

UNITED KINGDOM ATOMIC ENERGY AUTHORITY
Minutes of the 3rd Board Meeting in 2018

Date: 2 July 2018

Location: RACE Board Room, B1
Culham Science Centre

Members present:

Roger Cashmore, Chairman
Ian Chapman
Norman Harrison
Shrin Honap
Jim Hutchins
Sue Scane
Adrian Smith
Chris Theobald

In attendance:

Edward Lewis-Smith (BEIS)
David Martin
Maya Riddle (sec)
Catherine Pridham
Jerome Pamela (Item 4)
Colin Walters (Item 7-8)
Mark Shannon (Item 9-10)
Alli Brown (Item 11)

Apologies:

Adam Baker (BEIS)

1	Chair's Opening Remarks	2
2	Minutes of the 8 May 2018 meeting	2
3	Sub-Committee meetings	2
4	Culham Programme Advisory Committee (CPAC)	3
5	CEO's Report	4
6	STEP	5
7	Thermal Hydraulics Facility	6
8	Fusion Technology Facility (FTF) Siting	7
9	COO's Update	7
10	MAST-U External Review & Response Plan	8
11	P2 Financial Report	8
12	Board Performance Review	9
13	Any Other Business	9

1 Chair's Opening Remarks

- 1.1 Roger Cashmore welcome Edward Lewis-Smith his first Board meeting.
- 1.2 Edward Lewis-Smith said that he had recently joined BEIS to support Adam Baker with UKAEA sponsorship.
- 1.3 Roger Cashmore remarked on the government's new nuclear industrial strategy and thought that this signalled that UKAEA would play a progressively larger role in nuclear research and development.

2 Minutes of the 8 May 2018 meeting

- 2.1 The Board approved the minutes of the Board meeting on 8 May 2018 and the key actions were reviewed.

3 Sub-Committee meetings

7 June Remuneration Committee

- 3.1 Norman Harrison informed members of key points from the meeting, which included:
 - It had been a great year in taking new opportunities, but there had been a lack of delivery on MAST-U and JET;
 - There had been a debate on whether changes were reflected through to the Executives personal objectives and it was agreed that there would be an interim review of objectives; and
 - The role of CEO would be reviewed in light of the increased breath of activities.

29 June Board Assurance Committee

- 3.2 Chris Theobald informed members of key points from the meeting, which included:
 - UKAEA's management systems had been recertified;
 - Processes for improvement included capability mapping and putting competencies into the Unit 4 system;
 - Howard Wilson had produced a paper on scientific quality and as a next step would be benchmarking this against three other plasma physics labs;
 - The Integrated Delivery Process had been launched, which provided a multi-gate process for the lifetime of projects; and
 - There continued to be progress with information assurance and good preparations had been made for GDPR.

2 July Audit Committee

- 3.3 Shrin Honap informed members of key points from the meeting, which included:
 - UKAEA's annual report and accounts had been reviewed. Discussions had included the site restoration provision and the increase in headcount, which was due to an in-year rise in allocation of funding;
 - The Pension accounts had been reviewed and there were no matters of concern; and

- Both were anticipated to be unqualified accounts and the Audit Committee recommended that they be signed.
- 3.4 Ian Chapman emphasised the importance of renewing the JET lifetime plan and said that BEIS support might be required to ensure this was a priority.
- 3.5 The Board noted the updates and delegated signing of the UKAEA annual report and accounts to Ian Chapman.

Jerome Pamela joined the meeting

4 Culham Programme Advisory Committee (CPAC)

- 4.1 Jerome Pamela took members through the report. Key points included:
- interest from the new CPAC members was very high;
 - CPAC thought that UKAEA was going in the right direction and had good leadership from Ian Chapman. UKAEA's strategy strongly supported government objectives and they were very impressed with our success in getting funding;
 - While our Integrated Nuclear Design ambitions remained important, the priority had to be on ensuring the success of our current projects;
 - They were both impressed and noted the challenge presented by the rate of renewal of staff. It was important to have sufficiently experienced staff and to develop new people, so they welcomed PhD and apprenticeship programmes;
 - We should plan for the transition when JET eventually closed. They welcomed the work on JET decommissioning and as previously advised, this should be an opportunity;
 - MAST-U commissioning and restart plans had been reviewed and appeared appropriate. The combination of stretched resources and technical issues in particular the hydrocarbon contamination on the tiles, had led to a significant delay;
 - The MAST-U enhancement project would enable further scientific exploitation of the machine, but we needed to take account lessons learnt from MAST-U;
 - JET had suffered technical difficulties, which were resulting in delays to the campaign and now the timescales for DT were extremely tight. The problem with the Exhaust Detritiation System (EDS) was being resolved and the lessons learnt would be very important to ITER;
 - It was appropriate to focus plans for utilisation of JET beyond 2020 on where it could help optimise ITER. In particular, JET could be used to help train ITER staff and CPAC suggested exploring a similar collaboration model as had been developed with the US;
 - The fast development of RACE was very impressive, but they would like to see a clearer long-term strategy and more reporting on technical progress;
 - CPAC had been encouraging the growth of our tritium facilities for some time as this was clearly a strength for UKAEA. Therefore, the H3AT project was welcomed;
 - The Fusion Technology Facility (FTF) would provide a set of facilities which would be useful in development of strategy at UKAEA. They would like to see development of business strategies and in particular access models for users;

- They had been asked to review the plans for H3AT and FTF and confirmed that aspects would be world-leading. However, they were worried that schedules were being driven by budgets, rather than being technically driven;
- They were very pleased with developments in advanced computing and would like to see a greater focus on targeting fewer but larger grants;
- The cases for a next step spherical Tokamak was welcomed, however, it would be important to show how it would de-risk fusion; and
- They were pleased with our evolution on project management and more organised approach to projects.

4.2 Ian Chapman said that CPAC had done an excellent job and that he found their advice very valuable.

4.3 Chris Theobald asked about capability and make-buy decisions and Jerome responded that there was a tendency for UKAEA to do the work, whereas we could make more use of partners to develop some elements.

4.4 Roger Cashmore thanked Jerome Pamala for an in-depth review.

4.5 The Board noted the report

Jerome Pamela left the meeting

5 CEO's Report

5.1 Ian Chapman said that the UK had begun discussions with the EU over future relationships.

5.2 After obtaining government approval, we had submitted a bid in response to the EUROfusion call for bids for JET assets on the eventual closure of JET. There were 11 bids in total. In October, the Commission was looking to declare where assets would go when JET closed. We had pushed for a caveat that if JET was extended beyond 2020, that this would be reassessed.

5.3 The regulation for the Euratom Research and Training programme extension to 2019-20 had been provisionally adopted by the EU Council without amendment. This would include a two-year extension to the JET contract. The Council had agreed to take the regulation as an "A point" on their agenda which was expected in September 2018.

5.4 Therefore, the Board was asked to agree that UKAEA sought explicit confirmation in writing from BEIS that cashflow cover would be provided to enable us to continue operation in 2019, up to the point when the JET operation contract was renewed by the European Commission.

5.5 He had already seen a draft of the amended text for the proposed contract extension. Therefore, the Board was asked to agree Amendment 2.

5.6 The Commission already recognised that the six months of safe state couldn't be done in 2020 and wanted an agreement on contingency. The Board was asked to agree that UKAEA entered into discussions with BEIS/HMT.

5.7 The board unanimously agreed to all the above proposals.

5.8 Ian Chapman highlighted other key points from his report, which included:

- We were working with EUROfusion to develop the scientific case to extend JET beyond 2020;
- The government had agreed to fund a three-year post-doc scheme between UKAEA and Princeton Plasma Physics Lab. There was also an additional funding for research on next-step spherical tokamaks;
- The US National Academies report was now delayed to December;
- A delegation of President Macron and ITER Director General, Bernard Bigot had met with President Trump. 95% of the US's ITER spend was on American companies;
- We had submitted a bid with STFC on a digital twinning proposal, in response to UKRI's Strategic Priorities Fund;
- We were working on a strategy for developing the Culham site to attract more tenants;
- The revised National Nuclear Users Facility (NNUF) business was expected to go to the BEIS PIC meeting in July, which if approved would provide additional funding for MRF;
- It looked like we had won second prize in SOFT (Symposium on Fusion Technology), but this had not been formally announced;
- A view of the international collaboration landscape was provided as an action from the last meeting; and
- The minister had appointed David Gann as the new UKAEA chair.

5.9 Edward Lewis-Smith said that the minister's advisors were supportive of the indicative business case for development of Culham and that BEIS would work with UKAEA to develop a full business as a top priority.

5.10 The Board approved the proposals and noted the rest of the report.

6 STEP

6.1 Ian Chapman explained for the benefit of the new members that the Board had held a Strategy meeting in January 2018, where it had been agreed that we should be considering the next big fusion facility for the UK. The report provided an ambitious proposal for a Spherical Tokamak for Electricity Production (STEP).

6.2 This was set against a background of a pro-nuclear government, public funding for UK science and also substantial private investment into fusion.

6.3 To be successful the venture would need to have proper industrial support and he had held a number of meetings with potential partners

6.4 It would also need proper academic back up. He and Howard Wilson had held initial discussions with the vice chancellors of the N8 Research Partnership Universities.

6.5 He had had discussions with some of our European partners and explained that the proposal was synergistic with the European programme.

6.6 A phased approach was proposed with the first 5 years being a risk reduction programme, followed by a further 8 years to take the design through GDA and then if successful an 8-year build programme.

- 6.7 He had had a number of high level political meetings but needed ministerial support to take this forward. He also recognised that he was pushing the organisation very hard and sought the Board's views.
- 6.8 Adrian Smith queried the public sector status of UKAEA and Ian responded we could enter into a JV consortium with industry, which could act as the vehicle. Edward Lewis-Smith added that in the longer term UKAEA might want to consider different options.
- 6.9 Chris Theobald said that it was important for Ian to have a right-hand person to help him. He also thought that partners might be able to help us engage with the supply chain and City of London.
- 6.10 Jim Hutchins expressed his support as the proposal was central to our strategy. The country needed a facility post JET, regardless of Brexit, to maintain a strong role in fusion.
- 6.11 Adrian Smith expressed his support stating that it would provide the UK with a leadership opportunity and that it supported the government's agenda on both industrial strategy and place.
- 6.12 Norman Harrison said that it was hugely challenging but that we should seize the day.
- 6.13 Shrin Honap said that we might be able to strike up collaborations with potential partners to segue into striking trading deals.
- 6.14 Roger Cashmore said that we should put this forward for the UKRI roadmap and asked members to suggest contacts who might be able to help us.
- 6.15 Edward Lewis Smith said that the BEIS team would help flag this up to ministers.
- 6.16 Roger Cashmore confirmed that Ian had the remit to push this forward with government, but that he should keep the Board informed. An ad-hoc meeting could be convened by telephone if required.
- 6.17 The Board supported the proposal.

Colin Walters joined the meeting

7 Thermal Hydraulics Facility

- 7.1 Colin Walters said that the 2016 NIRAB report had recommended that a Thermal Hydraulics Facility be constructed. This new facility was to be jointly funded by BEIS and the Welsh government.
- 7.2 Fraser Nash had been commissioned to undertake requirements capture, but the communications had been limited and the current project definition was weak.
- 7.3 BEIS had asked us whether we could help, and it was proposed that we undertook a 6-month programme, to undertake a new requirement capture exercise. Our role would be to provide the project manager and technical input, and it was estimated that 80% would be outsourced.
- 7.4 Chris Theobald asked about the overlap with FTF and Colin responded that this should be minimal, but that the facilities would be synergistic.
- 7.5 Jim Hutchins expressed concern that the organisation was being over stretched.
- 7.6 Norman Harrison thought that it seemed to be a well-defined opportunity and that most of the resource would be external.

- 7.7 Ian Chapman said that once the requirements capture was completed, a proposal would come back to the Board.
- 7.8 Roger Cashmore concluded that the proposal was reasonable, but that there must be a gate as discussed.
- 7.9 The Board supported the proposal.

8 Fusion Technology Facility (FTF) Siting

- 8.1 Colin Walters said that the FTF consisted of three facilities and the base case was that they would all be located at Culham. However, four off-site locations had also been considered. The most promising sites were the two Advance Manufacturing Parks in Teesside and Rotherham.
- 8.2 The estimated capital building cost saving which could be reinvested into more equipment. The Executive had agreed that the cost of an off-site location should not exceed this.
- 8.3 The on-site building designs would need to need to go to the next stage in September. It was proposed that we continued with off-site discussions and brought a definitive proposal to the next Board meeting.
- 8.4 Ian Chapman said that we would need to consider the optics to staff.
- 8.5 Chris Theobald said that in principle it could be fantastic, especially in context with STEP and enabling jobs in the north east.
- 8.6 The Board noted the report and approved the actions.

Colin Walters left, and Mark Shannon joined the meeting

9 COO's Update

- 9.1 David Martin informed members that Cavendish had responded well to the safety concerns raised over one of their supervisors. He had met with a contingent of their senior management team and was having weekly meeting.
- 9.2 A second cohort of supervisors was being trained. Work was also underway to ensure that risk assessments were done in a structured way and that there was better engagement.
- 9.3 We had received recertification to ISO 9001, 14001 and OHSAS 18001 following the audit undertaken by AFNOR. There were five minor non-conformances, which were being addressed, as well as five areas of strength.
- 9.4 Mark Shannon said that he had provided an overview of the status of the major projects. Of particular concern was the EDS project, but a new project sponsor and project manager had been appointed which would effect some change. External resource was also being brought in from the Magnox framework.
- 9.5 Jim Hutchins asked about the delivery of the system from the Canadian company and Mark responded that there was a significant slippage, hence the decrease in the schedule performance index (SPI) value.
- 9.6 Roger Cashmore expressed disappointment that there weren't any project dashboards and said that it was important for the Board to see these.
- 9.7 Chris Theobald asked whether the MAST-U enhancement project would use earned

value reporting. Mark Shannon responded that the intention was to do so, but that we only had one cost engineer and were progressively rolling out earned value reporting to projects.

9.8 The Board noted the report.

10 MAST-U External Review & Response Plan

10.1 Mark Shannon said that we had developed an action plan to respond to the recommendations from the MAST-U review. We were seeking extra resource in Programme Management Office to take the actions forward, including cost engineering and technical support functions.

10.2 Sue Scane said she was surprised that some of the recommendations weren't already being done.

10.3 Mark Shannon said that there had been a scientific case for the MAST upgrade, but not proper cost estimates. Due to budgetary restraints we had had to cut back to the core scope. The hardware costs had come out close to budget, but we had seriously underestimated the technical issues and the cost overruns was primarily in person power.

10.4 Ian Chapman said one of the problems was that we had tried to do something cutting edge on a shoestring. However, in the end we would have a world class facility.

10.5 David Martin provided reassurance to the Board that we were using the lessons learnt and undertaking checks on new projects.

10.6 Mark Shannon said that we tended to do work in-house because we had the skills, but we did not necessarily have the bandwidth and needed to be smarter about resourcing going forward.

10.7 David Martin said that Gate 2 of our Integrated Delivery process was to have a credible resource plan.

10.8 Chris Theobald said that we should consider strategic partnerships and Ian Chapman responded that this would need proper thought as it could jeopardise our mission and have wider repercussions.

10.9 Norman Harrison asked how the Board could get comfort that the issues were being addressed. Mark Shannon proposed that a column was added to the action list to record status/when complete.

10.10 The Board noted the report.

Mark Shannon left and Alli Brown joined the meeting

11 P2 Financial Report

11.1 Alli Brown provided highlights from the report, which included:

- There was a new section at the back of the report including profit & loss and cashflows reports;
- There was significant capital expenditure this year, but the target was reliant on obtaining several planning permissions and this was a key risk. New buildings this year included OAS, the pavilion, modular building and a RACE building extension;

- The ITER Cycle project had been cancelled in its current form which had an impact on the BD budget;
- We were in the process of updating the JET forecast for the Commission;
- BEIS had agreed the additional funding for MAST-U operation; and
- ESS phasing of spend was likely to significantly change, which would impact on the RACE income target and therefore this might require change control.

11.2 Sue Scane asked about cash levels and Catherine Pridham said that JET cash flow was one of our highest risks.

11.3 Jim Hutchins queried the restructuring payment and Catherine Pridham responded that this funded some early retirees until the pension kicked in.

11.4 The Board noted the financial position at the end of period 2.

Alli Brown left the meeting

12 Board Performance Review

12.1 Maya Riddle said that the Board and sub-committee performance reviews had all out-turned positively. There are no specific recommendations.

12.2 The Board noted the report.

13 Any Other Business

13.1 Norman Harrison thanked Roger Cashmore for being a sterling chair for UKAEA.

13.2 Ian Chapman echoed his thanks, saying that UKAEA was lucky to have had such an engaged and enthusiastic chair.

13.3 Roger Cashmore thanked them for their kind words. He then remarked on the enormous changes at UKAEA that had occurred over the last 8 years as we had moved from an “R&D” institution to a “R&D plus delivery” institution. This inevitably had led to immense pressures on the organisation but pressures that UKAEA was coping with. This was a testament to the quality of existing personnel in all departments.

13.4 From the contents of this Board meeting and the strategy which the Board had endorsed it was clear that these pressures would only increase in the next few years, providing the UK with a continued and enhanced capability in nuclear research, development and delivery. However, finally he wished to remind the Board and the Management that UKAEA’s world standing relied on its position in the fusion R&D world and to retain this high position, these activities must be strongly supported during the coming years bringing benefits to fusion not only in the UK but also worldwide. He wished the Board, the Management and the Laboratory the best of success in all its future endeavours.

13.5 The next meeting was on 12 September 2018.

Secretary Maya Riddle

Chair Roger Cashmore