MEMORANDUM

Department of Environmental Services
Director: Shona I C MacDougall

Renfrewshire Council

Tel: 0141 840 3134 Fax: 0141 840 3233
My Ref: I:\s_admin\sm 2010\smacd\memo\09_0527_PP Remediation and Earthworks Planning Application ROF_Final 150310
Your Ref
Andrew Jamieson
Date: 15th March 2010

To: Bob Darracott
Director of Planning & Transport

From: Shona I C MacDougall
Director of Environmental Services

Subject: 09/0527/PP – REMEDIATION AND EARTHWORKS PLANNING APPLICATION, ROYAL ORDNANCE FACTORY, BISHOPTON

I refer to the above planning application, your consultation request dated 13 August 2009 and the further submissions and information received from the applicant since then.

1. SCOPE OF REVIEW

This application, 09/0527/PP, is related to application 09/0456/PP for the construction of a Landfill at the ROF site, for which a separate response has been prepared. In accordance with Planning Advice Note 51: Planning, Environmental Protection and Regulation, discussions have been ongoing with specialists from the Scottish Environment Protection Agency (SEPA) to ensure consistency of controls over:

- waste management related issues;
- any emissions to air from earthworks associated with the above applications.

As well as SEPA's Environmental Partnership Unit, Environmental Services (ES) has worked closely with our appointed consultants Atkins Ltd (Atkins) to review and assess the documents submitted in support of this application for the remediation and earthworks at the former Royal Ordnance Factory at Bishopton. This response summarises extensive documentation and subsequent assessments relating to this application. All subsequent references to ES incorporate advice provided by Atkins and SEPA, where appropriate.

The following documents were submitted by the applicant, BAE Systems (BAE), in July 2009 in support of the planning application and these have been reviewed:

- Planning Application Form and Certificates;
- Application Plans and Drawings;
- Environmental Statement;
- Environmental Statement Non-Technical Summary;
- Public Consultation Statement;
- Appendix 11.1 Remediation Strategy Report (2009);
- Appendix 11.2 Stage 2 Factual Report (2009) Parts 1 to 4;
- Appendix 11.2 Stage 2 Interpretative Report (2009) Parts 1 to 4;
- Appendix 11.3 Monitoring Plan (2009); and,
- Appendix 11.4 Verification Strategy (2009).

In particular, the review has focussed on the documents comprising Appendix 11.1 to 11.4, which present the factual site investigation data and BAE's interpretation of it, which form the basis for the remediation strategy and associated proposals for monitoring and verification thereof.

Historical documents (in many cases associated with previous planning applications for the site) have also been consulted for background detail on the site.

In addition, further supporting information, in the form of hard copy and electronic versions of revised plans, responses to technical queries and copies of electronic files in editable formats has been requested and received from BAE on a number of occasions throughout the process. Where relevant, such information has been taken into consideration in forming our opinion in addition to the formal submission documents.

In December 2009, additional justification documents were provided by BAE for:

- Building decontamination; and
- Landscape mounds.

These, in turn, have been the subject of review and a number of revisions.

2. GENERAL COMMENT ON SUBMISSIONS

The applicant has adopted an overarching, site-wide approach to their data interpretation, risk assessment and proposed remediation. The applicant has, however, acknowledged that, should the application be successful, they will need to provide further detailed information at a smaller scale and undertake a validation exercise to supplement information in areas of the site not yet thoroughly investigated.

The applicant has acknowledged that further interpretation of data is required in order for ES to determine that the most appropriate remedial options will be utilised.

Following receipt of the additional justification documents referred to above, and subsequent discussion and correspondence between ES and the applicant, these two issues have reached a point where the application can progress subject to compliance with the recommended conditions.

In summary, we recommend that further supporting information is sought from the applicant through the attachment of the undernoted conditions, such that robust conclusions can be drawn regarding the significance of any potential pollutant linkages and the appropriateness of the proposed remediation strategy in addressing them.

3. THE REVIEW PROCESS

The review and assessment of the submissions has been undertaken by ES and Atkins, with SEPA staff providing technical support, mainly on issues relating to waste management and the water environment. Further correspondence and advice from SEPA has been received and this information is included within various other documents issued to the applicant.

Correspondence has taken place between ES and BAE during the review process covering a wide range of issues relating to the assessment and remediation of the site. This process has continued allowing some issues to be resolved. There are other issues which require further discussion and agreement. However, these outstanding issues should be capable of being resolved through compliance with the recommended conditions.

4. SUMMARY OF CONTAMINATION ISSUES TO BE ADDRESSED IN PROPOSED CONDITIONS

While submission documents have been found to be lacking in detail in some respects, we anticipate that the required level of supporting information can be obtained from the applicant through the attaching of suitable conditions to any planning approval. The key issues identified are presented in sections a) to h) below:

a) Risk assessments and data gaps:

Further works will be required to address gaps in the data collected at the site. The data interpretation and risk assessments is, at this stage, limited in nature and must be revised in line with scientific, technical and authoritative guidance as required. The site would benefit from being separated into smaller areas of concern, which BAE acknowledge. An appropriate assessment of the risk to the water environment from contaminated soil must be completed. These issues will be addressed by Conditions 5, 6, 7 and 10.

Risk assessments must be completed that take into account the fact that soils will be moved and re-deposited around the site, perhaps to a more sensitive environmental setting than their current location. This issue is addressed by Conditions 10 and 16, which require the applicant to demonstrate all materials are ‘suitable for use’.

b) Remedial options appraisal:

Conditions 8 and 11 will require the applicant to provide an appropriate level of detail in support of their chosen method of remediation for each linkage to demonstrate that the requirements of statutory guidance (e.g. PAN33) has been met.

c) Landscape mounds and waste management issues:

The materials to be used in the construction of landscape mounds must be suitable for use and protective of both human health and the water environment. The materials to be used must satisfy SEPA's Land Remediation and Waste Management Guidelines (2009). If the applicant demonstrates compliance with these guidelines, SEPA will not consider this activity as a form of waste disposal.

Further discussion between BAE and ES/SEPA has resulted in BAE providing additional documentation for the proposed landscape mounds. This has provided a way forward, and to an extent has addressed the concerns raised by ES and SEPA. However, the criteria to confirm materials are protective of human health and the water environment are yet to be provided and agreed.

At this stage, it seems likely that the construction of the landscape mounds will be regulated under the planning regime rather than the Waste Management regime. However, this cannot be confirmed until final criteria are provided by BAE and approved by ES and SEPA.

Conditions 10 and 16 will require that all materials to be moved and re-used onsite are demonstrated to be suitable for use (i.e. not posing any significant risk to any relevant receptor) in their proposed final location.

d) Proposed remediation in Retained Land:

Despite the identification of significant pollutant linkage(s) in the Retained Land, the applicant has not provided any detailed proposals for remediation. Condition 11 will require the applicant to submit proposals for remediation and promptly implement any required works in this area.

e) Conceptual Site Model(s):

Considering the size and complexity of the site, the Conceptual Site Model (CSM) presented is very general. BAE has proposed to develop individual CSMs for smaller areas of the site in line with the proposed approach to address the contamination issues on the site in a phased manner. The provision of revised CSM(s) will be a requirement of Conditions 5 and 6.

Due to the lack of detail in the CSM, and the limitations to the risk assessment previously discussed, it is possible that all potential pollutant linkages have not been identified and that additional intact linkages, particularly in relation to the water environment, may exist at the site.

For example, sufficient assessment of the potential for contaminated sediments to act as a conduit to surface water receptors has not been considered. Condition 7 requires the applicant to carry out such an assessment.

No consideration of the landfill operations, including the new and specific land use in this part of the site, and the potential for introduction of new pathways and/or receptors, has been included within the CSM. Furthermore, the proposed remediation methods for the landfill appears to conflict with those proposed for the formation of the landfill within application 09/0456/PP. Condition 12 requires that revised details of the remediation of the landfill area are provided for clarity.

Further information is required from BAE to demonstrate that no new pollutant linkages will be created during the remediation and earthworks activity, and/or that no significant residual risk to receptors will remain following their completion. This issue can be addressed by Condition 8, 9, 10, 16 and 17.

f) Potential for changes in legislation and guidance during works:

It is likely that revisions to legislation and technical guidance will occur on occasion through the duration of the remediation works, which are anticipated to last for around 15 years. In order to 'future-proof' any consent, Condition 9 will require the applicant to re-assess data in line with any new authoritative guidance or legislation to ensure that best practice standards current at the time of any particular activity are applied throughout the duration of the works.

g) Uncertainties in development design:

BAE has stated within the documents that the final development layout is unknown at this stage, but has characterised and assessed the risks to receptors with regards to the development layout as shown in the Masterplan. Condition 4 ensures that in the event of any change to the design of development, the risk to the receptors shall be adequately characterised and the remediation and earthworks proposed for that phase of development will be revised to ensure the land is made suitable for the new use.

h) Detailed management plans and strategies:

The provision of a number of detailed plans describing how the remediation is to be implemented is still outstanding, and this is acknowledged by BAE. Condition 3 will require that all such outstanding plans are submitted and approved. The reports included at Condition 3 have been drawn from the list provided by BAE within Section 1.4 of the Remediation Strategy document, but have been limited to those which will require review and approval by ES.

In addition to the strategies and plans listed above, additional detailed plans are also required by Condition 7 (Sediment Assessment Plan), Condition 9 (Framework for managing changes in legislation), Condition 14 (Communication Strategy) and Condition 16 (Site Waste Management and Soils Reuse Plan). All plans are required to be approved by the Planning Authority.

5. NOISE

Condition 27 of the Outline Planning Application (06/602/PP) stated that before the commencement of each identifiable development phase a Construction Noise and Vibration Management Plan shall be submitted to and approved by the Planning Authority. This has been submitted, and while it is acceptable at present, the condition cannot be discharged as it required the submission of such a plan before the commencement of each identifiable development phase. The same plan may however be capable of use for each phase of development, but this will only be established in light of how works on site are conducted, and the extent of any future guidance relating to construction noise. In due course, once such a plan has been submitted and approved before the final identifiable construction phase, Condition 27 of application 06/602/PP should be capable of being discharged.

6. THE OUTCOME OF THE CORBY CASE

The recent Corby steelworks case has raised concerns in the local community, although there are fundamental differences between ROF and Corby.

The Corby case has highlighted the importance of careful and technically robust regulation of the development of land affected by contaminants. While there are important differences between the two cases (transport of material offsite, scale of contamination, quantities of material, failures in control, changes in regulatory process), there are lessons to be learned from the Corby case. The shortcomings that occurred at Corby in terms of regulatory controls, monitoring and compliance have been carefully considered. Compliance with current best practice and the conditions recommended in this report would minimise the risk of any similar occurrence at Bishopton.

From a legal perspective, the fact that a remediation operation is already underway would not necessarily exempt it from any new standards which are introduced. This will be addressed by Condition 9.

The Corby case also dealt with the responsibilities of Corby Borough Council (CBC) as the owner of the land rather than as planning or regulatory authority, and, accordingly, the judge’s findings have to be viewed in this context. Renfrewshire Council Legal Services highlighted, in particular, that care must be taken to ensure that any experts engaged to advise on, or to deal with, contaminated land, are suitably qualified, their advice is heeded and that risk assessment is a vital factor. We have taken this approach.

7. DUST

The related Landfill Application is also subject to control under the Pollution Prevention and Control (Scotland) Regulations, 2000, which are enforced by SEPA. In accordance with Planning Advice Note 51: Planning, Environmental Protection and Regulation, discussions have been ongoing with SEPA to avoid duplication of controls for that application and to also ensure that controls which are put in place are consistent, both for the Landfill PPC Permit, the Landfill Planning Application, and this application. Dust can be considered as solids suspended in air with a particle size between 1 and 76 microns. ($PM_{1\text{-}76\ \mu m}$), consequently, dust can in theory come within the controls set out in the Environment Act, 1995, Part V where there is a statutory air quality objective covering PM_{10} (particle size<10 μm).

Advice was sought from SEPA and Atkins, who both commented to the effect that although PM_{10} is present in dust from landfill sites, it makes up a tiny fraction of the emissions and is more associated with combustion and secondary sources. Most of the particulates from the site will be around the greater than 30 micron level and would largely deposit from atmosphere within 100 metres from source, and would therefore be dealt with under nuisance legislation (where PPC controls did not apply). SEPA would therefore not expect that emissions of PM_{10} would be a major issue or be likely to result in any exceedences of current Air Quality Objectives. Atkins concurred with SEPA's opinion.

SEPA has confirmed that the PPC permit will place restrictions on the operator to minimise the generation of dust to the atmosphere, primarily through the use of water to dampen dusty material. To ensure consistency with PPC requirements for the Landfill, the details which require to be approved in Condition 3.c. will ensure that consistency can be achieved between SEPA PPC controls and any consent granted for this application.

8. DECONTAMINATION BY BURNING

Decontamination of buildings on the site by burning was initially proposed in 2003 by BAE. ES had concerns about the possible impact on local air quality and any consequential health effects, as well as the potential for nuisance and disamenity to residents in Bishopton. Consequently a number of trial burns have taken place on the Bishopton site since an initial demonstration burn in November 2005. There have also been several meetings to discuss the proposed burning of buildings attended by ES, BAE, Enviros, Atkins, the Health and Safety Executive, Glasgow Scientific Services, RC Legal Services, Greater Glasgow & Clyde Health Board and SEPA. This was to establish the feasibility or otherwise of air quality modelling and monitoring to demonstrate that there would be no adverse effects on amenity or air quality. The reports on each trial burn and the modeling/monitoring undertaken were assessed by Atkins, and a summary is presented in Appendix A.

Between submission of the planning application in July 2009 and November 2009 careful consideration was given to the proposals to decontaminate buildings by burning, however it was not possible to conclude that there were adequate safeguards in place to adequately protect human health and amenity. Comments concerning the documentation submitted up to November 2009 are set out in Appendix B. Since then there have been a number of further documents submitted regarding the potential decontamination of buildings by burning and these have been subject to discussion and correspondence with Atkins, SEPA and GG&CHB as well as the applicant. The undernoted text sets out the current position.

Potential Constraints on the Burning of Buildings

An underlying principle of the Environmental Permitting Regulations and the UK industrial pollution control regime is the primary requirement to prevent the release of harmful substances. Only where that is not practicable should the second principle be adopted of reducing emissions which may cause harm. At the Examination in Public, the applicant's position was that remediation (of explosives contaminated buildings) by burning was not a measure required. However, since then, the applicant has sought to remediate by burning.

PAN 33 makes it clear that, as part of the Government's commitment to sustainable development, the legacy of contamination has to be dealt with. Consequently ES would expect that controls which apply to this activity would be largely consistent with extant controls for other types of industrial process involving combustion in ensuring no unacceptable impacts on air quality, amenity and health.

It is therefore necessary to demonstrate that remediation by burning is the Best Practicable Technique of Remediation (BPTR) for remediating explosives contaminated buildings. This requires an assessment of the options that provide the most benefits or the least damage to the environment, as a whole, at acceptable cost, in the long term as well as in the short term.

The basis for such an assessment was previously submitted as supplementary information in application 06/602/PP but concentrated on releases to air, as opposed to all media. It also focused on health and safety issues; the Health & Safety Executive have previously advised that burning is one method of decontamination, but not necessarily the only option and that there are others which may be appropriate, depending on circumstances.

The applicant has submitted further supporting information in their updated Building Decontamination Justification document V3 dated 28 February 2010. This provides further clarification on issues raised by ES. The applicant has indicated within this document that burning would be the BPTR for a number of the buildings on the site. This assertion has been reviewed by Atkins who are satisfied that the report now provides a more robust justification for the three building decontamination methods proposed. BAE has included, as requested, a matrix on the aspects of Section A13 of PAN33 and this matrix is reasonable, providing information on the various issues surrounding the three proposed methods with their positive and negative impacts While there are some minor points still being addressed by BAE, sufficient progress has been made to allow the application to be progressed.

Atkins review of the submitted burning justification documentation is based on the knowledge and information provided by BAE Systems.

On the basis that the amended proposals which have been submitted constitute the BPTR for explosives contaminated buildings, then methods analogous to the Best Available Techniques (which is the control mechanism used by SEPA to regulate emissions from prescribed industrial processes and installations) would require to be used to minimise any emissions.

In the context of the proposed building decontamination programme, certain building preparation measures have been found to reduce the amount of smoke generated as a building is burnt. It is entirely consistent with EC and UK policy to seek to minimise exposure to any residual smoke emissions. The most sensitive indicator of such exposure is odour. The most practicable method to prevent exposure to smoke is to prohibit burning dependent on wind direction. This requires a protocol to take account of the location of the specific building and the direction of residential properties. The most recently submitted documentation makes reference to this. As a secondary objective, addressing odour in this way will also preserve local amenity. BAE recognise that further discussions with ES require to take place to satisfactorily address the monitoring issues where decontamination by burning is proposed. Compliance with Condition 3h should allow these two objectives to be achieved.

It is recommended that the Planning consent should also be conditional on a general prohibition of burning buildings on the site unless in accordance with the documents submitted in compliance with Condition 3. This is a requirement of Condition 19. The objective is to prevent emissions of smoke that are detectable beyond the site boundary. Whilst the modeling and monitoring undertaken to date have not provided the degree of certainty required to demonstrate that these health and amenity based objectives can be achieved, there is nevertheless scope for BAE to undertake monitoring to an extent which can demonstrate consistency with controls currently applied to other similar types of activity.

SEPA was asked if it had an opinion regarding the proposal to remediate by burning and stated that Renfrewshire Council was responsible for the burning of buildings in terms of regulating any nuisance. From SEPA's perspective, if the site operators have to add any material to the buildings to help get the fire started, it should be clean untreated timber to help minimise the polluting effects from the burning exercise. SEPA’s comments have included the suggestion that receptor monitoring should be undertaken at building facades. SEPA has also commented that, were burning of building accepted by RC, background monitoring should be undertaken .

Conditions recommended by ES are set out below.

1. Prior to written approval for the discharge of each individual planning condition, a final version of all relevant documents as agreed with the Planning Authority shall be provided to the Planning Authority.

Reason: *To ensure that a proper record is kept, including the complete collation of documentation and a final version as agreed for future reference and FOI reasons.*

2. Unless otherwise agreed in writing by the Planning Authority, in consultation with SEPA, the remediation works and earthworks shall be carried out in accordance with the approved detailed strategies, method statements and any other plans, drawings, documents, details, schemes or strategies which have been approved in writing by the Planning Authority pursuant to these conditions.

Reason*: To ensure that all remediation works and earthworks are conducted as agreed and that any deviations are brought to the attention of the Planning Authority and agreed as appropriate.*

3. Prior to any demolition, clearance, enabling, or building works commencing on site, the following documents, as listed within supporting documents submitted by BAE, shall be submitted for the written approval of the Planning Authority. The proposed content of each plan shall be approved in writing with the Planning Authority in consultation with SEPA. Thereafter all works shall be undertaken in accordance with the approved documents:

a) Water Management Plan (including impact of remediation);
b) Logistics Management Plan;
c) Materials Handling and Storage Plan;
d) Site Clearance Method Statement;
e) Building Decontamination Method Statement;
f) Asbestos Monitoring Plan;
g) Detailed Verification Plan;
h) Detailed Monitoring Plan;
i) Remediation & Construction Traffic Management Plan (potentially incorporated into the overall Traffic Management Plan); and,
j) A Phased Submission of Information Statement.

Reason: *To ensure that all appropriate detailed documentation is provided and approved by the Planning Authority.*

4. Where the Masterplan changes and/or the phases of development alter from that submitted with the Planning Application, details of all changes shall be submitted in writing to the Planning Authority. Subsequently, suitable re-assessment and interpretation of data, and, where appropriate revision of the Remediation Strategy, shall be completed and submitted for the approval in writing by the Planning Authority in consultation with SEPA.

Reason: *To ensure that any changes to the proposed development are considered appropriately and remediation and earthworks are suitable to any changes to the proposed development.*

5. Prior to the commencement of works on site, a plan sub-dividing the site into defined Land Quality Management Areas (LQMA), for the purposes of land contamination assessment and remediation, shall be issued for the written approval of the Planning Authority. Thereafter all works shall be undertaken in accordance with the approved plan.

Reason: *To ensure the appropriate sub-division of a) the entire site and b) the proposed phases of investigation, remediation and verification into manageable sub-areas to allow clear management of land quality issues and allow future sign off of related conditions in a staged manner.*

6. Prior to any remediation and earthworks commencing within a specific LQMA as required by Condition 5, the applicant shall provide a revised Interpretative Report for that specific area to the satisfaction of the Planning Authority in relation to proposed land use. This shall include the interpretation of factual data; justification of the interpretations provided; the revision of detailed risk assessment processes and revised Conceptual Site Model(s) with regards to all relevant receptors for the written approval of the Planning Authority in consultation with SEPA. .

Reason: *To ensure that the factual data is suitably interpreted and assessed to ensure that potential risks to future users and the wider environment are appropriately considered.*

7. Prior to commencement of works, a Sediment Assessment Plan shall be provided for the written approval of the Planning Authority in consultation with SEPA. Thereafter, additional works shall be undertaken in accordance with the plan to provide further data, interpretation and risk assessment in relation to the presence, fate and transport of contaminants associated with sediments within process drains, ditches and other surface water features for the written approval of the Planning Authority.

Reason: *To ensure that any ongoing impacts to the water environment from sediments are adequately characterised.*

8. Prior to any remediation and earthworks commencing within a specific LQMA as required by Condition 5, the applicant shall provide further options appraisals in relation to the proposed remediation works for each specific LQMA for the written approval of the Planning Authority in consultation with SEPA. This options appraisal shall conform to the requirements of relevant authoritative technical guidance (e.g. paragraph A.13 of PAN33, and Chapter C of Scottish Executive Paper SE/2006/44) and shall take cognisance of the impacts on receptors during implementation and also wider issues (e.g. the long term performance and post-treatment management requirements, and social and community impacts) as discussed within such documents. The applicant shall provide evidence to ensure that the Best Practicable Technique for Remediation has been selected for each remediation requirement, including the decontamination of buildings by burning.

Reason: *To ensure that the Best Practicable Technique for Remediation is utilised to be suitably protective of the local community and environment.*

9. Prior to commencement of any works, a framework for incorporating the requirements of any future legislation and changes to authoritative guidance for the assessment of data shall be provided for the written approval of the Planning Authority in consultation with SEPA. Thereafter, all works shall be undertaken in accordance with the approved framework.

Reason: *To ensure that best practice and guidance current at the time of the each remediation and earthworks phase are used in the assessment and development of the site.*

10. All assessment criteria utilised for interpretation of data or for the screening of imported or site won materials for re-use shall be protective of all relevant receptors and agreed in writing with the Planning Authority in consultation with SEPA. Assessment criteria shall be updated following any changes in legislation and/or authoritative guidance over the remediation time period. Where new assessment criteria are developed, full justification for the changes to criteria shall be provided in writing and subsequently approved in writing by the Planning Authority in consultation with SEPA.

Reason: *To ensure that best practice and guidance current at the time of the various remediation and earthworks phases are used in the assessment and development of the site. To ensure that no new pollutant linkages are created through the movement and/or importation of materials to the site.*

11. Prior to commencement of development within the Core Development Area (CDA), a Remediation Options Appraisal and Remediation Strategy Report specifically for the Retained Land, shall be submitted for the written approval of the Planning Authority in consultation with SEPA. Thereafter, all works required shall be implemented, completed and verified within a suitable timescale to be agreed in writing with the Planning Authority in consultation with SEPA.

Reason: *To ensure that any/all significant pollutant linkages identified within Retained Land are remediated in a timely manner. Although no development is proposed within Retained Land, this part of the site requires to be made suitable for use.*

12. Prior to commencement of remediation and earthworks, a revised Remediation Strategy specifically for the remediation of the landfill and all ancillary areas (as included within the boundary of application 09/0456/PP) shall be completed and issued for the written approval of the Planning Authority. Thereafter, works shall be implemented as agreed.

Reason: *To ensure that remediation of the entire landfill area renders the site suitable for use, taking into account all proposed land uses both during and after operation of the landfill.*

13. Prior to commencement of remediation and earthworks within each specific LQMA as required by Condition 5, a Remediation Method Statement which incorporates details of the various remediation and earthworks activities within that specific area shall be submitted for the written approval of the Planning Authority. Each Remediation Method Statement shall include details of earthworks to be completed; remedial techniques to be employed; the locations where those techniques will be used; the types of contaminant(s) and materials handled; estimated areas and volumes of contaminated material to be remediated/relocated; items of plant and equipment to be used; monitoring of emissions and control measures and any required environmental authorisations. These Method Statements thereafter agreed shall be implemented in the approved manner.

Reason: *To ensure that an appropriate level of detail is provided on the type and location of remediation and earthwork activities within each phase of works; to demonstrate that the works will be completed in line with best practice at the time of each phase of works; and to minimise adverse environmental impacts.*

14. Prior to the commencement of remediation and earthworks, a Communication Strategy shall be provided for the written approval of the Planning Authority in consultation with SEPA.

Reason*: To ensure that appropriate level of communication is maintained throughout the duration of the remedial works, and to ensure information is made available to the Planning Authority in a timely manner.*

15. If at any time during the enabling works, remediation works, earthworks and subsequent construction phase, contamination is encountered which was not identified in the course of site investigation to date, works shall cease in that specific area (except to the extent that it would not further disturb that contamination) until the necessary investigation, assessment and appropriate method statement is prepared to allow the contamination to be treated or removed, and submitted for the written approval of the Planning Authority in consultation with SEPA, and any necessary remediation has been carried out.

Reason: *To ensure that any as yet unidentified contamination identified during the redevelopment is properly remediated.*

16. Prior to commencement of works, a Site Waste Management and Soils Reuse Plan shall be provided for the written approval of the Planning Authority, Thereafter, imported or site won materials (including sediment dredged from watercourses), shall only be placed or re-used on the site in accordance with the Site Waste Management and Soils Reuse Plan, which shall ensure that they present no unacceptable risk to human health, the water environment, planting and the wider environment. The import onto the site of material classified as 'waste' shall only be acceptable with the prior approval of the Planning Authority.

Reason: *To ensure that the movement of materials around the site is undertaken in an controlled manner and that appropriate records are kept; to ensure that no contaminated material is brought onto site and that all site won materials placed onsite are suitable for re-use.*

17. Further monitoring and gas risk assessment from the Made Ground and Peat strata shall be completed post-remediation and prior to construction to ensure that the risk to all existing and proposed buildings onsite, including the landfill area, is adequately characterised. This information shall be provided as a supplementary report which shall include details of the investigation, risk assessment, and proposed gas mitigation measures for the written approval of Planning Authority.

Reason: *To ensure that the risk to receptors in the CDA and to the landfill and ancillary structures is properly defined and any required mitigation measures are integrated into the development.*

18. Prior to commencement of development within a specific LQMA as required by Condition 5, site verification report(s) for that area shall be submitted to, and approved in writing by, the Planning Authority. In areas where no development is to occur, a verification report shall be submitted to, and approved in writing by, the Planning Authority within 3 months of completion of the remediation works to confirm that the required remediation works have been satisfactorily completed. This condition may be discharged on a phased basis where agreed with the Planning Authority.

Reason: *To ensure that all appropriate steps have been taken in respect of remediation; that the required levels of remediation have been achieved in the interests of environmental and public safety; to ensure that all remediation is properly validated and recorded.*

19. Burning of buildings shall not take place within or on the site, unless undertaken in accordance with relevant documents required by Condition 3.

Reason: *To prevent disamenity and prevent any unacceptable risks to public health.*

If you wish to discuss any of these matters further, please do not hesitate in making further contact with myself and/or Robert Steenson/Andrew Jamieson.

Shona I C MacDougall
Director of Environmental Services

APPENDIX A

a. Trial Burn, October 2006

The Enviros report presented a dispersion modelling study of emissions from burning various groups and sizes of buildings. The study was reliant on the use of published emission factors for the burning of various types of materials. The results were evaluated against ambient Air Quality Objectives (AQO's) and Environmental Assessment Level (EAL) criteria derived from occupational exposure limits values. On that basis, various distances were proposed for each modelled scenario beyond which the results were within those criteria.

Comments The Atkins peer review provided an overview of the report and made certain recommendations which are summarised as follows:

- the dispersion modelling report lacked transparency,
- the use of emission factors was inherently highly uncertain,
- emission factors used would overestimate all results to varying degrees,
- the model may be significantly underestimating the short term results,
- it is accepted that the main pollutants are particulate matter and oxides of nitrogen,
- omissions and errors in the report cast doubt on the value of the conclusions,
- the interpretation of the results took no account of loss of amenity to residents,
- residents of Bishopton could be likely to consider the smoke to be a nuisance.

It was recommended that BAE develop working procedures firstly to prevent or minimise emissions and secondly to prevent or minimise exposure of residents to any unavoidable residual emissions. The presumption should be against burning buildings. It was recommended that a site specific approach should be adopted to restrict burning near to the site boundary to avoid the exposure of local residents to fumes, smoke or odours through zoning. A similar approach could be developed for other areas of the ROF site.

b. September 2008 Dispersion Modelling Study

This report substantially updated the previous study and addressed emissions from burning isolated buildings of various sizes. The zones within which air quality criteria for specific pollutants were shown to be breached by the model were discussed. The report concluded that "the model results are inevitably subject to considerable uncertainty". It recommended excluding burning of small buildings within 400 metres of residential properties, extending to 1200 metres for large buildings. They suggested that a monitoring survey carried out during the burning programme would allow measures to be put in place to avoid significant adverse effects on air quality.

Comments
The Atkins peer review came to the following conclusions, a number of which reflect concerns raised in the initial peer review:

- Shortcomings in the dispersion modelling of pollution from burning buildings,

- the report lacked transparency,
- where emission factors were missing, model results were underestimates,
- the reported "sensitivity testing" was of minimal value and in relation to building types and the representation of the fires, was found to be fundamentally flawed,
- the use of emission factors was inherently highly uncertain and omissions and errors cast considerable doubt on the value of conclusions,
- some calculations lacked transparency and brought into question the viability of the entire modelling exercise,
- conclusions regarding compliance with air quality objective limits beyond specified distances and the viability of "zones" beyond which burning of buildings was deemed to be acceptable could not be relied upon,
- there was insufficient assurance that local amenity would be maintained, particularly concerning odour.

c. Modeling Issue Meeting on 22nd April 2009

Attended by BAE, ES, Atkins, Enviros, and GG&CHB. The key points which emerged were:

- dispersion modelling studies were not considered a viable approach due to numerous inherent uncertainties,
- BAE stated that approximately 70 buildings within 400 metres of the site boundary would be steam cleaned; resulting in 381 buildings requiring decontamination by burning,
- it was now proposed to burn buildings individually, rather than in groups, over a two to three year period,
- a certain type of straw giving low smoke emissions would be used in future.

d. Trial Burn 11th June 2009

Comments
Prior to this burn Atkins were asked to comment on the proposals in the Enviros draft report "Building Decontamination Trial - Bishopton". This highlighted the importance of establishing a baseline concentration of particulate matter prior to burning and attempting to determine the downwind distance at which a burning smell is apparent.

The purpose of the monitoring was now to monitor particulate matter released during the burn as an indicator of exposure to smoke, rather than the previous monitoring which was undertaken in an attempt to validate the modeling. The objective was to understand the potential dispersion of the smoke during a building fire in order to avoid public exposure.

The approach was that controls should be in place to ensure that there is no effect evident at any residential properties during burning. Perceptible odour due to smoke would be the most stringent criterion.

Following this trial burn, Atkins commented on the further Enviros report "Bishopton Trial Burning Air Quality Summary150609" It was acknowledged that variable wind conditions on the day presented difficulties in suitably locating the downwind

monitors in order to detect the plume. Two monitors, one relatively close to the building and the second at some distance downwind, recorded particulate concentrations every minute. It was suggested that during any future test it would be preferable to locate two monitors at a similar distance downwind, perhaps separated by a thirty to sixty degree arc to better reflect potential exposure and to take account of changes in the wind direction. This was to help with potential longer term site boundary monitoring, perhaps allowing a relationship to be established between measured transient spikes in particulate concentrations and potential loss of amenity due to odour.

e. Trial Burn 24th September 2009

Two very similar buildings were burnt, one with the use of a water atomiser as a smoke control measure and the other without. Four monitors were deployed around each building during the burn period, recording particulate concentrations every minute.

Two of the four instruments were located at some distance downwind, reflecting potential exposure. Positioned over an approximately 60 degree arc, these would be more likely to capture the plume and provide a clear indication of concentrations above background attributable to the smoke from the building. This would help inform the development of monitoring and control strategies.

The Enviros report entitled “Factual Report on Air Monitoring during Controlled Decontamination Burning at Bishopton on 24th September 2009” concluded that:

- air quality standards for particulate matter would not be compromised as a result of the burning process, even at locations very close to the buildings,
- concentrations within 50 metres of the building façade were similar to or higher than those at approximately 250 metres from the buildings,
- particulate matter concentrations measured during the use of the atomiser spray system were not significantly different to those recorded without.

Atkins observed evidence of smuts (in the form of white flakes believed to be from interior painted surfaces) at approximately 300 metres downwind during the first burn, for an overall duration of some fifteen minutes. During the second burn the period of dark smoke was relatively brief, less than two minutes within the first ten minutes of the trial. Again, smuts and odour were evident downwind.

Visual observation did not indicate that the use of the water spray during the first trial materially reduced smoke. Enviros reported that concentrations of PM_{10} for the second trial, without the water spray, were slightly lower than during the first trial. However, there are numerous variables that may account for such small differences. During the trials, there were difficulties with the settings of a number of the monitors, and only one of the monitoring instruments (situated 50m from the building) recorded data at one minute intervals.

During the first burn the one minute average results at a distance of 50 metres from the building show a doubling of the total suspended particulate (TSP) plume for two

minutes, 15 minutes after the start of the burn. A similar pattern emerged with the 15 minute average results located 250 metres downwind.

During the second burn the monitor providing one minute data shows approximately six “plume events” during the 65 minute monitoring period. The second highest one minute reading for TSP occurred towards the end of this second burn, the cause of which could not be determined. The fifteen minute average results do not provide evidence of the effect of the plume.

Neither the June nor September trials demonstrated a clear indication of the effect of the plume in respect of particulate concentrations recorded at the monitoring locations in close proximity to the burning buildings. An “alert threshold” could not therefore be derived. Given the evident difficulties in placing monitors in appropriate locations to detect the plume and the highly variable nature of local wind conditions, proximity monitoring appears not to be feasible. Simple direct observations of the extent of the visible plume and of the downwind distance at which odour is evident provide a clearer subjective impression of the effects of the fire than analytical measurements at one or more fixed locations.

The issues highlighted in this Appendix have been addressed to the extent that compliance with the suggested conditions will ensure that they can be satisfactorily addressed.

APPENDIX B

Documentation submitted in July 2009 Planning Application

The documentation submitted mentions the controlled burning of buildings “except within 400m of occupied housing”. This process was described further and showed the then estimate of the number of buildings to be burnt (284) pending further detailed assessment as well as various lines indicating buildings within 400 metres of potential residential receptors, which it was not proposed to burn.

Process improvements which had been developed were described. It was also stated that the 400 metre “no-burn” zone was derived from the monitoring of pollutants during the trial burn and from dispersion modelling. However, this was not substantiated by any objective measures or modeling. The proposed methodology included various measures to minimise smoke generation; including the following:

- burning would only take place when the weather was "suitable" (i.e. no high winds or heavy rain was forecast, and wind direction was forecast to be away from built up areas). Wind socks would be employed to monitor wind direction. Notification would be provided to ES and other relevant bodies at least 24 hours before the planned burning,
- buildings would be monitored to ensure that the fire did not flare up due to high winds,
- air monitoring would be carried out during the burn to measure particulate emissions. Details of the proposed monitoring would be contained within an Air Monitoring Programme.

The Remediation Strategy Report also included proposed control measures for dust generated by plant and machinery that were not directly related to the decontamination of buildings.

Comments

Atkins noted the general requirement to carry out burning only when the wind was forecast to be away from built up areas but that there should also be regard given to the few relatively isolated properties close to the site boundary. These properties were shown to lie within the 400 metre radii within the documentation submitted. Additionally, a site specific plan could be developed, grouping the buildings to be decontaminated by burning into various zones within the site. A protocol could be developed that would prevent burning of buildings in each zone when winds were forecast to be from certain stated directions that might potentially carry smoke towards residential properties which were closest to specific zones. The intention would be to ensure that any burning was dependent both on wind speed/direction and proximity to offsite receptors. Atkins highlighted that attempts to monitor particulate concentrations during the trial burns proved to be problematic, due in a large part to the shifts in wind directions prevalent on those days and the buoyancy of the plume tending to carry smoke aloft close to the source. Such short term measurements during trial burns did not provide a basis for comparison with the air quality objectives as the objectives for particulates relate to annual average and 24 hour mean concentrations. These measurements also demonstrated the considerable difficulty in deriving an “alert threshold” in such circumstances.

Monitoring Plan

This was intended to provide an appropriate air quality monitoring programme at the Bishopton site, to provide the required level of assurance that there were no significant adverse effects on human health or the environment as a result of emissions to air from the building decontamination programme. It set out the proposed monitoring methods, record keeping and an action plan. The proposed mobile and fixed monitoring locations were shown in the submitted documentation (subject to review and agreement with ES). Substances which were to be measured included particulates (PM10, PM2.5 and TSP), nitrogen dioxide (NO_2), quantities of dust deposition, polycyclic aromatic hydrocarbons (PAHs), lead and formaldehyde. The types of monitoring equipment proposed were also described. Target detection limits of less than 20% of the air quality standards or guidelines were proposed. The monitoring frequencies for the various substances were also specified. As part of a management plan it was proposed to set action trigger thresholds at 70% of the short-term (24 hour or less) air quality objective or guideline value, representing a threshold level at which mitigation would be required or work activities modified. This was intended to prevent the air quality objective or guideline being exceeded. It was proposed that measurements at specified monitoring would be compared with these thresholds.

Should short term or long term trigger thresholds be exceeded it was proposed that "this will result in a cessation of activity. Works will not recommence until either a) or b) below has been achieved:

a) Confirmation of a minimal impact from site activities through consideration of background levels of airborne pollutants, based on data from the offsite monitoring location....; or

b) Changes to working practices or environmental conditions have taken place which gives a high degree of confidence that the short-term air quality objectives/guidelines will not be exceeded."

Comments

Some of the proposed fixed locations for PM10 monitoring within the site may not have been representative of conditions at the nearest properties in Bishopton. One location appeared to be close to the site entrance and may have been affected to some extent by vehicle exhaust emissions.

The potential need for an additional monitoring site or sites to provide better coverage of locations in Bishopton should have been considered. The same issue of monitoring site locations may have needed to be considered concerning the locations for the NO_2 monitoring. Only one site was situated close to properties near the site boundary and this may have been affected by vehicle emissions. The measurement of NO_2 at the proposed downwind location was likely to be subject to the same difficulties as encountered with the particulate monitoring during the trials. Even if minute-by-minute readings were found to show brief peaks in concentrations due to a fire, the utility of such transitory measurements was not clear.

Dust deposition monitoring was proposed elsewhere in the context of the earthworks activities and it was appropriate for sites to be selected in that context, as it was not anticipated that the burning activities would affect monthly mean dust deposition measurements.

The proposed detection limits of 20% of the applicable air quality standard were not relevant to the continuous analysers which have far lower detection limits. Dust deposition measurements are relatively unsophisticated and the concept of a detection limit for Frisbee gauges was perhaps merely theoretical. For PAHs, lead and formaldehyde a detection limit well below the objective or guideline value was to be recommended to ensure typical rural ambient concentrations were not reported as “below limit of detection”. This may have dictated the duration of the sampling or the minimum volume of air to be sampled.

It was considered appropriate to review the frequency of measurements for certain pollutants. If the sampling durations required to provide sufficient analyte were very much longer than the period of burning each day, any evidence of the effect of the fires may have been diluted.

The proposed short term “trigger thresholds” were for PM_{10}, formaldehyde and nitrogen dioxide. Of these pollutants PM_{10} and formaldehyde have 24 hour short-term thresholds and nitrogen dioxide a one hour threshold. Given the short duration of each individual burn episode (and the difficulty experienced during the trials of recording even a few minutes of elevated particulate concentrations) it was unlikely that the proposed thresholds would ever be reached, even were the fires to be relatively close to the monitors.

The actions proposed in the event of trigger levels being reached would in general be appropriate, especially, for instance, where there were continuous activities causing emissions such as may be the case at quarries or large construction sites. In the context of the building decontamination programme, it was considered unlikely that the proposed procedure would ever influence operational practices, due to the relatively brief periods of emissions. It was also noted that that the terms “minimal impact” and “high degree of confidence” were open to some degree of interpretation.

Roles and Responsibilities

The approach to the keeping of records, public involvement, response procedures and supervisory issues were described.

Comments
The approach to record keeping and related matters was reasonable.

Action Plan

This section reiterated much of the proposal regarding trigger levels set out in the monitoring methods section, the action or trigger thresholds being 70% of the absolute thresholds, the latter being the air quality strategy short term standards. The response to short term measurements above the trigger threshold would be to stop further work in the area. Mitigation proposals with regards to short term

thresholds were threefold, depending upon whether the measurement was below the trigger threshold, between the trigger threshold and the absolute threshold, or above the absolute threshold. In the first instance, the standard measures (largely related to building preparation) that were to be routinely implemented would be maintained. Where measurements were between the trigger threshold and the absolute threshold the following was proposed:

- Check meteorological conditions and cease/reduce operations until more favourable conditions occur;
- Where practicable, moving of site activities to an alternative building, if site and weather conditions permit;
- Assessment of the key source of the emissions and the relevant background levels.

If measurements were above the absolute threshold the following was proposed "where applicable":

- Cessation of the operations;
- Review decontamination procedures and programme;
- Reconsider buildings identified to be decontaminated by burning;
- Await more favourable meteorological conditions.

If measured levels exceeded the long term standard at six monthly reviews, the above measures would be "implemented as appropriate". If measured levels exceeded the long term standard at monthly reviews, the measures set out above for short term measurements between the trigger threshold and the absolute threshold would be "considered and implemented as appropriate".

Comments

The action plan as proposed was unlikely to have any influence on the decontamination due the linking of the action threshold to the health related AQO. Measurements made over the 24 hour period specified in AQO's would be unlikely to reflect the effects of burning buildings during relatively brief periods of the day. The setting of the trigger or action thresholds at 70% of the air quality objectives was arbitrary. Broader concerns such as the potential nuisance or loss of amenity of local residents due to visible smoke, smuts and odour were not addressed.

The initial measures proposed were not particularly onerous; checking meteorological conditions should have been a routine prerequisite on a day to day basis. Similarly the choice of building to be burnt should in any event have been made in the context of the current and forecast wind directions. It was not clear what was meant by "assessment of the key source of the emissions" in the context of burning particular buildings specifically prepared for burning, as it was believed that this should have been known in advance of any proposed burn. In this relatively rural environment short term absolute thresholds were highly unlikely to be exceeded even during a burn. As such, the mitigation measures proposed would not be triggered by the measurements. Although a review of decontamination procedures and a reconsideration of the buildings to be burnt were mentioned, simply ceasing to burn buildings until wind directions were more favourable would resolve the matter in practice. The primary consideration prior to the burn, i.e. the wind direction, should

have prevented the occurrence of high concentrations at monitoring locations near housing. There required to be sufficient confidence as to the mitigation measures to be taken in the event of measurements of high concentrations.

Treatment of Background Concentrations

This described the site engineer checking the previous days' 24 hour mean particulate concentrations (PM_{10}) at the on-site and off-site locations. If below a specified trigger concentration, no action was required. If any result was above that concentration, the background monitor concentration was subtracted; if the difference between the two was greater than a specified value, then the measures proposed for an exceedence of the absolute threshold were to be implemented. On a monthly and six monthly basis, if the long term particulate or PAH concentrations were below the relevant objective, no action was required. If at any site concentrations were above the relevant objective the difference from the background site would be calculated. If the site contributions were above 10% of the objective then the mitigation measures as described in the action plan would be implemented.

Comments

What was proposed effectively permitted the remediation programme of burning buildings to continue despite 24 hour mean concentrations exceeding the limit value the previous day, provided that the difference between the measured exceedence and background concentrations was less than a specified value. There were considerable difficulties during the trial burns in detecting elevated particulate concentrations for more than a few minutes, even with monitors placed within 200 metres of the burning building. The proposed monitoring programme had just two monitors in the north eastern part of the site near housing in Bishopton, which were quite likely to be much further away from the fires, and hence would be less affected by the smoke. Consequently, the extent of monitoring currently proposed was not acceptable. If, for instance, burning took place over two hours during a day, the extent of the contribution from a fire would be to an extent which would have been entirely implausible, given the results obtained during trial burns, and hence the proposed "mitigation measures" would never be implemented in practice. There was a similar flaw regarding long term concentrations above background levels in that it was suggested that mitigation measures were to be implemented if an on-site monitor gave a six-monthly mean above the relevant objective and was 10% above the background monitor concentration for that period. (This was not consistent with the Action Plan which did not include a caveat regarding background concentration.) With regard to the PAH benzo(a)pyrene, a further difficulty was presented by the proposed limit of detection of 20% of the objective concentration. A screening procedure as proposed of 10% of that concentration was therefore not feasible.

Conclusions and Recommendations regarding burning at the end of 2009

Dispersion Modelling

BAE presented two attempts at atmospheric dispersion modelling of the emissions from burning buildings. Numerous issues were identified with the initial report regarding various uncertainties and the overall validity of the approach used. These issues were not satisfactorily resolved in the second dispersion modelling report. It

was subsequently agreed that the fundamental difficulties in modelling burning buildings were such that there would not be a sufficient degree of confidence in the model results to specify fixed downwind distances from the fire that would ensure compliance with air quality criteria. Their finding that the combustion products with the highest potential to affect air quality were particulate matter and oxides of nitrogen was considered likely to be sound.

Trial Burns

Air quality measurements for combustion products such as formaldehyde and polycyclic aromatic hydrocarbons (PAHs) required extended sampling periods well beyond the duration of the fire. Such measurements therefore were not likely to detect concentrations above background and were not suitable indicators of exposure to smoke. Particulate monitoring instruments however were capable of recording average concentrations over very short periods and hence may have been an indicator of smoke from the fires. It had been anticipated that the trial burn monitoring might have provided evidence from which some sort of “alert threshold” may have been derived, which in turn may have informed a monitoring and control strategy. However, the particulate monitoring undertaken during the June and September trials failed to provide a clear indicator of the plume, even at downwind locations relatively close to the fires. There were considerable difficulties in placing monitors in locations where the plume may have been detected, given the highly variable nature of local wind conditions. It was therefore concluded that reliance on such measurements at specific fixed locations within the site boundary as a control measure was not feasible. Observations as to whether there was visible smoke and whether an odour was evident at the site boundary was likely to provide a more robust confirmation of the absence of adverse effects on local amenity than analytical measurements at one or more fixed locations.

Remediation Strategy

The proposed 400 metre distance to properties was a marginal constraint; the decontamination trial burns demonstrated that smoke may be clearly evident at substantially further distances downwind of a fire. The remediation strategy did not provide a sufficiently robust procedure to ensure that fires did not take place when the wind direction may have carried smoke to residential areas and isolated properties. The proposals to employ “alert thresholds” were flawed in various respects and would not either have prevented, or indeed at least minimised, the exposure of local residents to pollutants. The strategy did not provide any degree of assurance that local amenity would be maintained. The odour from smoke, even if evident on a relatively infrequent basis, may have represented an unacceptable impairment of amenity, particularly given the extensive duration of the building decontamination by burning programme. Controls should have been in place to ensure that there was no effect evident at any residential properties during burning episodes. Perceptible odour due to smoke would be the most stringent criterion.

Air Quality Monitoring

The monitoring proposals did not fulfill the stated objective of providing the required level of assurance that there were no significant adverse effects on human health or the environment as a result of emissions to air from the building decontamination programme. To demonstrate compliance with the statutory health based AQO’s, the relevant pollutants should have been monitored at off-site locations representative of

potential exposure of the public. In practical terms, these locations would have been representative of the closest residential building façades in Bishopton. The monitoring equipment specified should have met or been equivalent to established reference methods to allow comparison with the AQO's. The Detailed Monitoring Plan referred to in Condition 3h would allow this to be addressed to the satisfaction of the Planning Authority. The monitoring carried out during the trial burns indicated that such measurements within the site were not to be relied upon as a control measure. Frequent observations along the site boundary should have been carried out to confirm that no odour was evident during burning episodes. This would provide a fundamental check that a control protocol prohibiting the burning of buildings for specific current and forecast wind directions prior to the burning of a building was effective.

The issues highlighted in this Appendix have been addressed to the extent that compliance with the suggested conditions will ensure that they can be satisfactorily addressed.