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MINUTES OF THE TWELFTH DEPLETED URANIUM SCREENING PROGRAMME OVERSIGHT BOARD MEETING ON 22nd SEPTEMBER 03

Present:			
Board:	Professor David Coggon	MRC	Chair
	Surg. Cdre Nick Baldock	INM	
	Mr Ron Brown	DRPS	
	Dr Chris Busby	LLRC	
	Mr Ivor Connolly	NGV&FA	
	Maj Gen (Retd.) R P Craig	RBL	
	Mr Jim Glennon	NGV&FA	
	Dr David Lewis	INM	
	Dr Gordon Paterson	BRC	
	Professor Brian Spratt	RS	
	(Charles Williams	*GVIU*	*Secretary)*
Observers:	Air Cdre Simon Dougherty	DMSD	
	Wg Cdr Charlie Wilcock	DMSD	
	Mrs Brigid Rodgers	GVIU	
	Mrs Janie Walker	GVIU	
	Miss Rosie Wane	GVIU	
Apologies:	Dr George Etherington	NRPB	
	Professor Ian Gilmore	RBL	
	Dr Muir Gray	NSC	
	Dr Gideon Henderson	Ox Uni	
	Mr Neville Higham	HSE	
	Professor Malcolm Hooper	GVA	
	Dr Len Levy	MRC IEH	
	Dr Margaret Spittle	MH	
	Dr Hilary Walker	DH	
	Mr Alan Duncan	HJA	

Item	Discussion and Decisions	Actions (Action date)
1.	**Introduction** a) The Chairman welcomed Maj Gen (Retd.) R P Craig to his first meeting of the Oversight Board. b) The Chairman explained that the main business of the meeting would be: i. To update members on the tendering exercise for the main testing and decide the way forward; and ii. To hold a final discussion on the second pilot study in preparation for a separate meeting with the laboratory representatives scheduled to follow the DUOB.	
2.	**Minutes of last meeting** a) One minor grammatical correction was agreed by the Board. **Action 12.1 Secretary to finalise minutes of 11th DUOB and circulate**	Secretary (completed 23.09.03)
3.	**Matters arising from last meeting** i. Discrepancy in Pilot Study Reports a) The secretary was unaware of an outstanding action and was asked to look into it. *[Post-meeting note: 10th meeting item 4a – possible discrepancy between two tables in one of the laboratory reports.]* **Action 12.2 Secretary to investigate possible discrepancy** ii. Committee Examining Radiation Risks from Internal Emitters (CERRIE) a) Dr Busby said that DU would be discussed by CERRIE at its meeting in January 2004. iii. DUOB Terms of Reference (TOR) a) The secretary confirmed that the TOR had been dated. b) The Chairman confirmed that he had written to the Minister, Ivor Caplin MP, concerning a possible extension to the role of the Oversight Board. *[Copies of the Minister's reply were circulated at the meeting.]* The Minister had suggested that he meet with Professor Coggon. However, the Minister did not wish the Board to undertake formal oversight of DU testing arising from the 2003 conflict in Iraq and did not wish to extend the retrospective urinary uranium test developed for veterans of the Balkans and 1991 Gulf war to personnel involved in Op TELIC (the UK component of the 2003 conflict in Iraq). Professor Coggon said that he felt the view on this might change with time. Dr Busby said he believed that the decision was unacceptable and the matter should be pursued. iv. Op TELIC personnel DU intake research a) Mrs Rodgers said it had been decided that research into the urinary uranium levels of UK military personnel deployed in the 2003 Iraq conflict would be carried out as part of broader post-TELIC health research by Professor Simon Wessely's group at King's College London. She had written to Professors Coggon and Spratt and to Dr Etherington to ask them to assist Professor Wessely with the DU aspects of the work.	Secretary

b) Professor Coggon confirmed that he had been asked to collaborate with the King's College team. He said that there was some urgency to the work because of the inevitable fall off in urinary uranium concentration over time. The study protocol would be drawn up mainly by the three DUOB members. The Oversight Board as a whole would have the opportunity to comment on the protocol, but would not have the authority to veto it. Professor Spratt said he was pleased with the decision and felt that the study would make a useful addition to the literature.

c) Mr Glennon asked for it to be minuted that he had not been told about the decision to place the Op TELIC DU study with King's. He felt that all members of the DUOB should be involved. The Chairman responded that everything was totally open. The letters had gone out only a matter of days before the meeting and the matter was now being discussed. He could not see that there was a problem. Dr Paterson expressed his contentment with the arrangements.

d) Mr Connolly enquired about the timescale. Professor Coggon said that the study was to take place early in the new year (2004). The KCL team would be visiting major military centres. The DU study was additional to the main elements of their work, and it was crucial to co-ordinate it properly with them. Professor Spratt commented that knowledge of the extent of DU exposure on the battlefield had long been wanted, and thus the study would be a positive step.

e) Dr Busby said that the DUOB existed in part for the purpose of external credibility. He was concerned about a large portion of the DU research going to a psychiatrist; and asked why neither he nor Professor Hooper had been invited to advise Professor Wessely. He said that there was a lack of trust in 'establishment' figures, and people outside would not believe the results of research carried out in the way proposed.

f) The Chairman explained that the study had to be handled separately from other activities connected with DU because it was part of a larger post-TELIC health investigation for which the DUOB was not competent. The wishes of the Minister were clear. The Oversight Board existed to oversee DU research arising from the 1991 Gulf war and Balkans deployments.

g) Maj Gen Craig was concerned that the Institute of Naval Medicine (INM) was seeking accreditation for urinary uranium analysis. He felt that as a MoD laboratory, INM would not have credibility. Professor Coggon explained that the INM laboratory would be involved in biological monitoring, not in the Op TELIC DU study or analysis of historical DU exposure. Dr Busby said that he did not want INM involved at all.

h) Dr Busby enquired why Professor Spratt and Dr Etherington had been chosen. Mrs Rodgers replied that both were scientists with relevant experience and expertise.

i) Professor Coggon said that Dr Busby and the other members of the Board would be able to comment on the design of the questionnaire used in the KCL DU study. Professor Spratt said that the questionnaire would be concerned with exposure only, not health. Dr Busby said that there was anecdotal evidence of health problems among Op TELIC veterans, and therefore state of health should be included. He asked to see the health data being collected (in other ways) from the TELIC personnel. The Chairman felt that this was an unreasonable request; Dr Paterson said that the information would be medically confidential. Dr Busby pointed out that it could be anonymised, as he required only statistical data.

j) Mr Glennon expressed concern about collaboration of DUOB members with Professor Wessely, whom he said the veterans did not trust. The Chairman asked who could be called upon to do work of this kind if all scientists associated with the MoD were excluded. Dr Busby proposed Professor Hooper. Mr Glennon suggested that his organisation might withdraw from the DUOB if its wishes were not respected.

v. Main testing contract tender evaluation

a) The Chairman confirmed that a marking scheme had been produced and used to assess the tenders. *[Details were discussed later in the meeting.]*

vi. Information for veterans and GPs

a) The Chairman confirmed that he had drafted advice for use after negative urinary DU test results. This had been modified on the basis of comments received.

b) Mr Brown asked whether the reference to normal uranium levels meant that the advice could be given only after completion of the normative values study. Professor Coggon replied that enough was already known for some approximate bounds to be put on "normal". Mr Brown then asked about the situation if an individual showed a natural uranium isotope ratio but abnormally high total uranium concentration. Professor Coggon said that separate advice would be needed in that case. Mr Brown suggested it should be made clear for whom the draft advice was intended.

c) Mr Connolly queried whether a large DU exposure that had occurred ten years before the test could really be ruled out on the strength of a negative result. Professor Coggon thought that it could. Mr Glennon asked whether that included lung burden. Professor Spratt said that it did, as shown by the Durakovic paper ("Estimate of the time zero lung burden of Depleted Uranium in Persian Gulf war veterans by the 24-hour urinary excretion and exponential decay analysis", Military Medicine, 168, 8:600, 2003). Mr Brown said that the Durakovic approach to estimation of lung burden had been satisfactory, in as much as it suggested broadly similar intakes to those predicted by a number of theoretical assessments.

d) Professor Coggon said that within the Board only the likelihood of health consequences from small internal exposures to DU was contentious, and the difference of opinion on that issue was mentioned in the draft advice. Dr Busby said that he was content. He added, however, that without an autopsy it was not possible to know for certain that an individual showing low urinary uranium concentration did not have an insoluble depot of DU lodged somewhere in their body.

e) Professor Spratt asked whether it were necessary to report the total uranium concentration in addition to the presence or absence of DU. Professor Coggon said that as the value would have been measured, it would have to be disclosed. Some advice on the interpretation and possible consequences would also have to be given. Professor Coggon expressed his gratitude to Dr Busby for the assistance he had provided in the choice of appropriate language.

f) Mr Connolly asked whether measurements could be affected by past medical treatments, such as diuretic flushing. Professor Coggon said that diuretics should affect only the DU fraction in solution, and not any insoluble reservoir of material.

	g) Maj Gen Craig asked if any work had been published on DU levels in autopsy tissue. Professor Spratt was not aware of any. However, it was felt that the Americans might be doing something in this area. The Chairman asked that the MoD make enquiries.	
	Action 12.3 Secretary to request autopsy information from the USA	Secretary
	h) Professor Coggon said that he would revise the draft advice again.	
	Action 12.4 Chairman to amend the draft advice on 'negative' test results	Chairman
	i) Mr Glennon remarked that from the point of the view of the recipient, the advice was hardly unambiguous. Mr Brown agreed. Professor Spratt said the DUOB might be keen to tell a veteran who had been tested that they had nothing to worry about, but could not, since that was a matter of scientific dispute. Dr Busby agreed, and said that a book could be written on the *possible* consequences of low-level DU exposure.	
	j) The Chairman asked if the Board wanted a stronger negative statement. Mr Brown suggested saying that people with higher levels of DU contamination were still healthy after 12 years. Professor Coggon said that would be unacceptable to the veterans' organisations. He added that the test results would be sent to the individual's GP (provided permission were given), so there should be scope for veterans to discuss the meaning of their results with their doctor. Veterans would of course also be free to consult Dr Busby and others for further advice if they wished. The equivocal wording of the draft was a compromise, but probably the best that could be achieved.	
	k) Dr Paterson said that people tended to think a negative result meant no risk at all, but that was not the case. He was therefore comfortable with the compromise. Professor Spratt said that the orthodox scientific view should be put first. Dr Busby said he was happy with that, since it would give his minority view the last word.	
	vii. Kuwaiti cancer registry	
	a) The Chairman said that he had emailed a request about information from the Kuwaiti cancer registry and was awaiting a response.	
	viii. Age data on Gulf war veterans	
	a) Dr Busby said that he still required an age and gender breakdown of (1991) Gulf war veterans by 5-year interval up to age 80. Mrs Rodgers said that an analysis of cancer figures could not be released before publication of the MacFarlane paper. *[The paper in question is a cancer mortality and morbidity study of the entire Gulf deployment.]*	
	Action 12.5 Secretary to provide Dr Busby with age and gender data for the 1991 Gulf war veterans	Secretary

4.	**Pilot study results summary tables** a) The Chairman said that results in tabulated form had been received from the pilot study laboratories, and that he had collated them with a summary text. *[The document had been circulated to all members of the Board]*. He noted that there were quite large differences in the concentration of the spiking solution as measured by the three laboratories, and suggested that an explanation should be sought at the wash-up meeting. Mr Brown said that at less than 20%, he did not feel the differences were very significant with regard to any potential health effects. b) Professor Coggon said that the accuracy of the results seemed to be somewhat lower than had been estimated by the laboratories, and he thought some sources of error had not been taken into account. However, the accuracy of the $^{238}U/^{235}U$ ratio was very good: mostly within 1% for two of the laboratories, and within 2% for the third. These were well within the uncertainties reported by Durakovic. c) Mr Brown said he would expect the two laboratories using identical instruments and techniques to agree. In some instances the error ranges of corresponding results did not overlap, so the actual uncertainties must have been larger than stated and this was important when assessing the significance of the results. d) Professor Coggon said that the measurements of total uranium concentration had been less accurate than the isotope ratios: generally they agreed to within 10-15%. The $^{238}U/^{236}U$ ratio was really only measured satisfactorily by one laboratory, which had achieved quite good internal consistency. The ^{236}U ratio was a difficult measurement. e) Professor Coggon said there was no indication that the 400 ml urine samples had given markedly more accurate results than the 100 ml samples. There was also no systematic difference between urine samples before and after storage. These observations could have significant bearing on the procedures used for the main testing. f) Dr Lewis wondered about the calculation of the quoted 95% confidence intervals. Professor Coggon said they had not been derived in the way he would do it, and clarification was needed from the laboratories. He had looked at how individual results varied from the mean for each sample across laboratories, and the confidence intervals seemed too narrow. g) Dr Lewis asked whether it was worthwhile keeping the ^{236}U measurement as part of the test. Professor Spratt said that he would be happy with the ^{235}U ratio only, since potential exposure of personnel to DU was not in question. He suggested that the ^{236}U ratio be examined only as a confirmation in ambiguous cases. h) Mr Glennon stated that the veterans wanted the ^{236}U measurement retained as a means of confirming the presence or otherwise of DU. Other Board members questioned the scientific validity of that view. The Chairman ruled that the Board would not yet decide on the matter.	

5.	**Update on screening programme contracts** i. Main testing contracts a) The Chairman and secretary reported on the technical evaluation of the main testing tenders. Seven organisations had been invited to tender and six had done so. A technical assessment panel comprising Professors Coggon and Hooper and Dr Henderson had met on August 12th and reached a conclusion, which was subsequently supported in a separate evaluation by Dr Lewis. b) The panel had rejected two of the tenders, which were considered technically inadequate. The remainder were allocated scores against a range of technical criteria. Professor Coggon said that in his view the lowest-scoring laboratory was good enough to be involved in the programme, possibly in an independent audit role. The secretary said that the MoD contracts branch had written to each of the four acceptable tenderers, requesting clarification on a number of points highlighted by the panel. Answers were awaited. *[Post meeting note: all responses have now been received.]* c) Dr Busby asked whether it was the intention to place contracts with three laboratories or all four, and whether there would be sufficient testing capacity. The Chairman said that the recommendation of the technical panel was to award contracts to the three top-scoring laboratories. The promised total capacity of those laboratories was 1300 samples per annum. d) Mr Brown said that he felt the sample throughput promised was optimistic, and wondered whether the Board should encourage the fourth laboratory to resubmit. Dr Busby supported that idea. Dr Paterson remarked that the MoD could not work outside its formal contract procedures. Mr Brown reminded the Board that the normative value study would be adding to the number of samples for analysis. e) Mr Connolly asked about the order in which veterans' samples would be tested. The secretary said that the Board had yet to decide on a procedure for accepting people into the programme and arranging the test. However, he thought it most likely that the tests would happen according to the order in which people came forward for them. ii. Healthcare provider a) The secretary said that two companies had been invited to tender, but only one had done so. One company decided not to participate on the grounds that the activity required was not its core business. The sole tender received was technically assessed on August 29th by a panel comprising Professors Coggon and Hooper (in person) and Dr Paterson (by correspondence). The panel wanted clarification on a number of points in the bid, and the MoD contracts branch wrote to request this from the company. Subsequently the company withdrew its offer, saying that it had underestimated the extent of the requirement and did not have the necessary resources. b) Professor Coggon explained that the company had no experience in handling samples for uranium analysis and lacked advisory expertise in radiation medicine and toxicology. However, the logistics arrangements had looked satisfactory, and the panel had been willing to help the company identify suitable experts. Professor Coggon stressed that the MoD had actively searched for potential contractors and discussed the requirement with several organisations. There appeared to be no-one in the market with all the attributes needed. Therefore the Board must rethink. One possible way forward was to place contracts with a number of regional NHS occupational	

health departments for the basic sample collection; and get another organisation for the central co-ordination role and dealing with the results. The DUOB itself could help with finding suitable experts to advise on the interpretation of test results.

c) Professor Coggon suggested that it would be useful at this stage to carry out a 'pilot' exercise with, say, 30 veterans in a single geographical area in order to test the procedures. Spot samples of urine as well as 24 hour collections could be requested. Analysis would be carried out by more than one laboratory and the results from the spot samples would be compared with those from the 24 hour samples. A similar comparison could be done as part of the civilian normative values study. If the spot results proved to be as good as those from the 24 hour collections in both cases, the logistics of the main testing programme could be greatly simplified. Professor Coggon recommended this approach to the Board. He said it would provide extra useful information and, importantly, get the testing programme started.

d) Dr Lewis said that spot samples must definitely be ratioed to creatinine. Professor Coggon agreed.

e) Dr Busby said that the Board might as well invite *all* the veterans who wanted a test in the area concerned to participate in the pilot. He had no objection to the proposal and considered it a good way forward. The geographical area could be chosen on the basis of how many veterans there were to be tested in various parts of the country. Professor Coggon said that for practical reasons, London would be the easiest area.

f) Mr Glennon said that he had reservations about the proposal, and wanted to discuss it with the members of his organisation. Professor Coggon said that participants in a pilot exercise would gain the advantages of having their tests done earlier than most and multiply analysed. The drawback was that more would have to be asked of them, in giving both 24 hour and spot samples.

g) Dr Paterson supported the proposal. He said it would be embarrassing for the Board if contracts had been let with the analytical laboratories but no samples were being collected. He also felt that the Occupational Health department involved in a pilot exercise could be asked to continue into the main programme.

h) The Chairman asked whether Dr Paterson would be willing to take on the advisory role in relation to a limited pilot of testing in veterans . Dr Paterson declined, saying that he did not have all the specialised expertise required and the job should preferably be done by one person. Mr Brown said that it would not be possible to find a single individual able to advise expertly on all aspects. The Chairman suggested that alternatively a panel of members drawn from the DUOB might undertake the work.

i) Mr Glennon asked that the proposed way ahead for the healthcare provision be discussed at the next Oversight Board meeting. He was uncomfortable at the way, as he saw it, the subject was being pushed. Dr Paterson asked Mr Glennon to state his concerns. Mr Glennon replied that the proposal was too close to the official 'side', and differed from the protocol agreed by the Board.

j) Dr Busby asked who would carry out the administrative functions. Professor Coggon said that either members of the DUOB or the Occupational Health department could write to the participating veterans.

k) Maj Gen Craig said that the proposal made eminent sense. The information obtained from a pilot exercise could change totally what happened next. Dr Lewis said the proposal was a good idea, but an area must be chosen where

	the background uranium concentration was low so that any DU was not masked. London would be satisfactory. l) Professor Coggon suggested that St. Thomas', Guy's, and King's hospitals would be a good starting point. Dr Paterson said that the Board should try to deal with the matter by correspondence before the next meeting. Professor Coggon said that if the veterans' representatives were unhappy with the proposal, they would need to suggest an alternative plan in order not to compromise the programme. m) The secretary reported that the MoD contracts branch had been trying to identify an organisation that might take on the 'central' co-ordinating function. The Department of Health had been contacted for advice and had suggested the Health Protection Agency. The agency had declined since its remit was public health issues only, and in turn had suggested the NRPB. Dr Busby and Mr Glennon responded that the NRPB would be totally unacceptable to the veterans. *[Post meeting note: The NRPB advised MoD contracts branch that it could not undertake work of this kind.]* n) The Chairman said that it should not be difficult to find a suitable organisation. Suggestions were welcome. **<u>Action 12.6 DUOB members to suggest potential contractors for the central co-ordination and advisory function</u>** o) Dr Busby said that the 'pilot' exercise should simply be the first stage of the main testing programme. Mr Connolly said that no answer from the veterans' side on the acceptability of the 'pilot' proposal was likely until the return of Professor Hooper. The Chairman said that Professor Hooper was already aware of the plan and appeared to be content with it. Maj Gen Craig said that there would be a big advantage in using spot samples. p) Mr Brown asked how veterans for a pilot exercise would be recruited. The Chairman replied that GVIU had a list of names and addresses of people who had enquired about the test; in addition, perhaps the veterans' organisations could assist. The Chairman stressed that the veterans' representatives must be comfortable with what was done. q) Mr Connolly said that a meeting of the NGV&FA would be needed in Hull to discuss the proposal. He asked whether the MoD could offer support by reimbursing the members' travel costs. Mrs Rodgers said this was unlikely. *[Post meeting note: The matter is under consideration by the MoD.]* r) Due to shortage of time, the Chairman deferred discussion on the purpose and choice of the "independent third party". <u>iii. Civilian normative values study</u> a) Professor Coggon explained that an organisation specialising in occupational medicine had been invited to tender for the normative values study and had done so. However, the protocol the organisation had put forward, which involved using hospital inpatients, was more elaborate and expensive than anticipated. Again, the logistics of the work would be much simpler if spot samples could be used. b) Professor Coggon had met staff from the prospective contractor and suggested breaking the study into two parts. The first part ("A") would involve collecting both a combined 24 hour urine sample and a series of spot samples over a second period of 24 hours. The results of the analyses would then be compared and the main study (part "B") designed accordingly. Even if a 24	All members

	hour collection proved to be necessary, the contractor could write in advance, inviting participation from people with forthcoming outpatients' appointments, rather than rely on inpatients. This would be more efficient than the original proposal. If a spot sample were acceptable, so much the better. Professor Coggon reported that the staff were open to the new idea, and the MoD was exploring its contractual aspects. c) Dr Busby said he agreed with the use of outpatients. It was not perfect, but probably the best practical option. Maj Gen Craig remarked that the NHS had very few convalescent inpatients nowadays in any case: people tended to be admitted to hospital immediately before surgery and discharged very quickly afterwards. d) Maj Gen Craig asked whether the Occupational Health world had established any time of day excretion profiles for heavy metals. Other members of the Board had no firm information on the subject. However, Dr Busby made the point that taking a bath tended to increase the excretion of lead due to the equilibration of internal and external cell pressures.	
6.	**Information to Veterans/GPs** a) Dr Paterson said that the College of Health (CoH) had now convened a focus group of veterans that had scrutinised the draft information sheets. He suggested that instead of the original plan of 'basic' and 'advanced' versions, there should be a single document with a more detailed annex. Revised drafts were now awaited from the CoH.	
7.	**Questionnaire** a) Professor Coggon said he had agreed with Professor Hooper that he (Professor Coggon) would prepare the next draft. The action therefore rested with him.	
8.	**Timescales** a) The Chairman said that contracts would be let with the analytical laboratories within a few weeks. Subject to contractual acceptability, the go-ahead should also be given to the prospective occupational medicine contractor for the first stage of the normative values study on the same timescale. With regard to the healthcare function, feedback was required from the veterans' representatives; but preliminary work to identify Occupational Health departments and other potential collaborators could proceed immediately. The whole process would probably take about two months. b) Professor Coggon requested nominations from the Board for the expert advisory role. Dr Busby offered himself, asserting that as low-dose radiation effects amounted to a new area of medicine, there were no established experts. Professor Coggon said that really someone with a medical background was needed. c) Professor Coggon said that the communication tools would not be needed until after the pilot exercise (if done). It was still possible for the test programme to begin before the end of 2003.	

9.	**DU background and scientific issues** i. Chromosomal aberration a) Dr Busby reported that the July meeting of CERRIE had involved a discussion with contributors from around the world on the validity of the ICRP radiological hazard model. It emerged that the chairman of the European Committee on Radiation Risks (ECRR) had written on chromosome damage in the 1980s. Good correlation was observed between the amount of damage and the external radiation dose. When applied to the Schott results, the implied dose was about 50 mSv: which in turn implied the presence of a depot of uranium within the body. The dose was not consistent with the ICRP approach. b) Dr Busby went on to explain that absorption of all gamma radiation is proportional to the fourth power of the atomic number. Thus uranium, with its high atomic number, absorbs the radiation strongly, converting its energy into photo-electrons. He suggested that most of these would be re-absorbed within the bulk of a substantial mass of uranium; but from fine particles (less than 3 microns) lodged in the body, electrons at an energy level below about 100 keV might reach surrounding tissue, creating a much higher local field. Dr Busby said there was some controversy about the influence of particle size. It was claimed that the effect disappeared at very small particle size, though he felt this observation could be an artefact. c) The Chairman requested the CERRIE position on the outlined theory. He said the Oversight Board was interested in new ideas and any experimental data that supported them. There was obviously a good deal of uncertainty. d) Dr Busby said that he wanted research to be done on chromosomal aberrations. Professor Spratt shared this view. ii. Durakovic paper on retrospective estimation of DU exposure from urinary uranium measurements a) Professor Spratt said that of the eleven test subjects in the paper, six had given a negative result, four had shown only a tiny lung burden of DU, and one had shown a significant lung burden (in the range 1-5 mg). Professor Spratt did not think it was valid to average the results as Durakovic had done. b) Professor Coggon said that he found the Durakovic paper interesting. Professor Spratt said the work suggested that the lung dose was actually a good deal lower than might be expected for battlefield DU exposure. c) Maj Gen Craig and Mr Brown discussed the work of the Bremen Institute. Professor Spratt said that chromosomal aberrations should be assessed in veterans showing various different levels of urinary DU. iii. NERC research on DU in the environment a) Professor Coggon asked about the role of the Natural Environment Research Council (NERC) in regard to DU. Mrs Rodgers replied that the NERC had been asked to call for proposals to carry out research on various aspects of DU in the environment. It had issued the call a few weeks previously. NERC involvement was described in the MoD's DU research programme proposal, which had been sent to the DUOB in early 2002. Professor Coggon asked for the Board to be kept informed. **Action 12.7 MoD to report to the DUOB on the NERC research**	Secretary

10.	**Depleted Uranium Workshop** a) Mr Brown stated that something would be said on each of the 13 topics in the MoD's DU research programme, although some might be very brief since there had so far been little progress. Professor Spratt said that the biokinetic modelling would be of most relevance to the Oversight Board. b) Mr Glennon referred to what he called the "secret" meeting on the second day of the workshop, and asked whether it would contain anything of interest to the DUOB. Mr Brown replied that probably only the Operational Analysis on possible replacements for DU munitions would be discussed. c) Dr Busby requested an agenda for the first day of the workshop so that he could decide whether attendance would be worthwhile. **Action 12.8 Secretary to provide Dr Busby with a workshop agenda**	Secretary
11.	**Date of next meeting** a) The next meeting was scheduled for Thursday November 20th 2003. b) The secretary was asked to canvass members for suitable meeting dates in January and March 2004. **Action 12.9 Secretary to canvass DUOB for January and March dates**	Secretary
12.	**A.O.B.** a) The Chairman referred to the transcript of the June 19th meeting of the Inter-Parliamentary Gulf War Group. He had been disturbed to see that Professor Hooper twice stated there were no plans for DU research by the Oversight Board. This was not the case. It had always been the intention to apply the retrospective test in research, and for the Board to be involved in the research. b) Dr Busby said it was not his understanding that the DUOB would *oversee* the research, but he was glad if this were the case. The Chairman said that the Medical Research Council (MRC) was better equipped to review the detailed science, but the Oversight Board would define the research questions. This could be summarised as "we propose, the MRC vets". The most appropriate form for the 'oversight' had yet to be worked out. Dr Busby said he did not accept that the DUOB lacked expertise on medical research questions. Dr Paterson commented that the Board could not really "stand over" the research teams. c) Mr Glennon said it had been stated that chromosome research was outside the remit of the DUOB. Professor Coggon replied that it depended on the question being asked. It was not appropriate to use chromosomal aberration as a measure of DU exposure, but to investigate it as a biological marker of effects from exposure would be reasonable. d) Mr Connolly said that emails from the secretariat had started requesting a "digital signature", and this was creating some problems. Mrs Rodgers responded that unfortunately that was a feature of the MoD's IT security arrangements on external email and could not be switched off at source. Air Cdre Dougherty explained to the Board how the digital signature could be deactivated on the recipient's computer. e) Mr Connolly requested an update on the biological monitoring of Op TELIC personnel. Mr Brown said that approximately 70 individuals had been tested to date. Of these, 62 showed a urinary uranium level that was considered	

	average for the southern UK (less than 30 ng l^{-1}); none had an exceptional isotope ratio indicative of DU. A small number of personnel based in Germany were found to have a natural isotope ratio, but a total uranium concentration in their urine of several hundred nanograms per litre. The only people in whom DU had so far been detected were those with "level 1" exposure who had sustained shrapnel injuries in incidents with DU munitions. Mr Brown added that of the 70 personnel tested, 24% had declared themselves to have had level 1 exposure: but in most cases this did not correspond to the exposure assessment made by their command. f) Maj Gen Craig enquired whether the background uranium levels in northern Germany were known. Mr Brown said he thought water drinking habits were implicated. Personnel from the same camp had shown wide variation. All the samples had been received from a single medical facility at Osnabruck. g) The Chairman referred to a comment from veterans reported by Mr Connolly, that journalists in Iraq seem to be able to obtain DU contamination results far more quickly than the DUOB. He asked Mr Connolly to pass the message back that measuring personal exposures more than 10 years retrospectively was very different from environmental monitoring and that the Oversight Board had a very much more complicated and exacting task.	

Distribution:

All members

All observers