

Dalgety Bay Particles Advisory Group

FINAL SUMMARY OF DISCUSSION and RECORD OF RECOMMENDATIONS and ACTIONS

3rd MEETING OF THE DALGETY BAY PARTICLES ADVISORY GROUP – 9 May 2012

Members Present:

Prof Alex Elliott (Member) – **AE (Chairman)**
Dr Tom Bruce (Member)- **TB**
Dr George Hunter(Member) - **GH**
Dr Andrew Tyler (Member) - **AT**
Mr Mark Toner (Technical Secretary) - **MT**
Miss Susan Carswell (Administration) – **SC**

Apologies:

Dr Jim Gemmill, SEPA – **JG**
Prof Tim Atkinson (Member) - **TA**
Jackie Hyland, NHS Fife - **JH**

In Attendance:

Mr Colin McPhail, Chairman Dalgety Bay & Hillend Community Council -**CM**
Miss Debbie Storm, SEPA Communications – **DS**
Mrs Joanne Brown, HPA - **JB**
Dr Paul Dale, SEPA – **PD**
Mr Ron Brown, Ministry of Defence (DSTL) – **RB**
Dr Will Munro, Food Standards Agency in Scotland(FSAS) - **WM**
George Brownless, CRCE - **GB**
Dr Jenny Wares, NHS Fife - **JW**
Mrs Linda Turner, Fife Council – **LT**

David Sanderson, SUERC – guest presenter

Prof Marian Scott (Member) - **MS**
Mr John Burton, HPA - **JBu**

AGENDA

Item	Time	Title	Paper Reference
1	10.30	Chairman's Introduction	-
2	10:35	Agreement to agenda	DBPAG-M3-A1
3	10.40	Minutes & Actions arising of last meeting	DBPAG-M2-P1 (M2-A3) DBPAG-M2-P2 (M2-A7) DBPAG-M2-P3 (M2-A7) DBPAG-M2-P7 (M2-A1) DBPAG-M2-P8 (M2-A4)
4	11:00	Walkabout site*	
5	12:00	SEPA update on monitoring and finds	DBPAG-M3-P4 DBPAG-M3-P5
6	12:15	SEPA update of solubility	
7	11:25	SEPA update of GPR work	
8	12:30	Monthly Monitoring Protocol (DIO contractor)	MoD DIO Investigation Plan – Annex D and Annex G
	13:00	Lunch	
9	13:45	DIO Investigation Plan	<i>DIO Plan distributed via email on 24 April</i> DBPAG-M3-P6
10	14:45	Recommendations for further work	
11	15:15	'Characterisation of contamination' – the use of large volume NaI detectors to investigate contamination at depth	
12	16:00	AOCB	
12a	11:40	FEPA Order	
13		Date of next meeting: 17 or 19 July	
	16:10	Close	

*Please bring appropriate clothing and footwear

1. Chairman's Introduction		
The Chairman welcomed all to the third meeting of the Dalgety Bay Particles Advisory Group.		
Recommendation	-	
Action	-	-
2. Agreement to Agenda		
All in agreement of agenda as presented.		
Recommendation	-	
Action	-	-
3. Minutes of last meeting - Actions Arising		
Outstanding actions are detailed in Action Point log.		
Subject to some minor amendments, the minutes of the meeting were approved.		
4. Walkabout site		
The Group undertook a site survey to assess the extent of the low tide. During the survey the group visited the area of the headland, slipways, demarcated area, and discussed the recent SEPA Ground Penetrating Radar Survey.		
Recommendation	-	
Action	-	-
5. SEPA update on monitoring and finds		
<p>PD provided an update of SEPA's monitoring at the end of April. This monitoring exercise was intended on providing a check on the effectiveness of the MoD contractor, Amec, who had concluded the April survey within the same week. The survey was targeted to coincide with the end of the Amec survey to provide an opportunity to monitor the same areas with limited tidal influence. PD noted that SEPA had surveyed on Friday 20 April and on the morning of Saturday 21 April recovered 40 sources, including a 2.1 MBq source and 5 sources > 20 kBq, although only 1 of these sources was less than 10 cm. The 2.1 MBq source was found outwith the demarcated area, in front of the headland at approx 35 cm depth. The Group queried the reason that SEPA had detected another multimegabecquerel source, and the MOD contractor had not. AT asked if AMEC were only recovering sources to 10 cm, as this is the minimum criteria set by this Group.</p> <p>PD replied that he could not comment on the AMEC criteria, but that SEPA action on variation from the local background. Review of the AMEC data suggests that the monitor detected the source; however the alarm was not triggered. RB commented that he has looked at the AMEC methodology and that anything that triggers the alarm should be dug up.</p> <p>The conclusion for the continued discrepancy in locating and recovery of sources would appear to be that the Amec system uses a fixed background, when they should be using a floating background measurement as the background levels vary throughout the site.</p> <p>CMcP asked if SEPA and MoD can agree on a background value. PD advised this was not possible as SEPA's system works on the operator interpreting the local rolling background automatically in their head. AMEC could employ the same system. PD noted that in theory, the AMEC system, being a 3x3 NaI crystal operated at ½ m/s should detect more.</p>		
Recommendation	The Group recommend that the monitoring criteria of 20 kBq (Ra-226) to 10 cm depth is further clarified.	
Action	Monitoring protocol is clarified in section 8 of these minutes	-
6. SEPA update of solubility work		
PD explained that the second batch of solubility work findings suggest a solubility of around 25%. A third batch has also been undertaken and the results look to give a maximum solubility of 33%, which related to a small source around the 20 kBq range.		

PD stated that a literature review had identified that a 20 mm battery could be ingested, therefore there may be a need to revisit the methodology for object selection.

All results will be written up and reports circulated to the group and published.

There is a concern over preferential selection of objects, i.e. dials (which AMEC and SEPA have recovered). There is a population of sources that have a high solubility.

RB suggested that PD contact a paediatric medicine specialist to check what size of pill and other objects that a child may swallow. This will give a benchmark to the size of particle that may be ingested.

PD also raised the issue of potential inhalation of sources, as some of the high activity particles tested were more friable. Additional work will be undertaken to determine whether or not inhalation pathway needs to be considered.

JB offered to pass results of work carried out by HPA on particle sizes and where they deposit in the body and the resultant doses. PD noted this and advised that this will be added to the SEPA report.

A major variable in particle solubility is likely to have been the fuel used for incineration of plane parts – some were put into the industrial incinerator or brazier and other parts were put into an open fire with fuel. There is no direct relationship between physical and chemical characteristics of the sources recovered. If something is small enough to be ingested it doesn't necessarily mean that it is soluble.

PD noted that:

- sources from between the slipways are typically large clinker lumps
- sources in other areas are smaller and more friable
- some particles are being analysed for chemical composition and accurate sizing

Recommendation	PD to contact paediatric medicine specialist to determine what size of object a child may swallow.	
	HPA to provide results of particle sizes and doses for ingestion.	
Action M3 A1	SEPA to contact Paediatric Medicine Specialist to determine range of ingestible size of objects	Action Due Date Next meeting
Action M3 A2	HPA to provide results of particle sizes and inhalation doses.	Action Due Date Next meeting

7. SEPA update of GPR work

PD explained that GPR work was undertaken in Ross Plantation and as a result it has been confirmed that the area has 2 valleys and an access road running through. The valleys were in-filled from the road and so this area is made ground. There were 2 phases of deposition near the shore next to Ross Plantation. This area of infill is wedge shaped and goes to 2m deep. A report is in the process of being written up and will be circulated to the group when available.

GIS Arcview was used to demonstrate the changing coastline over the decades from 1956 to the present day.

MoD left the site in 1969 and by 1971 the remaining MoD buildings had been demolished. House building started in the early 1970s. Between 1960 and 1971 an area of the coastline was built out. Luminising was done on the airbase, but the workshops processing the dials were in the area where houses now stand. Witness statements have confirmed that work was done in different areas and buildings.

Over the years the area around the sailing club has been eroded and re-built.

In 1971 there were no house builders present, MoD buildings were demolished and the surrounding area was still being farmed.

RB said that there was a lot about this site in its present condition that doesn't match the history of other MoD sites.

At some point between 1960-1971, this land was made up and came above sea level.

Recommendation	-	
Action M3-A3	SEPA to provide GPR report on Ross Plantation when available.	Action Due Date Next meeting

12 A: AOCB – FEPA

FEPA Order:

WM explained that a FEPA Order would be in place from 15:00 today (09 May 2012) and that Fife Council would be responsible for policing the area as it is now an offence to remove seafood from the area.

HPA have done monitoring with cockles and mussels and so far nothing has been detected.

This order is a precautionary measure, as a potential risk is present. The order can be revoked at anytime, and a formal review will be undertaken in 12 months time if still in force.

WM leaves meeting at 12:40

Recommendation	-	
Action	-	-

8. Monthly Monitoring Protocol

RB noted that this update has been overtaken by events as MOD have been looking at monitoring options with a range of agencies. It was clear that the issue of fixed and floating background and the use of spectrographic techniques need to be addressed in more detail. Discussions with David Sanderson have taken place regarding possible options.

PD highlighted the issues of importance for SEPA:

1. Protection of the public – this is foremost to SEPA and
2. Monitoring criteria that has been recommended has been adopted and met.

SEPA need to know whether the current system deployed by MoD/Amec is fulfilling the criteria and if not, is the public at risk?

RB said that the Amec reports should be able to answer this. However any change in contractor or monitoring technique would inevitably interrupt the monitoring.

AT has reviewed the MoD investigation plan and found a number of short comings:

- fixed trigger is inappropriate in this context, as when the background drops, the criteria of 20 kBq would not be met.
- Other systems are available that can meet the need
- At another site, through another forum, the issue of importance is the approach to a particle and how the measurement changes
- Size of crystal and line spacing are also key,
- Integration time on approach to the particle
- Total count available, but no detail on the energies

RB explained that he needs to know more detail on the alleged shortcomings because of the contractual implications. AT agreed to provide a written report on his review of Amec's methodology

AE explained that change is required as the group believe that at present the contractor is not recovering particles that are of importance to public health.

Paragraph 21 explains why big particles are missed as any intrusive investigation is limited of the count is not above 200.

On a separate matter, RB explained that resources have to be considered and that currently MoD were removing many particles of 10 kBq or less, which had little impact on human health and were in fact below the Expert Group criteria. It seems that at present Amec are doing remediation rather than investigation work which is not what MoD agreed to do.

AE asked if there was a level of particle below which we would not want recovery.

PD noted that until there is a well characterised population of particle size, activity, dimensions, solubility, hazard and estimate of the total population that it is difficult to make judgements on targets that we would not expect recovery. Until this has been defined all particles found have to be recovered to ensure the public are adequately protected.

RB explained that if there was a risk of the budget being exceeded, MoD would need to reassess the situation. The need for regular reviews was covered in the MOD Investigation Plan.

AT noted that it is impossible to say in advance what the particle will be in the field what can or can't be recovered so at present, he would advise that all particles are recovered.

PD advised that SEPA recovered 5 20 kBq and 1 2.1 MBq source in 1 day and 1 hour work, alongside another 34 sources. AMEC have spent 3 weeks and recovered 70 sources, PD advised that this is a contractual issue between AMEC and MOD.

PD noted that it is assumed that using the counts per second (cps) value as an indicator of activity, will normally underestimate the activity of a source when recovered. RB commented that a DSTL analysis of sources recovered by AMEC had concluded that AMEC tend to overestimate the activities of recovered sources using the cps method.

RB reiterated that MOD is determined to ensure that their commitment to support SEPA in its investigative activities does not become a remediation exercise.

PD noted RB's comment and understood his position in relation to remediation, but advised that the regulators position is that the monthly monitoring has to be done competently until the investigation has been completed in order that the public can be afforded a level of protection.

Recommendation	Group recommend that the wording in the DIO monitoring protocol be changed from a "fixed" to a "floating" background measurement.	
Action M3-A4	Amec to consider amending Annex D pt3.1, second paragraph to "floating background" (RB)	Action Due Date Next meeting
Action M3-A5	Amec report and AT's review report to be circulated to the group asap via email.	Action Due Date Next meeting
Action M3-A6	Annex D pt 1.2 Aims & Objectives – "... up to 20KBq". Amec to consider amending Annex D pt 1.2 to refer to particles greater than or equal to 20kBq. MoD to consider inserting a definition of "anomaly".	Action Due Date Next meeting

9. DIO Investigation Plan

The group reviewed the Investigation plan in conjunction with Tim Atkinson's paper (DBPAG-M3-P6)

Are there more than 2 dumps of the incinerated waste? Can we bring forward the timescale for interventions for remediation from May 2013 and use the MoD investigation plan for this? The Forum wants to get to remediation asap and COMARE is in agreement.

The new IAEA technical report on radium is currently in draft form and contains sections on remediation. There are examples such as Elliot Lake in Canada which was remediated.

PD – following the outcome of the investigation the group has to decide what remediation option should be or if designation should be taken.

Section 9 on P6 highlights the options to the group:
COMARE and the expert group agree that Option A is not a viable option.

Option B is considered as a temporary measure by the expert group but doesn't solve the problem.

Group have to decide whether option C or D is the most viable option and DIO work should be targeted to ensure there is enough information to make a decision.

Part 4 explains that re-population is the crux of the problem.

The Group considered TA's paper extremely beneficial to the CSM.

Group wish to target the investigation to establish whether there is one or more well defined deposits of material causing the contamination problem or if there is a more diffuse reservoir that can't be dug up and removed.

To establish this trial pits are required and the group has to determine the number and the parameters of these. Trial pits should be bespoke for each anomaly, with the aim of resolving the anomaly and the magnitude of it.

GH suggested we should factor in the lifetime of physical barriers to contain the contamination as these have a guaranteed control of 300 years contamination. Institutional control is likely to be 300 years.

According to the DIO plan, trial pits work is due to take place 6-19 July but the next expert group meeting will be 17 or 19 July. There will be at least 30 trial pits dug, however this number was used for budgeting purposes and it may be more or less depending on the actual data requirements. The GPR studies of DIO and SEPA should be combined to provide initial areas for trial pits.

For the next meeting, the group will have sight of:

- GPR work of SEPA/MoD
- MOD parameters for trial pits
- SUERC results of 16 I survey (potentially)
- Headland survey data
- Gamma-spec in-situ work
- 2 x2 NaI anomaly

DIO paper, Page 6: use Tim's conceptual model as a basis to work from and remove the section from the DIO report. This can be renamed as "outlet conceptual model"

PD advised that the trial pits will have radiometric survey done and asked what limits should be used and what parameters collected?

Group suggest a mini excavator with a narrow bucket could be used. Need to decide by the next meeting the parameters of the trial pits.

PD advised that SEPA have dug many holes on the beach, and can easily get to 1 metre depth within an hour. TB noted that parts of the beach have freshwater ingress due to the presence of frost on the surface during the December walkround.

CMcP stated that it was rumoured that old engines had been dumped in Ross Plantation, close to the freshwater pipe discharge.

A decision on what to do with any excavated sources from the trial pits will be decided at a future meeting.

AE confirmed that at the next meeting there will be a COMARE report on cancer incidences from Information Statistics Division (ISD) of NHS and a solubility report from SEPA.

The DIO plan sought advice on the use of RCLEA contaminated land assessment model but both SEPA and the HPA do not regard RCLEA as appropriate for this type of work as it cannot deal with particulate hazards and can't deal with screening for hazards. Additionally the use of the word "artefact" implies something other than clinker. The Group did not consider RCLEA suitable for use.

JB advised that the methodology for Dounreay and Sellafield particle assessments was more appropriate. GH noted that it could prejudice data collecting if looking for a bulk activity as an input to RCLEA. There is a greater need to understand how the activity is distributed through the particles. PD said RCLEA is not supported by SEPA as it provides a false negative result, instead a well characterise source is necessary.

The remediation point will dictate the type of data you will need and therefore the type of work that has to be done. It is not necessary to gather data on ingestion if all particles are going to be removed for example.

CMcP asked if hold points were considered. AE noted that this was a good point that needed further consideration.

Recommendation	Group recommend that DIO and SEPA work together and share information on GPR work undertaken	
	Group recommend that trial pit work is put on hold until the GPR work has been completed and reviewed by the group.	
	Group recommends that the proposed amendments to the DIO plan and made and a revised/updated version uploaded to the web.	
Action M3-A7	PD will check if the French/Canadian DVD can be copied and distributed.	Action Due Date Next meeting
Action M3-A8	RB to find DIO report of the excavation between the slipways and circulate to group	Action Due Date Next meeting
Action M3-A9	Annex H – leave monthly monitoring in place, get GPR data collated and shared and walkabout data collated and shared. Delay trial pits until after the next expert group meeting (PD & RB)	Action Due Date Next meeting
Action M3-A10	RB to circulate data of DIO parameters for trial pits.	Action Due Date Next meeting
Action M3-A11	AT to send comments on DIO plan to SC for inclusion in the minutes.	Action Due Date Next meeting
Action M3-A12	Annex A – pA4 – says that SEPA has confirmed there are no offshore caches. When in fact SEPA said it is unlikely that cache comes from offshore, it wasn't confirmed that there are no offshore caches. (RB)	Action Due Date Next meeting

10. Recommendations for further work captured in Item 9

11. Characterisation of contamination

David Sanderson from SUERC gave a presentation on the recent High Volume Sodium Iodide Crystal survey work undertaken at Dalgety Bay on behalf on SEPA.

Detection limits are dependent on background variations and up to a depth of 30cm – the signal drops by a factor of 4 with each 10cm drop in depth.

DS will write up report and forward to PD.

Recommendation -

Action	-	-
12. AOCB		
<p>Following a re-analysis of a dataset by SUERC which resulted in the identification of an apparent anomaly in the Crow Hill area of Dalgety Bay. SEPA staff investigated the area and could find no significant anomaly which is of concern for the areas in their current use. It is therefore the view of the regulator that the area at Crowhill is not an area of concern for the expert group at present. However, and if further information comes to light this can be re-examined.</p> <p>All versions of the MoD Investigation Plan to remain on the website with a description of changes. Highlight that the changes are designed to advance the timetable of work.</p> <p>CM noted that the sailing club suspended sailing 2 weeks ago but it has been resumed now that the MoD storage container has been removed.</p> <p>CM asked PD to attend the Community Council June meeting.</p> <p>A request was made for copies of the Government 1958 report to be sent to JB, GB & RB. SEPA agreed to examine whether this could be undertaken and the issue of copyright. It was noted that a copy of the report was available in the national archives.</p>		
Recommendation		
Action M3-A13	<p>SC to link from the draft mins of this meeting to the MoD plan on the SEPA website.</p> <p><u>Update</u> Link to MoD Investigation Plan</p>	Action Due Date Next meeting

DALGETY BAY PARTICLES ADVISORY GROUP

ACTION POINTS FOLLOWING MEETING on 9 May 2012

Number	Owner	Action	Progress – Open
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Meeting of 21/02/12			
M2-A9	SEPA	<u>10. Particle Hazard</u> SEPA to source appropriate procedure or laboratory for improving dose rate measurement of high activity particle, i.e. aniline dye for skin dose studies. <u>Update:</u> Work in progress and to report at next meeting.	Open
M2-A15	Ron Brown	<u>13 MoD Investigation Plan</u> RB to pass results and methodology of the Dec 2011 MoD survey to the technical secretary. <u>Update:</u> Action pending	Open

Meeting of 9/05/12			
M3 A1	SEPA	<u>6 SEPA update on Solubility Work</u> SEPA to contact Paediatric Medicine Specialist to determine range of ingestible size of objects	Open
M3 A2	HPA	<u>6 SEPA update on Solubility Work</u> HPA to provide results of particle sizes and inhalation doses	Open
M3-A3	SEPA	<u>7 SEPA update of GPR Work</u> SEPA to provide GPR report on Ross Plantation when available.	Open
M3-A4	Ron Brown	<u>8 Monthly Monitoring Protocol</u> Amec to consider modifying Annex D pt3.1, second paragraph to “floating background”	Open
M3-A5		<u>8 Monthly Monitoring Protocol</u> Amec report and AT’s review report to be circulated to the group asap via email.	Open
M3-A6	Ron Brown	<u>8 Monthly Monitoring Protocol</u> Amec to consider amending Annex D pt 1.2 Aims & Objectives – “... up to 20KBq” and Annex D pt 1.2 to refer to particles greater than or equal to 20kBq and to consider inserting a definition of “anomaly”.	Open
M3-A7	Paul Dale	<u>9 DIO Investigation Plan</u> PD will check if the French/Canadian DVD can be copied and distributed.	Open
M3-A8	Ron Brown	<u>9 DIO Investigation Plan</u> RB to find DIO report of the excavation between the slipways and circulate to group	Open
M3-A9	Paul Dale & Ron Brown	<u>9 DIO Investigation Plan</u> Amec to consider Annex H – leave monthly monitoring in place, get GPR data collated and shared and walkabout data collated and shared. Delay trial pits until after the	Open

		next expert group meeting	
M3-A10	Ron Brown	<u>9 DIO Investigation Plan</u> RB to circulate data of DIO parameters for trial pits.	Open
M3-A11	Andrew Tyler	<u>9 DIO Investigation Plan</u> AT to send comments on DIO plan to SC for inclusion in the minutes.	Open
M3-A12	Ron Brown	<u>9 DIO Investigation Plan</u> Annex A – pA4 – says that SEPA has confirmed there are no offshore caches. When in fact SEPA said it is unlikely that cache comes from offshore, it wasn't confirmed that there are no offshore caches. MOD (RB) to arrange correction.	Open
M3-A13	Susan Carswell	<u>12 AOCB</u> SC to link from the draft mins of this meeting to the MoD plan on the SEPA website	Closed