



MINISTRY OF DEFENCE

# DEFENCE NUCLEAR SAFETY REGULATOR

NUCLEAR WEAPON REGULATOR



DNSR/18/10/1

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## EXERCISE ASTRAL BEND 2010 – ASSESSMENT

References:

- A. JSP471: Defence Nuclear Accident Response
- B. JSP538: Regulation of the Nuclear Weapon Programme
- C. D/NM12/66 Exercise Di-Staff Instruction dated Apr 2010

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 air transport of US nuclear weapons, and was held at DTE Sculthorpe in Norfolk on 12 May 2010. The agreed objectives of the exercise are at Reference C.

3. DNSR assessed the MOD response during the exercise, and I provided a preliminary verbal assessment on conclusion. It is confirmed that the exercise provided an appropriate vehicle for demonstrating the agreed aspects of the arrangements, and the response showed the ability of the Strategic Weapons Nuclear Accident Response Organisation (incorporating the BRIZE NORTON Station NARO Team - SNT) to cope in such circumstances. This outcome incorporates my judgement that, in the real event, the response by the CES (especially the police) would have more effectively eased the issues faced by the SNT and which it struggled to manage in the exercise. Some weaknesses (reflected in the number of Findings) were noted however, in particular concerning the assimilation of MOD's advice by the emergency services. This has been a repeated source of difficulty, which suggests a need to review the way the advice is presented and the training of those with responsibility for providing it on the ground.

4. Details of the assessment are at Annex A. A preliminary summary of the Findings is at Annex B. In accordance with Reference B, the final version of the Findings is for agreement with SWPT. Any issues requiring clarification should be referred to DNSR-IT at an early stage.

5. While the assessment is inevitably focussed on areas for improvement, a number of aspects of the response worked well. In particular, this was the first involvement of the US response for several years and this enabled very useful liaison to be re-established. The much improved ambulance service response was also welcome following the publication of revised DoH advice on responding to radiation-related accidents. The wholehearted commitment, flexibility and enthusiasm of all participants were also clearly evident.

*Signed on original*

Annexes:

- A. Exercise Astral Bend 10 – Detailed Assessment.
- B. Exercise Astral Bend 10 Assessment – Findings and Observations.

Distribution:

Action:

SW PT – Hd

Information:

RAF Brize Norton – Stn Cdr

SW PT – SAM

DefSy – NucSYEP&AH

Dstl – [REDACTED]

DNSC Observer – [REDACTED]

## **EXERCISE ASTRAL BEND 2010 – DETAILED ASSESSMENT**

### **EXERCISE PLANNING AND MANAGEMENT**

1. The planning process was overseen by DNSR and was effective in fully engaging both the civil authorities (particularly the civil emergency services (CES)) and US Initial Response Force (IRF). All agencies confirmed their commitment to the exercise and it was therefore all the more disappointing that the police attendance on the day was very limited (to a sergeant and two constables). This clearly impacted on the overall co-ordination of the response at Bronze. There was large scale participation by the Fire and Rescue Service and a more than adequate response by the Ambulance Service. The involvement of the US Immediate Response Force [REDACTED] [REDACTED] (for the first time since Exercise DIMMING SUN 2003) was a key aspect of the exercise and was particularly well-managed<sup>1</sup>.

2. Simulation of the accident site was more limited than usual because of real-world events but was adequate for the purpose. The introduction of response forces and subsequent injects were well thought through to provide a realistic simulation while de-risking transport, and they gave the players appropriate scope to demonstrate their arrangements. Exercise management on the day was good, in particular intervening when necessary in order to enable the exercise to meet its objectives in the time available.

### **DOCUMENTED ARRANGEMENTS AND TRAINING**

3. A separate inspection of the Station NARO Team (SNT) which preceded the exercise (and is reported separately) revealed a number of issues with the maintenance of documentation between SW PT and the SNT. The exercise was also conducted using a draft revision of the US-UK Integrated Joint Operation Plan (IJOP) Part II. The combination of these situations may have contributed to the difficulties observed with the response (see below). Concerted effort is needed to bring the orders for the SNT (particularly in the US context) up to date as quickly as possible.

4. It is recognised that an air accident presents a particularly severe test of the arrangements given the inevitable initial absence on the ground of any specialist MOD response; the US involvement adds a further dimension to this. It remains incumbent on the MOD to ensure that their initial response provides the most effective support to the emergency services that is practicable. It is further recognised that there has been a hiatus in training provision for SNT executives which may have affected their background knowledge beyond the direct orders; whilst this is being rectified, it may be appropriate to derive a “reading list” to help in self training. There has been a single SNT for some few years, and it is noted that the initial response arrangements have not been reviewed over this period. Given the conclusion of other SW NARO changes, there may now be an opportunity to review arrangements and to consider supporting the SNT with staff for whom NAR is closer to the “day job”.

**Observation (TRO080): There is an opportunity to review arrangements for the immediate response to an air crash.**

### **THE RESPONSE**

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<sup>1</sup> A Table-top Exercise of the joint UK/US follow-on response was held at RAF Mildenhall on 13 May and was observed by the author.

## **Initial deployment**

5. The SNT were deployed from RAF HONINGTON rather than RAF BRIZE NORTON in order to de-risk the exercise in the event of helicopter malfunction. Departure was therefore artificially delayed to achieve a more realistic arrival time (just under an hour post-accident); a further delay was noted separate from this artificiality which may have been related to a technical problem on the second helicopter. The urgency of getting first responders airborne needs to take priority.

6. The emergency services arrived well ahead of this. They initially stood off several hundred metres from the crash site and established an initial Bronze at this location, suggesting that some Special Safety Cell (SSC) hazards information had been communicated to them through their control rooms. However, the majority of the Fire Service then moved forward to about 100m, ie. well inside the explosive hazard zone, apparently on the basis of their understanding of beta/gamma radiological hazards for which they were able to monitor. Much of the Ambulance Service and the police sergeant subsequently moved to join the Fire Service, all prior to SNT arrival. This led to subsequent difficulties in the response and is directly contrary to the SSC initial advice, and therefore brings into question the presentation of that advice and means of checking that it is understood and acted on.

**Finding (TRF146): The presentation of the initial SSC advice and checking its reception failed to induce the correct self-protection behaviour by the CES.**

7. The SNT helicopter landed a several hundred metres from the initial CES Bronze and, with no urgency apparent, it took 25 minutes for the SNT Commander to establish first contact with those CES remaining there: in effect a lone police constable. This presented a real difficulty for the SNT Cdr, who was correctly reluctant to go forward to meet the CES leaders, but who might, however, have pressed the need to make contact with greater urgency. In the event, and with some distaff assistance, meaningful contact was established with CES executives who withdrew to the initial location but after considerable further delay.

**Finding (TRF147): Insufficient priority was afforded to the need for the SNT Cdr to establish liaison with the CES executives.**

## **SNT in-cordon response**

8. The in-cordon team proceeded directly towards the crash site from the helicopter, meeting up with what in effect had become the forward-deployed Bronze. Attempts were made by the In-cordon Co-ordinator to brief the Fire Incident Officer but communication (via a respirator) was very difficult; Instructions-in-Writing were provided, but the information was not assimilated. This was yet a further effect of the ill-advised forward move by the CES. Face masks were provided for all personnel but were not widely worn until much later. Notwithstanding the difficulties, no emphasis was placed on the potential explosives hazards at that distance, given the continuing fire and the proximity of large numbers of personnel for a prolonged period. As indicated above, the unnecessary personnel were eventually withdrawn following distaff prompting.

9. There were difficulties in establishing a credible relationship with the Fire Service, in particular in relation to their radiation monitoring instrumentation. The Fire Service believed that in addition to alpha, beta and gamma radiation would also be present which their instrumentation (now standard issue for Fire Services) would be able to detect. This exacerbated the false sense of safety for the CES. SNT personnel found difficulty in correcting the view themselves, but they did not refer the issue to the SSC in order to obtain or prompt specialist advice.

**Finding (TRF148): The SNT did not have the information or knowledge to correct CES misconceptions about the radiological hazards.**

10. The Fire Service were initially engaged in recovering casualties and, in the absence of compelling advice to the contrary, continued with this but failed to fight the fire despite the explosive hazard. In-cordon team deployment to recce the scene and conduct monitoring was repeatedly delayed because of the fire / explosive hazards. A good initiative was eventually taken to monitor personnel who had been at the crash area; this enabled the release to be confirmed but later than the protocol calls for.

11. Once the casualties had been recovered the fire was quickly extinguished, and the In-cordon team was then permitted to move forward. A full recce was then conducted and details were efficiently handed over at the cross-cordon brief. In gathering the information good radio discipline was adopted close to the intact weapon, but this was not the case around identifiable components and explosives.

**Observation (TRO081): Radio discipline near crash debris needs to be improved.**

### **Medical**

12. Despite being made aware (by the “public” who came to assist) of three serious casualties, the Fire Service, in particular, showed a lack of urgency in accessing the forward area to recover them. This again may be indicative of shortfalls in the initial SSC advice to the CES (see above). The casualties were eventually recovered to the forward Bronze point and were triaged thoroughly and appropriately by the SNT In-cordon Medic. The correct priorities were identified, and emergency treatment was initiated where appropriate. The Medic also ensured that the casualties and walking wounded were given face masks.

13. Both the P1 and two P2 casualties were transferred from this forward point directly to hospital by Ambulance Service without decontamination and without needing any prompting by the SNT. The ambulance crew were made aware that the casualties were contaminated, this having been confirmed by the Yellow Monitor.

### **Monitoring and Temporary Control Post**

14. Downwind monitoring was carried out in accordance with protocols, and properly reported and recorded (as was the confirmation of release). All monitoring personnel were familiar with their instrumentation and procedures.

15. The Temporary Control Post (TCP) was declared operational within ~40 minutes of arrival of the SNT Main Party, which is a satisfactory performance. A number of personnel were then processed, with all areas (reception, undressing, monitoring, recording etc) functioning effectively.

16. The Fire Service set up their decontamination facility which, other than the absence of monitoring, provides a far better capability than the TCP. Given the earlier exchanges on monitoring, the Fire Service sensibly sought SNT monitoring support; this was initially resisted but was eventually provided. The US also deployed monitoring assets and sought to liaise on this with SNT personnel but made little progress.

**Finding (TRF149): SNT monitoring capabilities and advice were not pro-actively offered to the CES (and US on this occasion).**

### **SNT command and control**

17. As described above, the first meaningful liaison between the SNT Cdr and CES executives was significantly delayed. While the public protection advice was re-iterated, the explosive hazards and the need for self-protection was not sufficiently emphasised or assimilated.

**Finding (TRF150): The advice provided by the SNT Cdr to the CES did not emphasise the hazards adequately.**

18. The SNT Cdr established effective liaison with the US IRF Cdr, but there was limited understanding of the key sensitive areas, for example the presence of US armed personnel and their rules of engagement (again, the very limited police input impacted on this). The SNT Cdr's agreement was sought prior to deploying US guards to establish the Weapon Restricted Area and in relation to an entry by a US EOD team to carry out "render safe". These were agreed but without any understanding being gained about what actions were intended (especially by the EOD team) and without ensuring an accompanying UK presence for this activity, which is contrary to JOPS. (In the event only a recce was carried out, but this does not negate the principle.)

**Finding (TRF151): There was no appropriate UK oversight of the US EOD team's activities.**

19. The SNT Cdr was focussed on the need to provide a media briefing and obtained police agreement to this with the invitation to lead which the SNT Cdr for both the initial brief and a subsequent one alongside the US IRF Cdr. Presentation was confident and included good early confirmation of the presence of nuclear weapons. Questions were not well handled, however, suggesting a lack of background information and that lines-to-take (not least on US issues eg. approval for the flight, who's NWs involved) were not well understood.

**Finding (TRF152): Background information and lines-to-take with media questions were not well understood.**

20. All information was channelled to Chief of Staff who managed the team effectively and built up a comprehensive picture of the developing situation, logging this on stateboards and keeping the SNT Cdr informed as necessary. Regular reports were provided to the SSC. The stateboards provided a basis for briefing the MCA (and CRTF) on arrival. This was provided confidently and in accordance with the proforma.

**EXERCISE ASTRAL BEND 2010 ASSESSMENT – FINDINGS & OBSERVATIONS**

<b>Reference</b>	<b>Finding / Observation</b>	<b>Annex A para</b>
TRF146	The presentation of the initial SSC advice and checking its reception failed to induce the correct self-protection behaviour by the CES.	6
TRF147	Insufficient priority was afforded to the need for the SNT Cdr to establish liaison with the CES executives.	7
TRF148	The SNT did not have the information or knowledge to correct CES misconceptions about the radiological hazards.	9
TRF149	SNT monitoring capabilities and advice were not pro-actively offered to the CES (and US on this occasion).	16
TRF150	The advice provided by the SNT Cdr to the CES did not emphasise the hazards adequately.	17
TRF151	There was no appropriate UK oversight of the US EOD team's activities.	18
TRF152	Background information and lines-to-take with media questions were not well understood.	19
TRO080	There is an opportunity to review arrangements for the immediate response to an air crash.	4
TRO081	Radio discipline near crash debris needs to be improved.	11