



These minutes were agreed and accepted in the 74<sup>th</sup> Meeting of the EHSC on 25/11/10

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

**MEETING 73 OF THE EHSC  
HELD AT CLEATOR MOOR CIVIC HALL  
27<sup>th</sup> May 2010**

**Present:**

Professor John Haywood	Chairman
Professor Steve Jones	Vice Chairman
Mr Richard Rhodes	Secretary
Mr Jim Desmond	Sellafield Ltd
Mr Graham Huston	Gosforth PC
Mr S Standage	Allerdale Borough Council
Mr Stephen Tandy	Environment Agency
Mr Phil Edge	NDA
Mr John Cain	Copeland Borough Council
Mr Thomas Greer	Copeland Borough Council
Mr Ron Hargreaves	Community Representative
Lindsay Graham	Churches in Cumbria
Mr Simon Hunter	LLWR

1	<b>AGENDA ITEM 1 Chairman’s introduction</b>
2	The Chairman opened the meeting by welcoming those attending, including representatives of the public and press. There were a number of apologies including Ms Elaine Nattress (NII) and Mr Stewart Kemp (Cumbria County Council).
3	The members of the committee at the meeting introduced themselves.
4	<b>AGENDA ITEM 2 Minutes of Meeting 72</b>
5	Some comments were taken on the minutes before the meeting, and amendments were made. A member of the public noted that in Minute 131, there were no m/yr values given for Strontium, Caesium and Plutonium. This will be amended. CORE noted that in Minute 39 it was stated that Bill Camplin would be happy to send out consultation papers from the Food and Agriculture Organisation (FAO). This has not been done; these papers will be made available on the WCSSG website.
6	Matters Arising: There were no matters arising.
7	<b>AGENDA ITEM 3 Sellafield Discharges and Environmental Monitoring: A Preliminary Assessment – Mr J Desmond Presented.</b>



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8	<p>Slide 1: Provisional Terrestrial dose for 2009. It is estimated that in 2009, members of the public most affected by radioactivity on land received a radiation dose of about 16 microsieverts, compared with 17 microsieverts estimated for 2008. The main contributor to the Infant Critical Group is Sr90 and I129. The estimate does not include external contribution, minor pathways, marine foods and uses 2008 habit data.</p>
9	<p>Slide 2: Provisional Marine dose for 2009 For members of the public having very high seafood intake the provisional dose estimate for 2009 is 137 <math>\mu</math>Sv/year, this is lower than the provisional dose estimate for 2008 of 170 <math>\mu</math>Sv/year (final 2008 assessment was 161 <math>\mu</math>Sv/year). The main difference is due to lower concentrations of actinides in Winkles (approx 60% of 2008 level). The critical group, as in previous years, is adults. The main pathways are Mussels (75.6 <math>\mu</math>Sv/year) and Winkles (42.7 <math>\mu</math>Sv/year), and the main contribution is from actinides – Pu alpha (40.7 <math>\mu</math>Sv/year) and Am241 (67.5 <math>\mu</math>Sv/year).</p>
10	<p>Aerial Discharges 2009 See Figure 1 which compares 2008 and 2009 data for radionuclides. Aerial discharges were similar to 2008 with the exception of Sb125, which was higher in 2009 due to site and FHP breaching Sb125 rolling 12 month limit since July 2009, revised limits are effective from April 2010. Overall dose impact for discharges at limit has reduced following changes in April 2010.</p>
11	<p>Marine Discharges 2009 See Figure 2, which compares 2008 and 2009 discharge data for radionuclides. Increased marine discharges are due to increased Thorp and Magnox reprocessing throughputs. - Thorp 196te (104te in 2008) - Magnox 538te (430te in 2008) Sr90 and Ru106 increase due to treatment of Medium Active Concentrate (MAC) in EARP.</p>
12	<b><i>End of presentation - Questions from committee:</i></b>
13	No questions from the committee.
14	<b><i>Questions from press and public:</i></b>
15	<p>Referencing slide 1 of the presentation CORE asked, what are the minor food pathways? These are not included in estimated dose.  Mr Desmond informed attendees that a number of years ago a 1<math>\mu</math>Sv threshold for food was implemented for the monitoring programme. If the level in food was less than 1<math>\mu</math>Sv then it was taken off the programme.</p>

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16	<p>A member CORE asked: Throughput figures are low compared to design throughput, when Thorp and Magnox are fully operational will discharges increase?</p> <p>Mr Desmond informed attendees that the relationship between throughput and discharges is difficult to predict, and could not provide any further information regarding how throughput would affect discharges.</p> <p>CORE: Thorp throughput will increase; do you know when these operations will finish? What affect will this have on Sellafield Ltd meeting OSPAR targets?</p> <p>Mr Desmond informed that he does not have information regarding the throughput targets for reprocessing plants.</p> <p>CORE: Informed attendees that he has not been able to get reprocessing targets from Sellafield Ltd through the freedom of information act.</p> <p>Mr Edge informed that the intention is for reprocessing plants to perform better, with the aim of reprocessing all spent fuel that has been produced. Thorp reprocessing is aiming to be completed by 2020. There is no other way to address spent fuel, so the drive is for Sellafield Ltd to reprocess as quickly as possible.</p> <p>CORE: How will this affect discharges, and also commented that discharges in 2020 should be as close to 0 as possible to meet OSPAR targets.</p> <p>Professor Haywood added that 90% of dose to the marine critical group arises from historic discharges, not from ongoing activities.</p> <p>Mr Hargreaves added that a lot of activity is release from drilling for oil, for example around Norway. However agreed that this should not detract from any impact Sellafield may have.</p> <p>Professor Jones added that OSPAR refers to radiological activity in background levels.</p>
17	<p>A member of the public asked whether Sb125 was a fission or activation product. Sb125 is a fission product.</p>
18	<p><b>AGENDA ITEM 4 Environmental Health Matters – Professor S Jones presented.</b></p>
19	<p>Professor Jones presented 4 papers, these will be made available on the WCSSG EHSC Website.</p>



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20	<p>Paper 1: International Commission on Radiological Protection (ICRP) Statement on Radon.</p> <p>The ICRP has recommended a reduced reference level for exposure to radon, a natural radioactive gas, in dwellings but the UK action level is already lower than this recommendation.</p> <p>Summary below:</p> <ul style="list-style-type: none"> <li>- The commission issued revised recommendation for a System of Radiological Protection in 2007 (ICRP, 2007) which formally replaced the Commission's 1990 Recommendations (ICRP, 1991) and updated, consolidated, and developed the additional guidance on the control of exposure from radiation sources <sup>(1)</sup>.</li> </ul>
21	<ul style="list-style-type: none"> <li>- The Commission has now reviewed recently available scientific information on the health effects attributable to exposure to radon and its decay products. As a result of this review, for radiological protection purposes the Commission now recommends a detriment-adjusted normal risk coefficient for a population of all ages of <math>8 \times 10^{-10}</math> per Bq h m<sup>-3</sup> for exposure to radon-222 gas in equilibrium with its progeny (i.e. <math>5 \times 10^{-4}</math> WLM-1) <sup>(1)</sup>.</li> </ul>
22	<ul style="list-style-type: none"> <li>- Following from the 2007 Recommendations, the Commission will publish revised dose coefficients for the inhalation and ingestion of radionuclides. The Commission now proposes that the same approach be applied to intakes of radon and progeny as that applied to other radionuclides, using reference biokinetic and dosimetric models <sup>(1)</sup>.</li> </ul>
23	<ul style="list-style-type: none"> <li>- The Commission reaffirms that radon exposure in dwellings due to unmodified concentrations of radium-226 in the earth's crust, or from past practices not conducted within the Commission's system of protection, is an existing exposure situation. Furthermore, the Commission's protection policy for these situations continues to be based on setting a level of annual dose of around 10mSv from radon where action would almost certainly be warranted to reduce exposure. Taking account of the new findings, the Commission has therefore revised the upper value for the reference level for radon gas in dwellings from the value in the 2007 Recommendations of 600Bq m<sup>-3</sup> to 300 Bq m<sup>-3</sup> <sup>(1)</sup>.</li> </ul>
24	<ul style="list-style-type: none"> <li>- Taking account of differences in the lengths of time spent in homes and workplaces of about a factor of three, a level of radon gas of around 1000 Bq m<sup>-3</sup> defines the entry point for applying occupational protection requirements for existing exposure situations. The Commission now recommends 1000 Bq m<sup>-3</sup> as the entry point for applying occupational radiological protection requirements in existing exposure situations <sup>(1)</sup>.</li> </ul>
25	<ul style="list-style-type: none"> <li>- The Commission reaffirms its policy that, for planned exposure situations, any workers' exposure to radon incurred as a result of their work, however small, shall be considered as occupational exposure <sup>(1)</sup>.</li> </ul>

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26	<p>Paper 2: Temporal trends in childhood leukaemia incidence following exposure to radioactive fallout from atmospheric nuclear weapons testing. Summary below:</p> <ul style="list-style-type: none"> <li>- The radionuclides discharged from many nuclear installations are similar to those released into the global environment by atmospheric nuclear weapons testing, which was at its height in the late 1950s and early 1960s <sup>(2)</sup>.</li> <li>- No evidence was found of a wave of excess cases of childhood leukaemia corresponding to the peak radioactive fallout from atmospheric weapons testing <sup>(2)</sup>.</li> </ul>
27	<p>Paper 3: Cancer incidence in the vicinity of Finnish nuclear power plants: an emphasis on childhood leukaemia. Summary below:</p> <ul style="list-style-type: none"> <li>- The objective of this paper was to study cancer incidence, especially leukaemia in children (&lt;15 years), in the vicinity of Finnish nuclear power plants (NPPs) <sup>(3)</sup>.</li> <li>- The results do not indicate an increase in childhood leukaemia and other cancers in the vicinity of Finnish NPPs though the small sample size limits the strength of the conclusions <sup>(3)</sup>.</li> </ul>
28	<p>Paper 4: Enhancement of tritium concentrations on uptake by marine biota: experience from UK coastal waters.</p> <p>The study of tritium in marine life around the UK found high rates of enhancement of pharmaceutical company releases of organic-bound tritium in Cardiff Bay. However, enhancement rates were much lower at Sellafield and Hartlepool where tritium releases consist mainly of tritiated water. Sellafield tritium releases make very little contribution to doses to members of the public.</p>
N/A	<p>References:</p> <ol style="list-style-type: none"> <li>(1) International Commission on Radiological Protection Statement on Radon (ICRP Ref 00/902/09).</li> <li>(2) Temporal trends in childhood leukaemia incidence following exposure to radioactive fallout from atmospheric nuclear weapons testing (DOI 10.1007/S00411-010-0266-4).</li> <li>(3) Cancer incidence in the vicinity of Finnish nuclear power plants: an emphasis on childhood leukaemia (DOI 10.1007/s10552-009-9488-7).</li> <li>(4) Enhancement of tritium concentrations on uptake by marine biota: experience from UK coastal waters (DOI 10.1088/0952-4746/30/1/N01).</li> </ol>
29	<p><b><i>End of presentation - Questions from committee:</i></b></p>
30	<p>Mr Edge asked about radon dose (see first paper). Once the rad-material is in the workplace, should radon then be considered as occupational exposure?</p> <p>Professor Jones responded by saying that any radon exposure, not just from rad-materials or operations should be considered.</p>
31	<p>Mr Cain advised that it is up to the employer to determine radon levels for employees.</p> <p>Professor Jones advised that radon in the workplace is something that an employer might want to consider.</p>

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32	<b><i>Questions from press and public:</i></b>
33	<p>A member of the public asked: Did the report on Childhood Leukaemia cover people living in the far north of Scandinavia, who eat reindeer? The reindeer with eat Lichen, which is susceptible to fall out products.</p> <p>This is an issue and first became a factor following the Chernobyl disaster, when a 300 Bq/kg limit was put on all meat. Professor Jones informed that the paper does not consider this.</p>
34	<b>AGENDA ITEM 5 Report on recent beach monitoring work at Sellafield and Braystones – Mr J Desmond presented.</b>
35	<p>Slide 2, 3 and 4: Beach Monitoring Update. The new synergy instrument has been introduced for beach monitoring:</p> <ul style="list-style-type: none"> <li>- The system comprises 8 low energy detectors, optimised for Americium and Plutonium detection, added to the array.</li> <li>- The system was tested by sequential runs (20) over a line of reference sources (Co-60, Sr-90, Cs-137, Am-241) buried at depth on Drigg beach. Tests were carried out for depths of 0, 5, 10, 20 and 50 cms.</li> </ul>
36	<p>Slide 5: Figure 3 presents a beach monitoring summary for combined vehicle and hand monitoring for the 2009/10 financial year.</p> <p>A total of 354.81 Ha were covered in 2009/10, 50 contaminated stones were found and 191 contaminated particles. The proportion of particles as % of total finds is 79.3%.</p> <p>The finds are mainly located on Sellafield beach, with a number of particles at Braystones and a few at Seascale and St Bees.</p> <p>The areas of cobbled beaches were monitored by hand as the Soft Track vehicle cannot operate in these areas.</p> <p>&gt;= 2mm is a stone &lt;2mm is a particle</p>
37	<p>Slide 6: Figure 4 presents a beach monitoring summary for combined vehicle and hand monitoring since the start of monitoring in 2006 up to 31/03/10.</p> <p>A total of 948.77 Ha of beach has been monitored since the programme began in 2006, 403 contaminated stones have been found and 447 contaminated particles.</p> <p>The majority of finds are from Sellafield Beach (400 stones and 314 particles), with particles also found at Braystones (77), Seascale (34), St Bees (13) and Drigg (7). 3 stones were also found at Seascale.</p>
38	<p>Slide 7: Figure 5 shows beach monitoring find trends between 2007 and 2009/10. The rate of finding active stones has fallen since the programme began in 2006. However the new Synergy system, with increased sensitivity to actinides and strontium-90, has increased the rate of finds of particles with low actinide activities.</p>
39	<p>Slide 8: Figure 6 compares the classification of pre and post synergy alpha and beta rich finds up to 31/03/10. With the new Synergy system more low activity finds are being detected.</p>

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40	<p>Slide 9: Figure 7a shows the distribution of alpha and beta rich beach finds. Figure 7b shows the distribution of stone and particle finds. The majority of finds are clustered around the Sellafield Beach to the North of the Sellafield Sea Pipeline. Figure 7c shows the total area monitored since the start of the programme.</p>
41	<p>Slide 12 &amp; 13: The Health Protection Agency is producing a full risk assessment for Autumn 2010. The risks will probably be dominated by alpha rich finds, with very low risks from beta rich finds. The HPA have advised:</p> <p><i>“On the basis of information provided by the Environment Agency on 6 July 2007 on the finding of radioactive particles on beaches near the BNG Sellafield site, the Health Protection Agency (HPA) considers that no special precautionary actions are necessary at this time regarding access to or use of these beaches. However, HPA will continue to work with relevant authorities to keep the situation under investigation.”</i></p>
42	<p>Slide 14: Summary:</p> <ul style="list-style-type: none"> <li>- New Synergy monitoring system introduced in August 2009.</li> <li>- System calibrated at Drigg in October 2009.</li> <li>- Find rates for stones declining</li> <li>- Find rates for particles increasing due to Synergy.</li> <li>- Analysis of further finds - on track</li> <li>- Regular reports on progress on <a href="http://sellafieldsites.com">sellafieldsites.com</a></li> </ul>
43	<p>For more information on beach monitoring activities visit: <a href="http://www.sellafieldsites.com/what-we-do/featured-projects/beach-monitoring">www.sellafieldsites.com/what-we-do/featured-projects/beach-monitoring</a></p>
44	<p><b><i>End of presentation - Questions from committee:</i></b></p>
45	<p>Mr Huston asked, are the vast majority of finds from historic activities?</p> <p>Mr Desmond informed Mr Huston that data and models to date suggest that the majority are 25 years+ old. There is no reason to believe that there is a current source for the finds.</p>
46	<p>Mr Cain asked whether the level of turnover on the beach had an effect on the number of finds.</p> <p>Mr Desmond informed Mr Cain that 2m of beach turnover has been seen. The nature of alpha finds is that they emit very low Gamma, and so are shielded by sand. So beach turn over may result in more alpha finds, as these are brought closer to the surface.</p>
47	<p>Professor Haywood asked what the trend would look like if number of finds was plotted against activity of finds.</p> <p>Mr Desmond informed Professor Haywood that a plot of the Americium finds shows a log-normal distribution with no variation.</p>
48	<p><b><i>Questions from press and public:</i></b></p>

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49	<p>CORE asked whether the latest sampling data will show the age of each find, as with previous data.</p> <p>Mr Desmond informed that the latest sample will present find age. There is nothing to suggest new young particles. The alpha rich finds are between 25 and 40 years old.</p>
50	<p>Mr Tandy added that we cannot preclude the potential for historic particles to be held up in the 'system' and their subsequent release through decommissioning. Best Available Techniques (BAT) are being applied to mitigate against this potential.</p> <p>Mr Desmond added to this by saying that particles may have been on site 40 years and then release recently, we cannot rule this possibility out.</p>
51	<p>The subject of offshore monitoring was raised. This is something that will be looked into as a possibility. The purpose of any offshore monitoring will be to establish whether any particles are held up in the sea bed, which may be brought ashore in a storm.</p>
52	<p><b>AGENDA ITEM 6 Items of Environmental Interest / Works Update (Sellafield) – Mr J Desmond Presented.</b></p>
53	<p>Mr Desmond presented an update on reprocessing operations at Sellafield:</p> <ul style="list-style-type: none"> <li>- Magnox Reprocessing is currently shut-down, due to restart in June 2010.</li> <li>- Thorp are shearing fuel, 40 tonnes have been sheared since April.</li> </ul>
54	<p>Mr Desmond presented items of environmental interest:</p> <ul style="list-style-type: none"> <li>- There was a recent incident where 4 bags of low level waste were sent to the Lillyhall landfill site. This was discussed in more detail later in the meeting, see agenda item 8.</li> </ul>
55	<p><b><i>End of presentation - Questions from committee:</i></b></p>
56	<p>None.</p>
57	<p><b><i>Questions from press and public:</i></b></p>
58	<p>CORE asked, what is the volume of high level waste stored on site?</p> <p>Mr Edge responded by saying that the amount of stored HLW is the lowest in years after a good year of Vitrification. Figures provided to Phil Edge by Sellafield Ltd at the end of period 1 (May 2010) were that HAL stocks were 829m3 compared to the NII specification limit of 1123m3.</p>
59	<p><b>AGENDA ITEM 7 German Nuclear Sites Cancer Study – Professor Haywood presented.</b></p>
60	<p>Professor Haywood updated the meeting on responses to a study which found raised rates of childhood leukaemia in the vicinity of German nuclear power stations. Publications by Dr Ian Fairlie in a number of journals since September 2009 have suggested incorporated radionuclides as a cause but this suggestion does not appear to explain other studies including some reported to the meeting by Professor Jones. A working group of The Committee on Medical Aspects of Radiation in the Environment was formed to consider this topic but a report has not yet emerged.</p>

## Engaging with the Community

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61	The German Nuclear Sites Cancer Study will remain as an agenda item for future updates.
62	<b><i>End of presentation - Questions from committee:</i></b>
63	Mr Hargreaves asked whether there was an overlap between the German and Finland studies.  Professor Jones informed that the two studies do not overlap, however they all have a bearing on Leukaemia near nuclear sites.
64	Ms Graham asked whether Leukaemia studies have been conducted near medical facilities.  Professor Haywood responded by saying that the facilities do not have to be nuclear. The study concluded that leukaemia cases cluster more than by chance.
65	CORE disputed the fact that leukaemia cases around Sellafield are not considered as a cluster. None of the attendees disagreed with this.
66	<b>AGENDA ITEM 8 Regulatory Issues – Mr S Tandy presented on behalf of the Environment Agency.</b>
67	Stephen Tandy presented a briefing note from the EA on the issue relating to the disposal of Sellafield Ltd low level radioactive waste bags to the Lillyhall landfill site. The EA briefing note will be made available on the WCSSG EHSC website.  On the 12 April 2010, Sellafield Ltd incorrectly sent four bags of low level radioactive waste from the Sellafield site for disposal at the Waste Recycling Group's Lillyhall landfill site, Workington, Cumbria. This waste should have been sent to the Low Level Waste Repository, near Drigg for disposal. The environmental permit for Sellafield does not currently allow the disposal of this type of waste to the Lillyhall landfill site, and the landfill is also not permitted to accept this waste. The landfill is able to accept 'exempt' waste which has very low levels of radioactivity. Sellafield Ltd had originally believed that the bags of waste were exempt waste.
68	The mistake was discovered when, during a training session, a high level bag was passed as exempt by the equipment used.
69	At first it was thought that 5 bags had been released to Lillyhall, however it later emerged that only 4 had made it to the landfill, the 5 <sup>th</sup> bag was in a skip in Calder ready for disposal to the LLWR.
70	Mr Tandy commended the efforts of Sellafield Ltd and Waste Recycling Group (WRG) regarding their response to the event.
71	<b>AGENDA ITEM 9 Membership of EHSC</b>
72	Lindsay Graham attended the meeting representing Churches in Cumbria. Lindsay will be added to the membership list for future meetings.

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73	<p>In the May 2009 EHSC meeting Mr Hargreaves asked if Studsvik and WRG should also be invited to report discharge information to the meeting.</p> <p>This was raised again at the meeting, and it was suggested and agreed that Studsvik and WRG should be invited to send a representative to future EHSC meetings, or send a report of their environmental monitoring.</p>
74	<p>Mr Hunter of the LLWR asked what will be expected of him in future meetings.</p> <p>Professor Haywood informed Mr Hunter that attendees will be interested to hear of ongoing monitoring at the LLWR.</p>
75	<p>CORE asked whether it was possible to make all documents available on the WCSSG Website prior to each meeting.</p> <p>Mr Rhodes informed that for future meetings, providing the documents are prepared in time, they will be made available on the WCSSG website. The WCSSG website will be used in future for communications, providing agendas, minutes and papers.</p>
76	<p><b>AGENDA ITEM 10 Any Other Business</b></p>
77	<p>Professor Jones made Professor Haywood and attendees aware of reports that will be coming out that may be of interest to committees, for example Managing Rad-Waste and British Geological Survey reports.</p> <p>Professor Haywood suggested that these reports should be taken to the main WCSSG meeting, and confirmed that the expertise of the EHSC is available.</p>
78	<p><b>AGENDA ITEM 11 Press Release</b></p>
79	<p>John Haywood advised that he would write the press release and send this out for comment after the meeting.</p> <p>Since the meeting the Press Release has been distributed, agreed and published.</p>



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**Figure 1: Aerial Discharges 2009**

Year	2008	2009
H-3 MBq	1.41E+08	1.88E+08
C-14 MBq	6.86E+05	3.79E+05
Kr-85 MBq	2.57E+10	4.17E+10
Sr-90 MBq	3.77E+01	3.85E+01
Ru-106 MBq	1.39E+03	9.70E+02
Sb-125 MBq	3.61E+03	1.13E+04
Rn-222 MBq	3.20E+04	4.26E+04
I-129 MBq	5.74E+03	7.62E+03
I-131 MBq	6.26E+02	6.90E+02
Cs-137 MBq	1.31E+02	1.22E+02
Pu-Alpha MBq	2.27E+01	2.86E+01
Pu-241 MBq	2.62E+02	3.57E+02
Am-241+Cm242 MBq	1.71E+01	1.85E+01
Alpha MBq	1.10E+02	9.84E+01
Beta MBq	1.45E+03	1.42E+03

**Figure 2: Marine Discharges 2009**

Year	2008	2009
H-3 GBq	7.8E+05	1.5E+06
C-14 GBq	7.2E+03	8.2E+03
Co-60 GBq	7.2E+01	8.2E+01
Sr-90 GBq	1.7E+03	2.9E+03
Zr+Nb-95 GBq	1.2E+02	1.9E+02
Tc-99 GBq	2.4E+03	3.1E+03
Ru-106 GBq	1.4E+03	3.2E+03
I-129 GBq	2.0E+02	2.5E+02
Cs-134 GBq	1.2E+02	1.4E+02
Cs-137 GBq	5.1E+03	4.3E+03
Ce-144 GBq	3.5E+02	5.0E+02
Np-237 GBq	4.3E+01	5.2E+01
Pu-Alpha GBq	1.1E+02	1.2E+02
Pu-241 GBq	2.4E+03	2.9E+03
Am-241 GBq	3.0E+01	4.6E+01
Cm-243+244 GBq	2.9E+00	4.5E+00
Alpha GBq	1.3E+02	1.5E+02
Beta/Beta-5 GBq	1.4E+04	1.8E+04
Uranium Kg	2.8E+02	4.1E+02

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**Figure 3: Beach monitoring summary for combined vehicle and hand monitoring for FY 2009/10.**

Beach location	Area covered Ha	No of stones found	No of particles found
Sellafield	69.69	50	102
Braystones	65.17	0	68
Seascale	97.46	0	17
St Bees	67.33	0	4
Drigg	37.65	0	0
Nethertown	3.60	0	0
Silecroft	13.91	0	0
<b>ALL AREAS TOTAL</b>	<b>354.81</b>	<b>50</b>	<b>191</b>

**Figure 4: Beach monitoring summary for combined vehicle and hand monitoring since start of monitoring in 2006 up to 31/03/2010.**

Beach location	Area covered Ha	No of stones found	No of particles found
Sellafield	291.56	400	314
Braystones	121.54	0	77
Seascale	199.86	3	34
St Bees	149.13	0	13
Drigg	96.48	0	7
Nethertown	5.50	0	0
Whitehaven	1.74	0	0
Workington	25.56	0	1
Allonby	19.59	0	1
Goatwell Bay	8.18	0	0
Southernness	15.74	0	0
Silecroft	13.91	0	0
<b>ALL AREAS TOTAL</b>	<b>948.77</b>	<b>403</b>	<b>447</b>



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**Figure 5: Beach monitoring finds per hectare summary for combined vehicle and hand monitoring.**

Beach location		07/08	08/09	09/10	
				pre-Synergy	post-Synergy
Sellafield	Stones	2.45	1.1	0.78	0.66
	Particles	1.55	0.6	0.75	2.12
Braystones	Stones	0	0	0	0
	Particles	0.16	0.12	0.17	1.56
Seascale	Stones	0	0.04	0	0
	Particles	0.21	0.15	0.11	0.23
St Bees	Stones	0	0	0	0
	Particles	0.21	0.08	0.10	0
Drigg	Stones	0	0	0	0
	Particles	0.25	0.05	0	0

**Figure 6: Find characteristics for finds found up to 31/03/2010.**

	Classification			
	Alpha-rich Pre Synergy	Alpha-rich Post Synergy	Beta-rich Pre Synergy	Beta-rich Post Synergy
Total number	62	134	586	41
No. of particles	59	133	219	18
No. of stones	3	1	367	23
Mean Am-241	7.42E+04 Bq	3.24E+04 Bq	NA	NA
Max. Am-241	6.34E+05 Bq	2.52E+05 Bq	NA	NA
Mean Cs-137	NA	NA	3.12E+04 Bq	2.72E+04 Bq
Max. Cs-137	NA	NA	8.75E+05 Bq	3.08E+05 Bq

## Engaging with the Community

Chairman Cllr. David Moore Vice Chairman Cllr. Elaine Woodburn  
Secretary Shirley Williams



These minutes were agreed and accepted in the 74<sup>th</sup> Meeting of the EHSC on 25/11/10

Figure 7a: Distribution of Alpha and Beta rich beach finds.



## Engaging with the Community

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Secretary Shirley Williams



These minutes were agreed and accepted in the 74<sup>th</sup> Meeting of the EHSC on 25/11/10

**Figure 7b: Distribution of stone and particle beach finds.**



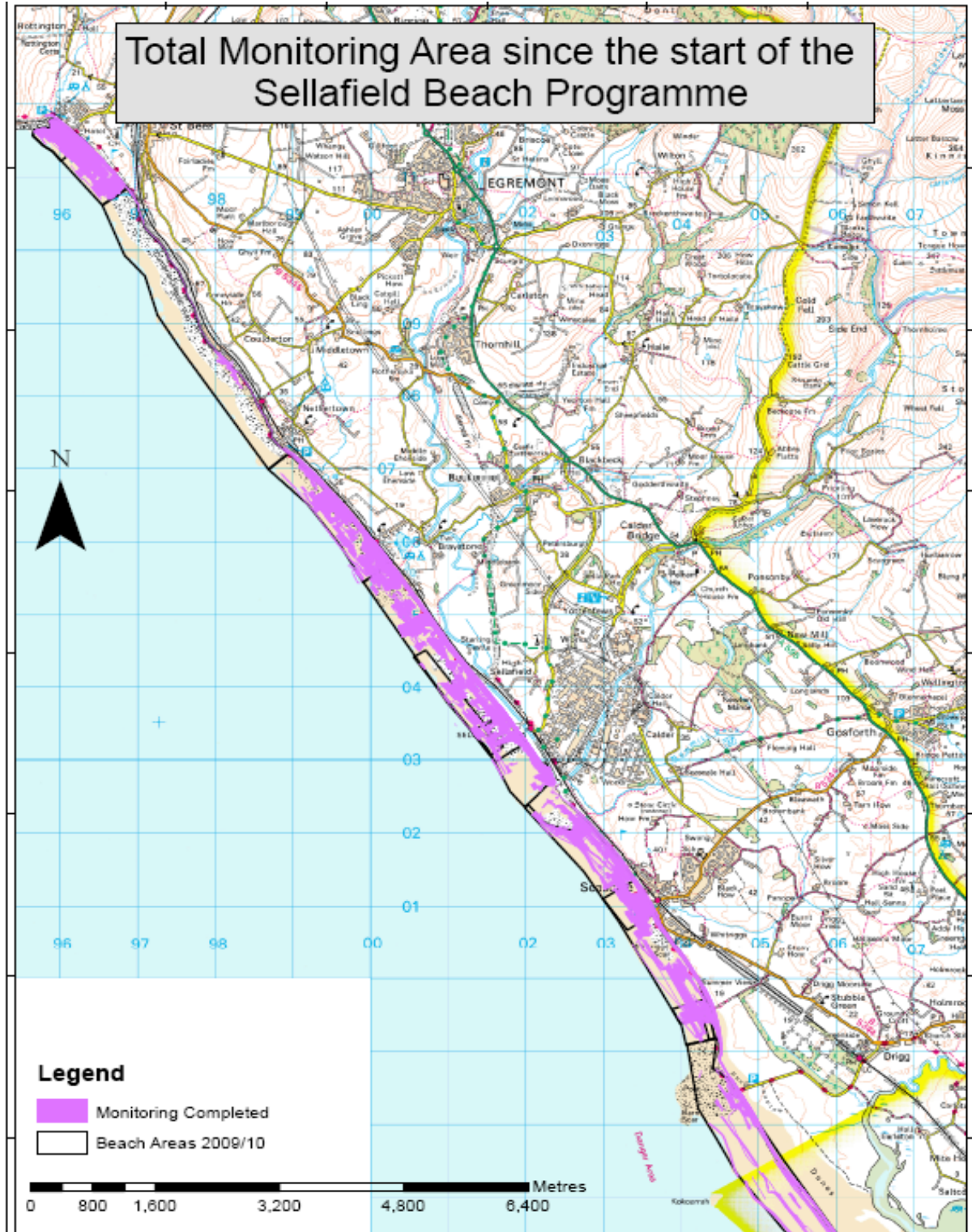
## Engaging with the Community

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Secretary Shirley Williams



These minutes were agreed and accepted in the 74<sup>th</sup> Meeting of the EHSC on 25/11/10

Figure 7c: Total area monitored to date.



## Engaging with the Community

Chairman Cllr. David Moore Vice Chairman Cllr. Elaine Woodburn  
Secretary Shirley Williams