



# Botany Mercury Independent Review

Final Report

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Environment Protection Authority



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## 1 Message from the Chair of the Steering Panel



*NSW EPA Chief Regulator Mark Gifford.  
Photo: EPA*

The Botany Mercury Independent Review Steering Panel (the Steering Panel) has been meeting over the past three years to investigate community concerns about potential off-site mercury contamination from Orica's former Chlor Alkali plant at Banksmeadow.

The Botany Mercury Independent Review (the review) into off-site mercury contamination has been one of the most comprehensive investigations of its type in Australia.

Although the review has presented many challenges for the Steering Panel, it has provided local residents and others with essential information about the potential for off-site mercury contamination. Ultimately, it has confirmed that the risk for people who live, work or fish in the area is no higher than for the general NSW population.

This report is the culmination of that work and provides an overview of the processes undertaken to reach the final conclusions.

The review has allowed the Environment Protection Authority (EPA) to reach out and better engage with the local community, providing increased knowledge and understanding that will assist the EPA in its broader community engagement activities that are fundamental to its role as the state's primary environment protection agency.

The Steering Panel members have brought critical knowledge, insights and thinking to the review and I would like to thank them for their commitment and dedication to this process and the spirit of cooperation in which they have approached their work.

Mark Gifford  
**Chief Environmental Regulator**  
**Environment Protection Authority**

## 2 Introduction

Orica (formerly ICI Australia) has operated a chemicals manufacturing facility at the Botany Industrial Park in Matraville since 1942.

Elemental mercury was used at Orica's former Chlor Alkali plant at the site from 1945 until its closure in 2002. This resulted in mercury contamination of the soil and groundwater in the region of the plant. Remedial action has been completed for some contaminated areas on the site and work is continuing to clean up contaminated soil and prevent any further impacts on groundwater.

In response to concerns raised in January 2013 by community representatives, the NSW Environment Protection Authority (EPA) undertook the Botany Mercury Independent Review (the review) of the environmental and health impacts of historic mercury emissions from Orica's former Chlor Alkali plant at Banksmeadow.

The purpose of the review was to determine if there was a significant health risk to the community, and the level of any such health risk, associated with mercury release from Orica's former plant from 1945 until 2002.

### 2.1 Steering Panel

The EPA established the Botany Mercury Independent Review Steering Panel (the Steering Panel) to provide an opportunity for community involvement and input from independent experts to inform and oversee the review.



*Botany Mercury Independent Review Steering Panel. Photo: EPA*

*Front Row L-R: Greg Sheehy, Lynda Newman, Ross Salter, Emeritus Professor Chris Fell  
Back Row L-R: Dr Talebul Islam, Catherine McMahon, Mark Ferson, Professor Alison Jones,  
Dr Klaus Koop, Mark Gifford*

The Steering Panel was established with broad stakeholder representation to guide and oversee each stage of the review. The Panel members were:

- **Chair** – Mark Gifford, Chief Environmental Regulator, EPA
- **EPA representative** – Greg Sheehy, Manager, Sydney Industry
- **Science representative** – Dr Klaus Koop, Director Environment Protection Science, Office of Environment and Heritage
- **Health representative** – Professor Mark Ferson, Public Health Unit Director, South Eastern Sydney Local Health District
- **Botany Bay Council representative** – originally Steven Poulton, subsequently, Catherine McMahon, Principal Planner
- **Randwick City Council representative** – Dr Talebul Islam, Coordinator Waste Management
- **Independent health expert** – Professor Alison Jones, Dean Graduate School of Medicine, University of Wollongong
- **Independent science expert** – Emeritus Professor Chris Fell, Principal Fell Consulting
- **Community representative** – Lynda Newman
- **Community representative** – originally Chantal Snell, subsequently, Ross Salter

The role of the Steering Panel was to oversee the review, select suitable independent experts to undertake each of the three stages, evaluate the results of the investigation and its recommendations and advise on communicating the outcomes to the community.

View the [terms of reference](#) for the Steering Panel for further information.

### 3 Outcomes of the three stages of the review

The review followed the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM) which sets out the nationally adopted standards for investigating contamination.

There were three stages of the review.

- **Stage 1** – a thorough analysis of all available reports, information and data on the former plant and its operations, including information from the community and others. This would provide the community with an understanding of issues and information that would inform Stage 2 of the review.
- **Stage 2** – extensive environmental testing of soils, air, sediments and fish for to determine levels of mercury contamination in residential areas and parks surrounding the former plant and in Penrhyn Estuary. At the request of the Steering Panel, this also included testing for lead, chromium, polychlorinated biphenyls (PCB) and polycyclic aromatic hydrocarbons (PAH) in a residential area around Grace Campbell Reserve at Hillsdale. After presentation of the result, a small number of residential properties were also tested at the request of land owners.
- **Stage 3** – an Environmental Health Risk Assessment to determine the risk of exposure to people using the information from Stages 1 and 2.

There was an option to extend the review to Stage 4 – an Environmental Health Risk Assessment for Individuals. However, the Steering Panel decided that Stage 4 was not required due to the low risk determined after Stage 1, 2 and 3.

The following provides a brief overview of the aims of each stage and the outcomes.

### 3.1 Stage 1: Data and Information Collection and Review

Environmental consultants CDM Smith were engaged following an open tender process. CDM Smith conducted a thorough analysis of all available data (12,000 pages), including information from the community.

#### Aims

The aims of Stage 1 were to:

- undertake a comprehensive independent review and analysis of the available data on the emission and distribution of mercury or mercury-contaminated material. The review would address community concerns and include an analysis of the extent and limitations of the data and information available
- seek other available information (e.g. confidential submissions from members of the public) about potential community exposure to mercury originating from the former Chlor Alkali plant
- determine what further information (e.g. environmental sampling) is needed to assess the potential health risks to the community from mercury emissions from the former plant
- determine the appropriate criteria for risk assessment and environmental testing types, methodologies and locations to assist in determining the health risk. This included any seasonal variation, a staged testing regime and appropriate quality assurance requirements
- provide an independent review.

#### Outcomes

CDM Smith concluded that the risk of off-site soil contamination around the former plant was low, and that there was no evidence of illegal off-site dumping of mercury waste from the Chlor Alkali plant that operated between 1944 and 2002.

To provide additional reassurance to the community, CDM Smith recommended that, as part of Stage 2, a program of environmental testing be carried out.

The EPA undertook a wide range of communication activities to ensure community members had opportunities to find out more information and speak directly with EPA and CDM staff and members of the Steering Panel. These activities included letterbox drops, newspaper advertisements, emails to a community subscriber list, social media alerts, media releases and website updates, community pop-up events and a public meeting in February 2014.

### 3.2 Stage 2: Environmental Testing Regime

In February 2015, following an open tender process, WSP Environmental were engaged to carry out a comprehensive environmental testing program. Testing was to be carried out on public land, parks and reserves within a 1.5 kilometre radius of the former Chlor Alkali plant and in sediments and a number of fish species in Penrhyn Estuary.



*WSP Environmental consultants conduct Stage 2 testing. Photo: EPA*

## **Aims**

The aim of Stage 2 was to conduct environmental testing and analyses as determined by Stage 1, and make recommendations in regard to informing health risk assessments.

For Stage 2, WSP Environmental was also required to identify any significant sources of mercury exposure which might cause possible short- or long-term impacts on the health of the local community from:

- mercury within the ambient air
- mercury in soil samples across parks and road verges surrounding the FCAP
- mercury vapour in stormwater drains
- mercury in sediments and fish in Penrhyn Estuary.

## **Outcomes**

The results revealed that mercury concentrations in the sediments in Penrhyn Estuary were low and mercury levels in fish are all below health safety limits.

Specifically, the findings showed that:

- mercury concentrations in soil were lower than the human health criteria for public open space land use and even below the more stringent residential land criteria;
- mercury vapour concentrations in stormwater drains and at each soil test site were less than the criteria for long-term inhalation exposure
- mercury concentrations in sediments in and around Penrhyn Estuary were below thresholds for protective human contact
- mercury concentrations in fish collected from Penrhyn Estuary were less than the criteria for human consumption
- concentrations of lead, chromium, PCB and PAH in and around Grace Campbell Reserve were well below human health criteria for public open space land use.



From over 300 samples taken, WSP Environmental concluded that the risk to human health from mercury being present in soil and stormwater drains in the area was very low. WSP Environmental also found that mercury concentrations in the sediments in Penrhyn Estuary were low and that the levels in fish were all below health safety limits. The overall result was that the levels were below the criteria for the environmental media sampled and are similar to levels in other urban areas.

The EPA's communications and engagement activities included letterbox drops, newspaper advertisements, emails to a community subscriber list, social media alerts, media releases and website updates, and a public meeting in June 2015 at which the EPA and WSP Environmental presented.

### **3.3 Stage 3: Environmental Health Risk Assessment for Public Health Concerns**

Independent consultants Senversa were engaged through an open tender process to conduct an environmental health risk assessment of the residential area around the Botany Industrial Park.

#### **Aims**

The aim of Stage 3 was to identify any significant routes and significant doses of exposure, including the identification of vulnerable populations like children.

#### **Outcomes**

The Environmental Health Risk Assessment found that the data provided from the previous stages reasonably characterise the area for mercury contamination and were of acceptable quality to use in the decision making process. Importantly, it found that concentrations of mercury in soils, ambient air, sediments and fish were below the screening criteria, demonstrating no expected impact on human health.

Further, concentrations of other potential contaminants, such as lead, chromium, PCB and PAH, that were included in the soil sampling in selected locations around Grace Campbell Reserve were lower than the relevant health screening criteria.

On the basis of these findings, public health risks to the community due to mercury contamination from the former Chlor Alkali plant and/or from other background sources of mercury were not discernibly higher than that expected for the general public in urban areas of New South Wales.

As part of Stage 1, local residents were asked if they would like their property tested. Following the results of Stage 2, four residents elected to have these tests. One residence from this testing program was found to have an anomalously high mercury concentration in a small garden bed. Further comprehensive testing of the residence confirmed this was a single isolated concentration. It was considered most likely that this was a result of residential waste being deposited in the garden bed or the importation of uncontrolled fill or soil rather than emissions from the former Chlor Alkali plant. The area was remediated to the satisfaction of the land owner and the EPA.

## 4 Conclusion

The three year Botany Mercury Independent Review has been both systematic and exhaustive. Results for each of the stages of the rReview outlined in this report have been presented to the community through a wide range of communication channels, which included a number of public meetings to present results and provide opportunities for concerned community members to ask questions of the independent scientists and other Steering Panel members.

All information regarding the review is available on the EPA website, including:

- full reports from each stage of the inquiry
- minutes of all steering panel meetings
- updates of findings
- publications.

Maps have also been created so that any member of the public can view the testing results closest to their property. These documents can be viewed –on the [EPA Orica Botany webpage](#).

The NSW EPA believes, and the Steering Panel are satisfied, that the review into off-site mercury has been a comprehensive and robust process that has engaged closely with the local community.

Given the results of each stage of the review and the conclusions reached the NSW EPA and the Steering Panel is confident that the risk for people who live, work or fish in the area is no higher than for the general NSW population.