

Responses to issues raised by Action Group

The Action Group opposing the Used Lead Acid Battery (ULAB) recycling facility held community meetings at the Hazelwood North Hall in October. Chunxing Corporation Pty Ltd (and Ascend) requested to attend but the Group declined our request. Consequently, we have prepared some responses to key claims made in the Action Group's media release, as well as in their meeting material.

Claim #1: The proposed battery recycling facility in Morwell will release lead in the air

- From our very first community meeting we have demonstrated through modelling (of actual emissions data from the China plant into the Hazelwood North context) that lead emissions will be extremely low – much lower than the other main (modern) plant in Australia.
- The worst case modelling result anywhere in the Hazelwood North area shows lead emissions at 300 times lower than EPA standards set to protect human health.
- At the nearest residences (approx. 1.2km plus away) the emissions are virtually zero (1,500 times lower than EPA standards), which is undetectable by field monitoring equipment. The school is further away again (1.6 km).
- Science does not deal in zeroes. There is always a number – a concentration – of pollutants in the air now and from computer modelling. In this case, the modelled number is extremely low.
- Putting this into context, a person spending 24 hours a day at the closest house who also drinks eight glasses of water a day from the tap of a completely safe water supply has the potential to be exposed to around 200 times more lead from drinking that water than from breathing the Hazelwood North air. At no stage would that person be risking their health or at risk of “lead poisoning”.

Claim #2: The World Health Organisation (WHO) say “there is no safe level of lead”

- This is a misleading statement.
- The WHO's document¹ is actually written to address a worldwide problem of lead impacts from unregulated, sometimes backyard recycling operations, particularly those in developing countries. The proposed ULAB facility will be heavily regulated using modern technology and techniques to ensure the safety of its employees and the community.
 - To compare the environmental credentials of these approaches with those of the proposed facility is like comparing the speed of a horse and cart with that of a jumbo jet. They both get you from A to B though, in the same way rudimentary and high-technology recycling both recover lead.
- Lead is present in the earth's crust and as a result is naturally present in soil, water and air. It is also found in processed foods and some consumer products. A safe level of lead is measured by a set of standards. The WHO's own safe level of lead in drinking water is set at 10 µg/L. These levels are not and should not be a cause for concern.

¹ <https://apps.who.int/iris/bitstream/handle/10665/259447/9789241512855-eng.pdf;jsessionid=55BF2AF42FB395A7AB91BDE9EDB275E7?sequence=1>

- There is no question about the health and environmental impacts of lead – that is why it is important to recycle batteries in a highly-controlled facility, so it does not leach into the environment and contaminate soil, water supplies and beyond.

Claim #3: There could be “lead poisoning” due to air emissions from this plant

- This claim is completely unsubstantiated. The level of emissions are such that it would be impossible to get “lead poisoning” from breathing the air in the area of this facility.
- As stated above, any emission levels are so low as to be indistinguishable from background levels – levels which do not cause lead poisoning.
- Lead poisoning is a specific condition from repeated exposure to excessive levels of lead. These days, lead poisoning can occur from unwitting exposure to lead-containing paint, such as when renovating an old house.
- Before 1970, paint used in many Australian houses contained high levels of lead. At that time, the Australian Uniform Paint Standard was amended to reduce the amount of lead in domestic paint from the previously recommended level of 50 per cent to one per cent. The maximum content was further reduced to 0.25 per cent in 1992 and to the current level of 0.1 per cent in 1997. In other words, lead may have been heavily reduced in paint but it has not been “removed”.
- The maximum lead concentration modelled at the nearest residence (or the school) is 0.000002 mg/m³. This converts to 0.00000024 parts per million (ppm). Leaded paint in old houses is 500,000 ppm and the maximum allowable lead in paint today is 1,000 ppm.
- Comparing lead concentrations from paint versus air:
 - Pre-1970s paint is **2,000 billion times** more concentrated in lead than the air around the plant
 - Current legal maximum concentration paints would be **4 billion times** more concentrated in lead than the air around the plant

Claim #4: Any level of lead can cause poisoning

- As described in point 3 above, this statement is categorically wrong. Low levels of lead exposure cannot cause lead poisoning. The levels modelled at the Chunxing facility simply cannot result in lead poisoning – they will not even be able to be measured at people’s residences.
- Lead poisoning is a specific condition from repeated exposure to excessive levels of lead. These days, lead poisoning can occur from unwitting exposure to lead-containing paint, such as when renovating an old house.

Claim #5: The proposed facility is “a very old process” and “outdated technology”

- Nothing could be further from the truth. The current China facility is four years old and uses world-leading technology – its Vertical Smelt Furnace has been granted a Chinese invention patent.
- The only thing “very old” about it is the word ‘smelting’. Unlike traditional secondary lead smelting, Chunxing maximises lead recovery by employing both a ‘melting’ furnace (for one type of lead) and a ‘smelting’ furnace for the other type of lead present. This furnace has unique design characteristics to ensure high reaction efficiency and its chemistry is process-controlled to minimise emissions and maximise lead recovery.

- The evidence of how new this technology is shows in its emissions performance. The other Australian plant is modern (2012), was 'best practice' at the time of its commissioning and is well-run and well-regarded by NSW EPA. Emissions from the Hazelwood North plant are modelled to be significantly lower than this.
- This is because of the intelligent chemistry, process control, automation and other engineering features it uses, plus its comprehensive pollution control system: multiple wet scrubbers, adsorbent dosing, cooling chambers and baghouse. No other ULAB recycler goes this far.

Claim #6: There are new technologies that are less dangerous; “much safer” technologies are based on electrolysis or solvents

- This statement is misguided and incorrect. The new technologies suggested are either far more dangerous or unproven beyond lab scale.
- Other technologies have been evaluated in the Works Approval application, alongside Chunxing's VSF furnace and associated technology. Two other 'newer' technologies were identified:
 - Hydrometallurgical (electrolytic) lead reduction
 - Solvent dissolution followed by electrolysis.
- The only commercially available hydrometallurgical technology is based on leaching with hydrofluoric acid, followed by electrowinning. This technology was trialled 40 years ago in Port Kembla, NSW and could not be commercialised due to major issues around health and safety, and environmental performance. Currently there is one commercial plant believed to be operating in Asia with many challenges of health and safety issues.
 - Fluorinated acids are extremely dangerous. Australia's chemical assessment body (NICNAS) notes of hydrofluoric acid: “acute exposure through either inhalation or skin contact has led to deaths in humans and that even contact with dilute solutions (0.1%) can “cause painful second and third degree burns that heal very slowly.”
 - The Action Group's own handout states that hydrofluoric acid can cause harm, including from inhalation: “can cause death from an irregular heartbeat or from fluid build-up in the lungs.”
- Apart from these health effects, neither fluosilicic nor fluoboric acid (fluorinated acids similar to hydrofluoric acid) can be kept from decomposing and releasing fluoride ions that could precipitate lead as lead fluoride, which is highly corrosive. The literature states that this “high corrosiveness limits commercialisation of processes using these chemicals.”
- Chunxing is not comfortable taking such risks with that kind of technology in Australia due to potential emission fluorine gas and leakage of reagents.
- There is also research currently being undertaken about extraction using Methane-Sulfonic Acid (MSA) followed by Electrowinning. Again, this process has neither been tested commercially nor established, with the process' patent only recently granted (July 2019). It is understood that a company in WA is currently exploring this technology for its lead-bearing ores. The chemistry of lead in ores is totally different from the chemistry of lead in ULABs.
- Dissolution using novel solvents, such as the PLACID process, one promoted by a company called Aquametals and a recent study using 'deep eutectic solvents' are all promising but limited to pilot or laboratory scale, with varying levels of lead recovery rates.

- None of these hydrometallurgical/electrolytic technologies are yet proven safe enough at sufficient scale or commercially viable enough to be considered for the proposed Latrobe Valley facility.

Claim #7: Lead was removed from paints

- Lead has been reduced from paints but it is still allowed at levels up to 1,000 ppm.
- Before 1970, paint used in many Australian houses contained high levels of lead. Then the Australian Uniform Paint Standard was amended to reduce the amount of lead in domestic paint from the previously recommended level of 50 per cent to one per cent. The maximum content was further reduced to 0.25 per cent in 1992 and to the current level of 0.1 per cent in 1997. In other words, lead may have been heavily reduced in paint but it has not been “removed”.
- Lead is still used in Australia in some road line marking paints. That is why emissions of ‘road dust’ from driving your car anywhere (including the Latrobe Valley) are higher than those from this facility.
- Comparing levels of lead in paint now, as well as those used in the past (old house paint), to proposed levels at the Chunxing facility are incomparable.
 - Pre-1970s paint is **2,000 billion times** more concentrated in lead than the air around the plant.
 - Current legal maximum concentration paints would be **4 billion times** more concentrated in lead than the air around the plant.

Claim #8: This technology produces lead dust and slag, which impacts workers, their families, community and surrounding land

- Potential lead-exposed workers in Australia (and China) are strictly monitored through thorough WorkSafe operational and blood testing regimes. Impacts to workers are heavily exaggerated.
- Potential impacts to their family and the broader area from the proposed plant are also false and create unnecessary and unsubstantiated fear in the community.
- Chunxing’s technology is very low emission, highly automated, fully enclosed at every stage of the process and, most importantly, employs many layers of pollution control equipment beyond any other similar operation in Australia and the highest level of controls in the world. Consequently there is no “lead dust”.
- If workers were exposed to high lead levels this would show up in their blood. Levels in the blood of workers at the 16-fold larger plant in China are closely monitored to the same standards as those applied by WorkSafe in Victoria and they follow the same procedures of workplace task rotation applied in Australia, for any industry dealing with lead; be it mining, metallurgy, laboratories or construction.
- Lead levels in the blood of workers at the China plant are below those set in both China and Australia, to protect worker health.
- Standard procedures apply to such workers – at the China plant or here – they must change clothes on arrival to work, then shower and change clothes upon leaving work. All laundering of work clothing is done onsite. There is no risk at all of carrying lead from the workplace home to their family or broader community.
- No measurable lead will impact surrounding land and communities since the only pathway for transport is the air – there are no direct water emissions from the facility. Air emissions are so low as not to be measurable at nearby residences and farms –

even cumulative quantities over many years would not be identifiable above background soil levels.

- Slag is the name of the solid glassy waste produced from smelting. There will be approximately 4,500 tonnes of slag produced that will contain lead, albeit at much lower levels than other similar operations and lower quantities of slag. This is handled in a straight-forward manner and will be disposed of at a prescribed waste landfill licensed to accept it in Victoria. There are strict handling and licensing requirements for transport, receipt and environmental monitoring.

Claim #9: “An EcoMENA article states that “in fact lead-acid battery recycling is regarded as one of the worst pollution industries worldwide”

- EcoMENA is a Middle East and North Africa (MENA) sustainability advocacy organisation. The article referred to (<https://www.ecomena.org/managing-lead-acid-batteries/>) is written entirely to address a worldwide problem of lead impacts from unregulated, sometimes backyard recycling operations, particularly those in developing countries.
- The very same article says: “Recycling of used lead-acid batteries, provided it is done in an environmentally sound manner, is important because it keeps the batteries out of the waste stream destined for final disposal. Lead from storage batteries placed in unlined landfills can even contaminate the groundwater. Recycling prevents the emission of lead into the environment and also avoids the energy usage associated with manufacturing lead from virgin resources.”
- There is no question about the health and environmental impacts of lead – that is why it is important to recycle batteries in a highly-controlled facility, so it does not leach into the environment and contaminate soil, water supplies and beyond.

Claim #10: The Victorian EPA only requires a 500m buffer distance (to the nearest residence) while the buffer zone in NSW (for the Wagga Wagga facility) is 5km, so the Hazelwood facility should be located 5km from houses

- There is no “5km buffer zone” in NSW. The NSW EPA does not specify buffer distances at all, but relies on case by case air quality modelling to assess impacts to sensitive receptors.
- The Vic EPA publication on separation distances requires a buffer of 500m for non-ferrous metal production (>2,000 tonnes per year).
- The Chunxing facility is 1.1km away from the nearest residence (sensitive receptor), or 1.2km if you measure from where the facility’s building will be placed on the property.
- The Wagga Wagga plant expansion (more than double the capacity of the Hazelwood facility) has recently been approved by NSW EPA, and is located 1.2km away from the nearest residence.

Claim #11: When assessing the Wagga Wagga plant expansion proposal, the NSW Government “noted the 5km buffer distance as a mitigating control in managing these hazards.”

- There is no “5km buffer zone” in NSW.
- The NSW Government (Department of Planning and Environment), in its assessment report dated February 2019, simply noted the geographical reality of the 1.2km nearest residence and 5km nearest township.
- The Department’s assessment further states: “No public submissions were received during the exhibition of the EIS, likely due to the isolated nature of the facility which is located 1.2km from the nearest residence” (emphasis added).

Claim #12: Dividing the emissions of the China plant by 16 is “not good science”

- The capacity of the reference plant in China is 800,000 tonnes of ULABs; the Hazelwood facility is designed to process 50,000 tonnes of ULABs – 1/16th of the size. Applying this ratio is a simple mass balance, because lead is not introduced into the process from anywhere other than feedstock ULABs.
- This approach is entirely valid because the processing and emissions control technology are identical in both cases, designed to produce the same quantity of output lead products and lead emissions per tonne of input lead (ULABs).
- The cornerstone of the US EPA’s emissions estimation methodology (US EPA AP 42 program), when estimating emissions with no operating data available, is to use *emission factors* (kg pollutant per tonne of input material), which operate on the assumption that if a process remains of the same design, then the emissions will be the same per tonne of input feedstock.
- Since a Works Approval is dealing with a plant that has not been built yet, emissions (as input into an air quality dispersion model) must be estimated. Rather than using literature-based industry wide emission factors (which are often the only data available) Chunxing has the luxury of an operational reference plant which has independent stack testing carried out on a quarterly basis.
- Even if the 16-fold scaling down was not done at all and the 800,000 tonne plant’s emissions were assumed for the Hazelwood North facility, the worst case ground level concentration anywhere in the area would still be 20 times below the EPA limit.

Claim #13: “The plant will emit a cocktail of toxic emissions to the environment”

- This statement is wrong and uses inaccurate and hyperbolic language.
- Emissions from the plant will be so low they will not be measurable at the nearest residence by field monitoring equipment.
- Science doesn’t deal in zeroes, there are always numbers produced by modelling, even if they are extremely low. Not only are emissions orders of magnitude below EPA standards, they are likely to be so low that EPA approval and licences may not even be required for air emissions.

Claim #14: This facility will emit significant levels of sulfur dioxide

- This claim is a massive exaggeration – as all of the claims about emissions from the facility are.

- The Chunxing facility will emit such infinitesimally low levels of sulfur dioxide that it will be just 0.001% (1/100,000th) of the existing industrial emissions of sulfur dioxide in the Latrobe Valley.
- Sulfur dioxide levels at the nearest residence are modelled to be almost 3,500 times lower than EPA limits.

Claim #15: “The location of the Council transfer station immediately adjacent to the plant may expose both transfer station employees and members of the public utilising the Council transfer station to pollutants including lead and other toxic pollutants.”

- People using or working at the transfer station will not be exposed to “toxic” levels of pollutants.
- The Council transfer station is located within the modelled area, where the worst case ground level concentration modelled anywhere in that area was 300 times below EPA limits set to protect human health.
- These limits assume breathing of that air occurs 24 hours a day across a lifetime.
- The ‘worst case’ concentration in a model is the worst hour it predicts across five years of hourly data, so this level doesn’t occur continuously across a year, a week or even a day. The layers of conservatism in air quality modelling are very high, to ensure confidence in the protective nature of its results.

Claim #16: “EPA limits may not necessarily ensure safe levels for the community.” The comparison is then made with lead pollution from SA’s Port Pirie lead smelter

- Comparing the Hazelwood North proposal with the primary lead smelter at Port Pirie is misleading and designed to spread fear.
- The Port Pirie smelter is a very large facility. Lead emissions from Port Pirie are 3,500 times higher than the proposed Hazelwood North plant. To suggest the two are equivalent is misleading.
- EPA Victoria does not regulate the Port Pirie plant, whose regulatory arrangements are unrelated to EPA Victoria design criteria.

Claim #17: There is an inference that 2km is some kind of significant boundary or “buffer zone”, within which there is potential for health impacts

- The 2km “buffer” has no particular meaning, but has been given a life of its own by the Action Group.
- Chunxing apologises for incorrectly using the words “2km buffer” in the original newspaper advertisement in June 2019, where it was used to (correctly) describe the distance to Morwell, the closest residential area or township, but not the closest residences (which are in Hazelwood North).
- From this small error, the Action Group has continued to infer there is such a thing as a 2km buffer around the plant. The only buffer is the EPA’s required separation distance of 500m, which is comfortably achieved.

Claim #18: “To date the company has not adequately consulted with the community”

- In the earliest stages of developing the application for Works Approval, Chunxing held two open community meetings in Morwell in June 2019, as a means of starting a conversation with the local community. The Works Approval Application had not even been started at that time.
- We have not been ready for further full public meetings because the Works Approval application has been in the process of being drafted.
- However, between then and now, Chunxing has had at least 20 more different meetings and engagements with local stakeholders, often one-on-one, over kitchen tables, in local cafes and boardrooms, explaining the proposal in detail. This has also involved letter drops into the Hazelwood North community.
- We have met with the Action Group on at least five occasions and have shared our working draft of the Works Approval application document, as well as all supporting data and other evidence we have used in carrying out the various environmental assessments. We have received no comments on these documents.
- Our request to attend the community meetings held by the Action Group was declined.
- The Works Approval assessment process itself, run by EPA once the Works Approval application has been accepted, is a public process with consultation and requests for public submissions. Everything prior to that is simply proactive engagement initiated by the company by its own choice.

Claim #19: Aqua Metals’ “aquarefining” technology doesn’t involve smelting at all

- A US company (Aqua Metals) has very recently patented a process for extracting lead using MSA as a solvent, then recovering it using electrowinning.
- It established its first (and currently only) facility in Nevada USA in 2017, a very small-scale demonstration plant whose largest production month (September 2019) was 160 tonnes of lead product. Chunxing’s proposed plant is small by world standards, but its output is planned to be 15 times larger than this.
- Aqua Metals own website (<https://www.aquametals.com/aquarefining/>) illustrates this process as suitable only for the lead paste component, noting that the lead metal plates and grid are “shipped to smelter for processing.”
- Therefore, aquarefining is not a full solution for ULAB recycling – such a plant would either require a smelter onsite as well or need to ship lead grid back out again to a smelting facility elsewhere.
- The technology is marketed as bolt-on technology to existing smelters, not standalone.
- Aqua Metals’ aquarefining technology is promising but far too early in its development to demonstrate scale, commerciality and safety, and still requires the use of a smelter.

Claim #20: The facility will send “toxic waste” to landfill in trucks through the area

- Slag is a solid waste produced from the process which will contain around 0.2 – 0.5% lead. As a glassy material that closely resembles volcanic rock, slag is relatively inert and quite resistant to leaching of lead.
- Levels of lead in slag from traditional smelting of ULABs are typically 10-fold higher than that from Chunxing’s process.

- Such slag is a prescribed industrial waste that is transported by EPA-permitted vehicles to landfill licensed by EPA to accept this waste.
- 4,500 tonnes of slag will be sent to landfill each year. To put this into context, Victorian landfills accepted almost 900,000 tonnes of prescribed industrial wastes in 2017-18.

Claim #21: Mulch from O'Connor's will be contaminated with lead, so people buying mulch from Bunnings will be buying lead-contaminated mulch

- Mulch or any other nearby industry's material/soil/surface will not be "contaminated" with lead.
- Air emissions are so low as not to be measurable at nearby residences and farms – even cumulative quantities over many years would not be identifiable above background soil levels.
- Regardless, levels of metals like lead are closely regulated in soils, composts and mulches via the Australian Standard (AS 4454—2003),

Claim #22: The facility will use a lot of gas, increasing greenhouse gas emissions

- The Works Approval Application devotes an entire chapter to assess *Energy Use and Greenhouse Gas Emissions (GHG)*. The GHG impact of operating the proposed Hazelwood ULAB plant is to add 17,442 tonnes CO₂-e per year (0.04% of national emissions).
- In the context of total lifecycle emissions (subtracting those emissions avoided from creating the same amount of lead from primary extraction and production activities) that impact becomes a net GHG reduction of 32,118 tonnes CO₂-e per year.
- According to the US EPA's Greenhouse Gas Equivalencies Calculator, this is equivalent to removing 70,000 cars from the road.

Yours faithfully
ASCEND WASTE AND ENVIRONMENT Pty Ltd



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