

## **EXPLOSIVES SUPPORT TO TRIDENT LIFE EXTENSION**

### **10 + 2 Life Extension**

#### **EDC37 Safety Testing**

Small-scale safety tests will be carried out on EDC37 supercharge explosives samples recovered from Surveillance round SLT-04 (and SLT-05 subject to availability). The tests will investigate:

- sensitiveness of explosives powders to impact and pinching between metal surfaces; electrical discharges and heat;
- thermal stability and chemical composition and nitrocellulose molecular weight;
- shock sensitivity
- growth of reaction when explosives charges are ignited.

The results of the tests on SLT-04 and SLT-05 will build on confidence gained from Surveillance Rounds SLT-02 & SLT-03 and Long Term Accelerated Storage Trials 2004/3 and 4066 that the safety of EDC37 is not degrading significantly with age. SLT-04 and SLT-05 provide direct stockpile aged evidence from explosives after 6.5 - 7 years' Service.

#### **EDC37 Mechanical Testing**

Testing of samples recovered from Surveillance round SLT-04 (and SLT-05 subject to availability) will determine the mechanical properties (including strength and extensibility) of EDC37 to provide data for stress analysis of disassembly processes.

#### **Interface with DCP(M) on EDC37 Ageing**

The surveillance evidence described above will be complemented the results of a DCP(M) research programme aimed at understanding the effects of age on EDC37. This includes detailed studies of degradation mechanisms and the results of laboratory tests on EDC37.

### **12 + 2 Life Extension**

#### **EDC37 Safety Testing**

Small-scale safety tests (as described for the 10+2 extension) will be carried out on EDC37 supercharge explosives samples recovered from Surveillance round SLT-05, SLT-07 and Stockpile Withdrawal Tests SWT-01 & SWT-02.

The results of these tests will build on confidence gained from Surveillance Rounds SLT-02, SLT-03 & SLT-04 and Long Term Accelerated Storage Trials 2004/3 and 4066 that the safety of EDC37 is not degrading significantly with age.

#### **EDC37 Mechanical Testing**

Testing of samples recovered from Surveillance round SLT-05, SLT-07 and Stockpile Withdrawal Tests SWT-01 & SWT-02 will determine the mechanical properties (including strength and extensibility) of EDC37 to provide data for stress analysis of disassembly

processes. The SLT-05 and SWT-01 data will extend the evidence on the effect of stockpile ageing on mechanical properties out to ~ 8 years' Service. However, since all stockpile data obtained thus far has been from the earliest production lot it is necessary to investigate the effect of age on the inter-lot variability of mechanical properties.

**Interface with DCP(M) on EDC37 Ageing**

The surveillance evidence described above will be complemented the results of a DCP(M) research programme aimed at understanding the effects of age on EDC37. This includes detailed studies of degradation mechanisms and the results of laboratory tests on EDC37.

Issues document – Input for Beckner from Stout/Thompson

**Item 13 MoD required changes – explosives**

AWE has disposal facilities on site at Aldermaston and Burghfield. Having an on site capability is a basic requirement for an explosive license. At Aldermaston a long-standing dispute exists between an adjacent property owner and the MoD. The persons property is in the safety buffer area outside of the actual disposal site. They want the city council to rezone it for development, which they have not been able to get approved. For years this has been contested and MoD has won to date. Should this change and the property be approved for development, AWE must shut down operations in the present disposal facility. The consequences are a new facility must be built using more modern technology (most likely an incinerator) because alternate space does not exist at Aldermaston to "burn" in. The cost impacts are in the £3-5m capital and £200+/yr. operating.

This issue is in the category of "might change" rather than "has changed". We recommend that AWEML document the concern with MoD and a change of this type will be cause for re-negotiation of contract.

**Item 14. Have production requirement and time scales for A45/A90 changed.**

Workload requirements have changed in both facilities since the proposal was submitted.

A90. The pit schedule per year after 2002 originally planned to drop to ~½ of current target rate. Revised plans call for the current rate to continue throughout the Trident refurbishment program. This change and background is documented in the *Corporate Manufacturing Plan*, dated Sept 99. located in our vault in F6.1. This plan was revised since the proposal. The new plan increases cost in A90 (although small on an incremental basis), increases pressure on feed material, increases Be workload, and makes it more challenging to balance all the other work in A90. In addition, it reduces the chance of moving some the HEU capability into A90.

A45. A new requirement for significant additional surveillance work on Trident secondaries has been established by SED. This actually occurred during the lead-in period. This work has substantial impact on the A45 manufacturing line. It will require delaying completion of new Trident components for 9-12 months and keeping the A45 production line open until late 2003. The original target was completion of requirements at end of 2002. Alternatives and workarounds to reduce impact of the surveillance work continue to be analysed by the AWE plc staff. Some alternatives reduce impact in A45 but increase it elsewhere. For example, one alternative would increase workload at Burghfield and slow down W177 disassembly work. This surveillance

requirement is documented in, *Technical Rational Supporting Trident RBA life extension* dated Jan 2000 (Note: this document is marked UK Eyes Only)

It is important to note that both of these changes were a result of the current AWE plc staff changing their position on an issue and not driven by MoD. However, MoD is aware of the changes.

The baseline plan for Trident assumes both the pits and secondaries can be re-certified and reused. Should this change it would have profound impact our future workload in A45 and/or A90.

**Item 15. MoD explosive disposal routes.** (Note: Revised 24/2 based on revised information from Dr Roger Roberts. See summary from Roberts - attached)

Our understanding is AWE plc has paid most costs for HE disposal out of one or more of their contracts. MoD has been involved primarily to make obtaining an EA license easier. Since the larger volumes of HE scrap (e.g. W177 super charges) are considered LLRA, a RSA permit from the EA is required to move to a disposal site off site. What the MoD has done is take ownership of material on paper so the EA request can be processed and avoid the "public comment" phase. On a government to government permit public interaction is not required. This allows the permit to be processed in much less time and reduces the risk it might not be approved. However AWE plc still does the work and funds most activity out of existing contract (s). The exception is MoD contracted directly with DERA for destruction of Chevaline parts and this money did not flow via AWE. AWE plc staff has now learned that MoD has a desire to withdraw from direct participation in destruction of stockpile HE (holding RSA approvals, placing third party contracts) If MoD implements this desired change it means time to get permits and risk increases and probably costs go up. On the plus side, the DA at AWE is trying to gather data that would convince the EA that parts from Tridents are not LLRA. If successful, it would get the EA out of the process.

**Item 19. Regulatory requirements for SNM storage strategy**

We have learned the regulators (NII) have significantly increased their focus on SNM storage and are very dissatisfied with progress made by AWE in recent years. They highlighted the need for AWEML attention to this matter in recent discussions over transferring the licence. A long-term ANM strategy document has been issued in the last two weeks by HB, which we reviewed. This plan addresses what we want to do in the long range and we concurred in the document. It does not deal with how and when we will meet the plan. We have committed to NII to issue a Program Plan that will describe how /when/cost of implementing the strategy to the NII by 9/30/00. As this plan is developed we will be able to estimate the costs and make the appropriate

trade offs. In reality the NII's view has not changed. They have not been able to get HB to do what they want and are now leaning hard on AWEML.

**Item 20. SNM generally**

We have looked at current issues in this area. Our view is balancing and planning for SNM is an ongoing effort that will continue for the life of the contract. This is not a "new" requirement but part of the job. As time goes forward situations will occur, for which solutions are difficult to identify. It is a challenging issue that requires constant management attention and some risk that you will not always have a solution. (This item is interrelated to Item 19.)

**Item 21. Disassembly sequencing/volume.**

Disassembly rates are still under negotiation with MoD. It appears a satisfactory outcome will result. Therefore high probability of no impact.

**Item 22. Chevaline Stage 1 retirement and out of spec devices.**

The words under this item do not make sense.

I assume this is talking about the "anomalous units." This is a key issue controlling the ability to get out of the alternate venue. NII has taken a hard position they will not allow them to ship until AWE has produced a process for disassembly and the associated safety case that is approved by NII. Work is going forward on this now but the solutions and completion time are yet to be finalised.

**Item 23. Standard of A90 services – issue of major refurbishment to ensure continued operability.**

This is probably not an issue, certainly in the first year.

**Item 24 HEU programme requirements including Naval fuel.**

Due to recent changes in MoD position, we believe a satisfactory milestone will be negotiated.

**25. A45 fireloading and other hazards.**

Our lead in team has pointed out issues to the A45 management that we feel need correcting. A write up by Nick Jessen is on file regarding this matter. We doubt this will be an issue but should be confirmed when the building surveys are done by the contractor AWEML is hiring.

**28. Manufacture Plan Revision**

A revised Corporate Manufacturing Plan was issued in September 99. It is highly classified and a copy is in our safe in F6.1. The significant change was

pit quantities. This plan should be required reading for all lead-in personnel (with proper clearances) working National Capability/Stockpile issues. See item 14 above.

Cc: Ev Beckner  
James Kelsey  
Jim Stout  
File

Mr Bill Thompson  
AWE ML  
C33.1

## BURNING GROUNDS AND EXPLOSIVES DISPOSAL

### Burning Grounds

- Aldermaston burning ground is an essential capability for destruction of explosives process and R&D wastes which are not certifiable for off-site transportation. License limits on explosive size and weight restrict its use for destruction of large scale or stockpile parts. Burghfield burning ground is similar in capability and deals with production wastes.
- Larger scale and legacy over-stocks from Aldermaston and Burghfield are shipped to other venues/contractors (DERA Shoeburyness, Cranfield COTEC range) for destruction by open burning/open detonation. This work is currently funded within the AWE project contract structure. SEE BELOW FOR THE SPECIAL CASE OF STOCKPILE HE PARTS.
- MoD has received complaint and intense lobbying from a neighbour about the Aldermaston burning ground. She alleges operational nuisance, and blames failure to obtain planning permission to develop her land on the buffer zones which extend across it. MoD has expressed a desire to close the Aldermaston burning ground. A feasibility study into alternatives was carried out in 1999.
- There are no low-cost fixes. The recommended alternative is an incinerator with environmental filtration, located within the main explosives area. ROM cost would be £5 million with annual running costs of £200k. The installation may be subject to regulation and public consultation. No project decision has been made.

### Stockpile HE Parts

- Stockpile HE is currently assessed as very low level radioactive waste. Accumulation, transfer and disposal are subject to authorisation under Radioactive Substances Act 1993 (RSA).
- Chevaline retirement: AWE holds an RSA authorisation (open to public scrutiny) to transfer HE to MoD control at Burghfield (a paper transaction). MoD has RSA Approvals (not subject to public scrutiny) to transfer the HE to DERA Shoeburyness and to dispose of it by detonation. AWE undertakes the transportation on MoD's behalf, funded by AWE project contract. MoD has placed a separate contract directly with DERA for the destruction; these monies do not flow through AWE.
- Trident and Chevaline Surveillance: all explosive from surveillance ends up at Aldermaston. AWE has RSA authorisations covering discharges from testing and final burning.
- Trident Refurbishment: MoD has indicated a desire to withdraw from direct participation in destruction of stockpile HE (holding RSA Approvals, placing third party contracts).
- The warhead DA has a programme to analyse stockpile components for tritium. There is growing confidence that all stockpile HE will be below the radioactive regulatory threshold. A conclusion is expected end-April 2000.
- If Trident stockpile HE at refurbishment does prove to be low level waste, the disposal route is currently seen as identical to Chevaline.
- If MoD decided to withdraw from participation in the transfer, AWE would need to obtain RSA authorisation for transfer to DERA at Shoeburyness. This would put the means of destruction in the public domain and would not be won easily or quickly. No preparatory work has started.

R H Roberts  
Ext 6424, Bldg B8E  
24 March 2000

## Meeting Record – Cliff Calow

**Classification: Unclassified**

**Present:**

Cliff Calow    AWE plc

James Kelsey        AWEML  
Peter Nash            AWEML

**Date and Location: 6 January 00, F6.1**

**Reason for Meeting**

Requested by AWEML prior to DTech presentations

**Subject of Meeting**

- Introductions
- AWE's intentions for presentations currently being organised
- Overview of Cliff's Organisation

**Main Points Discussed**

Cliff was relaxed and very personable, easy to talk to and was forthcoming. He is an AWE plc employee and noted that he was not part of H-B bid, so he wasn't sure what the details were. He knows Harry Saxton well as well as an old friend of Kelsey's – Nick Magnani.

Cliff took us through the main branches of his organisation total staff 1,300 reduced to 1,200:

- Manages both explosive research and explosive fabrication (res. at Aldermaston and fab. at Burghfield) Wants to combine into one unit. When plans are complete they will be presented to us by Cliff's Deputy, J Jenkins for approval. (Research is currently 115 people, and fabrication is 78). Any organisational changes in areas that are safety related require NII approval. Noted that Aldermaston facilities and Burghfield facilities are managed differently and this was another reason for trying to combine them. Explosive work includes detonators. Aldermaston group currently produces charges for Hydro work.
- Chemistry (Garth Williams – 209 people) Non-metallic materials, research plus produce components. Analytical chemistry plus support on-site environmental issues (for example waste discharge permits) Looks after Tritium (D7 and A19 areas). Consider this a sensitive area, especially in areas such as discharge of RA materials.

- Nuclear Materials (Chris Hutchinson – 99 people) Shepherds the MOD stock of Pu and HEU. Controls the on-site storage and the on-site and inter-site transportation of Pu and HEU. Also transport of PU into safeguards storage at BNFL (first trip made before Christmas) and transport to RR. Designs, manufactures, orders, and procures the containers for transportation. Two committees (RAMTAC and RAMSCAP) are responsible for approving the safety/security of these activities. They also develop some instrumentation that is used in monitoring the material. A small group that recycles Pu. They are required to maintain a 6 month stock (MOD reqm't) and this is difficult given the other competing requirements. Currently project to go below a 6 month stock in 5-6 years. Cliff felt that this was the right place to put any new work related to off-site transportation of weapons. The expertise already exists here although drivers are provided from Bill Hayes area.
- Directorate Manufacturing Business (Roger Hopkinson – 500 people) All A90 activities (compare to Phase I/Phase II activities). They cast and machine Pu. A45 deals with HEU. This group has conventional workshops and plating workshops. Also responsible for Quality control (of just their stuff????). Has both a facility manager and a production manager. People in this group to support facility manager too. Cliff felt that specific facility management was required and should remain attached to production team.
- Waste Management (George Wall – 137 people) Looks after all RA waste (solid, liquid, and trade waste) Cliff runs this particular contract as opposed to other areas where he is a supplier to other program managers. Currently constructing new solid waste storage building which should be available within 12 months. Liquid is more difficult. Pangbourne pipeline is current solution, but they are looking for other alternatives, eg evaporation for which Cliff mentioned a cost of £20m and 18 months duration. Feels that EA will not insist on evaporation and that other solutions eg ultra filtration may need to be investigated.
- Metallic Materials (123 people under P Finnerty). This is the old metallurgy division (Cliff's personal history includes technical activities as a metallurgist). Looks after depleted U, Pu, and Be. Mainly R&D activities. Ageing of materials, development of alternative materials. Does work in this group that is programmatically managed by Clive Marsh and Andrew Machin. Feels that current organisational system does work okay. This group does code development and modelling of materials.

Cliff said that for the presentation on DCP(M) would have programme content from Roberts, Williams and Finnerty. Cliff felt that his long acquaintance with AWE qualified him to provide an overview of the facilities and he would do this with Keith Hill who had implemented some of the BPR findings.

## **Actions**

- Cliff was unwilling to let us have a copy of the organisation chart which he spoke to, directly but he will organise this through John McTaggart.
- Cliff mentioned that a group was currently putting together a proposed set of new DCP programmes. A first shot had been completed before Christmas. We need to request a set of these.

## **Issues for AWEML**

- Cliff claimed not to have been part to the Hunting BRAE/DERA bid.
- Cliff wrote the first paper on site rationalisation. He would be a useful sounding board for any proposals we have.
- The infrastructure lead in team should attend Cliff's presentation.
- Need to take note of any work which AWE plc have done to integrate Convoy operations into existing SNM transport operation.

## **Key Words**

Convoy, Infrastructure, Facilities Management, Research, Waste Management, PPL

## **Copies:**

Directors  
Team Leaders

**Meeting Record – Clive Marsh DPR**

**Classification: Unclassified**

**Present:**

Clive Marsh AWE plc

James Kelsey AWEML

Peter Nash AWEML

**Date and Location: 6 January 00, E1.1**

**Reason for Meeting**

Requested by AWEML prior to DPR presentations

**Subject of Meeting**

- Introductions
- AWE's intentions for presentations currently being organised

**Main Points Discussed**

Clive was a little more reserved than was Cliff Calow or Clive Marsh but was helpful and pleased that we were consulting AWE staff before implementing any preconceived plans (contrary to what Hunting Brae had done at the start of their contract).

- Clive's work includes ASCII, DAHRT, NIF type work. Basically the equivalent of the US Science Based Stockpile Stewardship Program. He emphasized several times how closely they work with the US; primarily with LANL and LLNL.
- General structure of organisation is good but MOD places excessive restrictions on how they can move resources between projects.
- Chief customer is MOD Chief Scientist and his Ass't. Paul Roper. Clive did not seem to be aware that this was outside our direct link with the new integrated project team.
- "Our manufacturing capability is becoming more and more limited"
- Supports US-UK personnel interchanges, but has been able to attract US people to UK

Clive is planning a presentation which will be split over two days and will include visits to three facilities (Super Computing, Hydrodynamics and

Plasma) and introductions to the facilities managers. He will include information on mission, programme planning etc. He mentioned that AWE are considering the matrix of capabilities required to produce a follow on weapon and how significant weaknesses (eg cases, Be) could be addressed including options AWEML discussed in its proposal as gapping strategies.

### **Actions**

- Clive mentioned that he was liaising with Owen Price on presentation, Owen is currently in Change org. working for Gary George. We subsequently established that Owen is a potential AWE plc secondee to the Lead In Team. We would like to get him on board rapidly.
- Clive mentioned non US national collaboration and the related sensitivities more than once. We must ensure that we understand what is involved.

### **Issues for AWEML**

- Clive said that he got on well with the MoD Compliance team and that his quarterly reports were well "marked". In other areas where there might be personality clashes MoD had a tendency to "nit pick" which was unfortunate.
- Clive has clearly found working under the constraints of individual TCIF contract difficult as it has limited his flexibility. However, he also suggested that this was more in the perception of his customers (such as Andrew Machin) than in practice.
- Ensuring that AWE's research dovetails with that in the US is clearly critical. Clive mentioned that he has to tailor the programme so that results link into American work rather than simply being optimised for UK needs.

### **Key Words**

Capability Maintenance

### **Copies:**

Directors  
Team Leaders