Post Implementation Review for the NICNAS Director's 2007 decision to vary conditions on the Australian Inventory of Chemical Substances (AICS) for certain lead compounds used in industrial surface coatings and inks

National Industrial Chemicals Notification and Assessment Scheme – Department of Health and Ageing

February 2013

OBPR Reference 9256

Table of Contents

1 Background

The NICNAS Director decided to annotate the Australian Inventory of Chemical Substances (AICS) for 15 lead compounds in 2007 regarding their use in industrial surface coatings and inks. The effect of these annotations is to require their use in these applications to be notified to NICNAS as new chemicals prior to their introduction. These controls were effective from 1 January 2007, with a phase-in period to 1 January 2009 for certain sectors unable to immediately replace these compounds with lead-free alternatives.

These controls were implemented on the basis that:

- they were supplementary to industry's concurrent and voluntarily phase-out of the use of lead compounds in these applications, noting a regulatory ban was already in place on the use of these chemicals in consumer products;
- these chemicals are highly toxic, especially to the development of children;
- enforcement of and compliance with the current controls at the time was not uniform; and
- safer, non-lead substitutes for these chemicals were available.

1.1 Requirement for a Post Implementation Review

The NICNAS controls arose as a recommendation to the Director, NICNAS, from a NICNAS risk assessment of lead compounds in industrial surface coatings and inks in 2007. This assessment occurred on the basis of the chemicals' toxicity and followed a Ministerial declaration of the compounds to be Priority Existing Chemicals.

NICNAS consulted with stakeholders prior to, and during, the assessment, including the seeking of views on the recommendations contained in the resulting Priority Existing Chemical (PEC) report "Lead Compounds in Industrial Surface Coatings and Inks" as part of the legislated consultation process for the PEC in 2007. Following these consultations, the NICNAS Director decided to implement the PEC recommendation to limit introduction of the lead compounds as existing chemicals in industrial surface coatings and inks via annotation of the AICS under section 13 of *the Industrial Chemicals (Notification and Assessment) Act 1989* (the ICNA Act).

At that time, NICNAS also consulted with the Office of Best Practice Regulation (OBPR) regarding the Government's requirement for Regulatory Impact Analysis (RIA). The OBPR advised NICNAS to conduct a Preliminary Assessment of the impacts of the proposed AICS annotation on business and individuals or the economy. As a result, NICNAS consulted more extensively on the likely impacts.

NICNAS submitted a draft Preliminary Assessment to the OBPR for further discussion, and to determine what level of regulatory analysis was required. The OBPR at that stage determined that the decision to pursue a regulatory approach had already been made, would have a significant effect on business and that a Regulatory Impact Statement (RIS) was therefore needed. As a RIS had not been completed prior to the regulatory decision being made, and a Prime Minister's exemption was not obtained, the OBPR also determined that NICNAS was non-compliant with the best

regulatory practice requirements, and a Post Implementation Review (PIR) was therefore required.

2 Description of the problem and objective of Government action

The problem being addressed by the 2007 annotations was an identified need to supplement a concurrent and voluntary phase out by industry of lead-based pigments used in industrial surface coatings and inks, so as to prevent the exposure of people, particularly workers and children, to lead from these industrial processes. This need arose from the acknowledged harm to humans from the long-term and persistent effects of lead toxicity, and was exacerbated by:

- the lack of a complete ban on the use of lead in the industrial sector (in contrast to the consumer sector where such bans were in place);
- the incomplete use of Personal Protective Equipment (PPE[1]) in certain sectors using lead compounds;
- inconsistent monitoring of worker exposure in the workplace; and
- the lack of a level industry playing field, whereby the voluntary phase out of lead in industrial surface coatings and inks was being taken up mainly by the major businesses in the sector, rather than the smaller introducers of these chemicals.

Hence, the objective of Government action in relation to the annotation of the AICS was to eliminate the exposure of the Australian people to lead compounds in industrial surface coatings and inks.

Further details concerning the nature of the problem are provided in the following sub-sections.

2.1 Toxicity of and exposure to lead and risks to human safety in Australia

Use of lead compounds in gasoline and domestic paints has been restricted internationally for many years. In 2002, the World Summit on Sustainable Development proposed the phasing out of lead in gasoline and the phasing out of lead based paints (UN, 2002).

A large body of evidence has accumulated to show that lead compounds are a source of severe adverse health impacts in humans, particularly in children and workers in lead industries. It has been estimated that 17.3% of children aged 0-1 year in the WHO Western Pacific Region Subregion A (Australia, Japan and New Zealand) in the year 2000 were affected by the loss of IQ points caused by lead exposure. For adults it was predicted that 16.2% would have exhibited slightly elevated systolic blood pressure caused by exposure to lead (WHO, 2009). In the USA it was estimated that in 2002, economic losses caused by lead exposure in children were valued at

[1] PPE is the last element considered in the hierarchy of controls for protecting workers from the hazards of chemicals. The other controls, in order from the most preferred, are: eliminate the hazard, substitute the hazard with a lesser risk, isolate the hazard, use engineering controls, use administrative controls..

$43.4 billion (SAICM, 2009a). In addition to loss of IQ points, it has been suggested that lead exposure to children can cause chronic psychological problems.

A study published by the Australian Institute of Health and Welfare in 1996 estimated that 14.1% of the population had blood-lead levels of 5 – 10 µg/dl with a mean blood-lead level of 2.7 µg/dl in the urban population (WHO, 2009). It was predicted that this would be the level up to 2030 for urban children in the WHO Western Pacific Region Subregion A, with the level for adults being 2.4 µg/dl. These levels are characteristic of countries where the phase out of lead in gasoline (petrol) was completed decades ago. A 2000 study has found that children's maths and reading scores showed reductions correlating to blood-lead levels of 2.5 µg/dl (SAICM, 2009b).

It is estimated that blood-lead levels less than 1 µg/dl represent the theoretical minimum risk of health effects.

The blood-lead levels in the Australian population have most likely come from a variety of sources. The contribution of natural sources of lead to observed blood-lead levels is minimal. This is indicated by the fact that blood-lead concentrations of about 0.016 µg/dl have been measured in pre-industrial humans. It is not possible to decide how much of the baseline blood-lead level is due to exposure to dust from deterioration of domestic paints as against industrial surface coatings, or due to exposure to lead that still remains in the environment from the use of leaded petrol or from other sources. There will also be a contribution from leaching of lead from its reservoir in bone into the soft tissues as the half-life of lead in bone is 27 years.

In Australia, lead compounds have been used as pigments for colouration in surface coatings and inks, and these contribute to blood-lead levels while in use and long after use has been discontinued. Consultations undertaken during the PEC assessment indicated that the 15 lead-based pigment chemicals of concern are not manufactured in Australia, but instead are imported, either as the raw chemical or as the finished, formulated paint. Import quantities of the declared lead compounds into Australia from 2003-2005 for use in industrial surface coatings and inks ranged from 126 tonnes to 316 tonnes, of which:

- approximately 50% was used in automotive applications in 2005;
- 4% were used in inks; and
- 45% were for a range of other industrial surface coating applications, such as bridges, buildings, aircraft, etc.

The PEC report also considered total exposure of Australians to lead (such as through notifications to State health authorities of elevated blood lead levels), wherein it observed that:

- 1-10 occupational-related notifications each year from 2000 to 2005 occurred in Queensland workers removing paint from houses (an industrial application) and industrial structures (such as bridges);
- this compared with 200-1000 notifications for all occupations in NSW from 2000 to 2005; and
- notifications concerning lead-based paint accounted for around 80% of all non-occupational-related notifications in Queensland during 2000-2005.

The report moreover, noted that exposure to consumers could occur through the inappropriate use of lead-containing industrial paints in hobbyist pursuits, such as car restoration.

2.2 Controls in Australia

Controls on hazardous substances in the workplace follow a hierarchy, with substitution being the first priority where possible. If substitution is not possible, engineering controls and personal protective equipment are considered. Lead is judged to be of high concern given the severity of its chronic effects and that it accumulates in the body with a very long half-life.

2.2.1 Existing controls prior to 2007 – 2009 annotations

A number of regulatory initiatives were already in place to control the exposure of workers, the public and the environment to lead in Australia. Paint containing more than 0.1% lead in its non-volatile component[2] has been prohibited for sale for domestic use under Appendix I (Uniform Paint Standards) of the Poisons Standard since 1997.

Workplace controls are in place throughout Australia to limit atmospheric levels of lead and also mandate maximum blood levels of lead for workers[3]. These were based on the National Standard for the Control of Inorganic Lead at Work (NOHSC, 1994). Certain lead chromates are specifically listed in the Hazardous Substances Information System (HSIS) database and the remaining inorganic lead compounds are captured under a general class classification. However, these measures do not represent a ban designed to eliminate exposure.

In contrast to these controls, the majority of the industry had voluntarily decided to cease introduction and manufacture of lead compounds in industrial surface coatings and inks from 2007. This represents a ban designed to eliminate exposure to the extent that businesses participated in the action – the extent of business participation was not assessed in the PEC report.

2.2.2 NICNAS action to address exposure to lead in industrial surface coatings and inks 2006 - 2009

The Australian Paint Manufacturers Federation (APMF) and its members were of the view that lead should be restricted in industrial surface coatings and inks in the same way it had been restricted for many years in domestic paints. The APMF is the peak body representing paint manufacturers in Australia. These paint manufacturers account for around 95% of all paint produced in Australia on a per litre basis.

[2] This is the level of lead that is known to be present when no lead-based pigments are used in inks, and arises from lead impurities present in non-lead based pigments.

[3] The levels are:

- 2.41 μmol/L (50 μg/dL): for males and females not of reproductive capacity,
- 2.41 μmol/L (50 μg/dL): for males of reproductive capacity,
- 0.97 μmol/L (20 μg/dL): for females of reproductive capacity,
- 0.72 μmol/L (15 μg/dL): for females who are pregnant or breast feeding.

At the urging of the APMF, and in accordance with section 51 of the ICNA Act, 15 lead compounds for use in industrial surface coatings and inks were declared priority existing chemicals by the Minister for Health and Ageing on 3 January 2006 for health risk assessment because of the toxicity of lead, particularly to young children. The lead compounds used in industrial surface coatings and inks were identified by an industry focus group meeting and a joint survey conducted by NICNAS and the APMF during 2005 and 2006 prior to the commencement of the assessment. Throughout the process, NICNAS worked closely with the APMF, its members and the paint and ink industries in general.

All relevant companies were involved throughout the assessment and during the consultation period, regardless of membership in the APMF. This was underpinned by a legal requirement for businesses introducing the lead compounds to apply for assessment and provide relevant information into the PEC process. Failure to apply for assessment meant that introducers were prohibited from introducing the declared compounds during the period the chemicals were declared as PECs.

The joint survey of 2005 – 2006 indicated that there were few uses in industrial surface coatings and inks where lead compounds could not be replaced with non-lead substitutes. The survey indicated that there were also few technical barriers to the replacement of lead compounds by non-lead compounds in current product formulations.

2.3 NICNAS PEC assessment of lead compounds in industrial surface coatings and inks

The aim of the assessment was to determine the residual risk to health of adverse effects to workers and the public (noting the concurrent industry action to phase out the use of these chemicals) and identify the controls necessary to address any such risk. The health risk assessment was limited to the use of the identified lead compounds in industrial surface coatings and inks. Current regulatory controls were assessed to identify whether these were adequate.

NICNAS undertook the assessment following a Ministerial declaration of these chemicals as PECs in January 2006. It then published a final report on 20 September 2007 entitled "Lead Compounds in Industrial Surface Coatings and Inks". The process was underpinned by legislated consultations.

2.3.1 Effectiveness of existing controls

NICNAS assessed the effectiveness of existing controls as follows:

- atmospheric and biological monitoring are required under the *National Standard for the Control of Inorganic Lead at Work [NOHSC:1012 (1994)]*. However, no companies provided atmospheric or biological monitoring data during assessment, hence it was not known whether or not compliance with these controls was effective.
- monitoring and reporting of blood lead levels is also mandated under State and Territory occupational health and safety regulations, however, the blood lead level at which reporting is mandatory differs in various jurisdictions, and information on compliance with the controls is not available.

- substitution of lead compounds with non-lead compounds was mostly feasible, supported by a voluntary phase out by industry, however, this process was still underway at the time of the assessment and so its effectiveness was not assessed[4];
- the use of PPE was fairly widespread, but was less completely used in very specific situations, such as small automotive repair shops.

As a result, the PEC assessment concluded that it is not known whether these existing controls are effective overall, and that exposure of workers to lead was likely in some specific cases.

2.3.2 Risk assessment

The PEC assessment noted that workers can be involved in the formulation of coatings, in the preparation of previously coated surfaces for applying coatings and in applying fresh coatings. From the limited use data provided by formulators of industrial surface coatings and inks it was determined that risk to formulators was low. However, the risk of adverse effects from exposure to lead is high for workers involved in sanding and paint stripping and for spray painters. This is consistent with overseas monitoring data in vehicle repair technicians where high blood lead levels were reported. This also suggested that use of personal protective equipment is either not effective or not used to the extent required.

The health effects of lead on children are greater than for adults. Exposure can occur to dust from deteriorating paint in commercial and public buildings, schools, child care centres, and bridges and ships coated with industrial surface coatings. Exposure could also arise as a result of dust remaining in the atmosphere following renovation or remediation activities or exposure from the use of industrial surface coatings at home.

The report also considered if elimination of lead from the workplace was possible by substituting with non-lead alternatives. It concluded that such elimination was generally feasible, but that in a few instances, some businesses would not be able to replace lead with non-lead substitutes due to inferior performance of the pigment or the economics of developing substitutes.

Finally, it concluded that whereas controls on lead in consumer applications are more stringent (including bans on lead or lead compounds in surface coatings of particular products), such controls are not in place in the workplace. Rather, workplace controls

[4] The PEC report noted that the APMF embarked upon a phase out of all lead compounds in industrial surface coatings and inks over the period 2007-2010, whereby:

- the manufacture, import, sale, distribution and end-use of all lead-based paints and coatings used in industrial applications other than automotive and aviation repairs was to cease from the end of March 2008;
- the manufacture and importation of all lead-based paintings and coatings used for automotive and aviation repairs is to cease from the end of December 2008; and
- the distribution, sale and end-use of all lead-based paintings and coatings used for automotive and aviation repairs is to cease from the end of December 2009.

generally relied on exposure standards, whereby exposure to lead was permissible up to a legally defined level.

2.3.3 Recommendations of the report

To summarise:

- the adverse health effects of lead have been recognised for many years, particularly on young children, and the use of lead compounds in surface coatings intended for domestic use has been restricted for some time.
- users of industrial surface coatings containing lead compounds can be exposed to these chemicals by inhalation or through the skin. Workers and the general public risk exposure to lead through repainting of motor vehicles, both commercially and by hobbyists in the home, and repainting of structures such as bridges, where the old lead based paint needs to be stripped off; and
- use of lead free paints will eventually eliminate exposure to lead in these instances and therefore the risk of health effects, to the extent that lead continues to be legally introduced in industrial surface coatings and inks due to an inability to locate lead-free alternatives, and these instances have been notified to, and assessed by, NICNAS.

Based on the above, one of the recommendations in the assessment report was that the NICNAS Director declare lead compounds be phased out of industrial surface coatings and inks at concentrations greater than 0.1% in the non-volatile component. This would occur at the point of introduction through annotation of AICS under Section 13 of the ICNA Act, thereby eliminating the exposure of workers and the public to lead from industrial surface coatings and inks, whilst allowing a legislated conduit for the continued introduction of lead when lead-free alternatives cannot be sourced. These instances must be notified to NICNAS and assessed, so that appropriate risk mitigation measures can be put in place to prevent impacts on human health, safety and the environment[5].

Based on the consultations, a staged approach to implementing the AICS annotations was agreed as some companies/sectors needed time to source alternatives to lead-based pigments, and to allow companies time to reformulate their surface coatings and inks and sell current stocks. As a result, NICNAS introduced the annotations in a phased manner from 1 April 2008 with a complete phase out from industrial surface coatings from 1 January 2009[6]. An example of an annotation is at the Attachment. Note that:

[5] Under Section 5 of the ICNA Act, if a chemical is to be introduced outside of conditions placed on the AICS for that chemical, then that chemical is a new chemical for the purposes of the introduction, and the legislated procedures for the notification and assessment of new chemicals then applies.

[6] The implementation of the annotations followed the consultative process prescribed by Section 13 of the ICNA Act whereby the Director published: a proposal in the Commonwealth of Australia Gazette – Chemical Gazette of June 2007; published a decision that took account of stakeholder comments in December 2007; and finally announced in February 2008 (following a period to allow for any applications to the Administrative Appeals Tribunal to review the decision – none were made) that the annotations would commence from 1 April 2008.

- the sectors that would face particular difficulty in adjusting to the annotations are identified in the annotation itself, namely certain automotive and aeronautical sectors; and
- the continued introduction of these lead compounds in industrial surface coatings and inks at levels greater than 0.1% (ie which signifies the intentional addition of lead pigments to paint) requires notification to NICNAS as a new chemical, thereby triggering an assessment process which allows for appropriate risk mitigation measures to be implemented.

The APMF, with members' support, resolved that members should complete the phase out by 1 January 2010, having sold existing stocks and destroyed any stocks that remained. NICNAS did not introduce a compliance project to monitor the take-up of the annotations by industry as the sector was at that time moving to voluntary removal regardless of the annotations.

The other recommendations in the report were to the Australian Safety and Compensation Council (ASCC)[7] to restrict the use of lead compounds in the industrial surface coatings and inks in the workplace, through amendments to the *National Model Regulations for the Control of Workplace Hazardous Substances*[8], and to the National Drugs and Poisons Schedule Committee (NDPSC)[9] to prohibit supply, sale and use of lead compounds in inks and to review existing requirements for domestic paint containing lead.

Thus, the recommendations were designed as a package, predicated on the voluntary industry phase-out, which would together lead effectively to the removal of lead in industrial surface coatings and inks.

3 Post Implementation Review

The phase out of lead in industrial surface coatings and inks should have been complete by 1 January 2009. Thus this PIR is prepared two to three years later, when the annotations should have had a full effect.

The baseline measure against which impacts are assessed is what would have happened to the introduction of lead in industrial surface coatings and inks had the annotations not been implemented. At this time, industry was already gearing up for a phase out of lead in these products.

To inform the PIR, NICNAS consulted with stakeholders in 2011-2012. Consultations with industry and community comprised an impact survey of formulators (introducers) and users (Master Painters and the general public), mediated through industry associations and unions, to ascertain:

- whether the introduction of lead compounds in industrial surface coatings and inks has discontinued, and if so, whether this would have occurred without the annotations being in place;

[7] In 2009, Safe Work Australia replaced the ASCC
[8] Now the *Model Work Health and Safety Regulations 2011*.
[9] On 1 July 2010, the NDPSC was replaced by two advisory committees, the Advisory Committee on Medicines Scheduling and the Advisory Committee on Chemicals Scheduling

- what were the impacts on business of adjusting to the annotations; and
- if lead compounds were still being introduced, why.

NICNAS also consulted with State and Territory health departments to seek blood lead notification data to ascertain whether the number of individuals notified as having blood lead levels exceeding legislated exposure standards had changed.

Finally, NICNAS also noted any developments in the regulation of lead in industrial surface coatings and inks arising from other portfolios/ jurisdictions, as well as any developments in the toxicology of lead.

These consultations are described more fully in the "Consultations" section.

3.1 Actual Regulatory Impacts of the Annotations

Due to a very low response rate to the impact survey, the following analysis is necessarily qualitative. It is also noted that the continued introduction of lead compounds in industrial surface coatings and inks without notification to NICNAS is illegal under the ICNA Act, and therefore the perception by potential respondents of self-incrimination could be present should they confirm that they are currently introducing these chemicals. This could contribute to the reduced response rate and/or bias responses towards "not introducing".

The sectoral composition of respondents to the business/user survey was:

- Introducers were mostly in the auto refinish/collision repair sector, as well as commercial vehicle/component building, commercial vehicle refurbishing/refinishing and aircraft refurbishing and repairs.
- Master Painters were evenly spread across the auto refinish/collision repair, aircraft refurbishing and repairs and painting of commercial buildings/structures.
- For employee/general public responders, there was a spread of involvement in auto refinish/collision repairs, commercial vehicle refinish/repairs, aircraft refurbishment/repairs and painting structures.

3.1.1 Impacts on business

Overall, the annotations had little impact on business, compared to what would have occurred had the annotations not been implemented, as industry was already phasing out the use of lead compounds in industrial surface coatings. However, as noted during the PEC assessment prior to the introduction of the annotations, a very few businesses reported an inability to locate suitable replacements for lead, and indeed some businesses contacted NICNAS in the years subsequent to 2009 to ascertain whether they might notify the continued use of these chemicals. However, no such notifications were received and therefore it is assumed that business did not accrue a cost of preparing any notifications.

The costs to business of replacing lead compounds in surface coatings and inks were also largely as expected, as were the impacts on the number and range of suppliers – mainly minimal. Again, it was noted to NICNAS that these changes would have

occurred anyway as industry was moving to the voluntary removal of lead compounds from industrial surface coatings.

More specifically, the following impacts on businesses were noted:

Extent of on-going introductions of lead compounds post annotation

- Most introducers noted that they were aware of the annotations, and a smaller portion noted that had the annotations not been put in place, they would have reformulated anyway to remove lead from paints – this reinforces the fact that the annotations were well-communicated and the move to lead-free industrial paints in 2007 was driven by industry and was already occurring as the phase-in period for the annotations commenced.

- Most introducers stated they were not using industrial paint products containing greater than 0.1% lead, although a minority of users observed they were still using lead-based paints. Respondents still using products containing lead in contravention of the annotations were one employee/general public respondent and two master painters. Reasons provided for this continued introduction were:
    - superior performance of a lead-based formulation;
    - orders from particular clients
    - inability to adequately reformulate a product

  This result mirrors observations made to NICNAS during the PEC process.

- A benefit of the annotations was cited by one respondent as that all businesses (ie importers and domestic manufacturers of paints) were now on an equal footing in that they could not work with lead-based paints.

  This indicates that an uneven playing field was in place prior to 2007, as noted in the PEC report.

Use of Personal Protective Equipment (PPE)

- One instance was noted of a Master Painter who sometimes used PPE, whereas the other two respondent Master Painters always used PPE.

  A benefit of excluding the introduction of lead in industrial paints is to prevent exposure to lead of painters who do not use PPE.

Compliance costs – noting that these would have been incurred anyway as industry moved to voluntarily replace lead compounds in industrial surface coatings and inks

- There was a cost associated to reformulation, including development of non-lead alternatives – costs were noted to be ≤ $100,000, and this reflected an increase in the cost of paints of <20%, though others noted this was partly due to inflation.

  NICNAS found pre-annotation that slight changes to costs were expected.

Number and range of suppliers

- The number of paint suppliers had reduced (quantity not requested), primarily as a result of there being fewer suppliers of non-lead based pigments than

there were of lead-based pigments – ie the market had not been able to completely adjust to the change for commercial reasons.

This change was not expected on the basis of the pre-annotation consultations, where it was predicted that the number and range of suppliers would likely not be affected.

3.1.2 Impacts on workers

NICNAS did not observe in its preliminary assessment what the quantitative impacts on workers might be, although the PEC report was predicated on the scientifically-accepted fact that there is no safe level of exposure to lead for humans. The PEC report also noted that the greatest risk of exposure would arise from operations involving surface preparation, where old lead-containing paint is removed, and particularly where the use of personal protective equipment may be poor, such as in small automotive spray-painting workshops.

Post the annotations, NICNAS found that a very few workers were still not using PPE appropriately, and were also still working with lead-containing paints (it is assumed these paints are not old stock given the period of time that has elapsed since the annotations were completely in place – some three years – and therefore these paints were supplied illegally in contravention of the annotations).

Data obtained from state health authorities on blood lead levels and notifications were not comprehensive enough, nor current enough, to decide if the annotations had an impact on blood-lead levels in workers. As an example, Queensland Health noted that blood-lead level notifications for workers engaged in "removal of paint from domestic buildings" and "removal of paint from other structures (boats, bridges) ranged in 2000 through to 2008 from eight to four, with a minimum of 1 in 2002.

Thus, the benefits of lead removal from industrial surface coatings and inks in terms of health effects remain uncertain. However, as mentioned previously, given the current blood-lead levels in the Australian population and the known health effects of lead exposure, the probability of a significant health benefit from elimination is likely. The relative contribution of other main sources of lead – deterioration of lead-containing domestic paints, atmospheric lead from its accumulation in the environment via historical use of leaded petrol, and leaching of lead from stores in bone are difficult to determine.

3.1.3 Impacts on government

The expected impacts of the annotations on government (NICNAS) arise from the legislated consequence that any introductions of lead compounds in industrial surface coatings and inks cause those chemicals to become new chemicals, and therefore notification to NICNAS is required. Impacts on other government agencies were not expected.

No notifications from industry were received by NICNAS post-annotation, and therefore no impacts on NICNAS accrued. Moreover, NICNAS did not undertake compliance checks following the introductions of the annotations due to the moves by

industry at that time to voluntary replace lead compounds in industrial surface coatings. Hence the impacts on NICNAS of implementing the annotations were negligible.

3.1.4 Overall impacts of the annotations

Given the voluntary replacement by industry of lead compounds in industrial surface coatings and inks, the annotations had, at best, a marginal utility in preventing the introduction of lead compounds these applications. The annotations at best **served** to:

- discourage introductions by small businesses that are not members of industry associations and so were less likely to comply with a voluntary withdrawal program;
- protect workers in vulnerable occupations where poor PPE practices exist; and
- provide a legislated conduit for businesses unable to develop appropriate replacements for lead compounds to notify these instances to NICNAS for assessment and the development of appropriate mitigation measures, which nonetheless was not taken up.

However, the extent to which the above benefits were realised may have been improved by the establishment of a targeted monitoring and compliance program to supplement the educational measures that NICNAS had put in place.

The above conclusions need to be qualified by the following two factors that confound assigning a causative relationship between the reported decrease in introductions of lead (regardless of whether this was due to the annotations or to the voluntary industry action) and any reductions in blood lead levels (which can be used as an indicator of health impacts):

- the body stores lead in bone with a half-life of 27 years, and this is known to leach into the soft tissues – hence lead in bone acts as a reservoir for continued toxicity after external exposure to lead has stopped. Therefore, the accumulated body burden would not be expected to reduce significantly over the period in which the annotations to the AICS have been in place; and
- painters undertake two basic operations – stripping away old paint and mixing/applying new paint. Where painters are stripping away paint on structures that have a long maintenance cycle (bridges are an example) the paint that is being stripped would have originally been laid down pre 2007-2009 (ie pre-annotation), and so will likely contain lead. Hence painters will be exposed post the annotations to lead when stripping paint in this situation, even if they are then applying fresh paint that is lead free.

3.2 Future of the annotations

NICNAS is of the view that the fundamental need behind the government action to annotate the AICS in relation to the use of certain lead compounds in industrial surface coatings and inks has continued since 2007-2009 as:

- a scientific view has emerged since 2007 (for example, as discussed at a national public forum entitled “Eliminating Childhood Lead Toxicity in

Australia – A little is Still too Much" on 5 June 2012, held at Macquarie University, NSW), that the current exposure standards for lead in Australia are set too high (at 10µg/dl blood), and should be lowered 10 fold (to less than 1µg/dl blood)[10];

- Safe Work Australia did not implement the NICNAS recommendation to restrict the use of lead compounds in industrial surface coatings and inks. However, independent of the NICNAS recommendation, it has incorporated into the new Model Work Health and Safety Regulations 2011[11] a general limit on exposure of workers to lead, as well as a limited control at 0.1% in relation to abrasive blasting on the basis of an existing control at the state level. Therefore, national model controls to prevent the use of lead in the workplace are still extremely limited;
- Safe Work Australia also noted in its Regulatory Impact Statement to the new Model Regulations[12] that there is inconsistency in how some jurisdictions address model regulations pertaining to lead in the workplace, including biological monitoring of blood lead levels in workers – this was also observed in the 2007 PEC assessment report; and
- there is evidence of the continued introduction of lead in industrial surface coatings and inks due to an inability to locate suitable lead-free alternatives – hence there is a continued exposure to workers and possibly the public.

Given the findings of the impact survey reported in Section 3.1 combined with the above scientific and regulatory developments post 2007, NICNAS is of the view that there is a continued need to limit the introductions of lead in industrial surface coatings and inks, whilst providing a legislated conduit for businesses unable to find suitable alternatives to lead to notify NICNAS so these uses can be assessed and adequate controls put in place.

4 Consultations

NICNAS undertook consultations on the annotations of the AICS in two stages – pre-annotation and post annotation.

4.1 Pre-annotation consultations

These consultations occurred in the preparation of the 2007 PEC report, were mandated under the ICNA Act, and were facilitated by relevant industry associations. These consultations involved:

[10] Letter by Taylor et al to Medical Journal of Australia 197(9), p493, 5 November 2012
[11] Schedule 10, item 11 (Restricted Hazardous Chemicals, lead and compounds) limits exposure from abrasive blasting to 0.1%, which has been revised down from the 1% limit in the analogous schedule to the *National Model Regulations for the Control of Workplace Hazardous Substances 1994*.
[12] Decision Regulation Impact Statement for National Harmonisation of Work Health and Safety Regulations and Codes of Practice, 7 November 2011, section 6.9.2 Lead

- declaration by the relevant Minister of the 15 lead compounds as PECs – as a result, persons introducing these chemicals were required by law to "apply" to NICNAS as "applicants" to the PEC assessment;
- persons introducing these chemicals were obliged to provide information on introductions, exposures, etc to NICNAS to inform the assessment (users and governments were also consulted, though under the ICNA Act, they were not obligated to respond); and
- NICNAS provided a draft of the PEC report for public comment and correction, before publication of the final report.

During this mandated process, NICNAS conducted a survey of introducers to ascertain the volumes of introduction and how these chemicals are used. In developing the recommendation to the NICNAS Director on the annotations, NICNAS also consulted with industry on likely impacts, and consequently developed the phased approach to provide an appropriate time period for business to develop alternatives to lead compounds and thus comply with the annotations.

4.2 Post annotation consultations

With the assistance of industry associations and other stakeholder groups, NICNAS again conducted an impact survey to ascertain actual impacts of the annotations. Three separate instruments tailored to specific stakeholders were developed, and the response rates were:

- Introducers – companies that import finished paint products, formulate paint products in Australia or who manufacture lead –based pigments in Australia – 12 respondents;
- Master Painters – businesses that undertake contract paint work – six respondents; and
- Employees and the general public – painters who work for contractors and enthusiasts who use industrial paints for home use (such as touching up cars) – five respondents.

As the continued introduction of lead in industrial surface coatings and inks, without notification to NICNAS, is illegal under the ICNA Act, NICNAS was concerned that admission by an introducer of continued introduction would be regarded by the respondent as self-incrimination, thereby discouraging truthful responses. To address this likely limitation, the survey instrument directed to Master Painters was also designed as a check against the accuracy of responses from Introducers.

The number of introducers who responded (12, proportion of APMF members unknown) can be compared to the number of companies reported in the PEC assessment report as introducing lead in paints in 2007 (101, with 44 being APMF members). Hence the representativeness of the respondents is extremely uncertain. However, at least for the largest group, introducers, there is consistency in the responses that suggests they may represent the true situation. For the other groups, the responses should be regarded as anecdotal but, to the extent they are consistent with those of the introducers, reflective of the actual situation.

In order to ascertain whether the annotation might have caused an actual change in the extent of lead exposures to workers, NICNAS also sought blood-lead level data reported to State and Territory health departments. Only NSW, Victoria and Queensland responded.

The data provided from post-annotation consultations is presented in the Appendix in summary and detailed form, along with the survey instruments.

5 Conclusion

Based on the above evidence and discussion, this PIR concludes that:

- the 2007 annotations of 15 lead compounds to phase-out their use in industrial surface coatings and inks were marginally effective in reducing the risk to workers and the public from lead used in industrial surface coatings and inks with minimal imposts on business, given:
    - the concurrent voluntary industry program to phase out such use, and
    - that in some specific sectors, poor PPE practices were in place; and
- the annotations should continue in their current form, with appropriate monitoring and compliance, given the:
    - increased scientific concern over appropriate standards for blood lead levels; and
    - continuing, though isolated instances of lead introductions, possibly for appropriate commercial reasons, combined with continuing poor use of PPE in some sectors, which therefore requires on-going assessment and management of associated risks.

6 References

SAICM, 2009a – Lead in Paint: Intergovernmental Forum on Chemical Safety. *Geneva* 2009. Click here to read the SAICM report.

SAICM, 2009b – Submission by the Intergovernmental Forum on Chemical Safety in relation to phasing out the use of lead in paint. Click here to read the SAICM report.

UN, 2002 - United Nations: World Summit on Sustainable Development. Johannesburg 2002. Click here to read the UN report

WHO, 2009 – Comparative Quantification of Health Risks, Lead Exposure, volume 2 chapter 19, pp 1495 – 1542. Click here to read the WHO report

7 Appendix 1 - Example annotation of the AICS

EXAMPLE ANNOTATION OF A LEAD COMPOUND – EXTRACTED FROM THE AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES, 29 JUNE 2012

AICS Listing

CAS No:	1309-60-0
Chemical Name:	Lead oxide (PbO2)
Molecular Formula:	O2Pb
Assessed by NICNAS:	Yes
Associated Names:	• Lead dioxide

IMPORTANT INFORMATION ABOUT THIS CHEMICAL

Condition of Use

The importation and manufacture of this chemical is subject to the following conditions of use under section 13 of the Industrial Chemicals (Notification and Assessment) Act 1989.

1. This chemical must not be imported or manufactured for use in any industrial surface coating or as a component of industrial surface coatings at concentrations greater than 0.1%*, EXCEPT for use in industrial surface coatings or in any components of industrial surface coatings for the following industrial applications:
    a. Auto refinish car collision repairs;
    b. Commercial vehicle and component building;
    c. Commercial vehicle refurbishing and repairs;
    d. Aviation building (heavy, general and light); and
    e. Aviation refurbishing and repairs.
2. This chemical must not be imported or manufactured for use in any ink or as a component of inks at concentrations greater than 0.1%*, when intended for industrial uses.

3. From **1 January 2009**, this chemical must not be imported or manufactured for use in any industrial surface coating or as a component of industrial surface coatings at concentrations greater than 0.1%*.

**calculated on the non-volatile component of the surface coating or ink.*

The chemical is deemed to be a new industrial chemical under the definition given in section 5 of the Industrial Chemicals (Notification and Assessment) Act 1989 if the proposed use does not meet the above conditions.

For further information contact info@nicnas.gov.au.

NICNAS Priority Existing Chemical (PEC)

This chemical has been reviewed as a part of the NICNAS Priority Existing Chemical (PEC) assessment process. NICNAS assesses existing chemicals on a priority basis in response to concerns about their health or environmental effects, or both. To search for a specific NICNAS PEC report, click here.

Data Current as at 29 June 2012

8 Appendix 2 - Post annotation consultations

In order to undertake the PIR, NICNAS again consulted with the APMF and other industry players in order to frame relevant questions for surveys. To this end, the Australian Master Painters Association (AMPA) and the trade union movement were approached to assist. Three targeted survey instruments were prepared in consultation with these bodies and placed on the Survey Monkey website from 2 February 2012 to 27 April 2012. These were aimed at Introducers (**Attachment 1**), Master Painters (**Attachment 2**) and Employees/General Public (**Attachment 3**). The APMF, AMPA and the union movement agreed to publicise the survey through their membership.

The results of the survey are tabulated in **Attachment 4**.

The survey asked respondents:

- were you in the industry prior to 1 April 2008 and did you stay in the industry?
- are you currently using (marketing) industrial paint products containing greater than 0.1% (dry weight) lead?

- Questions to introducers only:
    - Were you aware of the annotations?
    - how many products needed reformulation?
    - are you introducing lead containing products?
    - how long did this take?
    - at what cost (also source of cost)
    - what proportion of the product range was this?
    - could all coatings be reformulated?
    - were you planning to remove lead?
    - is introducing new coatings easier? and
    - how did the cost compare with predicted?
- Questions to Employees and Master Painters only:
    - what was the change in cost of coatings since 1 April 2008?
    - has the range of industrial paints available changed since 1 April 2008?
    - how has the number of suppliers changed?
    - what is the annual volume of paints and demand?

In addition questions about personal protective equipment, identifying market segments and blood-lead level data were included.

NICNAS also:

- contacted State Health Departments concerning numbers of workers notified as having blood-lead levels higher than the allowed maximum.
- consulted internally with its chemical assessors to ascertain as to whether introducers had notified the annotated lead compounds as new chemicals since the annotations commenced - any continued introductions of these lead compounds post annotation without notification is illegal under the Act.

8.1 Attachment 1 - Business Impact Survey – Introducers

BUSINESS IMPACT SURVEY
ON THE EFFECT OF THE REPLACEMENT OF LEAD BASED PIGMENTS IN INDUSTRIAL SURFACE COATINGS AND INKS ON INTRODUCERS

This survey can be completed electronically and submitted online.

ORGANISATION:

. . . . . .

ABN:

. . . . . .

Contact details:

. . . . . .

. . . . . .

1. Are you aware of the AICS annotations to restrict the concentration of certain lead compounds in industrial surface coatings and inks? (please select from drop down list)

2. Were you involved in the surface coatings and/or inks market prior to 1 April 2008? (please select from drop down list)

3. Were you involved in the surface coatings and/or inks market after 1 January 2009? (please select from drop down list)

4. If you were involved in the surface coatings and/or inks market before 1 April 2008, after that date did you?

☐ Quit the market

☐ Stay in the market but reduce your product range

☐ Stay in the market and reformulate all relevant products

☐ Stay in the market and reformulate some products

☐ Other (please specify)

. . . . . .

. . . . . .

5. What was the reason for your action in question 4 above? For example the NICNAS AICS annotations on lead compounds; market forces.

. . . . . .

. . . . . .

6. Which market segment(s) do/did you supply? (check one or more boxes)

☐ Auto refinish/collision repair

☐ Commercial vehicle and component building

☐ Commercial vehicle refurbishing and repairs

☐ Aircraft and component building

☐ Aircraft refurbishing and repairs

☐ Other (please specify)

. . . . . .

7. Are you or were you? (check one or more boxes)

☐ A manufacturer of lead compounds

☐ An importer of lead compounds

☐ A manufacturer of coatings

☐ An importer of coatings

☐ A manufacturer of inks

☐ An importer of inks

☐ A formulator of industrial surface coating and/or inks

8. If you were not involved in the surface coatings and/or inks market before 1 April 2008 and subsequently became involved, what was the reason you entered the market?

. . . . . .

. . . . . .

9. Are you currently marketing surface coating and/or ink products containing lead compounds at concentrations greater than 0.1% in the non-volatile component? (please select from drop down list)

10. If you formulated industrial surface coatings and/or inks prior to the AICA annotation, how many surface coating or ink products containing lead did you need to reformulate?

. . . . . .

11. What proportion of your surface coating or ink product range did this represent? (please select from drop down list)

12. How long did it take you to complete reformulation?

. . . . . .

13. Were any surface coatings or inks containing lead unable to be reformulated? (please select from drop down list)

14. What proportion of your surface coating or ink product range did this represent? (please select from drop down list)

15. Please attach a list of the chemical compounds (correct chemical name and CAS No. where available) used as

substitutes for the lead compounds and the lead compounds they replace

. . . . . .

16. **What is the approximate annual volume of coatings or inks containing lead replacements you introduce?**

. . . . . .

17. **Has this volume changed compared to the volume of surface coating or ink products you introduced prior to the change in regulation? (please select from drop down menu)**

18. **If your volume of introduction has changed, to what do you attribute this change? For example the NICNAS AICS annotations on lead compounds; market forces.**

. . . . . .

19. **What was the approximate overall cost resulting from replacing lead in your products?**

. . . . . .

20. **Were you planning to remove lead compounds from your products even if the AICS annotations did not go ahead? (please select from drop down menu)**

21. **If you answered "yes" to Ques. 20 how did the actual cost compare with your budgeted/anticipated costs of removing lead compounds from your products? (please select from drop down menu)**

22. **What was the percent difference between the actual cost compared with your budgeted/anticipated costs of removing lead compounds from your products? (please select from drop down list)**

23. **What activities contributed to your costs? (please select one or more from drop down menu)**

24. The use restriction on lead in surface coatings and inks was introduced in 2008 & 2009. Since the relevant date for your market sector, has the number of suppliers changed? (please select from drop down menu)

25. If changed, to what do you attribute the change?

. . . . . .

26. Because of the AICS annotation has the introduction of new industrial surface coating and ink products been made easier or more difficult?

27. What is the reason for your answer to question 26 above?

. . . . . .

28. Do you undertake blood lead level monitoring of your employees? (please select from drop down list)

29. If you answered "yes" to Ques. 28 would NICNAS be able to have access to de-identified employee results? * (please select from drop down list)

30. Are there any other comments you wish to make regarding impacts of the restrictions on lead compounds in surface coatings and inks?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

*** Please note:**
1.You are not under any obligation to provide blood lead level data to NICNAS.
2. If employee blood lead levels are provided to NICNAS the data will be aggregated in any report though it may be broken up by occupational sectors.
3. Companies will not be identified.
4. If you answered "yes" to Ques. 29, NICNAS will contact you to discuss our request.

8.2 Attachment 2 - Business Impact Survey – Master Painters

SURVEY OF MASTER PAINTERS
ON THE EFFECT OF THE REPLACEMENT OF LEAD BASED PIGMENTS IN INDUSTRIAL SURFACE COATINGS

This survey can be completed electronically and submitted online.

<u>Definition:</u> in this survey, the term "industrial" means products that are not generally used in the painting of domestic structures, such as houses, flats etc and structures associated with a domestic use such as outbuildings and fences.

ORGANISATION/NAME:

. . . . . .

ABN (if applicable):

. . . . . .

Contact details:

. . . . . .

. . . . . .

1. Were you involved in the industrial painting industry prior to 1 April 2008? please select from drop down list)

2. Are you currently involved in the industrial painting industry? please select from drop down list)

3. If you were not involved in the industrial painting industry before 1 April 2008 and subsequently became involved, what was the reason for this?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

4. If you were involved in the industrial painting industry before 1 April 2008 and subsequently left the industry, what was the reason for this?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

5. Are you?

☐ A company employing painters

If yes, how many painters do you employ?.....

☐ A labour contracting company hiring out painting contractors

If yes, how many painting contractors do you hire out?.....

☐ A self employed sole trader

6. Are you currently using personal protective equipment when doing painting or painting related work? (please select from drop down list)

7. If yes, what is equipment?

. . . . . .

. . . . . .

. . . . . .

8. Are you currently using industrial paint products containing greater than 0.1% by dry weight of lead? (please select from drop down list)

9. If yes, what is/are the brand(s) of paint?

. . . . . .

. . . . . .

. . . . . .

10. Which market segment(s) do you work in? (check one or more boxes)

- ☐ Not applicable (go to ques 9)
- ☐ Auto refinish/collision repair
- ☐ Commercial vehicle and component building
- ☐ Commercial vehicle refurbishing and repairs
- ☐ Aircraft and component building
- ☐ Aircraft refurbishing and repairs
- ☐ Painting of commercial buildings (eg factories)
- ☐ Painting of structures (eg bridges)
- ☐ Other (please specify)

. . . . . .

11. Since 1 April 2008 has there been any change in the cost of paints? (please select from drop down list)

12. If the cost of paints has changed, how much has this change been (please select from drop down list)

13. What do you think has contributed to any change in costs?

. . . . . .

. . . . . .

. . . . . .

14. Has the range of industrial paints available to you changed since 1 April 2008? (please select from drop down list)

15. What do you think has contributed to any change in product availability?

. . . . . .

. . . . . .

. . . . . .

16. What is the approximate annual volume of industrial paints you purchase?

. . . . . .

17. The use restriction on lead in surface coatings and inks was introduced in April 2008. Has the number of suppliers in your market sector changed since then? (please select from drop down menu)

18. If changed, to what do you attribute the change?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

19. Do you undertake blood lead level monitoring of your employees or if self employed, have you had your blood lead levels measured? (please select from drop down list)

20. If you answered "yes" to Ques. 19 would NICNAS be able to have access to de-identified results? * (please select from drop down list)

*** Please note:**

- **You are not under any obligation to provide blood lead level data to NICNAS.**
- **If blood lead levels are provided to NICNAS the data will be aggregated in any report though it may be broken up by occupational sectors.**
- **Companies and individuals will not be identified.**
- **If you answered "yes" to Ques. 15, NICNAS will contact you to discuss our request.**

21. Are there any other comments you wish to make regarding impacts of the restrictions on lead compounds in surface coatings and inks?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

8.3 Attachment 3 – Survey of Workers & the General Public

SURVEY OF WORKERS & THE GENERAL PUBLIC ON THE EFFECT OF THE REPLACEMENT OF LEAD BASED PIGMENTS IN INDUSTRIAL SURFACE COATINGS AND INKS

This survey can be completed electronically and submitted online.

<u>Definition:</u> in this survey, the term "industrial" means products that are not generally used in the painting of domestic structures, such as houses, flats etc and structures associated with a domestic use such as outbuildings and fences.

Name:

. . . . . .

Contact details:

. . . . . .

. . . . . .

1. Were you involved in the industrial painting industry prior to 1 April 2008? please select from drop down list)

2. Are you currently involved in the industrial painting industry? please select from drop down list)

3. If you were not involved in the industrial painting industry before 1 April 2008 and subsequently became involved, what was the reason for this?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

4. If you were involved in the industrial painting industry before 1 April 2008 and subsequently left the industry, what was the reason for this?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

5. Are you?

☐ A worker employed in industrial painting

☐ A worker employed by a labour contracting company

☐ A person who is not employed as a painter but uses industrial paints in the home (eg restoring or undertaking body repair work on vehicles)

6. Are you currently using personal protective equipment when doing painting or painting related work? (please select from drop down list)

7. If yes, what is equipment?

. . . . . .

. . . . . .

. . . . . .

8. Are you currently using industrial paint products containing greater than 0.1% by dry weight of lead? (please select from drop down list)

9. If yes, what is/are the brand(s) of paint?

. . . . . .

. . . . . .

. . . . . .

10. Which market segment(s) do you work in? (check one or more boxes)

- ☐ Not applicable (go to ques 9)
- ☐ Auto refinish/collision repair
- ☐ Commercial vehicle and component building
- ☐ Commercial vehicle refurbishing and repairs
- ☐ Aircraft and component building
- ☐ Aircraft refurbishing and repairs
- ☐ Painting of commercial buildings (eg factories)
- ☐ Painting of structures (eg bridges)
- ☐ Other (please specify)

. . . . . .

11. Since 1 April 2008 has there been any change in the cost of paints? (please select from drop down list)

12. If the cost of paints has changed, how much has this change been (please select from drop down list)

13. What do you think has contributed to any change in costs?

. . . . . .

. . . . . .

. . . . . .

14. Has the range of industrial paints available to you changed since 1 April 2008? (please select from drop down list)

15. What do you think has contributed to any change in product availability?

. . . . . .

. . . . . .

. . . . . .

16. What is the approximate annual volume of industrial paints you purchase?

. . . . . .

17. The use restriction on lead in surface coatings and inks was introduced in April 2008. Has the number of suppliers in your market sector changed since then? (please select from drop down menu)

18. If changed, to what do you attribute the change?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

19. Have you ever had your blood lead levels measured by your employer or if home user, have you had your blood lead levels measured? (please select from drop down list)

20. If you answered "yes" to Ques. 19 would NICNAS be able to have access to de-identified results? * (please select from drop down list)

*** Please note:**

- **You are not under any obligation to provide blood lead level data to NICNAS.**
- **If blood lead levels are provided to NICNAS the data will be aggregated in any report though it may be broken up by occupational sectors.**
- **Companies and individuals will not be identified.**
- **If you answered "yes" to Ques. 15, NICNAS will contact you to discuss our request.**

21. Are there any other comments you wish to make regarding impacts of the restrictions on lead compounds in surface coatings and inks?

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

8.4 Attachment 4 – Results of Surveys

A summary of the survey results is presented at Table 1.

The number of introducers who responded (12, proportion of APMF members unknown) can be compared to the number of companies reported in the PEC assessment report as introducing lead in paints in 2007 (101, with 44 being APMF members) and 2011 (30 were APMF members, total number of introducers not queried). Hence the representativeness of the respondents is extremely uncertain. However, at least for the largest group, introducers, there is consistency in the responses that suggests they may represent the true situation. For the other groups, the responses should be regarded as anecdotal but, to the extent they are consistent with those of the introducers, reflective of the actual situation.

- Introducers – companies that import finished paint products, formulate paint products in Australia or who manufacture lead –based pigments in Australia – 12 respondents;
- Master Painters – businesses that undertake contract paint work – six respondents; and
- Employees and the general public – painters who work for contractors and enthusiasts who use industrial paints for home use (such as touching up cars) – five respondents.

Table 1 Results of surveys (individual responses) of Employees and General Public, Master Painters or Manufacturers/Importers of Industrial surface coatings or Inks[13]

	Introducers	Master Painters	Employees and General Public
Number of Respondents	12	6	5
Sectors[14]	9 automotive 2 aviation 6 general industrial	1 automotive 1 aviation 2 general industrial	3 automotive 1 aviation 2 general industrial
Were you aware of the annotations?	10 (Yes) 1 (No) 1 (Don't know)	N/A	N/A
Were you involved in the industrial painting industry prior to 1 April 2008?	7 yes 4 no 1 don't know	3 yes	4 yes

[13] "N/A" – not applicable – the question was not asked in the instrument
[14] Respondents can be in multiple sectors

	Introducers	Master Painters	Employees and General Public
After 1 April 2008 did you stay in the industry? reasons for answer.	7 yes (and reformulated all products) (one of these specifically cited AICS annotations as reason for reformulating product)	3 yes 1 no	3 yes 1 no
Did you stay in the industry after annotations were completed (1 January 2009)?	8 yes 1 no 1 don't know	N/A	N/A
Did your introduction of lead compounds change following the annotations?	No. respondents manufacturing lead compounds – changed from 2 to nil Importers of lead compounds – changed from 3 to 1.		
Are you currently using (marketing) industrial paint products containing greater than 0.1% (dry weight) lead?	9 no (3 did not answer)	2 yes: 1 response: spray enamel, epoxy and polyurethane 1 no	1 yes 2 no
Number of products needing reformulation; how long to complete reformulation; cost; proportion of product range	3-20 products (across 6 respondents) 1 month – 3 years $5-100k Mostly <10% of product range	N/A	N/A
Source of cost	2 New machinery 2 Manufacturing 4 R & D	N/A	N/A
Could all coatings be reformulated?	9 Yes		
Change in cost since 1 April 2008	N/A	1 Increased by < 10% (due to manufacturing, labour and materials) 2 Decreased	2 Increased by <20% (1 respondent attributed increase to inflation)

	Introducers	Master Painters	Employees and General Public
Were you planning to remove lead even if annotations did not go ahead?	5 yes 1 no	N/A	N/A
How did the reformulation cost compare with predicted?	2 greater 2 as predicted	N/A	N/A
How has the number of suppliers changed?	2 unchanged 2 decreased	1 unchanged 1 decreased	Nil response
Is introducing new coatings easier?	2 yes 2 same as before ("all companies have same restrictions")	N/A	N/A
Has the range of industrial paints available changed since 1 April 2008?	N/A	1 unchanged 1 increased 1 decreased	1 increased 1 unchanged
Annual volume of paints and demand.	40,000 L; 1,000 L; 2,000 L; 10,000 L 1 increased 4 no change	100, 99 L	N/A
Extent of personal protective equipment use	N/A	2 yes 1 sometimes	3 yes