

**WEST CUMBRIA SITES STAKEHOLDER GROUP
ENVIRONMENTAL HEALTH SUB-COMMITTEE**

**MEETING 66 OF THE EHSC
HELD AT CLEATOR MOOR CIVIC HALL
ON 30th November 2006.**

Present:

Professor John Haywood	Radiation Protection Advisor, N.Cumbria Health Authority
Mrs Liz Sherwen	NFU
Mr Bill Harvey	Six Parishes
Mr Ron Hargreaves	Six Parishes
Dr Matthew Emptage	EA
Mr Glyn Davies	NII
Dr Jean Vickers	Cumbria Primary Care Trust
Professor Steve Jones	Westlakes
Mr Vic Emmerson	Copeland Borough Council
Mr Jim Desmond	BNGSL
Ms Sue Allen	BNGSL

Apologies:

Cllr Mrs McCarron-Holmes	Allerdale Borough Council
Mr S Moffatt	Allerdale Borough Council
Mr Dave Davies	Copeland Borough Council
Dr Nigel Calvert	Cumbria & Lancs Health Protection Agency
Mr Tim Parker	BNGSL

Public and Press

Ms J Allis-Smith	CORE
Mr A Irving	Whitehaven News

AGENDA ITEM 1. Chairman's introduction

- 1 The Chairman opened the meeting by welcoming members and public and Mr Glyn Davies representing the NII. Professor Haywood also welcomed Mr John Titley (EA), Dr Kins Leonard (CEFAS), Mr Stuart Conney (FSA) and Mr Jim Desmond (BNGSL) who would be presenting summaries of the monitoring reports to the meeting.

AGENDA ITEM 2. Minutes of Meeting 65

- 2 2.1 Minutes – no amendments requested. The minutes were approved for issue
- 3 2.2 Matters arising – nothing raised

AGENDA ITEM 3. RIFE-11 REPORT

3.1 Terrestrial Monitoring – Mr Stuart Conney FSA

- 4 As an overview of the work of the FSA, which is a Government department with an independent board rather than a minister, Mr Conney said that a new strategic plan was due to be issued shortly. As well as the monitoring work covered in the RIFE report, they

- were involved with health campaigns, for example the reduction of excess salt in food.
- 5 This is the eleventh RIFE report, a compilation of data from all agencies having a responsibility for the environment. The Food Standards Agency (FSA) monitors food, assesses the total dose and the effect of this on public health.
- 6 Around the nuclear site, the FSA monitors milk, fruit, crops, animals, fish and seafood, and environmental materials (eg grass) if no food is available. Readings distant from Sellafield are taken for background values and general diet surveys are carried out. Milk samples from 20 local farms produced 1038 milk analyses and 621 non-milk (animals/crops) analyses were done and the estimated dose for the year was calculated.
- 7 For 2005, the dose to local consumers consuming above-average amounts of locally grown food and milk was $34\mu\text{Sv}/\text{year}$, against a $1000\mu\text{Sv}/\text{year}$ dose limit from artificial sources (excluding medical treatment). The estimated dose was well within the recommended limit and he added for comparison that a dental X-ray would give a dose of $5\mu\text{Sv}$.
- 8 Dr Vickers queried how the milk bulking was done. Mr Conney advised that the bulking was not done till the month's analysis was complete, if the FSA heard that an alarm had gone off or there had been a release, there would be time to stop the bulking and test individual samples.
- 9 Mr Hargreaves asked how they took enhanced naturals into account. Mr Conney replied that these were analysed for if known about, but not taken into consideration. Mr Hargreaves queried a mention in the RIFE-11 report of a polonium-210 reading of 1.8mSv in Tonbridge (Page 202), and asked if there was a critical group for that. There was no other information to indicate the source, was this one sample important, was it affecting people? Mr Conney was unable to provide further information on this data, but commented that somewhere in Cornwall gave a 10mSv reading.
- Post-meeting note:- The data from Tonbridge (1.8mSv from Po-210) was not from locally collected foods but from a "basket" brought from a local supermarket so could have been sourced from anywhere in the world, individual foods are not tested. The analysis was repeated and again showed positive.*
- 10 Professor Haywood took up the point as to whether this reading mattered – interest has to be taken as radiation harm was linear, there was no threshold, every additional dose causes harm, but may not cause illness unless in great amounts. He referred to a case in Ireland where a woman had died of cancer and her husband was also found to have cancer. Investigations showed radon was present – but there was no evidence that this was the cause of these particular cancers.
- 3.2 Marine Monitoring – Dr Kins Leonard CEFAS
- 11 CEFAS is an agency of DEFRA, the majority of their radiological work is for the FSA. They design and operate the marine monitoring programme on behalf of FSA, collate information and run assessment models where there are data gaps. CEFAS collates the habit data. They publish and distribute the RIFE report which this year is also on a CD.
- 12 Habit surveys are reviewed 5 yearly for terrestrial and aquatic and 1 yearly for aquatic. They interview people in the area gathering information on food consumption and activities. Compared to 2004, 2005 shows a slight decrease in the consumption of shellfish.
- 13 C14 increased in lobsters and plaice, decreased in winkles.
Tc99 showed a decrease from last year following the introduction of the TPP treatment.

- Cs137 was generally decreasing, though there were historic effects caused by mobilisation from the seabed.
Pu241 was similar to Cs137.
Am241 was similar/steady with in-growth from Pu241.
- 14 Betagamma in fish - highest concentrations are of tritium and C14 (~100Bq/kg). There was a slight increase in C14 levels despite a decrease in discharges. Betagamma in shellfish – from tritium, C14 and Tc99 (up to 1800 Bq/kg). Tc99 was down compared to 2004. Transuranics - similar to 2004, approx 40Bq/kg.
 - 15 The dose from Sellafield discharge was 0.22mSv/year. There was an additional 0.23 mSv/year from phosphate discharges and natural sources, giving a total of 0.45 mSv/year, a decrease from 0.63 mSv/year in 2004. There had been changes in habit/consumption using a 5 year average.
 - 16 Dr Leonard then reported on studies on Tc99 remobilisation from the seabed – research for the FSA. Tc99 had previously been expected to move out into the North Sea, but was now found to be absorbed into sediments (like Cs137 in the 1970s). They were calculating the Tc99 total on the seabed to estimate likely remobilisation in the future. Cores were being taken to obtain an inventory to model amounts and make predictions. They were expecting water concentrations to decrease after 2010, this is only a minor contributor to food dose.
 - 17 For OSPAR, which was an agreement on monitoring radionuclides in the environment, they were looking at the whole area – the coastal shelf, Irish Sea, and Sellafield area. 2005 is a baseline (1995-2001), 2006 will be the first periodic evaluation. The reports from this study are on the web-site (<http://www.ospar.org/eng/html/welcome.html>).
 - 18 Professor Haywood had noted that the phosphate works contribution of 0.23µSv/year was half the value for the previous year but other radionuclides had not declined in the same way and asked if a reason for this was known. Dr Leonard said the concentration had probably gone down. These particles are reactive so disperse slower, mechanisms differ, Po210 is conservative and will be washed away. Pu and Am stick to sediments and form a reservoir, U is conservative and won't stick. Rhodia discharges have stopped, Mr Tittle commented that the authorisation for Rhodia had been revoked in 2004.
 - 19 Professor Jones suggested that there were also seasonal variations – possibly storms disturbing sediments. Dr Emptage said it would be worth considering the input of Tc99 to the sea from groundwater, there was freshwater seepage onto the beach and seabed probably – they needed to be aware of this. Dr Leonard said this was a gross look – 20 cores and a large area covered. The major aim was to determine if this was a likely source for the next 20 years or so. There were expecting a large error on it.
 - 20 Ms Allis-Smith recalled that Pu remobilisation had been mentioned at the Windscale enquiry and asked if anything had been learnt from that with regard to Tc99 remobilisation. Dr Leonard said they had expected Tc99 to be dispersed swifter than Pu, only when they started to investigate had they determined that its K_D (max 10^3) meant it tended to stick more than anticipated. The dose to the public was not significant even though the amounts look large. The majority is from the mud-patch off shore, concentrations in other areas eg sandy sediments were much smaller. Ms Allis-Smith asked if it could be brought back into the Ravenglass estuary, Dr Leonard replied that Ravenglass was exporting activity but the mechanism for this was not known.

3.3 Environmental Monitoring – Mr J Titley EA

- 21 The report covered Sellafield and LLWR discharges, and disposals of solid waste to the LLWR. A new authorisation came into effect at Sellafield on 1 October 2004, with changes to gaseous and liquid limits. The pipeline authorisation had 8 limits reduced and Np237 and Cm243 added. In 2005 all reported aqueous discharges were below limits and less than 35% of the limits.
- 22 Gaseous limits also changed, with reductions to 11 limits. All discharges were below limits – C14 was the largest at 28%.
- 23 LLWR liquid discharges were less than 1% of the limits of their authorisation. Disposals to LLWR of LLW were all within limits, the highest was 27% for other alpha.
- 24 Check monitoring of Sellafield and LLWR effluent and LLW monitoring was undertaken. Aqueous monitoring compared well to Sellafield results – overall general good comparison for 2005. Comparisons were not so good for gaseous, of 67 analyses by the EA there were 24 discrepancies. The reason was different approaches – eg C14 is precipitated to a solid by BNGSL, whilst EA contractor analyses the bubbler liquids directly – EA considering if contractor to adopt BNGSL techniques.
- 25 LLWR liquid effluents gave good agreement – over 90% in 2005.
- 26 The EA have a laboratory at Winfrith to check LLW disposals, ISO containers of drums of LLW are seized for checking before going to the LLWR. A range of non-destructive and destructive tests is carried out on the drums. ISO-freights from Bradwell and Berkeley have been checked and various discrepancies found. A new and reconfigured drum testing kit is being checked out.
- 27 The EA cover the non-food part of the monitoring programme, they calculate and monitor dose rates, via monitoring of mud, sands and seaweed sampling, strandline sampling and gully-pot monitoring.
- 28 Dose rate comparisons vary, the dose from the Calder river from the ‘shine’ from Calder Hall has decreased now this is shut down, dose rate trends are declining. Some silt concentrations are down, some are up - looking at 1998 to 2004 and 2005. Cobalt levels follow discharges so does Ru-106. Cs-137 is less clear, but generally declining, where it goes up it is likely due to release from older sediments. Am241 discharges fell but redistribution occurred following sediment movement. Pu239/240 declined then was remobilised. Tc99 levels are down in seaweed following the trend in discharges.
- 29 The non-food dose is less than 0.040mSv/year, well below the public dose rate. Total dose is 0.41mSv/year, 0.46mSv/year depending on methodology and including Rhodia discharges, all below the 1mSv/year public dose limit.
- 30 Mr Titley then asked if anyone had any suggestions for changes to the RIFE report and asked if a summary report would be useful.
- 31 Professor Jones said that when comparing the RIFE and BNGSL reports, comparison of assumptions on terrestrial food consumption was difficult and asked how the RIFE results were arrived at. Mr Titley stated that the CD included with RIFE now included spreadsheets which showed how the dose calculations were undertaken.
- 32 Mr Hargreaves commented that he found it helpful to read the details, to lose that would be a pity, but it would be OK if the details were on the CD. He asked that they keep a continuity check – ie things not measured in the same way. The report doesn’t cover all radioactivity or all the environment – it needs to be rational
- 33 Dr Vickers commented that from the point of view of public health, and regeneration in

West Cumbria, it needed to be clear that a person could move to West Cumbria and live here with confidence, that the kids could jump in the sea – that it was safe to live here. The public don't get that reassurance from the report as it is. The report needed to be positive that it is safe – a non-technical document putting the results in 'whole-life' context was needed.

- 34 Mr Hargreaves commented that there were vast differences in doses from natural sources – this is evident in the report – if you can pick it out.
- 35 Professor Haywood suggested there was a need for a briefing of a more general appeal, whether this was for CEFAS to produce would need to be discussed. For Sellafield there is data on cancer rates and location, but no evidence of causes – so a general interest briefing would have some difficulties. Mr Conney said they couldn't do such a report for the West Cumbria area – they would have to do other areas as well. Dr Vickers asked if the agencies could get together to discuss possibilities, Mr Conney said focus groups were being targeted as to what information they want. Mrs Sherwen commented that the report needed to be as detailed to show the information put together and the work that is done.
- 36 Ms Allis-Smith said that CORE had a Geiger counter, which was calibrated for them by Harwell. They do tours with visitors taking measurements, from the Visitors Centre to Ravenglass and Waberthwaite – at Waberthwaite she said, they don't even need to get out of the car to register 5x background. The reading at Waberthwaite church was 600cps. They had compared these with the RIFE report, and she asked why they were getting higher readings (2x background) than the agencies.
- 37 Professor Haywood suggested that they were not sampling the same locations, or not using the same protocol for the measurements. Mr Conney said they go where people get doses – not footpaths but bait digging areas, and they look at the cumulative dose over the year, not just a one-off reading. Dr Emptage said work had been going on over several years, particularly in the Esk estuary, looking at the Cs137 inventory in the estuary, data had been published on this and there are areas of higher activity than those monitored routinely. To survey the entire estuary on a regular basis is expensive, but is done from time to time – this is likely to show results equivalent to what CORE has found.
- 38 Professor Haywood commented that what you measure depends on what you want to calculate. The RIFE report dose is based on activity and habit, and applied to the critical group as a worst case scenario. The average dose would be much less. Mr Conney advised that from data-loggers put in houseboats it was possible to see differences in readings as the tide came in and out, so they were fairly certain that they were looking at the doses actually received.
- 39 Professor Jones said that differences could be due to the instrument, even if it was calibrated. If the Geiger tube was energy-compensated, it would give different readings and background varies with how you define it. Until they are sure they are using the same instrument, it was not sensible to make such comparisons.
- 40 Dr Emptage suggested that as they specify the monitoring programme that BNGSL undertake and their own programme and these are routinely reviewed, he would speak to Ms Allis-Smith after the meeting and include the locations she highlighted in the programme, for public reassurance.

AGENDA ITEM 4. BNGSL Environmental Monitoring Programme

4.1 Annual Report on Discharges & Monitoring of the Environment – Mr J Desmond BNGSL

- 41 For marine discharges, Mr Desmond explained that BNGSL monitored the whole environment, from discharges via the sealine to seawater, and pathways back to man such as sea to land transfer from seaspray. The primary monitoring objective is to produce an annual retrospective assessment of critical group doses resulting from Sellafield operations, to measure progress towards the 20 μ Sv/year objective. He also covered the secondary principles and underpinning principles of the programme. The FSA programme is wider than an operator can sustain – Sellafield aims to do 10% of the FSA programme to provide a comparison.
- 42 Where values are stable, less samples are taken. Where values alter eg. seaweed which changes with discharges, more frequent samples are taken. Sellafield uses a similar location/sampling area, and also samples up as far as the Isle of Whithorn.
- 43 Sellafield calculated the dose to the marine critical group as 230 μ Sv/year. Consumption was slightly up, dose slightly down. The dose was mostly (75%) from mussels and winkles, and mostly from Pu/Am, then Cs137. Pu concentration in mussels was aligned to discharges.
- 44 Tc99 in lobsters was falling in line with discharges, with a timelag. The dose from Tc99 in all foods was falling, with a time lag, following discharges.
- 45 For aerial pathways, Sellafield monitors the full environment - soils, grass, food, drinking water, direct measurements. The near Sellafield area (4km zone) is covered, plus the Ravenglass estuary and Drigg. The Ar41 dose is now almost nothing following the Calder shutdown. The critical group was assessed to be infants with a total dose of 13 μ Sv/yr. The most significant contributor was Sr90 in milk, giving 50% of the total dose. The measurements of Ru106 and I131 give very high limits of detection (LoD) in milk so modelling concentrations are used for the dose assessment.
- 46 The revised programme had been used from April 2006, and will be reviewed annually. Mr Desmond said that notice will be taken of comments from the EHSC minutes, the BNGSL programme review will take CORE comments into consideration.
- 47 Changes to the programme which had been implemented were reduced foodstuff monitoring with the FSA contractor providing fish samples, more groundwater sampling, and enhanced beach monitoring. The review in October 06 had been submitted to the EA
- 48 A study of groundwater monitoring had been completed and a report was expected in early 2007. Mr Desmond advised that the group concerned would be willing to report to the EHSC – this was accepted. The Contaminated Land group was taking responsibility for the project to investigate contaminated land and groundwater on the Sellafield site.
- 49 At the EA's request, enhanced beach monitoring had been undertaken. A bulletin had been issued concerning the NUKEM trial on Sellafield beach w/c 27 November 06. Several minor finds items had been located, the EA had been notified. The items had been taken to site for investigation/analysis, further information will be issued when available. The initial assessment was that there was no danger to the public.
- 50 Routine Kr85 monitoring had been set up, for the first time using a contractor.
- 51 Time proportional water sampling equipment had been fitted in the River Calder – this was taking hourly samples rather than spot monitoring.

4.2 Comparison of findings BNGSL and RIFE reports – Professor S Jones

- 52 Professor Jones explained that he started this exercise by assembling a comparison table, he drew attention to possible areas of inconsistency between the reports – analytical methods, locations and sampling timings. There was not always enough information in the reports to identify which of these areas might explain individual differences in results. Limits of detection (LoD) for samples cause problems in comparing results. The majority of marine samples are of a positively determined value, but with terrestrial samples a large proportion are at LoD (BNGSL data has a slightly higher number of LoD results). Then he checks to see if samples are in agreement - if samples are within a factor of 2, they are counted as reasonably similar.
- 53 In 2004, Cs137 results for marine samples were mostly in agreement while terrestrial samples showed wide differences probably because of differences in sample locations. In 2005 there were fewer sets of comparable samples. For elderberries and blackberries, BNGSL results were higher – but again differences may reflect locations. For samphire the BNGSL result was much higher (and for Tc99) – this was a salt marsh plant, not always inundated by the tide, and so timing of samples relative to tidal inundation may be a factor.
- 54 Pu comparison has always been good. Marine comparison was good, but for terrestrial – honey potatoes and milk – BNGSL was reporting LoD, while the RIFE results were reported at lower, positively determined, values.
- 55 For Tc99 the 2005 milk results were inconsistent. Marine samples were comparable. The BNGSL porphyra result was from an average of samples from St Bees to Selker rocks, the RIFE sampling regime was different.
- 56 Porphyra results for Sr90 were different in 2005. For sheep and pheasant, BNGSL results were at LoD
- 57 With C14 the FSA does not take account of background, the RIFE report assumes the C14 level is standard for different food substances. BNGSL takes account of C12 in food, results are not much elevated above background.
- 58 Habit data – both BNGSL and RIFE are now using a 5 year rolling average, and both using the same assumptions, so arrive at the same dose of about 195 $\mu\text{Sv}/\text{year}$.
- 59 For the terrestrial critical groups, RIFE habit data are not clearly defined in the report text (Note: Mr Titley had now advised that further data was provided on the CD-ROM that accompanies the report). Here there are substantial differences in the calculated doses, albeit at low values in absolute terms. For example, for the critical group dose from consumption of terrestrial foods and inhalation, BNGSL report 11 $\mu\text{Sv}/\text{year}$ whereas RIFE report 34 $\mu\text{Sv}/\text{year}$. The difference arises mostly from the way in which dose from I131 and Ru106 in milk is estimated – BNGSL use values calculated from the environmental modelling of discharges, whereas RIFE values are based on sample results reported at the LoD.
- 60 Mr Desmond commented that BNGSL would report C14 and C14 background in the future. Dr Emptage said that the LoD issue would be looked at, this may make comparisons more meaningful in future.

AGENDA ITEM 5 & 6 Items of Environmental Interest/Works Update

- 61 Mr Desmond brought the following items to the committee's attention.
- The stores at Lillyhall were in operation – 60 vehicles a week were delivering from

- stores to site, a reduction of 3000 vans/lorries a year coming to the site.
- 93 drums of Plutonium Contaminated Material had been transferred to EDS from the B300 stores since April 2006. This completes the work to reduce the fissile inventory of the B300 stores by 80%, as specified in Licence Instrument 7.
 - The sealine pipe recovery was completed on 25 June 06. 2 metal and 1 plastic pipeline were removed.
 - NIREX have reviewed proposals for the trial encapsulation of a drum of B30 Magnox sludge in WEP. The issue of a Letter of Compliance is promised.
 - For the Calder cooling tower demolition, holes for the explosives have been drilled. The project is waiting for regulatory approval to proceed.
 - The LLWR at Drigg has received the necessary approval to start shadow working, as a stand-alone site.
 - The successful installation of the 42te gantry refurbishment system in B30 will allow the refurbishment of the skip handler gantry. Returning the skip handler to full operation will allow sludge retrieval and pond management to begin.
 - BNGSL has joined WANO – enabling the site to share in world-wide best practice
 - LLWR has been allowed an extra 9 months to remove bulk PCM to Sellafield.
 - BNGSL has been fined for the Thorp breaches in April 05 which resulted in the plant being shutdown. 83m³ of liquor containing Pu and U leaked into a stainless steel containment vessel.
 - The formation of a National Nuclear Laboratory has been announced, to be located at Sellafield.
- 62 Dr Emptage said that he had been advised of an increase in gaseous discharges from FHP in June, this was being investigated. The plant limit for Cs137 had been breached in August, since then discharges had returned to normal. The problem was understood and still being investigated.
- 63 Mrs Sherwen queried plans for the cooling tower demolition – this would be better done during the winter months (November to April) when cattle were indoors. A lot of noise would disturb livestock. She and other local farmers had received no information on the demolition so far. If they were notified in advance, cattle can be taken indoors. This will be referred to the demolition management team.
- Note: Contact will be made with Mrs Sherwen by Gill Marsden of the Demolition Group, explaining their plan and that the demolition date will be notified when it is known.*
- 64 Ms Allis-Smith raised the issue of the risk from dust generated by the tower demolitions. Mr Desmond thought that this should have been considered as part of the environmental Impact Assessment submitted to the regulators. *Note: This is available on the BNGSL website (www.britishnucleargroup.com and search on Calder Hall – Key Workstreams-Safety Case).*
- 65 Ms Allis-Smith asked about the epidemiology study and the NDA's position. Professor Jones said the NDA had taken this over, a Chair of Epidemiology was being appointed. Ms Allis-Smith asked if the study being done on the work-force would be done on the population as well.
- 66 Ms Allis-Smith drew attention to research on iodine discharges from the USA (Hanford etc), showing that discharges contribute to thyroid diseases, commenting that such work would be appropriate here. Professor Jones replied that he would provide the contact details of a committee that oversees such work.

These Minutes were approved for issue by the EHSC on 31 May 2007.

AGENDA ITEM 7. Environmental Health Matters

- 67 Professor Jones had no items of interest to bring to the committee's attention

AGENDA ITEM 8. Election of Chairman and Vice-Chairman

- 68 As there were no objections to the current Chairman and Vice-Chairman continuing in these positions, and no alternative candidates proposed, they were confirmed in post.

AGENDA ITEM 9. Press release

- 69 The press release drafted by Professor Haywood was discussed and agreed for issue. The release was based only on the RIFE 2005 report as the full set of reports was not available. Professor Haywood said he had tried to create a simple message. The insertion of comparisons with other doses received by members of the public was considered but it was decided to omit this. An explanation of what the RIFE report covers was to be inserted in the note to editors section.

AGENDA ITEM 10. Any other business

- 70 No issues were raised

- 71 The meeting closed at 16.03