



be alert not alarmed  
early warning tool for sulphur dioxide

alcoa anglesea

environment report

september

2008



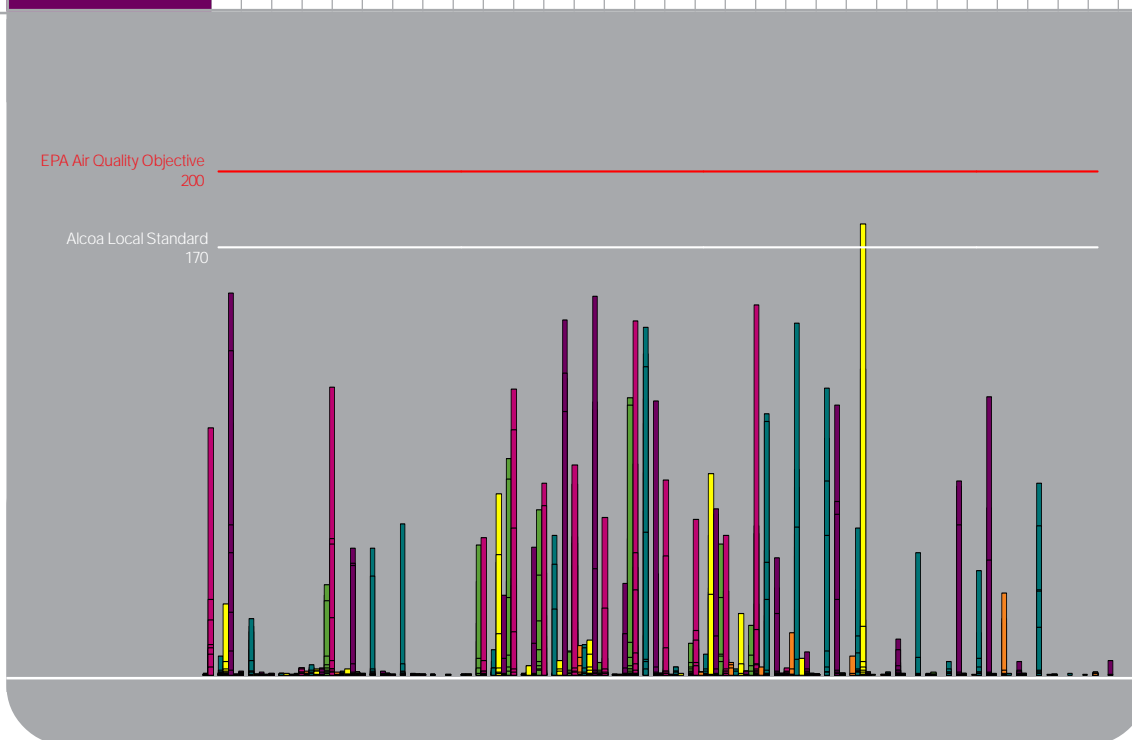
australia's aluminium

# air

Air Monitoring	Average	Maximum
Stack Monitors		
Opacity g/m <sup>3</sup> 10-minute average	0.071	0.165
Stack SO <sub>2</sub> kg/min 1-hour average <b>Licence limit</b> 100kg/min	58.80	69.36

Ambient Monitors	Average	Maximum
SO <sub>2</sub> 1 hour ppb		
Community Centre	2	110
Primary School	6	147
Mt Ingoldsby	< 1	33
Scout Camp	6	140
Camp Wilkin	2	179
Camp Road	7	152

Ambient Monitors																														
SO <sub>2</sub> Maximum 1 hour averages (ppb)																														
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Community Centre	1	1	0	1	36	1	1	0	0	52	86	86	10	5	110	1	13	52	20	1	1	1	0	1	1	1	1	0	0	
Primary School	98	2	1	3	114	1	0	0	0	55	113	76	83	7	141	-	49	78	62	14	-	-	-	-	55	147	3	1	0	0
Mt Ingoldsby	0	0	0	2	1	0	0	0	0	1	0	0	12	0	0	0	1	5	3	17	0	7	1	0	0	0	33	0	0	1
Scout Camp	8	22	1	4	2	50	60	0	1	10	1	56	12	-	138	57	8	2	104	82	-	140	114	58	1	49	5	41	0	76
Camp Wilkin	29	0	1	2	2	0	0	0	0	72	4	6	14	0	0	0	1	80	24	5	-	-	-	0	7	0	179	0	0	0
Camp Road	152	1	1	3	51	2	1	0	0	32	51	141	150	37	109	0	66	2	47	9	107	1	14	1	77	111	6	0	0	6



# water



## Water Storage

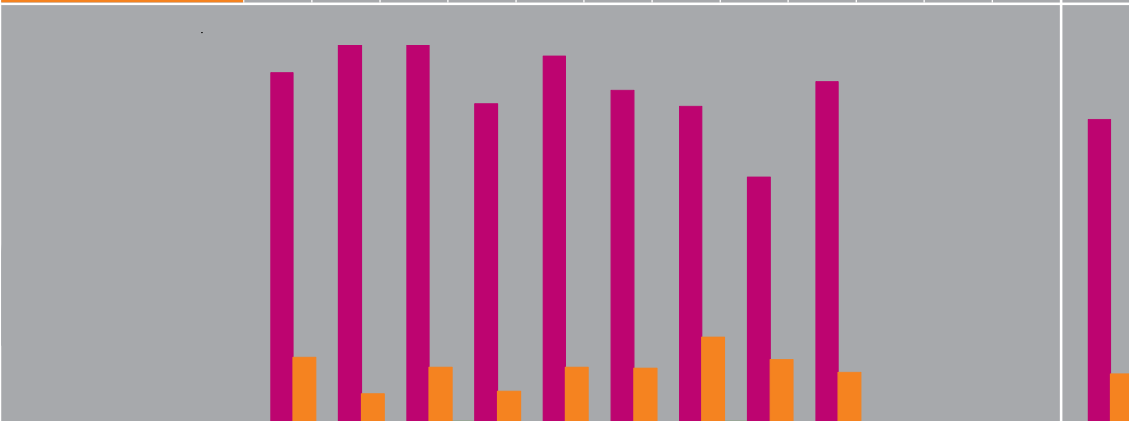
Barwon Water storage levels for the Geelong system at 31.1% capacity. Stage 4 winter water restrictions with allowance for limited residential garden watering have been extended until November 1, 2008.

Water Discharge	September	Total
ML		
Ashponds (SP1)	132	1247
Mine (SP4)	0	0.12

Water Monitoring 24/09/2008	SP1 Ashpond		SP4 Mine		SP3 Final	
	EPA limit	Lab Result	EPA limit	Lab Result	EPA limit	Lab Result
pH	4-10	9.1	3-9	no	5-9	7.5
Susp. Solids	100	5	100	discharge	30	< 4
Colour	50	4	50	at	50	4
Aluminium	10.00	0.15	10	time	5.50	0.06
Iron	10.00	0.30	20	of	4.00	< 0.04
Zinc	0.40	< 0.01	2.0	sampling	0.30	0.01

## WATER WATER USAGE PER MONTH (ML)

Date	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
Town Water	1.4	0.9	0.9	2.2	1.0	0.9	1.7	2.2	1.0				12.2
Bore Water	279	304	305	254	292	265	252	196	272				2419
Mine Water	53	24	45	26	45	44	69	51	41				408



## early warning tool for so<sub>2</sub>

Anglesea's approach to sulphur dioxide (SO<sub>2</sub>) has taken the next step with best practise technology to ensure the emissions from the station comply with the Victorian Environmental Policy for Air. Back in 2004, Anglesea developed the load reduction protocol; a tool requiring the control room operators to reduce the station load, thereby reducing the emissions from the stack when elevated ground level concentrations (GLCs) were detected at any of the six ambient sulphur dioxide monitoring stations. Until August last year, only half of the stations were equipped with telemetry back to the control room. Over time, this tool has been progressively improved with more stringent alarms in place, and telemetry installed on all ambient stations, enabling real time data to be fed back to the station. This has significantly reduced peak SO<sub>2</sub> ambient concentrations, and year to date Anglesea is complying with the Policy, with zero exceedances.

Earlier this year the consultants from ENVIRON were commissioned by Alcoa to implement the fully automated Early Warning (EW) tool to ensure that ambient SO<sub>2</sub> concentrations do not exceed Alcoa's internal target of 170 ppb. This limit is a lower target to comply with, and hence a bigger challenge, than the Victorian limit of 200 parts per billion averaged over a 1 hour period. It's only when an hourly reading over 200 ppb is recorded that a non compliance is noted. Previously ENVIRON have rolled out similar technology with Kalgoorlie Gold Mine to reduce the ground level impact of their sulphur dioxide emissions on the surrounding townships. A trial was conducted earlier in the year using five years of historical data to identify the critical weather conditions that contribute to elevated GLCs. The most problematic periods of the year are those of over Winter and early Spring months, when strong northerly winds are typically experienced.

The Early Warning tool comprises a predictive and reactive system, and can be considered more sophisticated than the current load reduction system, which is purely a reactive tool. The reactive facet to the EW tool is based on a series of alarms being generated if the ambient concentrations exceed nominated trigger values, similar to our Load Reduction Protocol. However, the predictive system is based on the use of a forecast model to predict the meteorological conditions that have the potential to give rise to peak SO<sub>2</sub> concentrations. The predictive tool will also indicate when to increase load again. ENVIRON have developed the algorithms specifically adapted for the Anglesea conditions and terrain, with the existing PI software already employed in the control process recently being upgraded in order to accommodate the EW tool. Once the implementation has been completed, two new screens will be established in the control room to help the operators interpret the incoming data and alarms. Anglesea is also seeking to establish another meteorological station north of the station, which will provide up wind information to further enhance the EW tool. Potential sites are currently being reviewed for suitability.

The focus on sulphur dioxide year to date is reflected with our progress of complying with the policy, and no exceedances of the 200 ppb experienced in over 12 months!

### PLANTS OF THE ANGLESEA HEATH

#### BLUE SQUILL or BLUE STARS (*Chamaescilla corymbosa*)

*Chamaescilla*...from the Greek, *khamai* meaning dwarf or on the ground, and *skilla* which is the classic name for the sea-onion *Urginea maritima*

*corymbosa*...full of *corymbs*, flat topped flower heads

Size:	7-20m H x 10-20m W
Habitat:	red gum woodland, damp and valley sclerophyll forests and grassy low open forest
Form:	tiny perennial herb
Foliage:	few basal, dull green, narrow grass-like leaves to 15cm long, often smaller, lying flat on the ground
Flowers:	open terminal clusters of 1 - 10 bright blue flowers to 15mm wide, individual flowers only last one day August to November
Did you know?	plants die back to tuberous rootstock in dry weather, these tubers were harvested for food by the Aboriginals

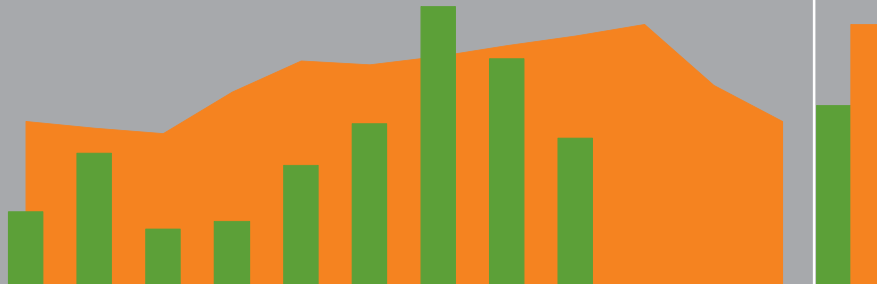
### BLUE SQUILL



LAND

RAINFALL (mm)

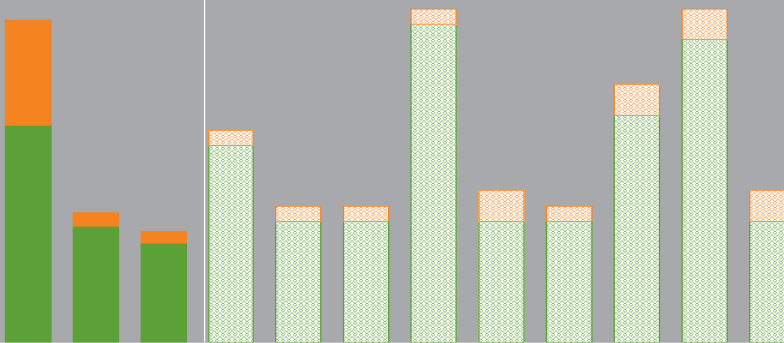
Month	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2008 Rainfall	19.8	35.8	15.2	17.3	32.5	43.8	75.8	61.6	40.0				<b>341.8</b>
1968-2007 Average	44.5	42.7	41.1	52.5	61.0	59.9	62.2	65.3	67.7				<b>496.8</b>



WATER

TOWN WATER USE (ML)

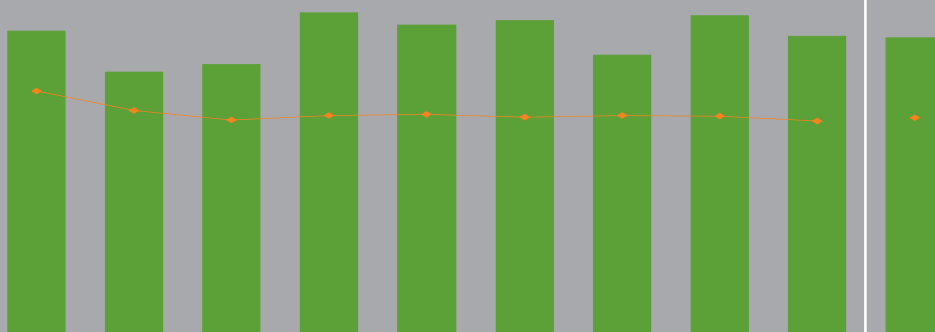
	2000	2007	2008	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Process	23.9	12.8	<b>10.9</b>	1.3	0.8	0.8	2.1	0.8	0.8	1.5	2.0	0.8			
Amenity	11.6	1.5	<b>1.3</b>	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2			



AIR

GREENHOUSE GAS (GHG) TOTAL (Mt) & GHG EMISSION EFFICIENCY (t/MWh)

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
GHG Mt	1.42	1.23	1.27	1.50	1.45	1.47	1.31	1.49	1.40	<b>1.40</b>
GHG t/MWh	1.34	1.24	1.19	1.21	1.21	1.20	1.21	1.20	1.18	<b>1.20</b>



# environmental improvement

Environmental Management Targets	September	2008 YTD	Forecast	2008 Target
Reportable Environmental Incidents	0	0	0	0
Monthly EHS ASAT Audit Completion (%)	100	100	100	90
Air Emission Targets	September	2008 YTD	Forecast	2008 Target
Ambient SO <sub>2</sub> ( no. readings > 200ppb)	0	0	0	0
Stack SO <sub>2</sub> (no. hrs > 100kg/min)	0	0	0	0
SO <sub>2</sub> Load Reductions (lost MWh)	6241	17120	22827	N/A
GHG Efficiency (t CO <sub>2</sub> e/MWh)	1.21	1.20	1.20	1.20
Opacity (10 min av > 0.25g/m <sup>3</sup> normal operation)	0	0	0	0
Water Targets	September	2008 YTD	Forecast	2008 Target
Town Water (ML)	1.0	12.2	16.8	14.2
Bore Water (ML)	272	2419	3225	2370
Waste Targets	September	2008 YTD	Forecast	2008 Target
Waste to Landfill (t)	0.0	4.5	6.0	8.0
Solid Prescribed Waste to Landfill (t)	0.0	0.0	0.0	0.0
Mine Rehabilitation Targets	September	2008 YTD	Forecast	2008 Target
2008 Area to Clear (ha)		0.0		0.0
2008 Area to Rehabilitate (ha)		0.0		0.0
2007 Mine Rehabilitation Species Richness (%)		N/A		100

## OUR ENVIRONMENT AND OUR EMPLOYEE

### Luke, what has been your role in the development of the Early Warning System?

I've been involved in the interface with the Honeywell Control System and the PI System. I also played a part in getting the additional telemetry for the on SO2 monitoring stations up and running. These feed in reactive data to the Early Warning System, which are then coupled with predictive forecasting data. The SO2 telemetry system will now also include a weather station to the North of the power station.

### How does this System benefit the Power Station?

The Early Warning System will provide additional information for the control room operators to better manage our SO2 emissions and, in turn, ground level concentrations in Anglesea.

### When will the Project be completed?

The development of this System has been going for two months and it is intended that it will be completed by November. Of course, if opportunities to improve the system become apparent further changes can always be made.

### How has the Project been challenging?

Because this is new technology for Alcoa Anglesea, the design of the system itself has been challenging, particularly the modelling and implementing the software in our unique situation.

...LUKE WEBB

