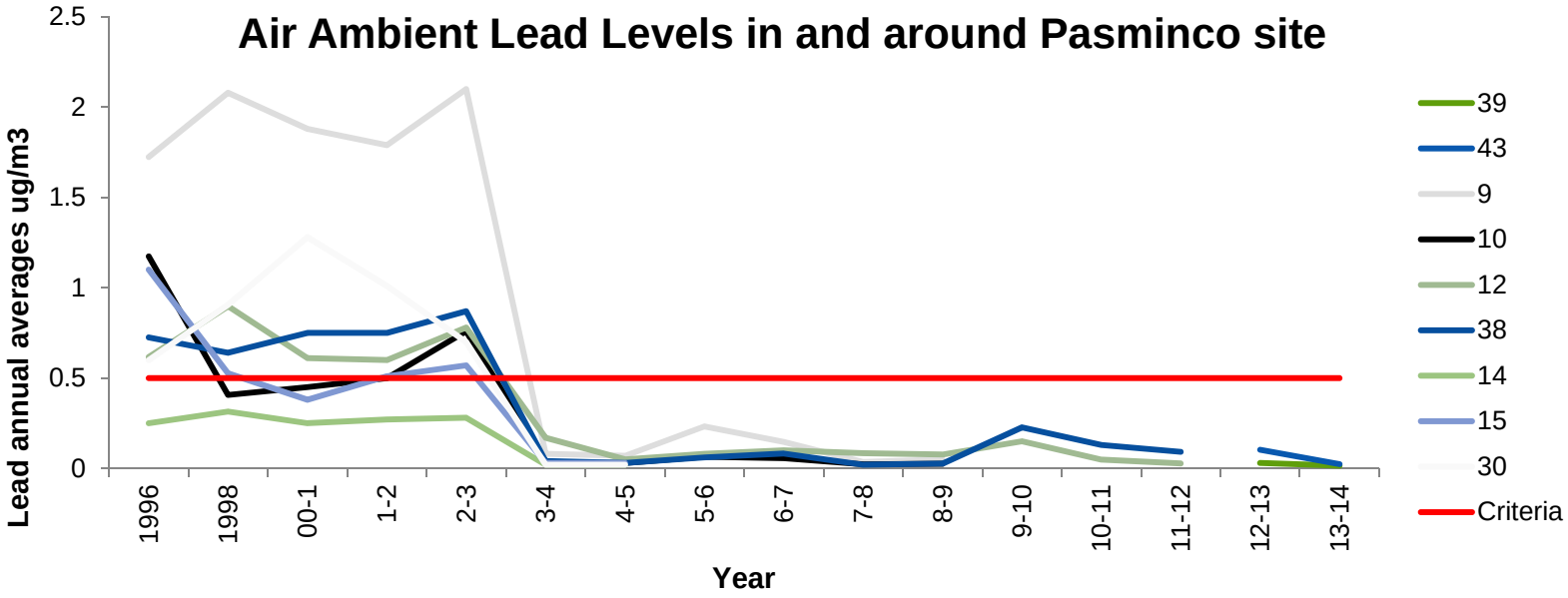
Actions to reduce exposure of children to lead

Smelter emission reduction

- **1985 – Lead emissions – 92 ,000 kg**
- **1995 new DA with a focus on reducing Pb emissions**
- **1999 – amendment to DA for increased production and stronger environmental controls**
- **2000 – Lead emissions – 14,000 kg**
- **2001 – Lead emissions – 20,000 kg**
- **2002 – Lead emissions – 11,000 kg**
- **2003 – Lead emissions – 11,000 kg**
- **2003/4 – Lead emissions – 2,300 kg (plant shut down 2003)**

Actions to reduce exposure of children to lead



39 – Pasminco premises – North West

43 – Pasminco Premises – South West

9 – Lakeview Street

10 – Boolaroo Public School

12 – Argenton

38 – Fourth Street Boolaroo

14 – Boolaroo Bowling Club

15 – First Street West

30 – Sixth Street

Actions to reduce exposure of children to lead

- **Operation of Environmental Health Centre (EHC) funded by Pasminco and supervised by the Dept Of Health**
  - **DA provided mechanism for residents to request lead sampling and cleanup**
  - **1998 - 2001 - Zonal remediation program – house cleaning, slag removal, top dressing soil – targeted 640 homes closest to the smelter. It was eventually shut down as being ineffective with ongoing lead emissions and recontamination, disproportionally expensive**
  - **2001-2004 Change of strategy to more intensive blood lead monitoring in children aged 0-2 years, focus on source removal (dust in ceilings, floor coverings, abatement, greening programs for homes with children with elevated blood levels**
- **Removal of lead and slag in school yards, sporting fields and parks, top dressing and irrigation, new sand in sandpits**

Actions to reduce exposure of children to lead

Smelter shut down in September 2003

- Ended fugitive/fume lead emissions
- This eliminated what Health considered principal source of lead exposure to children
- A view supported by recent experiences in Trail, British Columbia
- Blood testing in 2004 & 2005 supported this opinion

Actions to reduce exposure of children to lead

Smelter regulation, clean up and remediation

- **2001 - Pasminco goes into voluntary administration – Ferrier Hodgson appointed**
- **2003**
  - **EPA issues remediation order**
  - **Smelter shuts down**
  - **Zinifex floated – providing cash for Administrator to address environmental liabilities**
  - **Site cleanup commences**

Actions to reduce exposure of children to lead

Smelter regulation, clean up and remediation

- **2004 – 2006**
  - **Demolition**
  - **Assessment, removal/disposal of all saleable raw materials, chemicals**
  - **Enhancement of site water management**
  - **Groundwater assessment**
  - **Development of RAP and cell design**

Actions to reduce exposure of children to lead

Smelter regulation, clean up and remediation

- **2007 - 2014**
  - **DA issued for Pasminco site remediation, to remove source of on and off-site contamination**
  - **Remediation criteria adopted was to HILs, not risk based**
  - **All contamination to be placed in containment cell, constructed over monolithic stock piles of old slag**
  - **Remediation of Incitec site integrated into Pasminco remediation works and carried out 2013-2014**
  - **Basically all remediation completed by end 2014 into 1.8 M m^3 23 ha containment cell**

Remediation has eliminated the Pasminco and Incitec sites as a source of further on-site and off-site impact to humans and environment at a cost estimated to be of the order of $140 M

Actions to reduce exposure of children to lead

Lead Abatement Strategy (LAS)

- **Strategy based minimisation/elimination of exposure pathways to lead in private residences**
- **Guidance provided to Ferrier Hodgson by lead specialist with long involvement in local lead issues, Graham Waller**
- **Endorsed by EPA and Planning, accepted by Health**
- **Council wanted scope to be increased**

LAS strategy - exposure/risk based

Strategy Category	Measured Lead Concentration Parts Per Million ("PPM")	Abatement Required
1	<300 ppm	No abatement required
2	>300 ppm but <1,000 ppm	Option A - if grass covered, then barrier exists and no remediation necessary
		Option B – if not covered by grass but can be, fill and apply turf maintaining practical grounds levels for particular site
		Option C – if in shady area with low grass cover, add 25 mm topsoil and mulch cover
3	>1,000 ppm but <1,500 ppm	Option A – for already grassed areas, add additional 25 mm of top soil
		Option B – if not covered by grass but can be, add 25 mm of top soil and apply turf maintaining practical ground levels for particular site –
		Option C – when in shady spot with low grass cover add 40 mm of top soil and mulch cover
4	>1,500 ppm but <2,500 ppm	Option A – for already grassed areas, add additional 50 mm of topsoil as barrier
		Option B – if not covered by grass but can be, add 50 mm of topsoil and apply turf
		Option C - when in shady spot with low grass, add 50 mm of topsoil and mulch cover
5	>2,500 ppm but <5,000 ppm	Option A – for already grassed areas, excavate 50 mm of topsoil and replace with 50 mm of new topsoil as barrier – replace grass cover (if suitable lead content) or otherwise apply new turf
		Option B – if not covered by grass but can be, excavate 50mm of topsoil and replace with 50 mm of new topsoil and apply new turf
		Option C – when in shady spot with low grass cover, excavate 50 mm of top soil and replace with 50 mm of new topsoil and mulch cover
6	>5,000 ppm	Investigate soil profile vertically to determine level of excavation required up to a maximum depth of 100 mm, excavate, reinstate with new topsoil and apply new turf or mulch, maintaining practical levels for particular site

LAS outcomes

- **Approximately 2500 private residential property owners in the vicinity of the former Pasminco smelter were offered to have their properties tested for lead levels.**
- **Of which ~1230 (~50%) residential property owners accepted to have testing carried out.**
- **Of those tested the results for lead content were (ppm=parts per million);**

Lead Abatement Program

Result Categories	**Total**
Category 1 < 300ppm	**- 446**
Category 2 > 300ppm but < 1000ppm	**- 560**
Category 3 > 1000ppm but < 1500ppm	**- 116**
Category 4 > 1500ppm but < 2500ppm	**- 77**
Category 5 > 2500ppm but < 5000ppm	**- 18**
Category 6 >5000ppm	**- 0**
Not Eligible Due to Slag Content	**- 7**
TOTAL	**- 1,226**

LAS outcomes

- **These results were independently reviewed and verified by a third party environmental consultant and provided to the residential property owners.**
- **The lead levels were assessed against action levels in the *Lead Abatement Program and:***
  - **abatement works were offered in accordance with the schedule from the program to 437 residential properties;**
- **educational materials were provided to the other 784 participants with lower levels of lead**
- **After some drop outs, a total of 359 residential properties have had abatement works carried out.**