for the Fire and Ambulance Officers following their arrival, and a series of briefings was then established, properly under civil police co-ordination. All of this worked well, and the IC was very effectively integrated into the CES arrangements.

20. A comprehensive briefing was provided to the MCA and his team, reflecting the IC's very full understanding of what had happened. Although not a significant difficulty, the briefing was somewhat prolonged and unstructured as a result.

21. The MCALO liaised with the police in relation to media handling, and offered support, pre-scripted statements, handouts etc. This was all appreciated by the police, but the decision was made to refer all media to GOLD. The MCALO then made contact with media staff at GOLD, and arranged for statements and other material to be faxed to them. This demonstrated a well-balanced approach and understanding of MOD roles and responsibilities in relation to the media. In accordance with recently changed procedure, the MCALO remained with the convoy throughout (he is the designated NW custodian), rather than deploying to GOLD; this had consequences described below.

Security and Guarding

22. Both RM (initial) and MDP (subsequent) personnel provided fully satisfactory security and guarding right through the exercise, with effective and regular changeover being managed through the Health Control Post (HCP).

Support to the Multi-agency Strategic Response

Initial Support

23. Following the initial alert there was essentially no MOD input to (and certainly no presence at) GOLD until the arrival of the MCA party some 5½ hours after the accident; a realistic timescale for an accident in Scotland. [It is recognised that the absence of MCA telecons in the meantime was to an extent artificial, although this method of communication may be unreliable whilst in transit.] This lack of support created major difficulties for the multi-agency response, which struggled to attain a meaningful understanding of the issues. Previous arrangements required the MCALO to fill this gap, with a target arrival time at GOLD of 2 hours, but as noted above, the procedure has been changed. The lack of support (which ideally should include a physical presence) over such an extended and critical period was not acceptable.

Finding (TRF 0187): MOD support at the strategic response centre (GOLD) prior to the arrival of the MCA party was not adequate.

Follow-on Support

24. On arrival, the MCA team quickly established itself and consolidated its information base. The team then worked well to integrate effectively with the other agencies at GOLD and to begin to drive the BRONZE response forward in accordance with set priorities. Effective links were established with MOD HQ, and a good record was maintained on NERIMS. Support to the Strategic Coordination Group was very effective; the MCA quickly established his credibility and was able to assist in bringing the group back on track whilst clearly recognising the police's leading role. The MOD messages were clear and well coordinated.

25. Communication between the MCA (including AWE) team and the Safety Cell in MOD HQ was generally effective, but with limited staffing in London, the pressure on the MCA team was constrained and it became largely reactive rather than proactive.

Support to the STAC and RWG

26. MOD support to the Scientific & Technical Advice Cell (STAC) was more problematical. The STAC is often an unwieldy group, especially in a transport scenario where local civil agencies have essentially limited awareness of radiological issues, and therefore, a testing environment in which to function. On this occasion it comprised about 30 people from some 20 agencies, with the chair routinely changing; discussions lacked clarity, and progress was slow. Specialist advice to the group is formally the responsibility of the statutory authorities, particularly the Health Protection Agency (HPA), Scottish Environment Protections Agency (SEPA) and the Food Standards Agency (FSA). While MOD clearly has interests in assisting the group in relation to the radiological assessments, this must be done sensitively, recognising formal roles and responsibilities. MOD's principal contribution is likely to be channelling information and advice to HPA (especially), SEPA and FSA in order to contribute to their input, and significant progress was made in this direction. However, MOD input on this occasion was also characterised by direct intervention in open forum, providing information and advice to STAC as a whole, which had not been pre-notified to the agencies and was not agreed by them, and to dispute the advice which was being provided by the agencies. The effect was to compound the STAC's difficulties and to impede progress.

27. Given the complexities, MOD contribution to the STAC needs to be consistently of the highest calibre, but there was no apparent leadership or structure to the MOD STAC-related personnel (themselves from different MOD branches / AWE), and there were repeated changes in representation at STAC meetings. There is a lack of associated documentation setting out MOD roles and responsibilities and an appropriate modus operandi with the key agencies (principally HPA).

Finding (TRF 0188): MOD support to the STAC was not adequate.

28. The Recovery Working Group is lower key than the STAC and functions on a slower timescale so that demands are by no means so acute. However, two meetings were held with

effective MOD support in each case providing helpful input, clarification and guidance in concert with the specialist agencies (again HPA, SEPA, and FSA).

Support to the Media Response

29. For a variety of reasons (players being directed to the wrong exercise location, insufficient police resources and a lack of focus on the exercise by some agencies), the MOD input to the Public Communications Group (PCG) could not be assessed on Day 1. There was nothing that MOD players could have done to address this. Day 2 was a short day comprising two press conferences, answers to a few media questions submitted on paper and a couple of one-to-one interviews by the MOD spokesman. There were no press releases issued and no specialist briefings. This did not constitute an entirely effective media programme, but it did provide a basis on which to assess MOD's input.

30. There was a strong police lead, roles were identified, tasks allocated and systems put in place. The MOD team played its part; there was good interaction with other members of the PCG and with the police lead. The team proactively confirmed clearance procedures, consulted their plan and guidance regularly, prepared and submitted their key messages to the PCG Chair on time, briefed their spokesman and liaised with London. The management of the MOD team was particularly effective.

31. The MOD spokesman was a civilian and therefore must demonstrate competence and establish credibility because he does not have a rank or uniform to do this for him. His performance was mixed – some of his answers were strong and contained the agreed messages but there were missed opportunities. In one-to-one interviews he tended to be led by the journalist and could have made much better use of the questions to provide reassurance, appropriate context and scale. He tended to provide generic answers to questions but in this situation where he is the only MOD spokesman, and not simply there to provide background briefings, he needs to have more situation-specific information available. To his credit, he was one of the few spokesmen who put themselves forward for interview, and he did improve as the exercise progressed.

SILVER Functions

32. The AWE hazard prediction, based initially on the 9 White Monitor points input to NERIMS, was generated in a timely manner, and then updated in light of monitoring data; it provided useful context for multi-agency considerations. High level monitoring strategy was developed under HPA lead and agreed by STAC. A working level monitoring plan was drawn up by MOD and HPA and allocated appropriately for implementation. Wider area monitoring was tasked to MOD and was implemented by the Radiation Monitoring Group (RMG) as a SILVER function; after a considerable break from NAR exercises and significant restructuring, it was pleasing to see RMG operating and interfacing satisfactorily. The RMG Commander led well, maintaining a clear picture of the task and liaising with police on the practicalities of accessing the area; discrete live monitoring was conducted. A substantial quantity of monitoring data was collected, processed into NERIMS and made available effectively to other agencies, notably HPA. There were good links to 42 Geo, and a range of maps was produced. An effective assessment capability for collected samples was demonstrated.

33. There was, however, a lack of clarity about which was the most appropriate channel to select on the IS610A monitor with the result that over the course of the exercise all 3 channels were used at some time.

Observation (TRO 0114): Monitoring procedures should be reviewed to clarify under what circumstances each channel on the IS610a should be used.

Recovery

Bronze Commander

34. The Bronze Commander's routine is well established and was demonstrated to good effect. The pace and focus of the cell was maintained, supported by an appropriate level of informal discussion and formal meetings with heads of departments. Intentions and priorities and the status of ongoing tasks were well managed and discussed with GOLD. Early priority was appropriately given to the stability statement as this was clearly identified as the critical enabler to lifting shelter. It was recognised, and stated, early on that all in-cordon entries would require a task plan.

Health Control Post and In-cordon Monitoring

35. HCMF manning of the HCP was effective with evident understanding of the task. Cross cordon monitoring was carried out thoroughly and consistently. Access to the in-cordon areas was well managed (subject to appropriately authorised recovery task plans) with good records being maintained, including of dosimetry issued. Scrutiny of recovery task plans at the HCP ensured that when unsigned plans were presented personnel were not permitted access. This contributed to effective and appropriate control and personal safety in cordon as did effective contamination monitoring by teams deployed in-cordon.

36. Recovery of an in-cordon casualty was demonstrated. While appropriate measures were taken to reduce the risk of contamination transfer across the barrier there was some delay while the decision on whether to transfer the casualty onto a clean spine board was taken.

Observation (TRO 0115): Those likely to be involved with cross cordon casualty transfers during recovery should be familiar with agreed procedures.

Accident Site Health Group

37. The processes here are well developed, having been previously practised and benefitting from experienced personnel. A good awareness of in-cordon hazards was demonstrated, and this allowed dress states to be relaxed where appropriate. Records of doses to in-cordon personnel were effectively managed through liaison with the HCP. A number of recovery task plans that had been developed were approved.

AWE

38. The AWE team worked proactively and were forward looking, anticipating issues before being tasked. The focus of the exercise was on debris recovery, but weapon considerations were actively staffed nonetheless. In developing the stability statement there was a good level of discussion and self challenge that led to improvements in identifying what needed to be done. Previously developed concepts of re-establishing Lines of Defence did not, however, feature and might be refreshed.

Observation (TRO 0116): Lines of Defence concepts should be considered in developing weapon recovery options.

39. The processes of marking, collecting and packing explosive and fissile materials were clearly well established and were undertaken satisfactorily. In working up approvals for packaging and transport there was a good detailed dialogue between the AWE cell, the Bronze Commander and DNSR's Transport Inspector (the MOD Competent Authority). This took the issues to be resolved further than in any previous exercise, and the parties to it should capture the lessons learned.

Observation (TRO 0117): The lessons learned from the packaging discussions should be captured and incorporated into documented arrangements.

EXERCISE SENATOR 2011 ASSESSMENT – FINDINGS

Reference	Finding	Annex A para
TRF 0184	Any changes to approved emergency response arrangements are to be submitted to DNSR for approval prior to implementation.	1
TRF 0185	The hazard assessment for the transport operation, and thereby the justification for the extant public protection advice, has not been reviewed.	2
TRF 0186	The arrangements for providing the initial written alert to the police are not adequate.	11
TRF 0187	MOD support at the strategic response centre (GOLD) prior to the arrival of the MCA party was not adequate.	23
TRF 0188	MOD support to the STAC was not adequate.	27

EXERCISE SENATOR 2011 ASSESSMENT – OBSERVATIONS

Reference	Observation	Annex A para
TRO 0111	More systematic arrangements are required for exercise planning, particularly when engaging with many agencies.	5
TRO 0112	Specialist distaff should be involved in the planning and staging; a detailed casualty script should be provided.	7
TRO 0113	Provision of cervical collars and training in their use for cervical immobilisation would enhance casualty care in these types of scenarios.	12
TRO 0114	Monitoring procedures should be reviewed to clarify under what circumstances each channel on the IS610a should be used.	33
TRO 0115	Those likely to be involved with cross cordon casualty transfers during recovery should be familiar with agreed procedures.	36
TRO 0116	Lines of Defence concepts should be considered in developing weapon recovery options.	38
TRO 0117	The lessons learned from the packaging discussions should be captured and incorporated into documented arrangements.	39