



## Appendix B: Sampling, Analysis and Quality Plan



## **Sampling, Analysis and Quality Plan**

**Ash Residue in Morwell Roof Cavities Project**

Prepared for:  
Department of Health and Human Services  
50 Lonsdale Street  
Melbourne VIC 3000

3 November 2016





## Distribution

### Sampling, Analysis and Quality Plan Ash Residue in Morwell Roof Cavities Project

3 November 2016

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- Form 2: Sampling Questionnaire and Consent Form
- Form 3: Sampling Handout
- Form 4: Dust and Swab Sampling Form

**Appendix B: Chain of Custody**



## List of Acronyms

<b>Acronym</b>	<b>Definition</b>
<b>ALS</b>	ALS Limited
<b>AS</b>	Australian Standard
<b>CoPC</b>	Contaminant of potential concern
<b>DHHS</b>	Department of Health and Human Services
<b>DQO</b>	Data Quality Objectives
<b>EPA</b>	Environment Protection Authority (Victoria)
<b>HIL</b>	Health-based investigation level
<b>m</b>	Metre
<b>MAH</b>	Monocyclic aromatic hydrocarbon
<b>NATA</b>	National Association of Testing Authorities
<b>NEPM</b>	National Environment Protection Measure
<b>PAH</b>	Polycyclic aromatic hydrocarbons
<b>PM<sub>2.5</sub></b>	Particulate matter <2.5 µm
<b>QA</b>	Quality assurance
<b>QC</b>	Quality control
<b>SAQP</b>	Sampling Analysis and Quality Plan
<b>SEPP</b>	State Environment Protection Policy
<b>USEPA</b>	United States Environment Protection Agency
<b>UST</b>	Underground storage tank
<b>µg/kg</b>	Micrograms per kilogram
<b>µm</b>	Micrometres
<b>VOC</b>	Volatile organic compound



## 1.0 Introduction

Senversa Pty Ltd (Senversa) was engaged by the Department of Health and Human Services (DHHS) to conduct a series of works to assess the potential for residual brown coal ash to be present in roof cavities of residences in the Morwell area and surrounds, as a result of the Hazelwood coal mine fire in 2014. These works will investigate the potential for residents to be exposed to ash residue, if present, and whether any exposures constitute a potential ongoing risk to health.

Senversa has prepared this Sampling and Analysis Quality Plan (SAQP) to guide the investigation works.

### 1.1 Objectives

The works being undertaken are in response to Recommendation 9 of Volume III of the Hazelwood Mine Fire Inquiry Report 2015/2016, which was tabled in the Victoria Parliament on 10 February 2016.

Recommendation 9 states that the State should “*ensure that ash contained in roof cavities in Morwell is analysed and acted on.*” This recommendation goes on to say that the “*State should:*”

- *Commission an analysis of the ash contained in roof cavities of houses in Morwell and publish the results of that analysis to the community and Latrobe Valley Health Assembly, together with clear advice about the potential known, or unknown health effects.*
- *If the analysis of the ash residue in roof cavities reveals any content that is potentially hazardous to health or of unknown impact on health, conduct an audit of the extent of the exposure to ash and develop an action plan to remove the ash from all affected houses.”*

#### 1.1.1 Project Objectives

The overall objective of the sampling works outlined within this SAQP is to identify whether brown coal ash associated with the Hazelwood mine fire in February and March 2014 is present within roof cavities of residences in Morwell.

The data collected, such as ash samples and their chemical composition, will then inform an assessment of potential health risk to residents and whether management or remediation is required.

#### 1.1.2 SAQP Objectives

The objective of this SAQP is to outline the data collection activities required to assess ash residue in roof cavities in the Morwell area, and at an identified control site.

Specifically, this SAQP:

- describes the rationale and data quality objectives for the proposed sampling program;
- specifies the proposed criteria for selection of residences in Morwell;
- specifies the proposed control area and basis for selection;
- outlines the field methodologies for sample collection;
- specifies key analytical considerations;
- specifies the quality assurance and quality control (QA/QC) program; and
- identifies assessment criteria.



## 1.2 Data Quality Objectives

Senversa will adopt quality assurance procedures to provide a consistent approach to evaluation of whether the data quality objectives (DQOs) required by the project have been achieved. The approach will be consistent with the DQO process outlined in the National Environment Protection (Assessment of Site Contamination) Measure ('the NEPM') Schedule B2 *Guideline on Site Characterisation*. The DQOs will focus on assessment of the useability of the data in terms of accuracy and reliability in forming conclusions on the condition of the element of the environment being investigated.

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### DQO Seven-step Process

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#### 1. State the problem.

Hazelwood open cut brown coal mine, located adjacent to the town of Morwell, Victoria, caught fire on 9 February 2014 and continued to burn for 45 days. The fire was caused by embers spotting into the mine from nearby bushfires. EPA Victoria collected twelve ash samples during the fire at the Hazelwood mine when sufficient ash was being produced for collection. The samples were analysed for an extensive suite of potential constituents, with the analyses identifying the metals barium, boron, manganese and strontium as key analytes found in significant concentrations. Concentrations of a number of other metals (aluminium, arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, selenium, tin, titanium, vanadium, zinc), PAHs (acenaphthene, acenaphthylene, anthracene, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene and pyrene,) MAHs (benzene, toluene, xylene, styrene and 1,2,4-methylbenzene) and the solvent acetone were also present in some ash samples at low concentrations (EPA, 2015).

Investigation is required to assess the potential for brown coal ash residue to have accumulated within the roof cavities of nearby homes as a result of the fire. The investigation will assess whether ash is present in the ceiling cavity of residences, and subsequently whether there may be a health risk due to exposure to the brown coal ash residue by residents. Given the potential for the identified coal ash constituents to also be present in ceiling dust due to inputs from background sources other than brown coal ash (i.e. metals and PAHs may be present in historical ceiling dust deposits associated with traffic emissions, local industry, etc.), assessment of the chemical composition of roof cavity dust in an identified control site will also be undertaken.

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#### 2. Identify the decision/goal of the study.

The primary goal (overall objective) of this investigation is to identify whether brown coal ash residue is present within roof cavities of residences in Morwell as a result of the Hazelwood mine fire in 2014, and whether any ash present may pose a health risk to residents.

This objective will be addressed by:

- Collection of dust samples from within roof cavities of homes within Morwell, and an identified control site.
- Collection of swab samples of dust indoors, to investigate the relationship between the composition of ceiling dust and indoor dust.
- Analyses of collected samples for key constituents of potential concern (CoPC), including metals and PAHs, and comparison of the profile of these to previously collected ash samples and other potential sources of these contaminants.
- Completion of detailed site records to provide evidence of any visible ash in roof cavities, and to record dwelling characteristics or other factors which may impact on ceiling dust composition and migration pathways between the roof cavity and indoor spaces.
- Comparison of concentrations of CoPC to relevant health-based screening levels and/or completion of a quantitative health risk assessment to assess whether ash present within roof cavities may pose a risk to human health. Adopted health-based investigation levels (HILs) will be those published in the NEPM (Schedule B1) for soil. These screening levels are derived based on assumed residential exposure to contaminants in soil and/or indoor dust which is derived from outdoor soil and thus represent levels in indoor dust below which long term residential exposure would not be expected to pose a health risk, even if the dust was present within the living spaces of the home. They are therefore considered conservative for assessment of potential health risk associated with dust in roof spaces.



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## DQO Seven-step Process

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### 3. Identify the information inputs.

The primary chemicals of interest are metals and PAHs. They will be measured at all sampling locations (dust and swab samples) targeted for investigation. See **Section 3.0** for further information on the sampling methodologies and **Section 3.7** for analyses proposed.

Information on dwelling characteristics will be obtained during sample collection. This will include a visual record of the inside of the roof cavity (video and/or photographic) and a photographic record of all roof cavity samples collected. Field notes will include observations on characteristics such as the age of dwelling, building construction materials, visible gaps or holes in ceilings (e.g. ceiling roses), etc.

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### 4. Define the boundaries of the study.

The investigation area includes dwellings within the township of Morwell and a control site, discussed further in **Section 3.2**. The study will target dwellings selected in accordance with the criteria set out in **Section 3.1**.

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### 5. Develop the analytical approach.

National Association of Testing Authorities (NATA) accredited laboratories will be used for the given analytes and media, unless otherwise noted within **Section 3.7**. Appropriate laboratory limits of reporting (i.e. below relevant health-based screening levels) will be requested from the primary and secondary laboratories.

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### 6. Specify performance or acceptance criteria.

A range of QA/QC procedures and results will be used to evaluate whether the DQOs have been achieved. These procedures assess the useability of the data, particularly with regards to data accuracy and reliability for forming conclusions, and are undertaken in accordance with guidance provided within Australian Standards, the NEPM, and by the United States Environment Protection Agency (USEPA) (see **Section 3.7**).

A data validation checklist with specific acceptance criteria and discussion of results will be completed and provided within the investigation report.

As a minimum, field (intra-laboratory) and laboratory (inter-laboratory) duplicates will be collected at a frequency of 1 in 20. All field blanks, equipment rinsate blanks, and laboratory method blanks will require an acceptance limit of concentrations below the laboratory limit of reporting. All blank samples will be assessed for the potential cross-contamination of contaminants of interest.

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### 7. Develop the plan for obtaining data.

The scope and methodology are outlined in **Section 3** below.

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## 2.0 Background

### 2.1 Project Background

On 9 February 2014 a fire in the Hazelwood open cut brown coal mine, located in Morwell approximately 150 km east of Melbourne, was ignited due to bushfires in neighbouring areas. The fire burned for 45 days before being declared 'under control', with smoke and ash from the fire impacting on air quality in Morwell and surrounds during this time. Additionally, ash residue may have deposited over the surrounding areas during the fire, potentially providing an ongoing source of exposure to brown coal to the local community.

In response to the fire, a Parliamentary Board of Inquiry was established to better understand the fire, with several documents prepared and tabled in the Victorian parliament to summarise the findings. Included in the documents was a series of recommendations which were ultimately accepted and an implementation plan tabled to address the recommendations.

Recommendation 9 of the report *Hazelwood Mine Fire Inquiry Report 2015/2016 Volume III – Health Improvement* ('Volume III') recommends "that the State ensure that ash contained in roof cavities in Morwell is analysed and acted on". The purpose of this project is to assist in addressing Recommendation 9 of Volume III.

### 2.2 Ash Composition

A review of the available Australian and international literature, as well as site specific information collected during the fire, was completed and presented in a literature review (Senversa, 2016) and is summarised below. The physical and chemical characteristics of brown coal ash will be dependent upon the composition of the precursor coal material and the conditions under which the coal combusted, with the following key information noted with regards to the ash produced by the Hazelwood mine fire:

- A large number of naturally occurring elements are present in both coal and associated ash, however many of these are also expected to be present in natural soils and rocks (and hence dust) across local areas at similar concentrations to those found in the coal.
- Available data does, however, indicate that concentrations of some elements in fly ash are enriched relative to source material and/or increase with decreasing particle size, including arsenic, selenium, antimony and lead.
- While ash generated during the Hazelwood mine fire is expected to have generally similar characteristics to fly ash generated during power generation, some potential differences in ash deposited in surrounding areas have been identified. These include:
  - ash generated from a mine fire may have a higher proportion of organic compounds;
  - ash produced by the Hazelwood mine fire had a lower PM<sub>2.5</sub> (particulate matter <2.5 µm in diameter) content than fly ash (6% in mine fire ash as compared to 27% in fly ash); and
  - sources of smoke and particulate matter from biomass burning (bushfires) were also present at the time of the Hazelwood mine fire.

In addition, it is noted that ceiling dust samples will be representative of a range of materials deposited over time within the roof cavity, including from sources other than the mine fire. These sources could include traffic emissions (including from historical leaded fuel use), industry emissions (including regional coal mining and power generation since the 1950s), dust from soil, animal fur and waste (rats, mice, possums, etc), insulation materials, construction materials, etc.



## 3.0 Investigation Strategy

### 3.1 Criteria for Selection of Dwellings

The aim of selection of dwellings from those volunteered for sampling will be to provide a broad representation from the following criteria:

- **Dwelling age** – older homes (~pre-1960) potentially have more gaps in ceilings or wall cavities, while modern homes are generally better sealed. Due to the spread in age of homes encountered in Morwell, a minimum of 10 homes from each era of construction will be targeted, such as brick and tile homes built post-1980 and weatherboard homes built prior to 1980.
- **Building characteristics** – such as height of ceiling, materials of construction, presence and size of gaps in ceilings, heating and cooling systems, presence of open fires/chimney stacks, ventilation, potential presence of lead paint (based on age). These factors will be reviewed to assess potential ash from other sources, CoPCs from other sources and ability to physically sample in the roof cavity.
- **Location with respect to the ash plume(s)** – a review was conducted of available plume dispersion maps and subsequent EPA air and soil testing to assess the potential extent of brown coal ash impacts on the Morwell area. A map showing the available properties of residents who volunteered to have their roof cavities tested was overlain with this ash dispersion mapping data, to identify which properties are within the expected area of impact. The selection of dwellings will, in part, be chosen based on their distance from the plume to enable an analysis of trends between the CoPCs and the distance from the fire.
- **Safe and secure access for staff** – if any house is considered potentially unsafe to access and sample the roof cavity (e.g. dilapidated condition of house, no safe access point to the roof space, security concerns etc.), such properties would be excluded from the initial 50 houses selected.

A screening questionnaire will be used to exclude houses which do not have roof cavities or present an unacceptable risk to sampling staff. Dwellings that have had their roof cavity cleaned / vacuumed since the fire will be excluded from the assessment.

### 3.2 Control Site Identification

The control site must be outside the area affected by the Hazelwood fire, but requires similar proximity to other potential background contamination sources (e.g. major roads, power plants, other industrial sources) and similar house ages and construction types. The criteria for the selection of the dwellings will be identical to those outlined in **Section 3.1**. At this stage the control site is Rosedale. Rosedale is within eastern Latrobe Valley and the available data shows it was not impacted by the Hazelwood fire. In consultation with the community, Rosedale has been selected because it is considered to be similar to Morwell than other potential control towns in the region.

### 3.3 Roof Cavity Ash Residue

Samples will be collected in general accordance with USEPA (2008) guidance and will be conducted by a team of two staff at all times, being one senior Senversa staff member to liaise with residents and oversee works, and an experienced occupation hygienist to undertake sampling. In addition, Senversa's OHS expert, Steve Brazil, will be present during the first two days of field works, to review sampling procedures, provide HSE support, and ensure hazard assessment processes are appropriate for the works being conducted.



Works will be conducted as per the following general steps:

- Completion of property specific health, safety and environment (HSE) hazard assessment and toolbox talk. HSE actions required will include, as a minimum, turning mains power off prior to sampling, and use of a dust respirator and dust coverall.
- Placement of drop cloth below roof access point, and closure of all internal doors, to minimise introduction of dust into dwelling.
- Access roof cavity from an extension or A-frame ladder, with ladder to be held at all times by second staff member. Staff will be suitably trained in safe use of ladders and fall prevention. Field staff will not enter the roof cavity but will collect the sample while standing on the ladder, to minimise risk of disturbing dust and to mitigate safety issues for staff.
- In accordance with USEPA (2008) guidance, samples will be collected using a flexible spatula to scrape dust directly into a laboratory supplied jar. A non-conducting extendable sampling pole will also be used to allow dust to be collected from corners, or areas further away from the opening. A minimum of 1 gram will be required for analysis for metals, while 5-50 grams will be required for each additional analytical suite. Where there is not sufficient sample to be collected with a spatula, a filter paper will be placed to line the end of a vacuum nozzle. The sample will be collected onto the filter paper, and emptied immediately into a snap lock bag.
- Collection of photographs and video records of each roof cavity and sample collected.

Good housekeeping practices will be maintained at all times, including removal (using a vacuum with HEPA filter) of any dust that may have entered the dwelling from the roof cavity opening during sampling.

### 3.4 Swab Samples

The indoor swab samples will be collected in accordance with Australian Standard AS 4874-2000 as follows:

- Collection of a 10 cm x 10 cm swab sample from a hard surface where dust may accumulate (e.g. tops of cupboards, door frames) from two locations indoors at each house. The exact location to be sampled would vary between homes, but would be targeted at locations with an entry point for roof cavity dust (e.g. rooms with gaps in ceiling or a roof cavity access point), or are commonly occupied (e.g. kitchen or living room).
- Initially, only swab samples from 20 homes in the impacted area and from the 10 control sites will be submitted for analyses (60 samples total, from 30 homes). The additional swabs will be placed on hold at the laboratory and would be available for analyses at a later date, if required.

This data would provide a semi-quantitative measure of the potential relationship between roof cavity and indoor dust impacts, and the potential for brown coal ash residue in roof cavities to be present within homes.

### 3.5 Supporting Information

#### 3.5.1 Questionnaire

A property specific interview based questionnaire has been developed for completion with residents at each property sampled. The questionnaire will obtain information on features such as:

- Building characteristics – age, height of ceiling, materials of construction, presence and size of gaps in ceilings, heating and cooling systems, presence of open fires/chimney stacks, ventilation, lead paint, insulation types, pests, safety issues.
- Residents' characteristics – number of people living at the dwelling, age/s, number of years as resident, time spent at home, rental or owner occupied.
- Potential confounding factors – recent construction works on dwelling, regularity of access to roof cavity, anecdotal information on fires or other events.
- Evidence of mould – connections between mould and ash deposits, and colour and location of potential mould.



The dwelling screening questionnaire is included in **Appendix A**.

### 3.5.2 Visual Records

A property specific record will collect information on visual factors such as:

- Number and location and physical description of material/dust collected.
- Visual observations of dust in roof cavities, including colour, particle size, volume, depth, distribution within roof cavity, etc.
- Visual observations of any mould, particularly red mould on cornices or ceilings.
- Observations of surrounding features, if relevant.

In addition, detailed photographic and video records will be collected at each property and logged in the property sampling records.

### 3.6 Sample Nomenclature

Each dust sample will be placed in a clean glass jar supplied by the laboratory and clearly labelled with a permanent ink marker in the field. Sample labels will include the following information:

- Project name and number
- Sampling date
- Sample identifier

The sample identifier will be a unique identifying property code followed by the sample number, followed by D for dust or S for swab. For example, a dust sample collected from the 39<sup>th</sup> property would be identified as P39\_01 whilst a swab sample taken from the same property will be P39\_02 for metals or P39\_03 for PAHs. Visual records will be recorded with the unique identifying property code followed by "V" for visual and then numbered in the order taken in the field. For example, P01\_V01 would be the first visual record collected from the 1<sup>st</sup> residential property.

### 3.7 Laboratory Analysis

All roof cavity samples will be submitted to chemical laboratories accredited by the NATA for the analysis of the dust samples. ALS Environmental Pty Ltd will be used as the primary laboratory and Eurofins Environmental Pty Ltd as the secondary laboratory. As noted in Senversa's proposal (2016) no NATA accredited laboratories were identified for the analysis of the swabs. To ensure standard analytical requirements are met, an assessment of laboratory QA/QC procedures for the swab analyses will be included in the review results.

The analytical suite has been identified based on the analytical results of ash obtained by EPA Victoria during and after the fire and presented in EPA 2015 and at [www.epa.vic.gov.au](http://www.epa.vic.gov.au)<sup>1</sup> and in the literature review undertaken as part of this project (Senversa, 2016). The following suite will be completed on samples collected and scheduled for analysis:

- 17 metals: antimony, arsenic, boron, barium, beryllium, cadmium, cobalt, chromium, copper, lead, manganese, nickel, selenium, strontium, titanium, vanadium and zinc. Required sample: 1 g.
- Mercury. Required sample: 1 g.
- Polycyclic aromatic hydrocarbons (PAHs). Required sample: 10 g.

Where sufficient sample is available, the following additional analyses may be undertaken on a subset of residential properties proximal to the fire:

- Chromium VI. Required sample: 5 g.

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<sup>1</sup> <http://www.epa.vic.gov.au/our-work/monitoring-the-environment/hazelwood-recovery-effort/testing-during-the-hazelwood-fire/ash-testing-data-during-the-fire/ash-data-hazelwood-road>



The field staff will remove all large particles and visible fibres from the dust samples prior to submission to the laboratory. All dust samples will be sieved at the laboratory to <250 µm prior to analysis in accordance with US EPA 2008 recommendations as the <250 µm fraction is considered to be most relevant for potential exposure and health concerns.

All samples collected will be analysed on a standard 5-day turn-around time. However, the time required for transport of samples from site to Melbourne laboratory will be in addition to any laboratory guaranteed turnaround time.

Proposed quality control samples are:

- Duplicate pairs consisting of field (intra-laboratory) and secondary (inter-laboratory) duplicates analysed at a frequency of 1:20 samples for both dust and swab samples;
- Sample blanks will be collected (swabs and filters) and analysed at a frequency of one each per day of sampling.

Example chain of custody certificates are presented in **Appendix B**.

### **3.8 Health, Safety and Environment**

A comprehensive Health, Safety and Environment Plan (HSEP) will be prepared to guide the overarching program, which shall include a job safety analysis and safe work method statements for the proposed investigation works. Field staff will complete safety inductions and undertake toolbox talks at every property sampled, to discuss site conditions specific to each dwelling and identify any new hazards that arise on a property by property basis.

During all works at least one of these individuals onsite will meet minimum occupational hygienist qualifications. In addition, our occupational hygiene expert will be present during the first two days of field works, to review sampling procedures, provide HSE support, and ensure hazard assessment processes are appropriate for the works being conducted.

### **3.9 Privacy of Information**

There will be an appropriate level of confidentiality through limiting the distribution of personal or private information collected during the project. All personal information will be treated confidentially. Names and addresses of individuals participating in the sampling program will not be published. The mapping of results will not show 'points' or individual residential locations but rather may be represented by a gradient map. Each property sampled will have individual, anonymous paperwork for sampling and results. Sampled houses will each receive an individual report.



## 4.0 Reporting

At the completion of the sampling program, the deliverables listed below will be prepared. Copies of the draft investigation report along with representative individual property reports will be submitted to DHHS for review and finalised following review by DHHS and key stakeholders.

**Individual Property Reports** – which will comprise a plain language factual letter for each property which participated in the study. The letter will include a summary of the works completed, observations made, and analytical results. Results will be compared against conservative screening criteria (such as the health investigation levels for residential soils (HIL-As) and to those reported in control homes, to provide context to the results. All results letters will be provided to the property owner and the results discussed either in person or by telephone.

**Investigation Report** – a stand-alone scientific report will be prepared at the completion of the works, summarising all stages of the investigation. The report will be prepared in accordance with relevant Australian guidance, and with the expectation that it would be subject to rigorous technical review by DHHS and third parties.

As a minimum, the report will include:

- Finalised literature review (as prepared at project commencement).
- Engagement and property selection process.
- Sampling methodology, field observations, and analytical results (without identifying individual property owners).
- QA/QC review, including critical evaluation of investigation program and any issues which may have impacted on the study.
- Assessment of the potential nature and extent of brown coal ash residue.
- Discussion of potential risk to human health associated with brown coal ash residue.
- Recommendations for further works, if required.
- A summary of feedback on the draft reports from DHHS comments as an appendix and detail of any actions taken by Senversa to address DHHS comments, and the rationale for each decision.

The report will be prepared to be accessible for non-technical audiences, including the use of maps and diagrams where possible to aid in communicating key messages about the nature and extent of impacts.



## 5.0 References

Australian Standard 2000, AS 4874-2000 Guide to the investigation of potentially contaminated soil and deposited dust as a source of lead available to humans

enHealth, 2012a, Environment Health Risk Assessment Guidelines: Guidelines for assessing human health risks from environmental hazards

Environment Protection Agency 2015, Hazelwood Recovery Program water, soil and ash assessment – Morwell and surrounds, Publication 1600

National Environment Protection (Assessment of Site Contamination) Measure, as amended 2013 (ASC NEPM, 2013)

Senversa 2016, Proposal for Testing and Analysis of Brown Coal Ash Residue in Roof Cavities RFQ Reference Number C5322

USEPA 2008, Sampling and Analysis of Lead in Indoor Residential Dust For Use in the Integrated Exposure Uptake Biokinetic (IEUBK) Model

Parliament of Victoria 2016, Hazelwood Mine Fire Inquiry report 2015-2016 Volume III – Health Improvement



## **Appendix A: Forms**

**Form 1: Screening Recruitment Questionnaire**

**Form 2: Sampling Questionnaire and Consent Form**

**Form 3: Sampling Handout**

**Form 4: Dust and Swab Sampling Form**



## Screening Questionnaire for Recruitment

### Morwell Ash Residue Study

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Item	Details
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---

House Address

---

Phone Number

---

Name

---

#### Screening Questions

---

Item	Details
------	---------

---

Do you own the property? If renting, are you able to contact the owner for permission to participate?

---

Does your roof have an accessible roof cavity? (i.e. >0.5 m)

---

Is the cavity accessible from within the house? Location?

---

What is the height of your ceiling at the roof cavity entry point?

---

Has the cavity been cleaned since February 2014?

---

What is the age of your house?

---

What are the house construction materials (e.g. brick and tile)?

---

Can someone be home during business hours for sampling to occur?

---

Would there be any issues if the power was switched off for 30 minutes during sampling?

---

Are there dogs or animals which may interfere with access or sampling from a ladder?

Can the animal/s be confined during sampling?

---

Other:

---

## Sampling Questionnaire

### Morwell Ash Residue Study

---

**Item**

**Details**

---

Property ID

---

House Address

---

Name of resident present during sampling

---

Contact Details

---

Date Sampled

---

Time Sampled

---

Samples Collected

---

I, \_\_\_\_\_

(name)

of: \_\_\_\_\_

(address)

hereby authorise Senversa Pty Ltd personnel, as the consultants engaged by the Department of Health and Human Services (DHHS), to enter my property to collect dust samples from my roof cavity and indoors.

I understand the sampling works are being undertaken as part of the *Ash Residue in Morwell Roof Cavities Project*, which is being conducted in response to Recommendation 9 of Volume III of the Hazelwood Mine Fire Inquire Report 2015/2016, which was tabled in the Victoria Parliament on 10 February 2016.

I understand that the testing results will be provided to the property owner following completion of the works.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Property ID: \_\_\_\_\_



## Demographic Information

Item	Details			
Number of people living at the property				
Ages of people living at property				
Number of years living at the property				
Describe frequency of time spent indoors at home	Age	Weekday Hours	Weekend Hours	When not at home where is time spent (e.g. shed, nearby neighbour, shops, outdoors)
	Person 1			
	Person 2			
	Person 3			
	Person 4			
	Person 5			
	Person 6			
How many weeks a year are residents away from home?				
Renter or owner occupied?				

## House Construction and Layout Details

Item	Details
Age of building (approx.)	
Construction materials	
Roofing material	
Ceiling height (indoors)	
Are there gaps in the ceiling including ceiling roses?	
If yes - location, size of gaps. (Photo)	
Type and locations of heating, if any?	
Types and locations of cooling, if any?	

Property ID: \_\_\_\_\_



---

Item	Details
------	---------

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Location/s of chimneys/flues

---

Type of fuel burnt

---

Locations of redundant chimneys/flues  
Method of decommissioning?

---

Location/s of skylights

---

Location/s heating/cooling ducts

---

Type of insulation in roof, if known?

---

Does the house have lead based  
paints? Locations?

---

Have you undertaken any construction  
work since Feb-Apr 2014?

---

If yes, describe nature of construction.

---

How often is ceiling cavity accessed?

---

Has the ceiling cavity been cleaned at  
any time?

---

Have you participated in another study  
of roof ash?

---

Do you have solar power?

---

Do you have a gas hot water system?  
Location?

---

Are you aware of any pests in the  
ceiling? Rats, possums etc.

---

Are there any other safety issues we  
should be aware of, associated with  
accessing the roof cavity?

---

Do you burn garden or household waste  
outdoors? Location and frequency

---

Do you burn wood outdoors? E.g. BBQ  
or chiminea. Location and frequency

---

Have you noticed any mould growing in  
your property? If so, when did it first  
appear and what colour is it?

Please also describe the location(s),  
extent, appearance, etc.and/or provide  
photographs if available.

*NB: If any mould is currently present,  
pictures to be taken.*

---

Property ID: \_\_\_\_\_



---

Item

Details

---

Other observations (e.g. historical sources of dust such as house fire)

---

Completed by:

Date:

## Sampling - What can I Expect?

If your property has been selected, Senversa will contact you to arrange a date and time to undertake the sampling. You will need to be home for the whole time the sampling is being undertaken – approximately 2-3 hours. You will need to confine any dogs at the property in the backyard or in a room with the door closed during this time.

Two or three people will come to your property to take the samples. They will start by taking a look around and checking the location and accessibility of the ceiling access hole and complete a health and safety assessment. You will be asked some questions such as how long you have been living at the property and general questions about your house.

### Roof Cavity

Your electricity will need to be turned off while this sampling is being performed.

The person taking samples from the roof cavity will be wearing some protective clothing – a dust coverall, a dust respirator and gloves.

Dust samples will be taken from the roof cavity using a small spatula or vacuum cleaner. A drop cloth will be used at the base of the ladder to catch any dust falling from the roof cavity. A second person will be holding the ladder while the sampling is underway. Any dust which falls from the roof cavity during this sampling will be cleaned up.



### Swab Samples

Senversa will also take indoor swab samples from places where dust has accumulated (e.g. tops of cupboards or door frames) from two locations at your property. The sampler will mark out or measure the area for sampling and wipe the surface with a sampling cloth.

Note that while swab samples will be taken from all selected properties, some samples might not be tested at the laboratory. This is because we don't yet know if there will be enough dust for testing inside properties.

### Sampling Records

Senversa will collect the following information at your property:

- Photos and videos of the sampling locations and other features
- A rough plan of the layout of your property including sampling locations
- A description of the roof cavity dust
- Details of any relevant features near your property e.g. major roads, industry etc.

### Reporting

Once Senversa has received all the testing results from the laboratory, the results will be reviewed and reports prepared. You will receive a report with the testing results for your property which will include some information to help you understand what the results mean. Senversa will also prepare a larger report including the results for all properties including properties at the control location. This report will assess any differences in results between Morwell and the control site, and between houses with varying attributes (e.g. weatherboard and corrugated iron vs brick and tile).

Senversa will respect your privacy. Your name, address or photos that can identify you or your property will not be published (other than in your individual property report).



## Appendix B: Chain of Custody



**Surface Dust, Swab, Photo and Video Sampling Form**

<b>Job Number:</b> M12253	<b>Client:</b> DHHS
<b>Project Name:</b> Morwell Ash testing in Roof Cavities	<b>Site Code:</b>
<b>Field Personnel:</b> Katherine Potter and Mary Zaljevic	<b>Site Address:</b>

**Sample Description**

Sample ID	Date	Time	Sample type/ Method	Physical Description of Dust (Colour, particle size, odour etc)	Sample collected from: (Describe surfaces and general location)	Area of Collection (i.e. 'approx 1 m2 within 2 m of cavity opening')	Volume Collected	Other notes:
P	/10/2016		Dust - Vacuum / Spatula					
P	/10/2016		Swab					
P	/10/2016		Swab					

**Visual Observations and Records - Dust and Ash**

Area	Date	Time	Physical Description of Dust (Colour, particle size, odour etc)	Volume of Ash/ Dust Present? (Depth, areal extent, etc)	Video Record? (Y/N and number)	Photo Record? (Y/N and number)	Other notes:
Ceiling Cavity Observations	/10/2016						
Indoor Dust Observations	/10/2016						
Outdoor Dust Observation	/10/2016						

**Visual Observations and Records - Mould**

Area	Date	Time	Mould present?	Physical Description of Mould (Colour, location, extent etc)	Date of Appearance (if Known?)	Video Record?	Photo Record?	Other notes:

**Notes (gaps in house, visual record of gaps etc)**

<b>Signed:</b>		<b>Checked:</b>	
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