

## **Dalgety Bay Particles Advisory Group**

### **FINAL SUMMARY OF DISCUSSION and RECORD OF RECOMMENDATIONS and ACTIONS** **2<sup>nd</sup> MEETING OF THE DALGETY BAY PARTICLES ADVISORY GROUP – 3 February 2012**

#### **Members Present:**

Prof Alex Elliott (Member) – **AE (Chairman)**

Prof Tim Atkinson (Member) - **TA**

Dr Tom Bruce (Member)- **TB**

Dr George Hunter(Member) - **GH**

Prof Marian Scott (Member) - **MS**

Dr Andrew Tyler (Member) - **AT**

Mr Mark Toner (Technical Secretary) - **MT**

Miss Susan Carswell (Administration) – **SC**

#### **Apologies:**

Dr Jim Gemmill, SEPA – **JG**

Mrs Linda Turner, Fife Council – **LT**

#### **In Attendance:**

Mr Colin McPhail, Chairman Dalgety Bay & Hillend Community Council - **CM**

Miss Debbie Storm, SEPA Communications – **DS**

Mrs Joanne Brown, HPA - **JB**

Mr John Burton, HPA - **JBu**

Dr Paul Dale, SEPA – **PD**

Mr Ron Brown, Ministry of Defence (DSTL) – **RB**

Dr Will Munro, Food Standards Agency in Scotland(FSAS) - **WM**

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**AGENDA**

<b>Item</b>	<b>Time</b>	<b>Title</b>	<b>Paper Reference</b>
1	10.00	Chairman's Introduction Role of members & observers	-
2	10:10	Agreement to agenda	-
3	10.15	Minutes of last meeting	-
4	10.20	Actions Arising	<b>DBPAG-M2-P1 (M1-A2 MOD)</b> <b>DBPAG-M2-P2 (M1-A2 SEPA)</b> <b>DBPAG-M2-P7 (M1-A15)</b> <b>DBPAG-M2-P8 (M1A15)</b> <b>DBPAG-M2-P9 (M1-A5)</b> <b>DBPAG-M2-P10</b>
5	10.35	Revised Terms of Reference	<b>DBPAG-M2-P3</b>
6	10.40	Recent monitoring and results: - MoD update - SEPA update Monitoring Techniques Distribution of sources	<b>SEPA presentation (PD)</b>
7	11:40	Particle Population(s)	
8	12:00	Crow Hill contamination	
9	12:20	Headland Contamination	
	12:45	lunch	
10	13:30	Particle Hazard • Skin Doses • Ingestion Doses	
11	14:00	Forward Work Programme	
12	14:15	Revised Recommendations • Monitoring criteria • Monitoring frequency • Local restrictions • Signs	<b>DBPAG-M2-P4</b> <b>DBPAG-M2-P5</b>
13	15:15	MoD Investigation Plan	
14	16:15	AOCB	
15	17:00	Date of next meeting Close	

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<b>Agenda Item</b>	<b>Summary of Discussion</b>	<b>Recommendation</b>	<b>Action</b>	<b>Status</b>	<b>Target Date</b>
<b>1. Chairman's Introduction</b>	The Chairman welcomed all to the second meeting of the Dalgety Bay Particles Advisory Group.		Nil	-	-
	PD advised that the Scottish Government has declined to be a member of the Expert Group, due to their role with respect to potential legal action by SEPA. However, Scottish Government noted the remit and welcomed the creation of the group.	The Group noted the comments from Scottish Government.	Members/Observers asked to note the conditions attached to distribution of papers.		
	Roles of members and observers: - SEPA will decide on meeting papers distribution and their use. Papers distributed to members and observers should not be passed to anyone outwith the group unless permission has been granted. Minutes of each meeting will be posted on the Dalgety Bay pages of SEPA's website once approved by the Group. The purpose of this group is to provide advice to SEPA in line with the Terms of Reference.				
<b>2. Agreement to Agenda</b>	All in agreement of agenda as presented.		Nil	-	-
<b>3. Minutes of last meeting</b>	RB highlighted some of his comments that were for clarification rather than inclusion and which could be removed from page 13. With the amendments	The Group approved the note of the meeting.		<b>New</b>	<b>Completed</b>

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**4. Actions Arising**

made the note of the meeting was approved.  
DBPAG-M2-P1 – MoD response to M1-A2.

Group felt that paper didn't fully answer the questions posed. RB confirmed that as of the February monitoring survey the new criteria for monitoring and recovery as set by the expert group will be adhered to by the MoD contractors. A report detailing this will be available to members prior to the survey commencing at end of Feb. Previously Amec had been following "industry standards" regarding surveys, particle segregation & characterisation as there was no agreed monitoring criteria. PD said that he wasn't confident this was the case and that most recovered sources can be isolated to a teaspoon of material in the field using a metal tray.

Follow up report on detection capability by Amec monitors has been requested prior to next survey to explain what can be detected to a depth of 10cm, past monitoring risks and future capabilities using the expert group criteria.

Group is concerned over the discrepancy of number of finds

Group recommend that if the MOD current contractor cannot meet the new criteria then the MOD should source a different contractor capable of meeting the required detection limits.

Group noted papers 2, 7, 8 and 9.

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between Amec and SEPA. Amec's monitoring equipment should be twice as sensitive as SEPA's, yet SEPA have detected and recovered considerably more sources. SEPA's monitoring is solely to provide reassurance by performing a check on MoD's contractor monitoring. SEPA's monitoring is not to provide coverage against the monitoring criteria or clearance of the intertidal area. PD noted that SEPA's monitoring instruments are not capable, or intended to be capable, of delivering the detection criteria.

RB stated that practical experience showed that variations in factors like speed of monitoring, probe height and ground conditions made some discrepancies inevitable whatever system or contractor was used.

PD agreed with this comment but commented that it doesn't completely explain the differences.

DBPAG-M2-P7, P8 & P9:  
WM advised members that sewage outfall pipe at the north end of the beach will not interfere with any shellfish sampling surveys. WM noted that there was no commercial harvesting of seafood taking place, however anecdotal evidence

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suggests collection of molluscs by members of the public. Dalgety Bay is not an approved seafood bed.

No further comments of note on papers 2, 7, 8 & 9.

**5. Revised Terms of Reference**

Group recommendation to amend the wording to include “health impact” has been undertaken and completed.

The Group approved the revised terms of reference.

Nil

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**6. Recent Monitoring & results**

All in agreement with the revised ToR and they have been adopted. PD gave presentation on the collated dataset of particle finds by both SEPA and MoD contractors up to 4 November 2011.

There was a discussion on GPS issues, differential and kinematic GPS techniques and the accuracy of location of recovered items. SEPA indicated that their GPS unit was not particularly accurate and had an error of approximately +/- 5 m. The error will vary due to the satellite coverage being obscured by tree cover. A kinematic GPS survey of the coastline was underway

RB stated at this time that MoD contractors would not be surveying the muddy area of the beach in future as a previous incident in this area has raised health & safety concerns.

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PD advised that the gaps in the locations of SEPA source finds indicate gaps in survey work rather than an absence of sources. PD noted the range of depth of recovery of SEPA finds was between surface and 15 cm, excluding the high activity items recovered at depth. PD stated that this is likely to be more of a factor of the capability of the detector, rather than confirmation that particles with similar activity are not present at depths greater than 15 cm.

SEPA plan to check mapping, use digitised photos and plot how the coastline has changed over the years with the coastal GPS survey data.

It was suspected that main caches of contaminated material are at the headland and as the material breaks up, the smaller particles make their way along the coastline toward the north corner of the beach (towards the sewage pipe). There may also be a second cache in the made-ground area.

PD confirmed that at this stage it is possible that RB's hypothesis that the break up of material could be as a result of bulldozing rather than natural breakdown of the sources.

M2-A1: SEPA to forward a photo of the storm damage for Expert Group to view.

**New**

**Next meeting**

M2-A2: PD to provide map of coastline changes with superimposed aerial photos of the area and indicate locations of historical quarries/refuse tips

**New**

**Next meeting**

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<b>7. Particle Population</b>	<p>CM confirmed that clinker hadn't been seen until after the storm of March 2010, when storm erosion threw clinker and ash onto pathway.</p> <p>Two sources of clinker type material have been detected and recovered by SEPA from the new harbour area.</p>	<p>M2-A3: database of particle characterisation being prepared by SEPA to be circulated to group.</p>	<b>New</b>	<b>Next meeting</b>
	<p>TB requested details of the physical nature of the clinker – arrangements to be made outside the meeting.</p>			
	<p>RB suggested a geomorphologist could determine the soil layers in trial pits. Group recommended that this is not required at present.</p>	<p>M2-A4: MoD 2006 background report to be circulated to group by SEPA.</p>	<b>New</b>	<b>Next meeting</b>
	<p>TA suggested that group discussions would benefit from a history of land filling at the site.</p>			
<b>8. Crowhill Contamination</b>	<p>Photos clearly indicate that significant erosion of the coastline has taken place over the last 50 years.</p>	<p>M2-A5: SEPA to further investigate the area of suspect elevated Bi-214 at Crowhill</p>	<b>New</b>	<b>Next meeting</b>
	<p>TA summarised that a landfill is present under a thin layer of sediment on the beach and this could be a cache for many of the sources. SUERC had informed SEPA that they had detected unsupported bismuth-214 at Crowhill during a flight survey of the area during 1991. This was only recently revealed due to reprocessing of data. During a SEPA</p>			

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survey of the area an elevated signal was detected but no particles or contamination were found near the surface or on the intertidal area.

RB informed the group that MOD legal advice he received stated that Crowhill was not part of MoD land, and therefore MOD would not investigate this. MOD DIO has contracted the services of a Scottish commercial lawyer to investigate land ownership over the years.

Group recommend SEPA to talk to SEPA management to investigate Crowhill where the contamination was found both in private garden(s) and in the public woodland areas.

PD requested that this legal advice be passed to SEPA/Expert Group as a means of context setting.

RB confirmed that his statement reflected the views expressed by Andrew Robatham, MoD Min (DPWV) during his visit to Dalgety Bay. DBPAG-M2-P6 presented by Andrew Tyler.

AT advised RB that the paper can be shared with contractors but is not for public distribution.

Report is based on SEPA's investigation into the headland and what it is made up of. PD thanked DIO on behalf of SEPA, as their co-operation to take the waste, made the investigation possible.

M2-A6: SEPA to offer radon monitoring to Sailing Club

**New**

**Next meeting**

**9. Headland Contamination**

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<p>Bismuth 214 was detected in front of the sailing club. MoD &amp; HPA have offered radon monitors for use in the sailing club.</p>	<p>Group recommend that SEPA offer the sailing club precautionary radon monitoring to be undertaken by MoD/DSTL and HPA.</p>	<p>M2-A7: SEPA to provide 1990s radon survey report</p>	<p><b>New</b></p>	<p><b>Next meeting</b></p>
<p>CM confirmed that similar monitor had taken place in the houses in The Wynd in 1990s.</p>	<p>Group recommend that site 3 is sampled further.</p>	<p>M2-A8: SEPA to implement re-sampling at site 3.</p>	<p><b>New</b></p>	<p><b>Next meeting</b></p>
<p>AT highlighted that a high anomaly was found at Site 3, with the surface uniformly contaminated. Some point sources were recovered during the investigation.</p>				
<p>CM highlighted that MoD contractors were reluctant to discuss their work with the public and that this was unhelpful. RB to look into contractors being briefed prior to going on-site.</p>				
<p><b>10. Particle Hazard</b></p>	<p><u>Skin Doses:</u> AT looked at some recovered particles. 10MBq particle had dimensions of 1cm. During a reconstruction of beta &amp; gamma dose from the particle, the detector response was saturated at distances less than 50cm. The only instrument capable of dynamic range was a Thermo Rad Eye ER. Appropriate filter of dose rate 1cm, also 0.7mm onto skin. This demonstrates inverse square rule up to 1cm from particle. No homogenous distribution.</p>			

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76MBq particle, other particles of 2MBq were present, as were 10-20kBq particles.

10MBq particle measured using 2 instruments – Rad Eye & TLDs at certain distances and all measurements were in agreement. 76MBq particle – there was more self absorption. Smaller 10kBq particles, can extrapolate that a 30-40kBq particle would give a skin dose rate of 10 Grays per hour for contact (lower when integrated over 1cm<sup>2</sup>). Lower activity particles are of greater concern than originally thought.

RB said there were considerable differences between point and volume sources and that it was not clear what account was being taken of this.

Objects came in all shapes and sizes and it is difficult to characterise as they all break up easily.

PD acknowledged the support from DIO by providing LDs capable of being used to undertake this work. High activity sources saturated the gamma spec detector and SEPA are reluctant to undertake further work on these sources unless justified.

Group recommend that SEPA seek accurate skin dose measurement and undertake aniline dye measurements for contact dose rate

M2-A9: SEPA to source appropriate procedure or laboratory for improving dose rate measurement of high activity particle, i.e. aniline dye for skin dose studies.

**New**

**Next meeting**

M2-A10: MS to liaise with

**New**

**Next**

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Ingestion:

Analysis was undertaken on 30 particles in simulated stomach acid and small intestine test for 8 hours in solution.

More particles should be subject to ingestion analysis to characterise the variety of particles found.

JB suggested doing in-vivo studies instead, as it may be considered more realistic than gut simulant studies.

Additional pathways to consider are small particles getting into cuts and grazes and the preferential containment of particles (artefacts taken from beach and kept at home). Radium particles in the home could result in not only direct exposure but also from inhalation of radon gas.

Undertaking passive radon measurements in the basement of the sailing club was discussed and HPA offered to provide radon detectors for SEPA to deploy free of charge.

HPA letter:

At the request of Scottish Government, the HPA have committed to undertake an initial scoping public risk assessment for Dalgety Bay, on the understanding that more information is required to do a full risk assessment, and that

AT to do more samples for gut simulant studies.

**meeting**

Group recommends that John Cooper writes new correspondence to clarify HPA's advice as the letter is contradictory and if taken in isolation could be misleading

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additional particle characterisation and a survey of beach usage were considered.

JB agreed to produce a report to SEPA giving details of the assessment and assumptions made..

HPA provided a letter to the group from John Cooper of HPA. The assessment was focussed on the data from the area of increased finds. HPA recommend that the public are to follow advice on signs and not to remove anything from the beach. Longer term strategy and remediation plan is required as not enough is known about the number of objects etc and a plan needs to be put in place asap. Beach usage is dependant on following the advice given and HPA strongly recommend that the advice is followed by members of the public. HPA looked at the likelihood of people coming into contact via main exposure pathways in the scoping assessment.

Comments from group:

Members of the Group had concerns over the content of the letter, especially if it read in isolation without knowledge of the facts and history. The Chairman considered that if the letter was read in isolation that the message is inconsistent with warnings being issued on the signs. JB confirmed that HPA's John Cooper would clarify that this letter is to be

M2-A11: Members to relay concerns over HPA current advice in writing to technical secretary.

**New**

**Next meeting**

(Tec-Sec Note: This action was placed on members after the meeting by correspondence)

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read in conjunction with previous advice.

Members suggested that the letter appears to be at times contradictory in nature and gives mixed messages. It refers to “all credible mechanisms” for exposure yet some pathways have not been addressed and novel pathways are known to exist. Background data required to justify the exposure dose rates mentioned. Additionally, use of “acceptable” in relation to this is incorrect, as it should be “tolerable”.

**11. Forward Work Programme**

**1. Shellfish monitoring – DBPAG-M2-P10:**

Should flesh be separated from shell for analysis? Initially analysis for bulk shell and flesh and if concerns arise then interrogate closer.

Group recommend that this work is implemented as soon as possible.

**2. ISD Cancer Statistics Review:**

COMARE has requested that Information Systems Division (ISD) review statistics on all cancers in Dalgety Bay. Radium is linked to lung, bone, head & neck cancers but there is no direct link to leukaemia.

**3. Skin Doses:** Group recommend that SEPA seek accurate skin dose measurement and undertake aniline dye measurements for contact dose rate

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4. **Sample site** 3 to be revisited and sampled. RB offered to include this in the MoD's February survey.

5. **Solubility:** SEPA to undertake additional solubility Work

6. **Crowhill:** SEPA to undertake additional monitoring in Crowhill.

7. **Monitoring Frequency** – monthly and to cover existing area and new harbour area and Ross Plantation area to the criteria previously recommended by the group. Topographical survey of beach height data to be included.

**12. Revised  
Recommendations**

Local restrictions:  
Improved signage around the demarcated area has been completed. Some concerns were raised regarding public perception of the demarcated area. CM said the local resident perception is that it is an area under investigation. However the tape needs to be replaced.

PD explained the area was demarcated because detection of some sources saturated the detector and tape was erected to cordon off the area while the source was recovered. Further sources were found in this area so the tape has

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remained and will remain until area is fully analysed. statutorily

Signage:

2 types of signs currently at Dalgety Bay:

1. permanent signs in place since 2008
2. signs for demarcated area, which are not for discussion today.

Review of the permanent signs came as a result of SEPA's 2011 report indicating that people were removing artefacts from the beach and reporting that they hadn't seen or understood the signs.

Two new signs have been drafted using same wording as previous, but layout and warning symbols have changed.

RB confirmed that MoD is not accepting liability at the present time but are committed to supporting SEPA with the current investigation.

RB provided a statement on behalf of MOD following the meeting: "*MOD are happy to assist with investigations at Dalgety Bay but cannot give an open-ended commitment to remediate, when no one yet knows what this would entail, nor who is liable.*"

Group recommend using the sign with the exclamation mark symbol. Wording to be amended to say "Do not dig, pick up or remove". Font size should be maximised for the signage area. Reference to DIO at bottom of sign to be changed to MoD logo. Map to be simplified.

**13. MoD  
Investigation Plan**

M2-A12: RB to give MT a formal statement on MoD investigation plan.	<b>Completed</b>	<b>Next meeting</b>
M2-A13: RB to report Group's concerns on MOD investigation plan	<b>New</b>	<b>Next meeting</b>
M2-A14: SEPA and MOD to sort the semantics of the plan, and clarify the expectations of the Group.	<b>New</b>	<b>Next meeting</b>
M2-A15: RB to pass	<b>New</b>	<b>Next</b>

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RB noted that plan was separate from the monthly monitoring.

results and methodology of the Dec 2011 MoD survey to the technical secretary.

**meeting**

MoD Investigation Plan can be sent to observers with the proviso that it is not used or distributed outwith the expert group as it is work in progress.

M2-A16: RB to check and confirm the intent of the section 'removal of sources of significance'

**New**

**Next meeting**

SEPA indicated that it will address semantics with MoD and clarify the role of the group, as it is clear from the initial draft there is a misunderstanding of the role. SEPA will comment separately to MOD on the draft plan, however noted that the current form did not contain much detail in order to provide a detailed response.

Comments from group:

P2 – constraints & planning: second bullet point, should say “It is anticipated that the presence of ongoing monthly monitoring and retrieval...”

Plan also needs to highlight the presence of other things at site, such as signage, demarcated area, public advice, etc.

P2 – Aims: Expert group does not resolve issues; wording should be changed to “in examining”.

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SEPA concerned that the aim doesn't quantify the level of contamination. Figure 1 (p7) – Red line indicating area of investigation should be amended to include Ross Plantation and new harbour area.

SEPA concerned that there is no plan to investigate the intertidal area, where sources have previously been found. RB responded with the advice given to him is that MoD have concerns that digging in this area would promote release of sources.

Intertidal zone is the mean high and mean low spring tide levels.

P3 – second bullet point – MoD to discuss waste disposal with SEPA as radium store may be an option.

P4 – intrusive investigation – trial pits info need to specify size, depth, null hypothesis test, etc.

RB suggested that the choice of 30 trial pits has been based on a cost basis as a start for the investigation plan to be drafted.

Geophysics needs to go deep enough to find bedrock.

P5 para 1 – “radium point sources of significance” – RB to check what this

The Group feels the plan does not contain enough details and is disappointed that there is nothing relating to remediation. They look forward to receiving a more detailed re-draft.

The Group also recommend that recovery sources should be isolated as far as reasonable practicable to determine point source activity, rather than bulk.

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is in reference to.

P5, para 3 – “all sources placed in on-site store” – PD confirmed that this can only be done in accordance with the constraints of Registration.

Timescales need to be set against Stage 3 work.

**14. AOCB**

CM raised his concerns over no remediation in the MoD plan. MS has requested that all future meeting papers be collated in a single zipped folder which is sent to members. Additionally there needs to be a clear deadline for papers and no papers accepted past that deadline. All word documents to be in .doc format rather than .docx format.

M2-A17: Tec Sec to provide complete file list and files on CD for Members

**New**

**Next Meeting**

M2-A18: Actions to have timescales to allow action in a reasonable timescale.

**New**

**Next Meeting**

Expert group wish to discuss Stage 1 of MoD plan at next meeting. PD & RB to discuss issues with the current plan and look at a timeframe for stage 1 of the plan.

**Date of next meeting –TBC.**