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# **AWE Proposal for TP1 for the Implementation of the Nuclear Warhead Capability Sustainment Programme**

## **VOLUME 1**

## **ANNEX C**

Approaches to Improved [REDACTED]

[REDACTED]

[REDACTED]

30 <sup>TH</sup> APRIL 2007	[REDACTED]	Ref: AWE/HSSET/07/27 Issue 3

## ANNEX C

### APPROACHES TO IMPROVED [REDACTED]

Originated by:

[REDACTED]

Programmes

Date:

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	[REDACTED]	
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**AMENDMENT RECORD**

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## EXECUTIVE SUMMARY

This Annex addresses SRD 9079 [REDACTED]

This implies [REDACTED] It is possible that this could be achieved through early commitment to a Concept phase to ensure work is focused on the realism of a design solution, with project requirements definition worked in an integrated and comprehensive manner with stakeholders. In addition, advantage could be gained from the [REDACTED] [REDACTED] allowing physics design confirmation to follow [REDACTED] [REDACTED] will be important in gaining confidence in [REDACTED] the programme requires early progress with the establishment of [REDACTED] [REDACTED] including the commitment of [REDACTED] Whilst TP1 already assumes significant benefit from successful delivery of AWE's change programmes, projects such as Connect offer the potential to [REDACTED] through process optimisation in design to manufacture.

### 1. INTRODUCTION

The SRD (ref 1) contains three references to [REDACTED] and associated [REDACTED] [REDACTED] assumed to require some [REDACTED]

The SRD references being:

SRD 8298: [REDACTED]

SRD 9079: [REDACTED]

SRD 9080: [REDACTED]

The proposed TP1 programme addresses requirements 8298 and 9080 largely through the TDF [REDACTED] and TDF [REDACTED] programmes respectively. This note considers approaches to SRD 9079, achieving [REDACTED] and identifies the major implications for the programme of developing a realistically achievable strategy to meet this requirement, recognising that this would require a [REDACTED] an acceleration of some [REDACTED] This strategy is dependent to a large degree on the success of [REDACTED]

### 2. BACKGROUND

The NWCSP (05/08) AWE programme (ref 2) was structured to deliver increasing levels of [REDACTED] capabilities, measured against definitions of [REDACTED] (ref 3). These metrics were developed within the AWE R&D communities in response to the top level TRL and [REDACTED] definitions. From their inception it was recognised by both MOD and AWE that there was not a simple correlation with the standard definitions, ie in Annex B of the URD (ref 4) it was noted that [REDACTED] were represented by [REDACTED] for the [REDACTED] [REDACTED] design. Further, these were developed largely in isolation for each of the various sub-components and so do not fully represent the [REDACTED] As an early output

of the TDF [REDACTED] programme the [REDACTED] definitions are to be reviewed and revised to reflect a fully integrated approach to the warhead and its components.

Key stage points in the capability programme were recognised, in particular [REDACTED]

[REDACTED]

[REDACTED]

This diversity is perhaps to be expected, given the past levels of investment in warhead physics design compared with NNCs and Systems Engineering and Integration capabilities. The thrust of the NNC work is aimed at achieving Co-ordinating Design Authority (CDA) status for the [REDACTED] NNCs [REDACTED]. Thus an accelerated programme of achieving CDA status is required. [REDACTED]

As the NWCSP has progressed there have been a number of changes to the programme. In June 2006 a joint NWIPT, DGStratTech and AWE team investigated the benefits, costs and risks for UK warhead project options that could support the [REDACTED] (ref 8). Their report recommended changes to the [REDACTED] requirements that drive the [REDACTED] programmes (pp19):

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

MOD's expectation of the timescales for a [REDACTED] have become clearer, with assumptions for a [REDACTED] respectively. Although there is not, as yet, a formal requirement for either a [REDACTED] project, or for studies to specifically [REDACTED] the TP1 programme is addressing the capabilities these would require. A Capability Milestone [REDACTED] [REDACTED] has been proposed for [REDACTED] and the TDF [REDACTED] programme has been structured to provide early experience in [REDACTED] capabilities and to provide early indications of [REDACTED]

### 3. STRATEGIES TO IMPROVED [REDACTED]

The SRD (ref 1) identifies a [REDACTED] (SRD 8298) and seeks [REDACTED]

[REDACTED]

[REDACTED]

Whilst there is no agreed detailed understanding of the particular requirements of Main Gate for a [REDACTED] one is able to make general observations based on the Acquisition Handbook (ref 11).

Main Gate is defined as *"The major decision point in the acquisition cycle, at which the solution and the "not-to-exceed" figures for the project are approved"*. In order to achieve Main Gate the Business Case requires a *fully mature requirement and that technological risks are fully understood, with "robust costed plans to bring relevant technologies, across DLODs, fully to maturity, and fall-back plans should technical challenges be insurmountable"*, noting that *"Technology Readiness Levels together with System Integration Readiness Levels, if used properly, provide useful tools in this area"*.

It is further required that there is *"financial maturity with robust three point estimates (10/50/90% confidence levels) to include a "not to exceed" cost for the project are developed and the project is fully affordable - Clear plans are set out to manage the programme within approvals by trading cost for capability in the event of unforeseen cost growth" with a "fully mature procurement strategy: including a robust TLMP, properly assessed whole life costs and support risks, clear acceptance and disposal arrangements" and "assurance that the industrial base has the appropriate capability and capacity and is able to manage its risks"*.

Overall on timing and approval of Main Gate *"The APB and IAB are determined to ensure that, in future, all projects coming forward for Main Gate approval are appropriately de-risked and this will be the overriding factor in determining both the timing of the Main Gate and whether final approval is granted"*.

The technical requirement on the AWE programme for a Main Gate decision in [REDACTED] is therefore focused in demonstration of confidence in the technical [REDACTED] and its amenability to [REDACTED]

[REDACTED]

On the other hand the capability growth programme defined in TP1 is against a broad set of technical requirements for a [REDACTED]. The elements of a [REDACTED] Project Management Team have been established, with defined Integrated Project Teams and a Design Authority structure, [REDACTED]. However, in order for an [REDACTED] to be achieved there needs to be early engagement in a meaningful [REDACTED]

[REDACTED] This has been recognised in the TDP [REDACTED] plan, but may need enhancing in order to fully meet this challenge. Essentially, [REDACTED] all features of the [REDACTED]

Confidence in such a level of design definition would be enhanced through [REDACTED]



[REDACTED]

[REDACTED]

In addition to this early definition of the [REDACTED] need to be challenged to improve concurrent working, increase the utilisation of [REDACTED] and minimise timescales for [REDACTED]

AWE is aware of these issues and there have been initiatives in a number of [REDACTED] areas, eg MBA, Lean. Recently the Connect project, initiated in [REDACTED] has become the integration point, with its high level project requirement to significantly reduce [REDACTED]

This project will streamline and integrate the [REDACTED]

[REDACTED]

Whilst TP1 already assumes significant benefit from [REDACTED] (as described within the Volume 1 AWE Programme Plan) is vital in providing the correct "right first time" culture and innovative environment that will be needed [REDACTED]

#### 4. THE IMPORTANCE OF [REDACTED]

[REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**5. CONCLUSIONS**

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

AWE has already recognised the need to streamline and integrate the [REDACTED] processes to reduce [REDACTED] place an integrated, benefits-focussed programme that offers [REDACTED]

## 6. REFERENCES

1. Nuclear Warhead Programme 'System Requirements Document', Version 3.0, yet to be approved [REDACTED]
2. Nuclear Warhead Capability Sustainment Programme, [REDACTED] Ref AWE/PLAN/RAF/2005/10001, January 2005
3. [REDACTED] Definitions Document Revision 8 AWE/DWE20/06/B/HSC/CH/639 DATED October 2006.
4. Nuclear Warhead Capability Sustainment Programme 'User Requirements Document', Version 6.0, [REDACTED] Ref SIT/10/1/6/74 September 2006.
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8. [REDACTED] ref DPA/NW/DA/552/331/2 June 2006.
9. [REDACTED] – Draft of 19 April 2007 (attached as Appendix A).
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11. The Acquisition Handbook. Edition 6 – October 2005. Smart Acquisition, The Directorate of Defence Acquisition (D Def Acq).



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