Site Inspection Report No: 2007 / 032

HEALTH AND SAFETY EXECUTIVE
HM NUCLEAR INSTALLATIONS INSPECTORATE
(Click here for guidance on the new SIR format) *(Click here for guidance on IES codes (projects & systems)*

1.	VISITING OFFICERS	*Name(s)*	*ITEM (eg 8.1, 8.2)*
		[redacted]	All 8.1.1 8.1.1 and 8.3.1 8.1.1 8.1.1 8.1.1 8.1.1 and 8.3.1 8.1.1 and 8.3.1

2. DATE (S) OF VISIT 16 – 19 April 2007

3. SITE AND LOCATION OF VISIT Aldermaston/Burghfield

4.	PURPOSE OF VISIT -				
SIR Para graph	Inspection details (including operating unit / building)	Plan Name.	Div 3 IIS Code	LC / Topic	Outcome Rating
8.1	Planned Inspections				
8.1.1	LC15 AWE(B)	AWE	A1	LC15	4
8.2	Reactive inspections				
8.2.1	LC22 AWE(B)	AWE	A1	LC22	4
8.3	Licensees Project Related work				
8.3.1	[redacted]				
8.4	Other Site Related Work				
9.0	Recommendations and actions				

5. PRINCIPAL STAFF SEEN:

Topic	*Names of staff seen for each topic*	*Topic*
8.1.1	AWE(B) PRS team	AWE(B) PRS
8.2.1	[redacted]	LC 22
8.3.1	[redacted]	[redacted]

6. POINTS OF INTEREST TO OTHER SITES/SITE INSPECTORS

None

7. SUMMARY

An inspection was undertaken against the AWE(B) PRS to determine progress. There was some difficulty following the trail from shortfall to solution, some concerns over categorisation of modifications and concern that not all the work will be completed by September 2007 – hence code 4.

[redacted]

8. REPORT

8.1 Planned Inspection

8.1.1 Periodic Review of Safety LC15 – AWE(B) – Code 4

An inspection was undertaken to determine whether AWE(B) was making sufficient progress with PRS shortfall remediation and whether the solutions reduced risks ALARP. Prior to the inspection a meeting was held with AWE(B) personnel to bring the team up to speed on background and progress.

The meeting was attended by: [redacted] from NII. [redacted] and [redacted] attended on behalf of AWE(B).

[redacted] went through the PRS process during which originally 1000 shortfalls were identified. These reduced to 193 system improvements, 145 safety case improvements, 338 improvement work packages and 142 safety case justifications of the status quo.

[redacted] gave a high-level overview of the programme.

- New safety case by September 2007
- Facility actions closed out by September with 1 exception
- Manufacturing Authority actions closed out y September 2007
- The project continues beyond September 2007 to close out the remaining actions.

[redacted] talked about the Facility actions. 37% are done so far. About 5% are being challenged to see whether the remediation is really ALARP. [redacted] said none of the ALARP challenges represented a "no work" outcome.

[redacted] said his team had 145 actions of which 22 had been completed. The remainder would be completed when the safety case is issued in September 2007. This safety case will be based on the plant as it was in September 2006 as the engineering work is going on in parallel. [redacted] asked whether the modifications being undertaken will be incorporated. [redacted] said no new safety case was to be produced. In other words AWE(B) will end up with a safety case supplemented by a collection of modification proposals.

Following this meeting the teams split up and undertook their own inspections. Their notes are included below.

[redacted]

[redacted] 24 April 2007

[redacted]

[redacted]

1. A brief progress meeting was held at which AWE updated us on the progress of the [redacted] AWE indicated that an evidence file was about to be submitted to NII demonstrating the progress they had made in this area in support of an LI.

2. [redacted] explained the background to his ALARP studies and the decision to proceed with the chosen option. The decision was based on addressing the critical issues of [redacted] and doing this is a timely and cost effective manner. The full report would be provided in the evidence file.

3. The company would also be responding to my letter of 2 February 2007 NUC 700/52/55/2 P3 E37 and NII letter of 11 August 2006 NUC 700/14/50/2/2/ P2 E6 that raised the original concerns over the optioneering process and the [redacted] in particular.

4. [redacted] indicated that they were continuing to develop technical specifications for the works. He explained that AWE would be undertaking a reliability study of the new system and they would retain overall technical design control on this project. This study would form part of the overall justification and it was not considered appropriate to delegate this work to the [redacted] contractor.

B Site PRS

General Meeting

1. AWE provided a summary of the PRS process emphasising the scale of the operation i.e. 1000 shortfalls) and the level and depth of their endeavours to find solutions to them. E.g. 40 Pre ALARP meetings typically 5 solutions for each shortfall etc.

2. The main issue revealed in the meeting was that the revised safety case will be based on the plant as it existed at September 2007. There will be no attempt made to revise this generic case to reflect the ongoing improvements to the plant. Each modification will be appropriately classified under the AWE 804 plant modification process and a unique case made for the improvement. [redacted] who was not present at the meeting, will be responsible for the safety case aspects. For the more critical safety modifications it is vital that he can appropriately justify the engineering being provided and can therefore justify the engineering procurement process being used.

Break out Sessions

Manufacturing Authority 24 April

[redacted]

1. I briefly spoke to [redacted] of the Manufacturing Authority. He provided a summary of all the shortfalls listed against the MA.

2. There were 18 shortfalls ranging from Cat 1 to Cat 4 and he had provided an outline of the proposed actions that are proposed. Three items were completed and the outline engineering details of a number of modifications were listed. Eight items indicated that a challenge would be made against the original shortfall. That is the original SFRs were considered too onerous, unrealistic or there was new evidence/test etc. One action related to electrical issues.

3. I am generally satisfied that the MA are progressing the shortfalls appropriately and I will arrange further discussions with [redacted] to discuss them. The modifications will be controlled and implemented by the MA itself.

Remedial Works Team 24 April 2007

[redacted] (part-time)
[redacted] Part Time).

1. [redacted] provided a summary of the activities of the remedial works team. He explained that there were 338 shortfalls assigned to them amounting to around 80 planned fixes. The differences in the number of fixes arising out of the fact that a number of shortfalls may have a common theme and may be addressed by a single fix. The situation is further complicated by the fact that a similar fix would be implemented in a number of areas at different times.

2. Given the apparent complexity of the task AWE were asked to explain how the technical issues raised against a specific DAR would be rectified in practice. There were two main issues, the traceability of the process and the technical reassurance that the proposed modification would both resolve the original issue and produce the perceived overall safety benefit to the final safety case.

3. From the discussions it became apparent that there were a number of unique numbering systems using apparently similar numbering sequences in different areas. AWE explained that you needed access to the DOORS data base to follow the numbering system through from a unique shortfall to a planned improvement.

4. AWE provided a demonstration of how the system operated. From the demonstration it became appeared that the data base had limited search capability and is essentially a document record and retrieval system. That is given a unique shortfall reference AWE could retrieve the supporting documentation to the shortfall and it was then possible from reading the records to understand the history of it.

5. AWE indicated that against each shortfall reference there would eventually be a number of further documents as follows;

    a. Scoping document
    b. Engineering specification
    c. Basis of implementation pack
    d. Change Control 804 document
    e. Safety Justification.

6. Following a number of attempts to interrogate the system and track the progress of a specific design modification through the system AWE agreed to find a simple modification that was either at an advanced stage, or possibly at completion when the meeting resumed the following day.

Remedial Works Team 25 April 2007

[redacted] (part-time)
[redacted] (part time).

7. AWE provided the agreed example Unique Reference No DMP/LL24415970. The example related to an [redacted] door interlock system where the integrity of the original interlock categorisation was considered to be inadequate. The modification required the complete replacement of the interlock.

8. AWE provided a scoping document. The document identified the task in broad terms (i.e. provide a Castell Key interlock) but did not make any specific reference to the perceived hazard and the company engineering standards required to address this hazard. The document consisted mainly of the supporting references that led to the shortfall action. Reference was also made to uncertainty in the required SIL level.

9. AWE also provided what appeared to be an engineering specification (step b) for the interlock DMP/GGEC/LL24819731. I was concerned that the specification was essentially a simple procurement specification rather than a technical engineering specification that would place specific responsibilities on the supplier to achieve specified safety standards e.g. those derived from AWE CSPs. From our discussions it was not clear how the engineering responsibility for the safety of this system was being controlled during the procurement process. That is whether it was agreed within the original ALARP meeting, established within the project, transferred to the contractor or whether it was retained within AWE remedial project team. Whilst this was a fairly straight forward example it was not clear how more demanding projects would be controlled and when and where appropriate CSPs would be used.

10. To try and clarify the position [redacted] joined the meeting and he presented a flow diagram that was being developed as part of a facility project engineering process document i.e. design control plan. From the discussions it was apparent that the facility design/procurement process was still being finalised. That is when and where CSP documents would be used and how such requirements would be communicated and used by suppliers. [redacted] did however indicate that on the [redacted] modification AWE would be retaining overall design responsibility for the design as it was not possible to communicate all the relevant issues to the contractor.

11. In summary therefore it was difficult to establish how the remedial works engineering projects are controlled using the CSPs other than they will ultimately be subject to a final assessment by the 804 modification process.

12. An early discussion with [redacted] would appear essential to ensure that we have clear visibility of how safety requirements (i.e. shortfalls in the existing equipment) are incorporated into the remedial works engineering process and appropriate CSPs are used in the development of new designs.

13. The facility remedial works design control plan for these projects needs to be finalised urgently if these projects are to be completed to a September 2007 deadline.

[redacted]

Meeting on safety case shortfalls – present [redacted]

We discussed human factors in the shortfall identification and remediation process. Human factors in the PRS process has been limited to production of a report detailing a human factors and SMS review of extant assessments which identifies safety case shortfalls for human factors but no deficiencies in plant or processes except to reiterate shortfalls identified during human factors assessment undertaken in 2004, although these were not formally added to the PRS shortfalls database; it was indicated that they would beheld in the AMS database. AWE indicated that for the PRS reliance was placed upon engineering specialists to identify ergonomic shortfalls as part of the DAR process and formal human factors input was not sought. In addition it was stated that AWE modification process (804) requires human factors aspects to be addressed, however, AWE was not able to confirm that human factors advice had been sought in optioneering, design and implementation of PRS shortfalls. It is noted that a number of shortfalls have human factors implications for example, those focused on handling issues have the potential to include changes to operations and a number of shortfalls involve changes to the Human–Machine Interface.

Meeting on facility led shortfalls – [redacted]

Interrogated the AMS database, tracking a selection of shortfalls assigned to the facility to progress. The criteria for this decision process was not apparent looking through the list; there is some inconsistency, for example, the AMS database holds shortfalls that were explained as aimed at tooling, and challenges to the risk assessment. During discussion, AWE personnel indicated that these would not be resolved by the facility. Without clear ownership there is the potential for shortfalls to fall through the gaps. In addition, some shortfalls were ambiguously worded and the facility were unclear with regard to the issue to be addressed. The facility appear to be using AMS to manage the process rather than DOORS, there are practical reasons for this; production of work sheets for each individual shortfall owner integrates the PRS shortfalls into normal business. Details of the required actions and evidence of close out is not recorded. Progression of shortfalls through AMS needs to be this needs to be reconciled with the overall remediation of the PRS shortfalls to ensure AWE ahs adequate oversight of the whole process. This is something I will pursue in further inspections.

I also tracked some of the shortfalls carried over from the 2004 human factors assessment. They appeared difficult to track and dates for resolution of some fell between 2008-9.

Conclusion.

The presentation and inspection activity has prompted identification of three areas for further inspection from a human factors perspective;

1. Further interrogation of the AMS for progress of the facility-led shortfalls encompassing resolution of management issues and earlier human factors assessment used as source material for the PRS.
2. Progress of the safety case shortfalls.
3. Treatment of human factors issues in the engineering substantiation and modification process.

It is intended that these will be pursued during May inspection week.

[redacted]

AWE Staff present

[redacted]

NII Staff present

[redacted]

Presentation of progress with PRS shortfalls

AWE presented an overview of their progress with the activities to address shortfalls identified by the PRS. A copy of the presentation (restricted) was provided. AWE noted that those PRS actions that are presented as 'do nothing' actually mean that they will need to justify the status quo position. AWE said that the PRS shortfalls programme is constructed and prioritised by building access and operational programme. AWE acknowledged that the programme was not resourced in the software programme (Primavera); however they said that they have assessed resource requirements and are confident that there are no issue issues with resourcing.

The programme has four main work streams consisting of Facility Actions, Safety Case Actions, Manufacturing Authority Actions and Remedial works. Improvements/shortfalls programme consists of approximately 300+ items with the project continuing beyond the September 07 decision date (10 category 1 shortfalls will go beyond Sept 07 date).

Break out session

The meeting broke out into various smaller sessions to review progress on shortfalls.
The Remedial works programme (which consists of ~80 shortfalls) is being managed by [redacted] who has responsibility for 6 engineers. AWE attempted to demonstrate the DOORS database role in the Remedial works process. This process appears to take the output from the 'PRS handover report & close out

report' (DMP/GG/LL18029095) forward into an engineering scope of works document and then a technical specification as basis for contract of works.

In order to gain some confidence in the process AWE were asked to take NII through a PRS shortfall from its identification to completion (closeout). This demonstration proved quite difficult for AWE and revealed a number of potential areas for concern. AWE said that the process was difficult to demonstrate as it required input from other groups (PRS, safety case) and the majority of the improvements are still at the early stage of scoping.

We asked AWE to put together the best example to demonstrate the process for the meeting on the next day. At this second break out session AWE put forward an example shortfall to demonstrate the process. This shortfall involved the [redacted] machine in building *F**. AWE started by producing a copy of a signed off proposed scope of works document (DMP/LL24415970). This proposed modification was to provide a Castell key interlock system to control access.

AWE said that the scoping document process looked back to the PRS including the output of the DAR's and ALARP meetings (optioneering process). However it was difficult to establish how the engineered solution, that was proposed in the scoping report, had been derived and how it related to and satisfied the original shortfall against the SFR. This was further highlighted by a statement in the document that the basis for the design integrity was not yet known (not known but could exceed SIL 2).

AWE said that the due process was not yet completed at this stage and the document had to be processed by the safety case department [redacted] and go through facility modification risk assessment (FMRA) and modification arrangements (804) before being completed. AWE then presented a Design Control Plan in order to explain the process. However this project specific DCP failed to show a visible link and raised concerns that the project may not necessarily be complying with the corporate CSP's.

AWE accepted that the visibility and traceability of the link between the shortfall, ALARP and scoping process could be improved and suggested that this could incorporated in the scoping document. However it is only the visibility issue that raises concerns; it was worrying to see that the proposal in this instance had been developed through to an electrical specification stage report. This report (DMP/GGEC/LL24819731) is intended for issue to a contractor for works. A chief concern is that the categorisation of the entire process may not reflect the consequences of inadequate conception of design or implementation. AWE admitted that this modification may now attract a category B status however this contradicted what had previously been noted that only category A and C modifications existed.

In conclusion AWE failed to adequately demonstrate that the process would deliver engineering fixes that address the PRS shortfalls in terms of the safety case requirements. There is a risk that AWE could implement modifications that subsequently can not be demonstrated to satisfy the safety case.

The inspection raised the following observations / concerns:-

i. The process to address PRS shortfalls is complex and has many overlaps in responsibility. It needs robust arrangements to manage it with the DOORS database playing a significant role.

ii. The categorisation of the modification work is unclear against the consequences of inadequate design/ implementation.

iii. The process to demonstrate that the improvements satisfy the safety case requirements lacks visibility.

iv. The project (design control plan) may not be following AWE's own corporate CSP requirements.

v. The work is being driven by the delivery date of September 07, which raises a question on AWE's capability to resource and complete the task.

[redacted]

CIVIL ENGINEERING ASSESSMENT NOTES

These notes summarise the discussions held at AWE on progress with civil engineering issues for B Site PRS during the visit to Burghfield on 24/25 April 2007.

People met. AWE [redacted]

Engineering Issues

1. I have been discussing progress with addressing shortfalls at regular site meetings and have developed a table indicating the shortfall and progress being made. Some of the shortfalls will not be delivered by the decision date. Several of the shortfalls have been re-ALARPed and additional analysis and investigation is being undertaken which is different to the original fix. These may lead to shortfalls not being fully addressed by the decision date.
2. I have an agreed list of deliverables. These comprise reports and findings form investigations. I will assess these when they are available from the licensee. All these items should be available in adequate time for me to carry out an assessment before the decision date – but see also point.

DOORS Database

3. I tracked two shortfalls through DOORS and found the following.

a) No civil engineering issues have yet closed so could not be tracked to completion.

b) Details from the ALARP Report are included on DOORS but where requirements have changed e.g. [redacted] roof, the process is not traceable through DOORS. However, through interaction with the licensee, I am aware of the decisions taken (not good enough for the licensee's system though). (Shortfall 4.4.4.1)

c) At an earlier review of DOORS in February an observation was made that the items on the DOORS Database should be linked to the programme. This has not been done.

Points of Current Concern

1. There are several items of work which will extend beyond the decision date. These are shown on the programme.
2. There are also some items which are planned to finish before the decision date but which may extend beyond it for some reason. Some items are reliant on ongoing analysis work which may not resolve the issue. There is inspection work still being procured and which is slow in implementation which could push the resolution of the issue beyond the decision date. These relate to the trial for the investigation of buried structures concrete which was planned for January and has still not started due to difficulty in letting an appropriate contract. If the trial is successful it is not clear that the inspection in the facility will be complete by the decision date. If the trial is unsuccessful it is doubtful if there is time to look for an alternative. A similar situation could occur with the inspection of the masonry on the [redacted]
3. There are some items which are being reviewed and which are being put to the ALARP Panel for approval of a reduced scope of work. If the ALARP Panel does not agree to the reduction, further work is required which may overrun the decision date.

Observations

1. Many of the civil engineering shortfalls will not actually end up with a physical fix. There may be further analysis or justification which goes some way towards demonstrating that the risk may be tolerable. The will undoubtedly be a degree of engineering judgement involved in the final decision as to whether the plant is safe to operate.

2. AWE need to provide a coherent justification as to why it is safe to continue operating with a structure which will not meet modern standards. The current work will contribute to that justification but it will not, in its own right, provide a modern standards fix for the shortfall. A Justification is also required that the 'fix' is ALARP. There are a number of 'do nothing' responses to shortfalls which need to be included in that justification.

3. We need also to bear in mind that for the civil engineering structure the only real fix is the new facility.

[redacted]

[redacted] **Contribution to Burghfield Team Inspection Visit Report**

[redacted] **– Optioneering + programme**

Date: 24 April 07

AWE attendees: [redacted] (Remedial works project assurance manager), [redacted] (project manager, Cat A mods), [redacted] (senior engineering manager), [redacted] **NII attendees:** [redacted]

The Programme [redacted] is slightly ahead of schedule. AWE will calculate the reliability before the detailed design stage – the work should be complete by the end of Nov 07, which is when the draft PCSR will be complete. NII expressed the view that the reliability requirements associated with the [redacted] need to be more visible.

The optioneering [redacted] appeared reasonable – the only feasible options all had the same risk reduction.

Safety Case PRS improvements

Date: 24-25 April 04

AWE attendees: [redacted] (part), [redacted] (part)

NII attendees: [redacted] (part)

All safety case shortfalls will be addressed in the new safety case. The new safety case is based on the plant as 'frozen' in Sept-06.

[redacted] agreed to produce a progress statement regarding the safety case shortfalls – **ACTION: AWE**. These will include the following column headings:

- Shortfall
- Improvement recommendation
- Categorisation
- Progress (not started, just started, in progress, near complete, complete)

NII sought evidence of closure of shortfalls, and sampled shortfall 6.5.4.1 "glovebox operations should be subject to a HAZOP2 study in order to investigate cause and effect". The evidence presented was Hazop report DMP/GG/LL/17214183. However, the report was for a HAZOP1 not a HAZOP2. The shortfall therefore did not appear to be closed.

NII also sampled shortfall 6.5.3.1 and 6.5.2.1 regarding new lifting and tooling FMEAs. It was noted that the tooling FMEA did not have a 'failure mode', column, and hence did not appear to be consistent with AWE procedure CSP 855 s4, nor consistent with the lifting FMEA.

NII spoke to [redacted] a member of the Remedial Works team. NII emphasised the importance of doing a proper risk assessment for modifications, to ensure that risk is in fact reduced and not increased by being inadequately conceived or implemented.

Closeout meeting.

NII thanked AWE for its help and said that whilst some questions had been answered a number still remained and further inspections would be necessary – especially in terms of following the trail from shortfall through to remediation. NII said it also had concerns that in some cases the categorisation of the work may not be appropriate and the definition of the work may be unclear. NII said it would write in respect of the findings and also regarding the list of work which AWE was not proposing to have done by September 2007.

NII said it would come back in May and June and look at further examples.

In view of the fact that not all shortfalls will be remediated by September 2007 and that the process is not particularly transparent and also due to a number of other concerns, code 4 is considered appropriate.

8.2 Reactive Inspection

8.2.1 Modifications - LC22 - AWE(B) – Code 4

An inspection was undertaken into the modification to the [redacted] in the GGs to prevent [redacted] the GG following an accident and hence increasing the amount of contamination leaving the facility, which was incorrectly implemented, thereby also depressurising the [redacted] The modification was discussed with [redacted] and [redacted]

In summary:

The [redacted] went to only one DAR instead of 2 – it featured in the civil DAR but not the containment one.

The designer of the modification didn't realise this

The facility drove the modification and hence lost the overview

AWE(B) now has SFRs which it didn't when the modification was conceived and executed.

AWE(B) didn't know how long the [redacted] would stay [redacted] so there was an element of experimentation involved.

The report into the failure of this modification only addressed this modification and not the wider issues.

As a result I intend to write and ask AWE(B) to raise an Abnormal Event and then investigate what should have been done to address weaknesses in the modifications system.

In view of the poor quality of the modification paperwork and the lack of an AE code 4 is considered appropriate.

8.3 Licensees Project Related Work

8.3.1 [redacted]

8.4 Other Site Related Work

8.4.1 None this visit.

[redacted]

[redacted]

9.2 [redacted]

[redacted]

[redacted]

Signed..... [redacted] May 2007

Distribution:

AWE team
IIS Co-ordinator – [redacted]
[redacted] for TRIM and database