

4 Mar 11

## **SITE EVENT REPORT COMMITTEE (SERC) - ANNUAL REPORT FOR 2010**

### References:

- A. NB BP 19 (Issue 3) - Reporting and Recording of Nuclear and Radiological Events.
- B. JSP 518 Issue 3.1 - Authorisation Condition 7 (Incidents on Site).
- C. SERC annual report for 2009, BNSO/136/38.
- D. NRPA-3-11 (PORT) - NRP Event Reporting.

### **Purpose**

1. The purpose of this report is to update the Site Safety Committee on nuclear and radiological event reporting and to provide a summary of trends and emergent issues at HM Naval Base Devonport during 2010.

### **Scope**

2. This report covers all nuclear and radiological events that occurred on the MOD owned Naval Base Site during 2010 and that were reported in accordance with Reference A<sup>1</sup>. This is a requirement for NBC to satisfy in accordance with Reference B. Also provided within the report is feedback concerning the SERC Targets set at Reference C and Targets for the SERC to work towards during 2011. Noting the continued favourable feedback received from the Site Safety Committee, this report follows a very similar structure to that used in recent years. It does not cover the DRDL Site for which the Company has separate arrangements.

### **Evolution of event reporting at HMNB Devonport**

3. The arrangements for Nuclear and Radiological event reporting currently in use have remained largely unchanged since their introduction in the latter part of 2006. The changes introduced since 2006 have been evolutionary in nature, the most significant being the introduction of a new event cause code structure in 2007 when the previous arrangement was proving difficult to work with and of little benefit. Since its introduction in 2007, experience with the new cause code structure has been satisfactory. With over three years experience of the revised code structure and as anticipated when it was developed, it has proved to be more easily understood, easier to work with and meets

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<sup>1</sup> The report does not cover the DRDL Site for which The Company has separate arrangements.

our needs. This structure underlies a joint MOD/Babcock Devonport cause code structure that has been developed in preparation for the introduction of Common Event Capture Process at the Devonport Site. (Common Event Capture is discussed in more detail at paragraph 33). In anticipation of the introduction of Common Event Capture, the NSER form has been amended to include a field for Babcock OEF Event Numbers for cross referencing purposes.

### **Event list**

4. A list of nuclear and radiological events reported during 2010 is at Annex A. The list includes a basic description, event cause, event consequence code and remarks where appropriate. In some cases the assessment is provisional pending ongoing investigation, implementation of recommendations and/or agreement by the SERC.

### **Event history analysis**

5. As per the practice adopted since 2006, this report considers trends for nuclear and radiological events reported to the SERC over the preceding 5 years, in this case 2006 up to and including 2010. To enable a direct comparison, events prior to the introduction of the revised cause code structure in 2007 (BP19 Issue 1) have been re-assessed against the current tree structure for event cause (reproduced at Annex B). A high proportion of the events have been allocated more than one Immediate Cause (IC) and Underlying Cause (UC) codes which should be considered when comparing the total no. of events in any one year against the total no. of IC codes for the same period.

6. **History.** A total of 36 events were reported during 2010. The 5 year history is:

<b>Year</b>	<b>Total No of Events</b>
2010	36
2009	54
2008	55
2007	52
2006	32

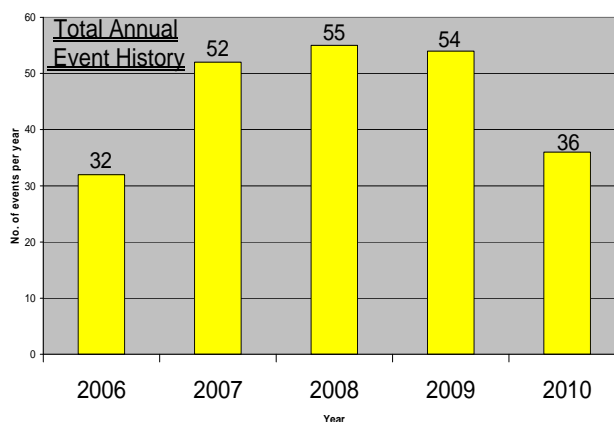


Table 1. No of events over past 5 Years.

It can be seen from the above event history that the number of events reported in 2010 was less than the previous 3 years. Similar fluctuations in the number of events have been noted in the past (50 events in 2004 followed by 35 in 2005 and 32 in 2006). Two of the factors that may have contributed to this reduction are considered below. Firstly in 2009, there were 8 events related to Diesel Generator (DG) derived shore supplies when submarines required a primary and alternative shore supplies energised from independent sources over an extended period. In 2010, such supply arrangements were not required on the MOD Site and there were no shore supply failure events reported. Secondly and subjectively in discussion with the TXB PAG Chairman, it is assessed that apart from routine maintenance work, there was a lower level of nuclear activity at the TXB Berths in 2010 in comparison to 2009. In 2009 HMS [REDACTED] undertook the later stages of a major repair and revalidation period followed by a substantial testing package and HMS [REDACTED] undertook the final stages of her LOP(R) at the TXB. With less non-routine nuclear activity it would be reasonable to expect an associated reduction in the number of events.

7. **Event Consequence (EC).** All events during 2010 were allocated an EC code in accordance with Reference A. This functions on a sliding scale from EC Code A, the most severe, to EC Code D. This is used in conjunction with a Task Frequency code in order to determine the Level of Investigation to be attached to the event; Trend, Root Cause Analysis (RCA) or Board of Inquiry. During the period 2006 – 2010, most events fell within the two lowest EC code categories. 2010 saw 1 NSER (11/10 Operation without Steam Generator (SG) overpressure protection on 2 submarines) categorised as Category B<sup>2</sup>. This event is discussed further at paragraph 20.

8. RCA was undertaken for 14 events, including some events where only a trend investigation was indicated but where the SERC Chairman in consultation with the Responsible Officer judged that it would be beneficial to conduct a deeper investigation. One event was subject to a Ship's Investigation which was forwarded to the SERC. The SERC noted that the quality of this investigation report was significantly improved in comparison with previous ship investigation reports received by the Committee. This may be attributable to improved guidance on investigations issued by FLEET HQ in the recent past.

9. **NRPA Event Reports.** NRPA Event Reports in accordance with Reference E were required for 8 events on the MOD Site at Devonport during 2010; for comparison 10 were required in 2009.

## **Breakdown of events by type and immediate cause code analysis**

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<sup>2</sup> Cat B Consequence = Serious actual or potentially serious event. Cat B Description = Significant impact or potential for significant impact on safety or regulatory compliance. Investigation would be required to maintain compliance. Includes HSE reportable events.

10. Events are categorised using the system described at Reference A. Three broad categories of cause are used for analysis of events.

- Equipment related event.
- Work control related event.
- Personnel failure event.

11. Each of these categories is then sub-divided to into three or four Immediate Cause (IC) codes. Applicable IC codes are allocated to each event. Thus it is possible that a single event may be allocated more than one IC code and could for instance be allocated more than one cause code under the personnel failure heading. The IC codes for events occurring over the past 5 year period are tabulated in Table 2. It should be noted that some events that are still under investigation and for the purposes of producing this report provisional ICs and UCs (where applicable) have been allocated based on the current understanding of the event.

IC code / description		2010		2009		2008		2007		2006	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.1	Equipment Breakdown	3	6	13	17	6	6	6	8	2	4
1.2	Equipment not fit for purpose	4	7	4	5	2	2	5	7	2	4
1.3	Equipment correctly specified, incorrectly used	0	0	1	1	1	1	1	1	0	0
2.1	Preparation planning related event	6	11	7	9	9	10	16	21	10	20
2.2	Written control related event	10	19	11	15	20	20	18	24	12	24
2.3	Verbal control related event	0	0	1	1	6	6	6	8	3	6
3.1	Persons not adequately SQEP	0	0	5	7	4	4	4	5	7	14
3.2	Incorrect action taken despite suitable guidance	25	46	24	32	33	33	14	9	6	12
3.3	Persons not Available	2	4	1	1	5	5	0	0	2	4
3.4	Poor safety culture/ awareness	4	7	8	11	13	13	5	7	5	10

Table 2. The number of events for each IC code over the last 5 years.

12. A comparison of cause codes allocated for the year 2010 against the average for the period between 2006 to 2009 is illustrated in the pie charts below:

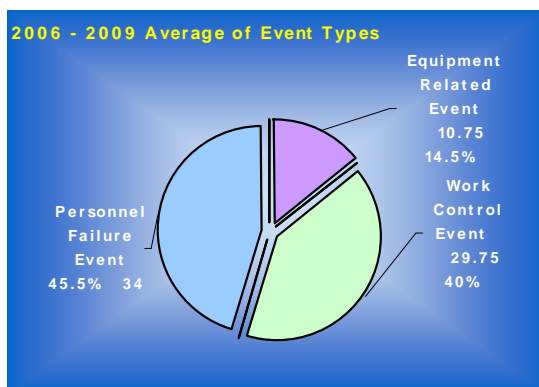


Chart 1.

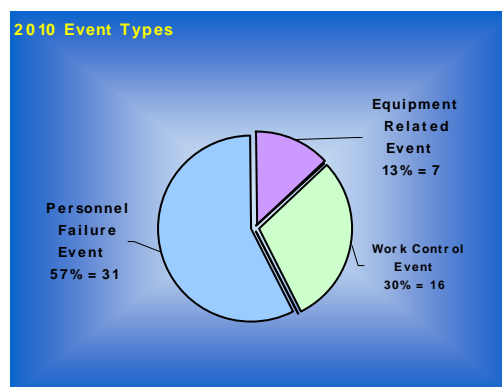


Chart 2.

13. These charts indicate that as a percentage of the total number of IC codes allocated, personnel failure is up marginally on 2009 (up to 57% from 51%) and once again is above the average of 2006 – 2009. There has been a marked decrease in the amount of equipment related events in 2010 compared to 2009. It is assessed that 2009 data was significantly influenced by the number of DG derived shore supply failures of which there were none (affecting the MOD Site) in 2010.

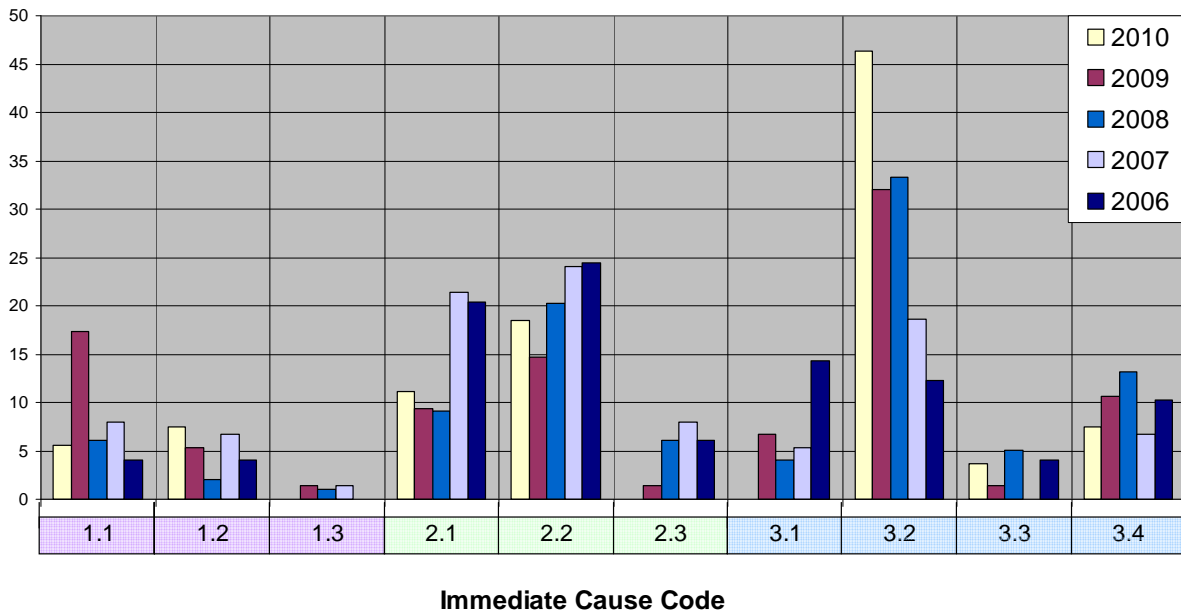
14. Events prior to the latter part of 2007 were retrospectively allocated IC codes from the current system by making a judgement based on the text of the investigation but without immediate knowledge of the events, thus perhaps failing to assign personnel failure codes that would now be allocated. Following in depth investigator training undertaken by some SERC members, there is increased awareness of human factors issues such as training, availability and performance and this is reflected in the Committee's discussion and consideration of events. At least in part, these factors are thought to explain the step increase in the identification of personnel failure as a cause since the beginning of 2008.

### Immediate Cause code analysis

15. **Trends.** Table 2 and Graph 1 give a breakdown of the Immediate Causes of these events. Incorrect action taken despite suitable guidance (3.2) remains the most significant IC. This is followed by written control and planning (2.2 and 2.1).

% of events

### Immediate Cause as a percentage over 5 year Period



Graph 1

16. When considered in greater detail, the most frequent Underlying Causes<sup>3</sup> for these particular IC codes are:

- Personal error (3.2.1)
- Written instruction not followed or ineffective (2.2.3)
- Action not completed in full (3.2.3)
- Ineffective written control (2.2.2)
- Failure to comprehend risk present / impact on safety (3.4.2)
- Ineffective plan or preparation (2.1.2)
- Failure to seek/obtain assistance/guidance (3.4.4)

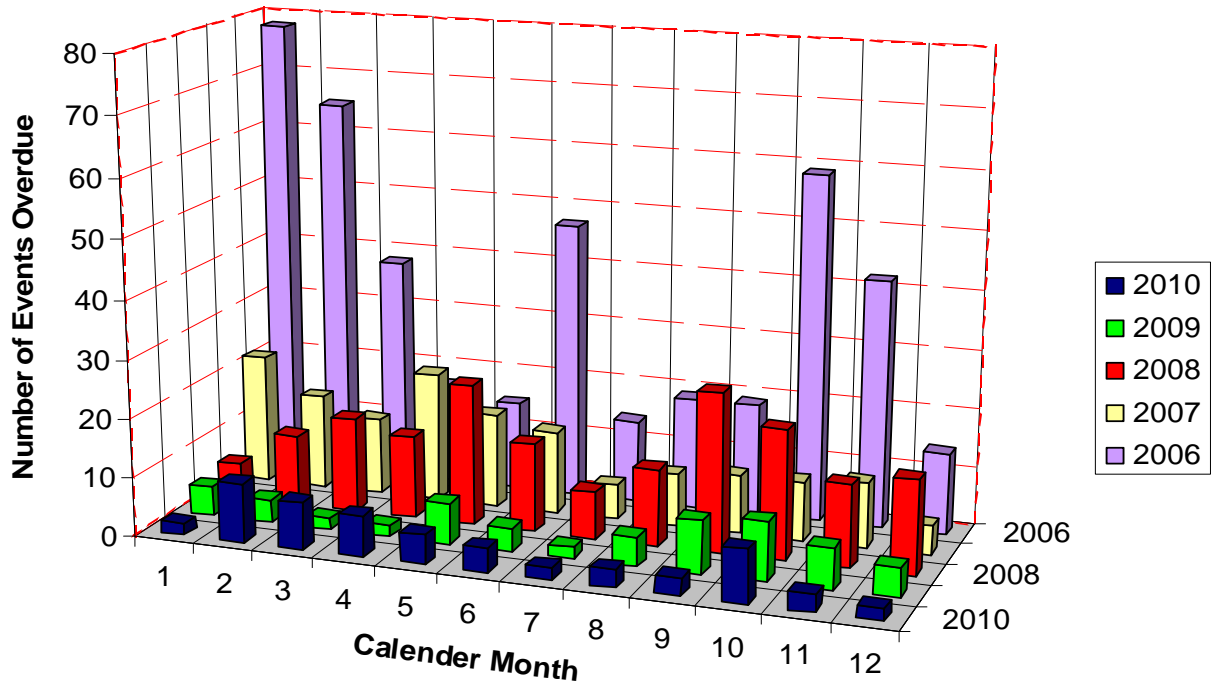
### Event process performance

17. Graph 2 shows the number of overdue events. Experience has shown that an interval of 4 to 5 weeks between SERC meetings achieves a satisfactory balance. This allows sufficient time for issues to be progressed and remain in focus whereas with a longer interval personnel do not give sufficient attention to addressing events, forget about the issues and a backlog develops. With this in mind and as per the previous two years, during 2010 the SERC met 11 times. That the number of overdue events has remained low during 2010 is due to the continued effort made by SERC members to progress towards resolving NSERs whilst facing many competing demands on their limited resources. Other factors reflected in Graph 2 are the success of the work by the SERC Secretary to chase up outstanding issues and the generally positive response

<sup>3</sup> It should be noted that at the time of writing, the underlying causes allocated to a number of events are a provisional assessment in the absence of final reports.

from those being hastened. Due to the number of potential reasons for delays, it would be unrealistic to expect further reductions in the number of overdue events.

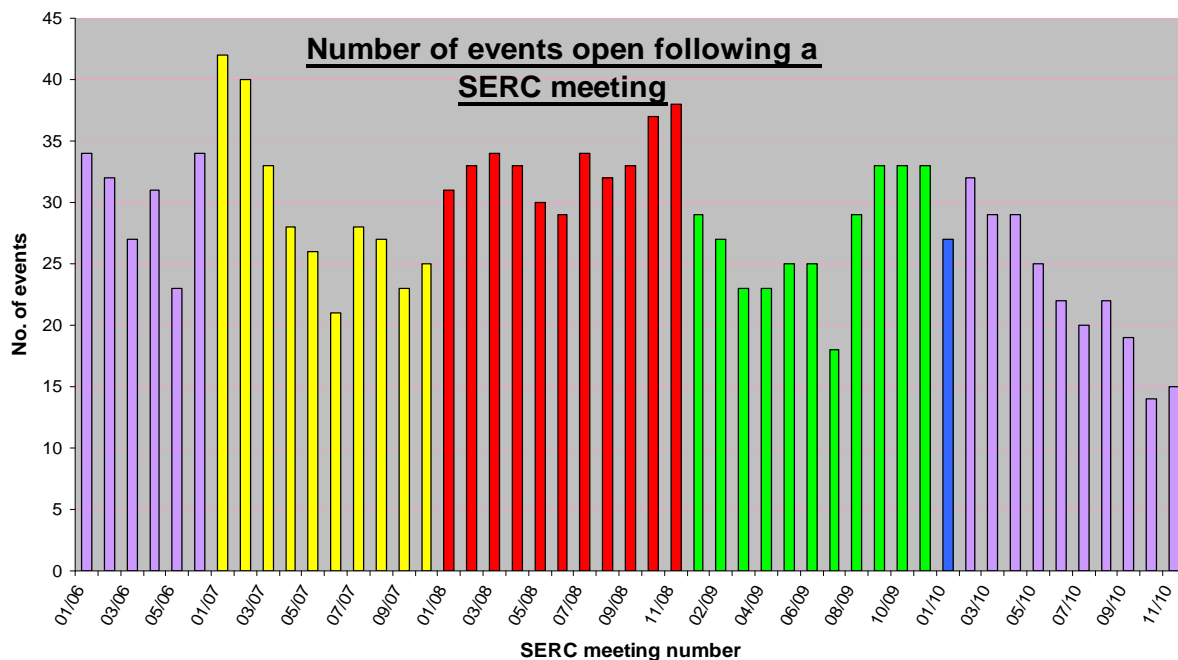
### 2006 to 2010 Overdue Events



Graph 2. No of events report submissions overdue each month<sup>4</sup>.

18. Noting that the SERC does not consider an event closed until the recommendations have been addressed and any consequent changes implemented, historically some events had been open for up to 4 years. By the beginning of 2011 all of the 2009 NSERs and 50 percent of 2010 NSERs had been closed out. Typically, 6 months is allowed to address recommendations emerging from an event, noting that in some cases such as implementation of a design change or a technical investigation, longer may be required. Thus it is reasonable to expect that at any time there will be approximately 6 months worth of events open. Allowing for the smaller number of events raised during 2010, this would give an expected figure in the range of 15 – 20 for the end of 2010.

<sup>4</sup> Overdue NSER submissions include overdue Part 1, Part 2, Part 3 and Part 4 aspects of the NSER.



Graph 3. No of NSERs remaining open following a SERC meeting<sup>5</sup>.

19. Graph 3 illustrates the number of events open following each SERC meeting. The reduction in the number of events open following a SERC meeting during 2010 broadly coincides with the reduction of the total number of events raised during 2010.

### Events of note

20. **Operation without SG overpressure protection.** The most significant event to come to light during 2010 concerns the failure, on two occasions, to remove SG Relief Overboard Discharge Hull Blanks that had been fitted to submarines whilst docked in RAMPs (NSER 11/10). This resulted in both submarines operating for an extended period without SG overpressure protection. Whilst this event initiated when docked on the Babcock Site following fitting of the blanks in 2007 and 2008 respectively, both the MOD and Babcock sites were involved since the blanks had not been removed by the time the vessels moved to the TXB. Both plants subsequently operated both alongside and at sea without the SG overpressure protection and hence outside the NRP Safety Case for a cumulative total of 22 months. A joint Babcock, Fleet and NBC investigation was undertaken with emergent recommendations being controlled by a Forward Action Plan (FAP) produced and managed by NRPA. The root cause of the event was the lack of robust procedures to manage the fitting/removal of the blanks and there were many contributory factors. In connection with this event, in April 2010 DNSR issued a Safety Improvement Notice (SIN) on Babcock, NRPA and FLEET (FLEET as NRPA Duty Holder) highlighting poor control of work surrounding the blanks and required the

<sup>5</sup> A nuclear site event report is deemed open until the SERC endorse the submitted Part 4 of the NBQ703 form. Endorsement is only granted once the implementation of the recommendations is complete.



amendment of business processes accordingly. All actions on the FAP were cleared to allow the SIN to be lifted by July 2010. DSM instituted a safety stand down across the whole of the submarine enterprise to ensure that the event and the key lessons learnt were widely promulgated and understood by personnel involved in the operation and support of submarines. Key changes made since the event include, mandating the application of the TAGOUT system to cover the fitting of any blanks or shorting straps, formalising the process for transfer of responsibilities between Authorisation Groups, revision of the agenda for pre-Plant State A (PSA) meetings, an additional TAGOUT audit requirement before entering PSA, the introduction of Temporary Equipment Fitting Removal/Transfer Sheets in Nuclear Procedures issued for use at the Tidal X Berth and revision of a number of nuclear procedures.

**21. Emergency Cooling Initiation Valve (ECIV) operating line restriction.** Whilst a submarine was conducting primary valve movements in preparation for reactor start up, the ECIV valve timings were excessively long, out of specification and it was observed that Sealed Visible Tundish A was not draining correctly (NSER17/10). The issue was drawn to the attention of the PAG Chairman who instructed the submarine to halt the planned start up and cool down to Plant State B. The NRPA placed a hold point on PSA operation and the problem was investigated under PAG procedural control. The lengthy investigation involved systematic flushing of sections of pipework down to the Reactor Compartment Active Drain Tank (RCADT). After flushing a section of the ECIV operating lines having first fully opened a normally set throttle valve, a small piece of plastic packaging material was recovered from the RCADT. Following this flushing and having reset the throttle valve, the timing and response of the ECIVs returned to normal. It was assessed that the debris had become lodged within the throttle valve thus hindering the ECIV operation. Work undertaken on the EC, Coolant Make Up and Valve Operating systems was reviewed, including that undertaken in LOP(R) but it was not possible to identify positively when or how this debris entered the system; it may have been present since build, introduced at LOP(R) or during a post LOP(R) repair. The PAG findings were presented to NRPA before the previously imposed hold point on PSA was lifted and the plant started up. The event highlighted the importance of maintaining scrupulous loose article control (LAC) of work sites at all times to prevent the entry of foreign bodies, the need to ensure that staff are aware of LAC and the importance of conducting valve movement checks. It is of note that BAe and Babcock have reported problems with LAC and the NRPA initiated a review of LAC. This review completed recently and an NRPA LAC report<sup>6</sup> has just been issued. Any emergent actions are now being considered.

**22. Control Rod Drive Motor (CRDM) – Damage to Thin Wall Section.** Whilst removing CRDM Stators as part of the process to fit Permanent Magnetic Locking Features (PMLF) in preparation for docking, one stator became stuck (NSER 18/10). Replicas taken following the eventual removal of the stator revealed significant scratching damage to a thin wall section. Although this damage has subsequently been dressed out, additional justification work has been required for further operation. Discussion of the draft technical report into this event is still ongoing between Babcock, the NRPA and Rolls Royce; agreement on a final report is expected soon. There is some suggestion in the draft report that the precursor to the damage during removal may have been the cleanliness/material state of the stator during its installation some years earlier thus making the damage difficult to avoid during removal. Since the event a number of changes have been made to the procedure for CDRM removal and

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<sup>6</sup> NRPA Review of Loose Article Control: Best Practice dated 22 Feb 11.

replacement to lessen the risk of repeating this event although it is unlikely that the risk of damage to thin wall sections can be totally eliminated due to the tight clearances and materials in use.

**23. Active jet vac hoses.** Two events (NSERs 23/10 and 33/10) have been raised concerning the deployment/tending of active jet vac hoses. Hose runs have been excessively long, inadequately supported and allowed to sag in the water between the submarine and shore. In one instance, a section of hose that had clearly sustained physical damage was in use. When questioned, Upper Deck Sentries have demonstrated a lack of knowledge of what the hoses were. The COMDEVFLOT SERC representative has taken action to highlight these issues to ship staff to increase their knowledge, awareness and reiterate their responsibilities for monitoring services connected to the vessel. Facility Operator, COMDEVFLOT and CBS staff have increased their vigilance with respect to monitoring the use of active jet-vacs and an audit of active jet-vac operations is planned for early 2011.

**24. Steering gear failure.** During a night time departure from Devonport whilst transiting from the Hamoaze to the Sound, a submarine experienced a steering gear failure, the subject of NSER 16/10. Maintenance and an OPDEF repair followed by alongside testing had been undertaken before sailing, but this was not briefed to the embarked Admiralty Pilot or QHM staff. There were no indications of any problems with the steering gear systems during the early stages of the departure; the failure of the steering gear occurred suddenly due to a previously un-revealed air lock present in the hydraulic transmission system and the interaction between electrical and hydraulic transmission systems. A number of positive aspects were illustrated by this event. Unexpected events may occur at any time with minimal warning and personnel must be ready to deal with them accordingly. That the submarine avoided collision with one of the navigation buoys and potential grounding was due to the prompt and decisive action by ship staff, the embarked pilot and deployment of the accompanying safety tugs working as a team. Steering gear failure is a drill that is regularly practiced by submarine crews, familiarity increases the chance of executing the drill correctly when faced with the real event. The safety value of the deployment of tugs to escort submarine arrivals and departures as precautionary measure in the event of propulsion or steering gear problems during transits through the Port was reinforced. Submarines have been reminded of the importance of notifying Pilots and QHM if there any doubts about the performance/proving of the steering or propulsion systems.

**25. Unauthorised work on Reactor Compartment Fresh Water (RCFW) cooling system.** NSER 32/10 was raised following an event in which significant lapses in the correct application of control of work arrangements resulted in unauthorised work being undertaken on the RCFW system. Prior to commencing work on a nuclear procedure, supervisors and maintainers should check that the controlling documentation covers the extent of the work to be undertaken; on this occasion there is no evidence that this checking took place. A section of the RCFW system was isolated for defect repair under control of a standard nuclear procedure with an associated TAGOUT, but it became apparent to the maintainers that the procedure did not isolate the intended work sites. The maintainers chose to raise a second TAGOUT adding valves to the original TAGOUT, thus extending the boundary of the isolated section of the system beyond that approved in the nuclear procedure, rather than stopping work, making the system safe and seeking approval for a change notice to the procedure. The use of two

interdependent TAGOUTs to achieve one safe isolation is considered out with the intent of the instructions for the use of TAGOUTs and is poor and unsafe practice. The Engineer Officer of the Day (EOD) is required to check that the TAGOUT is safe and fit for purpose before signing for its authorisation. The EOD had the opportunity to identify that the original TAGOUT was inadequate and receipt of the second TAGOUT gave him a further opportunity to identify that something was amiss. Although staffing of this event is not yet complete, COMDEVFLOT SMEO(SM) has written to the submarine Commanding Officer expressing his displeasure at the poor standard of work control evident during this event.

**26. Provision of continuous cover during nuclear repair.** A major section of the procedure approved by the TXB PAG covering a nuclear repair being undertaken in December 2010 called for continuous working. Completion of the repair was extended because at times some of the resources and equipment were not immediately available. The delays may have arisen due to misunderstandings between personnel/organisations. NSER 34/10 has been opened, an investigation is underway and it is yet to report.

**27. Questioning attitude.** The benefit of a questioning attitude has been noted on a number of occasions starting in 2009, but continuing into 2010. On occasion, MESM personnel working as part of the Fleet Time Support Group have had reason to question the route taken by some items of equipment being returned to their custody. If they have suspected that there was a possibility that the equipment may have been used in an application where it may have become contaminated and that it has not been cleared back to them through Health Physics in accordance with relevant procedures, they have requested additional radiological surveys to be undertaken. At times this has revealed low levels of internal contamination the spread of which has been prevented by their vigilance.

### **Update on events from earlier years**

**28. 2008 - Primary Coolant Discharge (PCD) hose failure.** The investigation into the November 2008 PCD hose failure (NSER 49/08) identified a number of design issues. The gestation of the design of new PCD hoses and connections to address these shortcomings has been protracted, however, the final details are now being resolved. New, double walled stainless steel hoses are being procured and modified jetty connections have been trialled. The new arrangements are expected to be ready for introduction into service in the next couple of months. Meanwhile, following two events highlighting shortcomings in the rigging of the original type PCD hoses in 2009, a permissioning regime remains in place requiring a senior member of CBS staff to inspect all PCD installations at the TXB facility prior to first use. It is envisaged that the permissioning regime will remain in place until confidence is gained with the installation of the new type PCD hoses.

**29. 2009 – DG derived shore supplies.** During 2009 a number of events were raised as a result of failures of DG derived shore supplies affecting the MOD Site. The generators are sited on the Babcock site and are able to support submarines on both sites. At one stage only two of the 8 installed DG sets were in an operational state. This

was investigated jointly by Babcock and MOD staff. Babcock now has an extensive get well programme underway. At present 5 of the 8 sets are in service with a sixth due to complete a major rebuild within the next few weeks. The final two sets are expected to be restored to service by the middle of 2011.

## **Other SERC issues**

30. **Information exchange with Faslane.** In recent months, there has been a marked improvement in the exchange of information about events between Devonport and Faslane. A number of Faslane events have been considered by SERC members with the aim of Devonport learning from these events.

31. **DEVFLOT participation in the SERC.** DEVFLOT was first invited to be represented at the SERC during 2007. This relationship evolved slowly at first. 2010 has seen a significant step improvement; the DEVFLOT engagement with the SERC has been much more positive and proactive. The DEVFLOT member has proved to be a valuable focal point in providing information to the SERC, informing significant elements of the SERC deliberation on events, seeking answers to questions and in providing rapid feedback to Ship Staffs of issues emerging and lessons learnt. The SERC membership has now been revised to include DEVFLOT as a full member.

## **Future development – review of progress**

32. Reference C identified 2 areas for future development:

- a. The development and implementation of a common initial event capture arrangement working with Babcock should be taken forward.
- b. Expansion of the number of trained investigators.

33. **Common Event Capture.** The intention of Common Event Capture is to ensure that all events (not just the narrow range of nuclear and radiological safety events considered by the SERC) on the Babcock and MOD sites at Devonport are initially captured onto a common system and that any data analysis/trending may be conducted across all of these events. The arrangements will utilise the Babcock OEF system, but some changes are necessary to meet MOD requirements and enable valid comparisons across the sites. The existing Babcock OEF system, which is an in-house developed bespoke system, had a number of shortcomings that have hindered users and the Babcock OEF Team. An update was needed to address these issues and the initial expectation was that the additional changes required for Common Event Capture would be implemented at the same time. Improvements to design, style and functionality, incorporating the additional NBC requirements, were produced as a set of Business Requirements and passed to the Babcock IT Section in early July 2010 with a projected in service date of November 2010. In the interests of creating a common reporting system across the whole Babcock community including Faslane and Rosyth, a commercial software solution was also investigated. This investigation is still ongoing

with a number of promising commercial solutions still under consideration. This wider consideration has currently stalled progress towards the implementation of Common Event Capture. Whilst not yet in a position to implement fully Common Event Capture arrangements across the whole Babcock and MOD Devonport Sites, significant progress has been made. Albeit as a temporary workaround, an increasing number of events from the MOD site are being entered into the Babcock OEF system. On a part time basis NEO2 from BNSO is embedded within the Babcock OEF Team as the MOD OEF Engineer, processing an average of 70 events per week from around the Naval Base (predominantly events that would not fall under the remit of the SERC), liaising with all the relevant stakeholders and inputting their investigation results. Working in conjunction with Babcock's Operational Experience (OEF) Team the following has been achieved:

- Event cause trees based on the current MOD NSER trees but expanded to meet the wider application across all types of events on both sites have been agreed.
- Following stakeholder consultation the necessary additional event types to meet MOD requirements have been identified and agreed for incorporation into the Babcock OEF system.
- A direct web link has been established between Babcock's OEF system and the MOD DII network via the WSMI Shared Data Area enabling the entry of events into the Babcock OEF system from DII terminals.
- NEO2 has been granted Babcock OEF system administrator rights, enabling him to process MOD Events utilising the OEF database.
- A joint Babcock/MOD Functional Procedure has been drafted to cover the reporting and processing of events.
- A revised Naval Base Business Procedure for the reporting and recording of nuclear and radiological events on the MOD owned Naval Base Site has been drafted taking into account Common Event Capture and the Babcock OEF system.

A Base-wide launch of Common Event Capture is planned to coincide with the launch of the new OEF system. As the stakeholders become fully integrated within the OEF system and awareness of the drive towards common capture gains momentum amongst the general Base population it is anticipated that there will be substantial rise in Naval Base Events being reported, capturing more of the events or incidents across the Devonport Naval Base and with the expectation of providing a safer working environment through lessons learnt and improved operating experience feedback.

**34. Expansion of the number of trained investigators.** Over the past few years, a number of MOD staff at Devonport have undertaken the Independent Investigators Course at AWE Aldermaston. Due to changes at Aldermaston, this has not been possible during 2010. Recent contact with Aldermaston has indicated that it should be possible to utilise the Aldermaston course once again during 2011. Meanwhile, one member of the BNSO team has successfully completed an IOSH recognised investigator's course with broadly similar content.

## **Future development - 2011**

35. The main focus for development during 2011 will be to complete the introduction of Common Event Capture across the Babcock and MOD sites at Devonport, building on the work undertaken during 2010 (see paragraph 33 above). It is recognised that this is dependent on a decision still to be made by Babcock about whether not to further develop their existing system or to adopt a commercial package. Although much of the preparatory work that is not dependent on the software solution has been completed, until this decision is made it will not be possible to provide an accurate forecast as to when the Common Event Capture arrangement will be fully implemented.

36. Once Common Event Capture has been implemented and with NEO2 already working alongside the Babcock OEF team, the aspiration is to improve the feedback to staff and learning from events working with Babcock in a more “joined up” manner.

37. Staff and course availability permitting, it is intended to provide investigator training to more SERC members.

## **Freedom of Information (FOI) Act**

38. No FOI requests were received at HMNB Devonport<sup>7</sup> for SERC information during 2010. As has become the practice since the receipt of an FOI request in 2007, a redacted version of the SERC Annual Report for 2009 has been published on the MOD internet site.

## **Ministerial reporting**

39. There have been no requirements for Ministerial reporting under Reference A during 2010.

## **Conclusions**

40. The number of events reported has reduced from 2007 -2009 levels, albeit similar fluctuations have been noted in the past. Two of the factors that may have contributed to this reduction are firstly that the 2009 figures included 8 Diesel Generator (DG) derived shore supply failures, such supply arrangements have not been required at the TXB Facility during 2010. Secondly it is assessed that apart from routine maintenance work, there was a lower level of nuclear activity at the TXB Berths in 2010 in comparison to 2009.

41. As observed since 2008, personnel failure features more strongly as an immediate cause than in earlier years. Although in some instances this has been due to poor performance by individuals, at least in part this change is considered to be due to increased awareness and probing of these issues by SERC members and those undertaking investigations. Other sites have reported similar findings.

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<sup>7</sup> It is noted that requests for this specific information were received at HMNB Clyde during 2009.

42. Incorrect action taken despite suitable guidance (IC 3.2) was the largest contributor when considering event immediate cause, then written control related events (IC 2.2). ICs 2.2 and 3.2 have consistently contributed to the bulk of events reported over the previous 5 years.

43. The SERC performance improvements in terms of the number of outstanding events and the number of overdue events achieved up to the end of 2009 has been sustained.

44. The primary focus for development during 2010 will be to continue the work with Babcock to complete the introduction of Common Event Capture on the Babcock and MOD sites at Devonport.

***Signed on Original***



Lieutenant Commander, Royal Navy  
SERC Chairman

Annexes:

- A. Nuclear and Radiological Events Reported During 2010.
- B. Event Cause Classification Code Trees.

## SERC ANNUAL REPORT 2010 GLOSSARY

Abbreviation	Definition
1 AGRM	First Assault Group Royal Marines
8WN	8 Wharf North
8W(S)I	8 Wharf South Inner
5 Basin WWS(I)	5 Basin West Wall South Inner
AC 7	Authorised Condition 7
AWE	ALDERMASTON Atomic Weapons Establishment Aldermaston
BAe	British Aerospace Contractor
BM	Babcock Marine
BNSO	Base Nuclear Safety Organisation
CBRN IPT	Chemical Biological Radiological and Nuclear Integrated Project Team
CBS	Captain Base Safety
CPOMA	Chief Petty Officer Medical Assistant
COMDEVFLOT	Commodore Devonport Flotilla
CRDM	Control Rod Drive Motor
D/QHM	Deputy Queens Harbour Master
DCBS(N)	Deputy Captain Base Safety (Nuclear)
DG	Diesel Generator
DHPO	Duty Health Physics Officer
DMC	Duty Monitoring Controller
DNSR	Defence Nuclear Safety Regulator
DRDL	Devonport Royal Dockyard Limited
DSM	Director Submarines
EC	Event Cause
EC	Emergency Cooling
ECIV	Emergency Cooling Isolating Valve
EMHQ	Emergency Monitoring Headquarters
EOOD	Engineer Officer of the Day
EOOW	Engineer Officer of the Watch
EPD	Electronic Personal Dosimetry
FAP	Forward Action Plan
FLEET HQ	FLEET Head Quarters
FLM	First Line Manager
FOI	Freedom of Information [FOI Act 2000]
FP	Functional Procedure
FSC	Facility Safety Case
FSGSCM	Facility Support Group Safety Case Manager
FSGM	Facility Support Group Manager
GTLD	Gaseous Tritium Light Devices
HMNB	Her Majesty's Naval Base
HMNB(D)	Her Majesty's Naval Base (Devonport)
HP	Health Physics
HPG	Health Physics Group
HPG(W)	Health Physics Group (WaterFront)
IC	Immediate Cause
IOSH	Institution of Occupational, Safety and Health
LAC	Loose Article Control



LOP(R)	Long Overhaul Period (Refuel)
MAXIMO	MAXIMO (trade name)
MCA	Military Co-ordinating Authority
ME Staff	Marine Engineering Staff
MESM	Marine Engineering Submarine
MOD	Ministry of Defence
NARO	Nuclear Accident Response Organisation
NB BP	Naval Base Business Process
NBC	Naval Base Commander
NBRSD	Naval Base Radiation Safety Department
NE02	Nuclear Engineer Officer 2
NP	Nuclear Procedure
NRP	Nuclear Reactor Plant
NRPA	Nuclear Reactor Plant Authority
NSER	Nuclear Site Event Report
NSM(L)	Nuclear Services Manager (Electrical)
OEF	Operating Experience Feedback
OPDEF	Operational Defect
PAG	Procedure Authorisation Group
PCD	Primary Coolant Discharge
PMLF	Permanent Magnetic Locking Feature
PSA	Plant State A
PSB	Plant State B
PPE	Personal Protective Equipment
QHM	Queen's Harbour Master
RA	Radioactive
RAMP	Revalidation Assisted Maintenance Period
RC	Reactor Compartment
RCA	Root Cause Analysis
RCADT	Reactor Compartment Active Drain Tank
RCFW	Reactor Cooling Fresh Water
RWCP	Radiological Work Control Permit
SDJR	Shut Down Junior Rate
SHP(RPA)	Senior Health Physicist (Radiation Protection Advisor)
SERC	Site Event Report Committee
SFM QA	Superintendent Fleet Maintenance Quality Assurance
SG	Steam Generator
SHPFO	Senior Health Physicist Facility Operator
SIN	Safety Improvement Notice
SMEO(SM)	Squadron Marine Engineer Officer (Submarines)
SQEP	Suitably Qualified & Experienced Persons
TAGOUT	System of work for isolating systems and equipment
TOFS	Time Out for Safety
TXB	Tidal X Berth
TXBFO	Tidal X Berth Facility Operator
UC	Underlying Cause
UDT	Upper Deck Trot Sentry
UMC	Underwater Diving Contractor
WSMI	Warship Support Management Initiative

**NUCLEAR AND RADIOLOGICAL EVENTS REPORTED DURING 2010**

NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
01/10	27 Jan 10	Following notification from Diego Garcia that their radiological monitoring instrumentation was going out of calibration a cross-check was made on the MAXIMO record keeping system to ascertain why this had not been flagged up to EMHQ staff (Babcock personnel provide calibration and maintenance service under the WSMI contract). This investigation revealed that there are major discrepancies between the 100% muster of instruments carried out by Diego Garcia and the MAXIMO system. This has led to the situation where the majority of instrumentation held on Diego Garcia is outside of its calibration date.	Work Control Related Event	C	The holders of radiation protection instruments carried out a review of MAXIMO records and the reporting process from EMHQ and Diego Garcia have been re-invigorated. This area remains under very close scrutiny from NBRSD and work continues to transfer the responsibility for maintaining Diego Garcia instrumentation to CBRN IPT.
02/10	30 Jan 10	The EMHQ Duty Monitoring Controller (DMC) attempted to contact the Duty Health Physics Officer (DHPO) in order to authorise radiography on the authorised site. The DMC called the DHPO's mobile phone and home phone but did not get an answer on either so left a message on answering machines. The DMC then contacted a different HP Officer who arranged for the radiography to be authorised.	Work Control Related Event & Personnel Related Event	D	A short instruction has been placed in EMHQ telephone area and duty personnel have been reminded to use all mechanisms available. The importance of ensuring all communication mechanisms are available has been emphasised to DHPOs.

8

Part 4 accepted means that the Part 4 of the submitted NBQ703 form has been endorsed by the SERC on the understanding that the implementation of the agreed recommendations has been completed. At this point in time the event is deemed closed.

Part 2 / 3 accepted means that the investigation and proposed recommendations detailed on the Part 2 / 3 of the submitted NBQ703 form have been endorsed by the SERC. At this point the event is still deemed open.

NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
03/10	29 Jan 10	A submarine was authorised by the TXB PAG to 'cold move' from 8 Wharf S(I) to 5 Basin WWS(I) with both onboard DGs released in NEC. On arrival at 5 Basin WWS(I) a delay in connecting electrical shore supplies. When electrical shore supplies were connected there was 1.25 hours to run on the battery.	Equipment Related Event & Work Control Related Event	D	COMDEVFLOT/PAG/BM/QHM/BNSO have been made aware of the event and future berthing arrangements will be conducted as a 2 stage move where practicable.
04/10	1 Feb 10	Failure to comply with the requirements of FSC 130. FSC 130 explains that a submarine specific Annex containing details specific to an individual submarine will be produced for each fuelled submarine entering 3 Basin. A submarine specific Annex was produced for HMS [REDACTED], but Annexes to FSC 130 have not been promulgated through the due process for subsequent submarines (HMS [REDACTED] and [REDACTED]).	Work Control Related Event & Personnel Related Event	C	The Facility Operator was notified of this omission by BNSO immediately it was identified. The Facility Operator considered options to redress the omission and amended Desk Instruction 09 accordingly and FSC 130 would be amended after review early in 2011. Annexes to FSC130 covering HMS [REDACTED] and [REDACTED] are now in place.
05/10	3 Feb 10	An inspection has identified that the Armoury was holding 98 SA80 rifles fitted with blade sights containing radioactive Gaseous Tritium Light Devices (GTLDs). This exceeded their local control limit of 50 set by NBRSD in Holdings Notification (ref: NBRSD/378/251/4) dated February 2009. Note: There was no breach of statutory authorisation levels for this event.	Work Control Related Event	D	A revised holdings notification has been issued and advice was given to the WPS. A letter was sent to the head of logistics for 1 AGRM regarding the event and the topic was included in the OEF/SERC newsletter.
06/10	5 Feb 10	HMS [REDACTED] was due to sail AM of Sat 6 Feb 10 but was delayed until AM of Sun 7 Feb 10. This delay was promulgated by signal at 1915 Fri 5 Feb 10. QHM staff received the signal but did not inform the Duty BNSO PAG member as required by NB BP 24 - Nuclear Submarine Movements Planning Devonport.	Work Control Related Event	D	A new check list was produced and has worked well. A Temporary Memo was also re-issued clarifying the requirements which has also improved the process.
07/10	26 Jan 10	A carboy marked with Trefoil tape was unexpectedly found onboard HMS [REDACTED] in the Engine Room.	Work Control Related Event	D	Surveys on HMS [REDACTED], [REDACTED] and [REDACTED] are complete. The carboys on HMS [REDACTED] were smeared and only one smear proved positive which was below minimal detectable activity. Further laid up submarines will be surveyed as they are opened up. This

NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
					work is scheduled by SHPFO.
08/10	28 Jan 10	A crane impacted on cope edge pit covers that had been left up on 8 Wharf. Two pilots were in attendance but did not notice the pit covers were up. OEF 19398 refers.	Equipment Related Event	D	All slingers/crane operatives have been re briefed. The Babcock Slingers training course has been reinforced outlining responsibilities of the Crane Pilot. The Babcock Slinging Manager has been informed of this event.
09/10	15 Feb 10	The Devonport Naval Base Nuclear Submarine Daily State Chit was not fully distributed to all required recipients on 15 and 16 February 2010 by NSM(L), Babcock Site Services due to IT connectivity issues.	Equipment Related Event	D	There has been no reported recurrence of this connectivity problem. Further problems regarding the distribution of the Daily State Chit would be managed locally if required.
10/10	2 Mar 10	Two Babcock Marine Test Engineers working underneath the casing adjacent to and above the Reactor Compartment onboard ██████ whilst PSA Critical were not wearing dosimetry.	Work Control Related Event	C	As a result of the investigation DEVFLOT issued a Memo informing/reminding all submarine crews and shore Health Physics staff of the control arrangements for radiologically controlled areas and the responsibility of Ship's Staff when acting as escorts of contractors
11/10	25 Feb 10	Two submarines have operated for a considerable period without SG over pressurisation protection after hull test blanks on ██████ and ██████ that were fitted in RAMP for testing were inadvertently left on. Both submarines returned to service and continued critical operation with blanks fitted until they were identified as being in place during diving operations to fit blanks for testing purposes. This NESR is being	Work Control Related Event & Personnel Related Event	B	Once the event came to light the blanks were removed from HMS ██████ and other submarines that were potentially at risk were checked to confirm that the blanks had been removed. A joint Babcock/MOD investigation into the event was conducted and the report findings were incorporated into a joint MOD/Babcock forward action plan. All actions

NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
		raised as a result of the joint Babcock/MOD/DNSR investigation.			from the plan have been completed.
12/10	10 Apr 10	The MCA Duty Staff Officer was not available via duty mobile phone or NARO bleeper during period pm 09 April to am 12 April.	Personnel Related Event	D	The event was fully discussed with the staff involved who now fully understand the importance of proper handover of duties to ensure continuity of coverage. The handover is now conducted face to face and in a more formal manner. To date this arrangement is working well.
13/10	14 Apr 10	A diving job on HMS [REDACTED] (13 Apr) finished after the day shift resulting in the RWCP number not being closed. As a result, on the 14 Apr, a UMC diver was able to draw dosimetry and dive without contacting the HPG(W) Forman. The Dive Supervisor did not contact HPG(W) Forman for a brief and this was identified when the HPG(W) Forman went to close the RWCP.	Personnel Related Event	D	As a result of the investigation it was recommended that the dosimetry software is updated to ensure when dosimetry is returned the RWCP number is automatically closed. This recommendation is now complete ensuring new dosimetry can not be drawn without the correct authority.
14/10	30 Apr 10	During the declassification of the GRP cover on 7 Wharf Effluent Hut, two effluent tank connections and associated waste were found discarded and unbagged within the controlled contamination area.	Personnel Related Event	C	The two connections and associated arisings were immediately double bagged and transferred to HPG(W). All items were processed through the Active Waste Monitor where it was identified that one of the connections was contaminated (3052 Bq) and the other connection was found to be free of any contamination. Part 3 now agreed.
15/10	16 Apr 10	Following a move to 5B WW(S) there was no telecommunications engineer, no equipment or cables, no diagrams or indication of location of communications hard point and no awareness by the mobile shore engineer about the responsible department for connecting the shore communication lines. It is a requirement in the Nuclear Procedure (97-	Work Control Related Event & Personnel Related Event	C	COMDEVFLOT has defined the telephone connection policy and will advise ships/submarines of Ship's Staff responsibilities. Discussions between HMNB Devonport and the MOD telephone contract staff to resolve issues regarding support to vessels, local procedures and infrastructure are ongoing.

NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
		850(1T)) that prior to energising the AC shore supply communications are available.			
16/10	26 May 10	Whilst on passage from the Hamoaze to Plymouth Sound, HMS ██████ suffered steering gear failure in the vicinity of the Battery Channel marker buoy in The Narrows.	Equipment Related Event	C	The event was handled well by all personnel involved and the lessons learnt are included in the investigation report. No further action was required.
17/10	22 May 10	During primary valve movements the ECIV operating times were out with specification; ██████ opening time was ██████ seconds, ██████ opening time was ██████. During subsequent investigation ECIV operating pipework had not drained correctly and SVT A indicated full. The suspected cause was an air lock or a physical blockage in the drain line to the RCADT. Further investigations revealed 1 foreign object in the EC system operating lines and a further 3 objects post flushing of the primary sampling sink drain line as part of the investigation.	Personnel Related Event	C	The submarine was instructed by the TXB PAG Chairman to halt the planned start up. The PAG met to discuss the issue and agreed to instruct the submarine to cool down to Plant State B. The source of the problem was then investigated under procedural control. NRPA endorsed the actions of the PAG.
18/10	18 Jun 10	Whilst fitting PMLF on 8 Jan 10 as a pre requisite to entering 5 Basin, CP ██████ stator became jammed in the partially raised position, prohibiting its removal.	Equipment Related Event	C	Following PAG discussion, lubricating (castor) oil was applied and the stator was successfully removed. Two surface defects were discovered on the motor tube thin wall section. The first of which was replicated and successfully dressed out under NSI supervision. The edges of the second defect were dressed and replication taken for PAG/NSRP TA consideration. This replication has shown that the scratch has a maximum depth of ██████. The deepest point of scratch to minimum design wall thickness is ██████. Awaiting the issue of the final version

NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
					of the Babcock Investigation Report (Mar 11).
19/10	9 Jul 10	A wooden transit box for the sub standard gauge was returned out of hours to the Pressure Gauge Test Shop. As a precautionary measure the box was checked for contamination and was subsequently recorded as having minor localised internal contamination.	Personnel Related Event	D	The investigation could not identify how the box became contaminated. All staff involved with the transportation and use of active and potentially active equipment are to be re-briefed of the requirement to ensure that protective boxes are only to be used if equipment inside the box is correctly packaged. Additionally, staff have been reminded not to stow boxes in radiologically controlled areas where practicable.
20/10	20 Jul 10	Whilst cooling down to PSB the Shutdown Junior Rating (SDJR) prepared and added chemical doses to both SGs. The SDJR, who was fully qualified, mistakenly used sea water rather than using demineralised water to mix the dose. He then continued to add a single dose to each Steam Generator (SG). The SDJR realised his mistake and immediately brought it to the attention of the EOOW who ordered a full set of SG samples to be taken for immediate analysis and future investigation.	Personnel Related Event	C	The investigation revealed that the chloride contamination was directly attributable to the misidentification of the hose which led to salt water being used instead of demin water. As a result all temporary hoses from sample points and vent cocks must be positively marked. All ME Watchkeepers must be re briefed about the importance of carrying out their duties diligently and correctly in a questioning attitude. DEVFLOT included this topic in the regular newsletter to units.
21/10	20 Jul 10	During the initial stages of the PMLF fit it was noted by NSI that Babcock Marine Refuellers were using an Un-authorized working copy of the Nuclear Procedure (NP 01-283(13)). Once this was highlighted to Ships Staff the authorised working copy was given the Refuellers. No PMLF had been fitted before the error was highlighted.	Work Control Related Event & Personnel Related Event	C	As a result of the investigation all DRAFT copies of Nuclear Procedures are clearly marked as such with a large watermark 'DRAFT'. This topic has also been included in DEVFLOT monthly newsletter.

NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
22/10	21 Jul 10	Exclusion zone sentry found to be asleep. CO HMS [REDACTED] arrived at 8W(S) to register his arrival and gain access to the jetty. The exclusion zone attendant was asleep and several attempts were required to wake him. Once awake the attendant registers the CO's presence in the exclusion zone.	Personnel Related Event	D	The investigation identified that the person involved was taking a prescribed medicine which caused drowsiness. This event has been briefed at TOFs where personnel were reminded that on any occasion where they are taking over the counter or prescription medicines they should inform their Line Manager of any possible side effects.
23/10	28 Jul 10	On the evening of 27th July 10 it was observed that the jet vac hose supporting HMS [REDACTED] on 8WS(O) was partially submerged in the river. Approximately a 4m length between the jetty and the inboard submarine (HMS [REDACTED]) was submerged, with a section on the jetty coiled with a diameter of approximately 0.4m.	Personnel Related Event	C	The rigging of the hose was brought to the attention of the submarine UDT who had not been briefed on the significance of the hose. The hose was removed from the river and the coil opened up so the minimum bend radius was not exceeded.
24/10	13 Aug	MESM were given a black hose by HMS [REDACTED] SS as part of the removal of non-essential equipment prior to going to PSA. As a precautionary measure MESM fitters requested HPG staff to check hose clear of contamination. The hose proved to be contaminated in one localised area.	Personnel Related Event	D	The hose was surveyed and quarantined. The area where the hose found on the submarine was surveyed and found to be clear of contamination.
25/10	24 Aug 10	Approximately 25 litres of liquid which was believed to be rain water was drained from the bunded area under the effluent discharge connection at 8W(S) without the liquid being sampled and confirmed clear of contamination.	Personnel Related Event	C	Investigations provided confidence that the liquid was not contaminated but did not positively identify how the liquid was drained away. Actions is being taken to blank or render the bund drains inoperable.
26/10	26 Aug 10	Whilst conducting a full muster of the Active Waste Facility by HPG(W) staff, it was discovered a valve, which had previously been in the store, was no longer in its stowage position as detailed in the HPG log.	Personnel Related Event	C	The valve was actually found in the AMF and after a full audit of the documentation it is clear that the valve never actually left the AMF and there was no requirement to raise an NSER.



NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
27/10	05 Oct 10	Items left on the jetty by HMS [REDACTED] for return to stores included RA materials. The RA stores were identified by RA stickers and were intercepted by the Return Store Manager. The RA stores being returned were located on broken pallets and the required paperwork was incomplete and in some cases missing. These RA materials have not been returned iaw Devonport Guide to Ships and SMs (Art 0289).	Personnel Related Event	D	DEVFLOT CPOMA and sent a signal to all DEVFLOT units detailing the requirements of returning radioactive stores and copied to all PORFLOT and FASFLOT units. Ships investigation has been undertaken into this event.
28/10	04 Oct 10	A mobile crane was operated at 8W(S) with the 66% load reduction function switched out. The crane was being used to lift a ship to ship brow from a departing submarine at 8W(S) outer berth. This decision appears to breach the requirements of the Joint NB /Babcock Crane Safety assessment for operation of mobile cranes (FP14- 33-000) and resulted in there being no protective device operational to prevent the use of the mobile crane beyond the limitation stated in Operating Rule 09 of the Tidal X Berth Facility Safety Case.	Personnel Related Event	C	The TXBFO immediately put a hold point on crane operations at the TXB. After initial investigations by FSGM, assurance was given to DCBS(N) by FSGM that there were robust and practical management and administrative arrangements in place to lift the hold point allowing crane operations to resume. This event was discussed with the Babcock Berthing Manager and Crane Services Manager (Tidal X Berth Servies Meeting) and the position with respect to operation of Mobile Cranes with the 66% load feature confirmed that all operations are to be conducted with the feature operable. It has been established that the lift did not breach the Facility Safety Case Operating Rules.
29/10	13 Oct 10	During SFM QA audit 2010SFM05 it was identified that the Drop Nose Pin UTW 15 was out of date for visual inspection during the weapon disembarkation of HMS [REDACTED] on 24th September 2010. This item is used for the test weight and spearfish handling variant only.	Personnel Related Event	D	Investigations recommended the following actions: 1. A review is conducted of the Weapon Handling Equipment issuing process to ensure that it is robust enough to prevent a reoccurrence. 2. That the Babcock Marine FLM attends the appropriate Lifting Equipment course to allow him to visually inspect equipment prior to issue if required. This then would help to prevent this

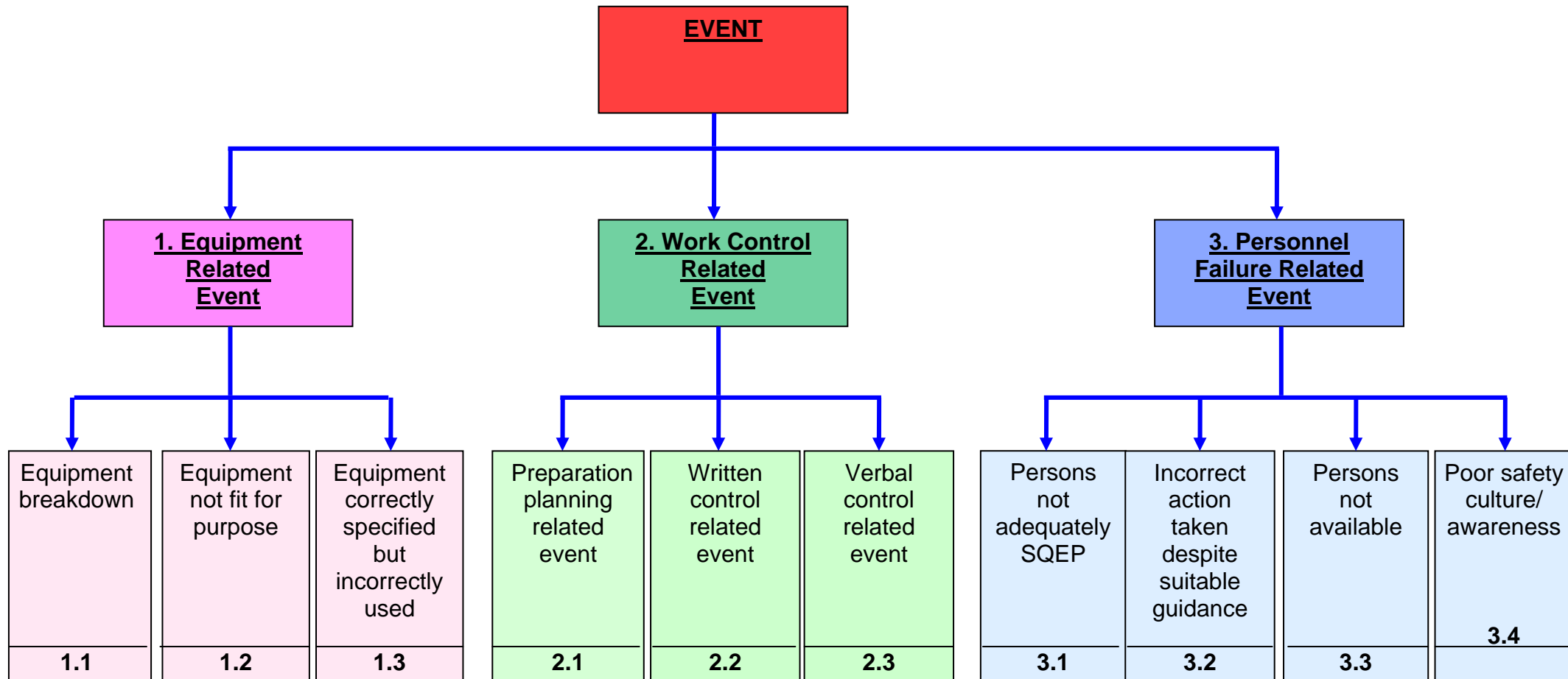
NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
					type of event from re-occurring.
30/10	19 Oct 10	An audit of crane operations including a review of the documentation supporting a series of lifts being undertaken at 9W was progressing. A mobile crane approval form (FR 14-33-000(1)) was produced that did not have the required signature of a Facility Operator's representative. A temporary hold was placed on operations to allow the situation to be reviewed. This identified that the appropriate approvals had been obtained for the days operation however it concluded that the lift approval form initially presented referred to a previous series of lifts from the day before (backshift) that appear to have been undertaken without obtaining the written approval of the Facility Operator's representative	Personnel Related Event	C	An investigation identified that the appropriate approvals had been obtained for the day's (20th Oct) operation however it concluded that the lift approval form initially presented referred to a previous series of lifts from the day before (19th Oct backshift) that appear (not confirmed) to have been undertaken without obtaining the written approval of the Facility Operator's representative. Discussions between DCBS(N) and FSGM identified that the temporary hold point has been removed and FSGM has provided DCBS(N) with sufficient assurance that the TXB FO has adequate control of all lifting operations on his facility. Notwithstanding the above, this event warrants sufficient investigation to understand what went wrong with lifting authorisation on this occasion to establish full confidence that errors will not be repeated in the future.
31/10	20 Oct 10	Ship Staff failed to observe radiological precautions iaw RPTW and Nuclear Procedure by not wearing C2 clothing , blue gloves or having EPD(P2) whilst operating valve D69 for effluent discharge.	Personnel Related Event	C	Ships Staff were reported to HPF for not wearing correct clothing or dosimetry whilst working in a C2 area. HMS ████████ MEO re-briefed all members of ME Department and disciplinary action was taken on the individual concerned.
32/10	3 Dec 10	Ship's Staff undertook work on RCFW Vvs █████, █████ and BXX that was not authorised by Nuclear Procedure NP 06-036(T). This NP was released for work on the RCFW System in the Engine Room but it did not cover the work to be carried out on █████, █████ and █████ nor did it have the necessary system isolations. Ship's Staff extended the isolation boundary on the RCFW System without the correct authorisation	Work Control Related Event & Personnel Related Event	D	An initial investigation recommended the following: 1. SS to conduct investigation in to root cause and comment in ER 10/10. 2. ASMEO O SM to ensure recommendations and actions from ER 10/10 are brought to attention of SERC.

NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
		from the TXB PAG			
33/10	10 Dec 10	<p>The deployment of a Jet Vac hose on HMS [REDACTED] had serious shortcomings as follows</p> <ol style="list-style-type: none"> <li>1 The hose was floating/resting in the river and snagged with seaweed.</li> <li>2 The hose run was extremely long (multiple lengths and connections) and inadequately supported.</li> <li>3 Sections of the hose did not have the required Radioactive markings</li> <li>4 A section of the hose number 011 (adjacent to first jetty connection point) – showed signs that it had been crushed.</li> <li>5 When questioned by SHPRPA the Upper Deck Trot had no knowledge of what the hose was for or of the need to keep it clear of the water. It is Ship's Staff responsibility to be fully aware of all umbilical connected to the submarine and shore services.</li> </ol>	<p>Equipment Related Event &amp; Personnel Related Event</p>	C	<p>The DMEO was instructed to resolve the supporting arrangements for the hose. HMS [REDACTED] Project Team were instructed to put a hold point on the use of the jet vac hose until it had been thoroughly inspected and deemed fit for purpose. On completion of the inspection the crushed section of the hose was replaced. A detailed joint MOD/Babcock audit of active jet-vac operations is underway in response to NSER 23/10 and this event.</p>
34/10	15 Dec 10	<p>A submarine [REDACTED] RxR required Freeze Seal isolations and Pressuriser drain to support RxR. NP01-532(1) called for continuous working due to sensitivity of repair. Continuous working not achieved at multiple points of the repair process. Repair still ongoing. Ship's Staff are NP Co-ordinators but have relatively little influence to obtain the degree of supported required to maintain continuous working.</p>	<p>Work Control Related Event &amp; Personnel Related Event</p>	C	<p>An initial investigation recommended the following:</p> <ol style="list-style-type: none"> <li>1. Conduct full and proper LfE post repair to understand repair technical shortfalls and service provision/support shortfalls.</li> <li>2. Post LfE, request Babcock review their ability to provide continuous working support for nuclear repairs of Freeze Seal nature to both Sites and assess their confidence in the ability to maintain support when plans change due to unforeseen circumstances.</li> </ol>

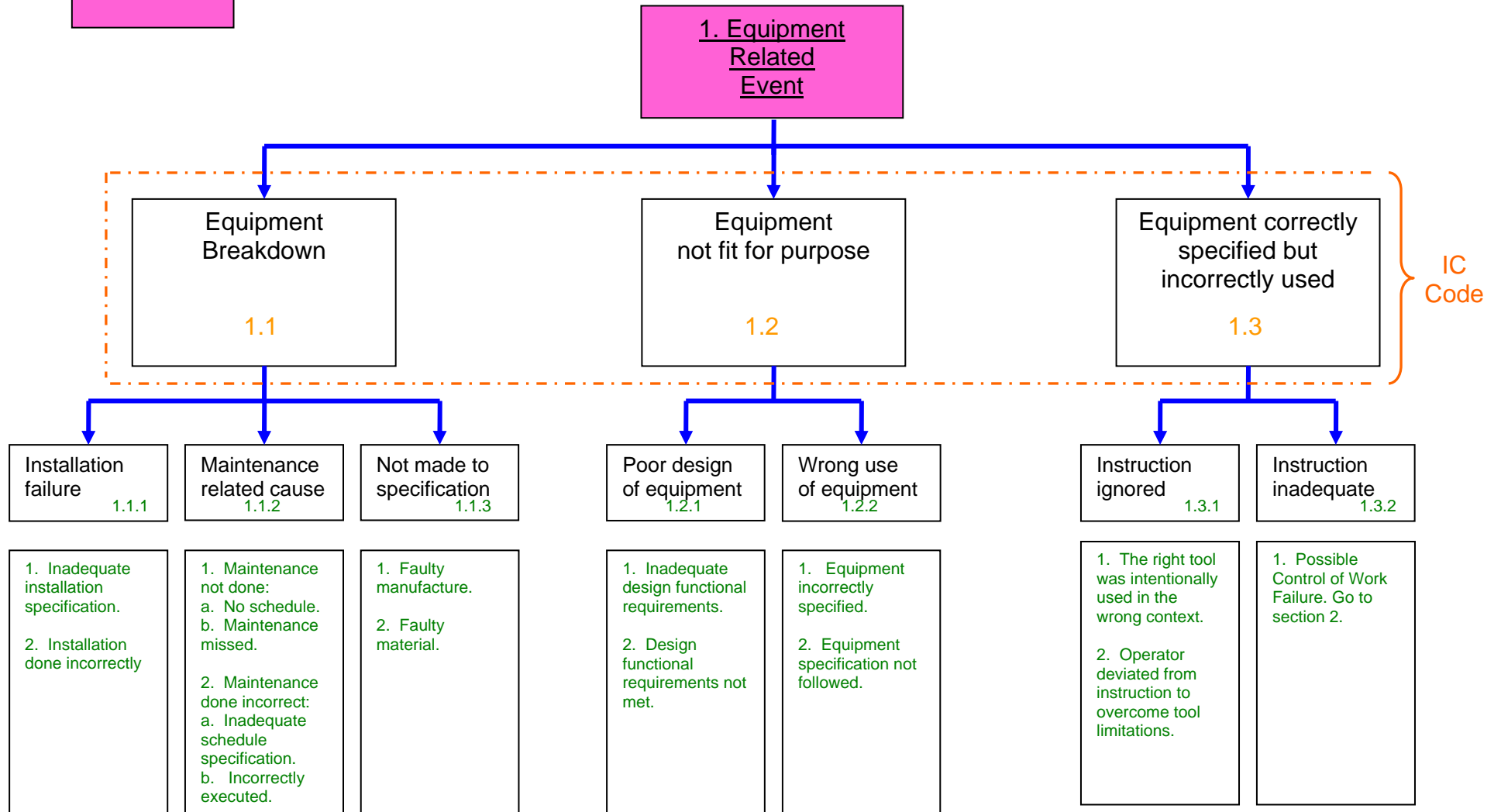
NSER number	Reported Date	Details	Cause	Event Consequence Code A-D	Remarks <sup>8</sup>
35/10	14 Dec 10	An unexpected loss of VOWF level occurred whilst undertaking NP 01-532(18) (■■■■ Repair). This loss was subsequently identified as a result of valve ■■■■ not being fully shut (This valve was required to be shut and tagged shut earlier in the procedure). Ship's Staff took action to prevent further loss of level and contacted the PAG Chairman to inform him of the event.	Personnel Related Event	D	Investigation ongoing.
36/10	17 Dec 10	At 21:45 on Friday 17 <sup>th</sup> December, the Health Physics monitor covering HMS ■■■■ Reactor Compartment informed the Health Physics Foreman he had detected contamination on a man exiting the RC. A member of MESM staff on exiting the RC had 12cps by direct probe on his overshoes and greater than background counts on his gloves. All other areas of the individual were clear and the man returned to HPG and passed through the whole body monitor where no contamination was detected.	Personnel Related Event	D	The person affected was reassured, had his contaminated clothing removed and was monitored locally to ensure he was not contaminated. The contaminated PPE was quarantined in the RC. The individual was then taken to HPG for secondary monitoring which proved clear. A monitoring team from HPG entered the RC to investigate the origin of the contamination. Contamination was present on the scaffolding platform on the mid level stbd side. Additionally a bag of blue roll and some loose blue roll was present, both were contaminated. The items were bagged for subsequent transfer to HPG and the area decontaminated. The scaffolding deals in question were varnished.

# EVENT CAUSE CLASSIFICATION CODE TREES

## Nuclear Site Event Reporting Immediate Cause (IC) Code Determination Diagram

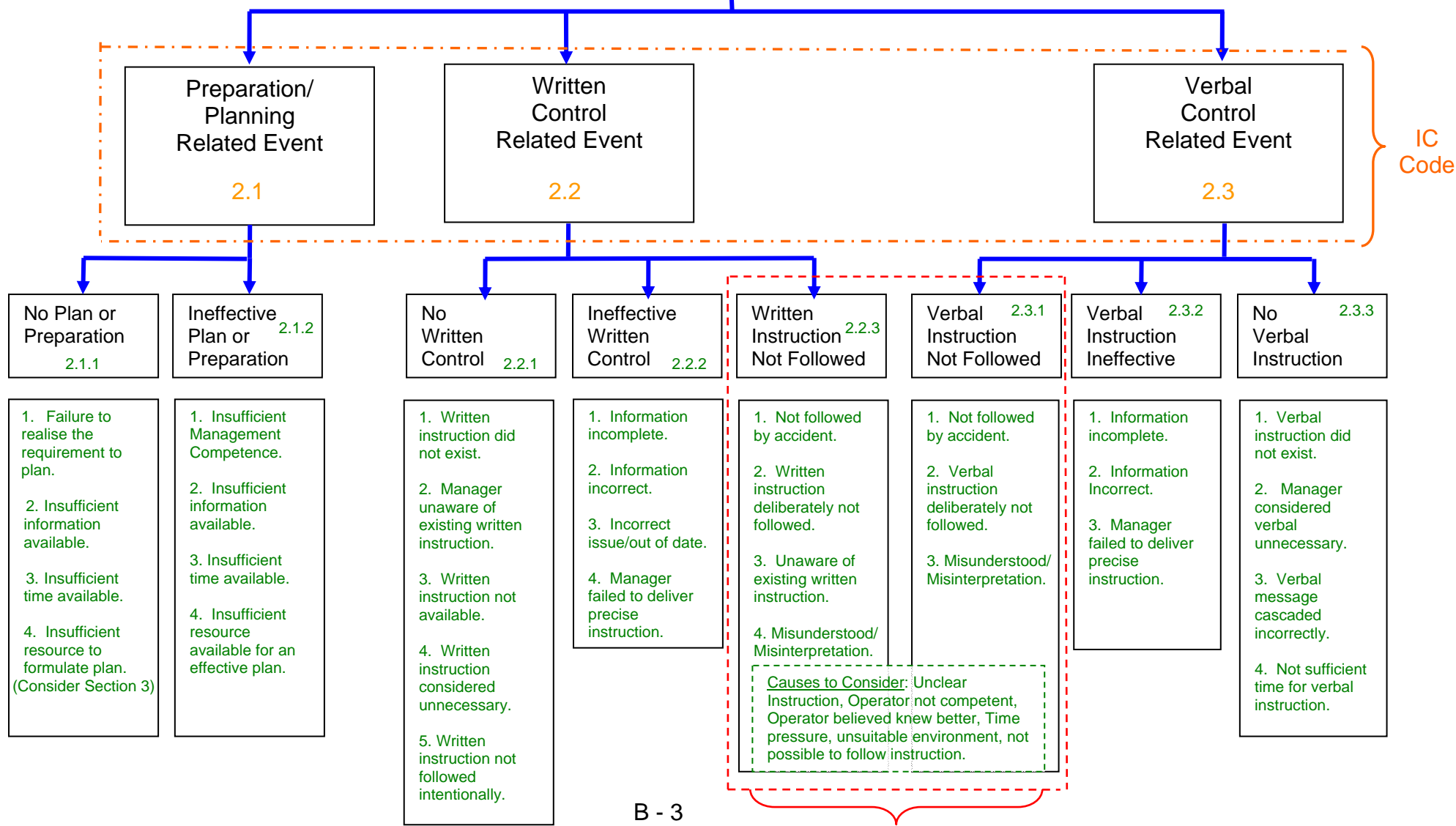


**Section 1**



**Section 2**

**2. Work Control Related Event**



**Section 3**

**3. Personnel Failure Related Event**

