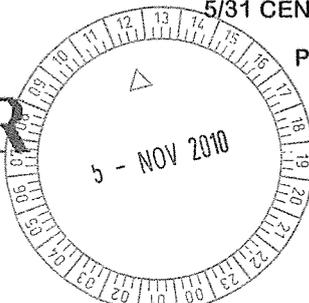
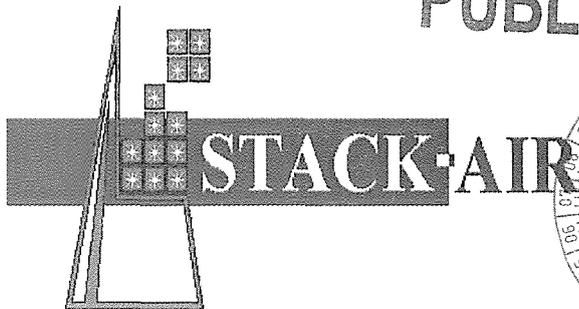


PUBLIC



5/31 CENTURY ROAD MALAGA WA 6090

PO BOX 479 DIANELLA WA 6059

TELEPHONE: (08) 9248 4900

FACSIMILE: (08) 9248 4922

EMAIL: stackair@iinet.net.au

www.stackair.com.au

Edenzone Holdings Pty Ltd ACN No 069 884 144 T/A Stack-Air ABN 80 069 884 144

4 November 2010

Standing Committee on Environment and Public Affairs

Legislative Council

Parliament House

PERTH WA 6000

COPY

Attention: Ms Linda Omar

STANDING COMMITTEE ON ENVIRONMENT AND PUBLIC AFFAIRS

INQUIRY INTO COCKBURN CEMENT LTD, MUNSTER

SUBMISSION BY KEITH JAMES (DIRECTOR, STACK-AIR)

Thank you for the invitation to provide a written submission to the Standing Committee on Environment and Public Affairs into Cockburn Cement Ltd, Munster.

My submission addresses Point 3 of the Committee's scope of inquiry, ie the process of issuing and amending licences.

I have worked in the field of emissions testing for twenty three years, and since 1993 I have been the owner and director of Stack-Air. My company specialises in the measurement of emissions to atmosphere from industrial point sources (ie stacks) and I have extensive experience and expertise in this area. A large proportion of my work has been to conduct licence compliance tests on behalf of industry, and I believe I have an excellent understanding both of what is industry best practice, and of how industry is regulated in Western Australia.

Over the years I have occasionally conducted work on behalf of Cockburn Cement, although I have not done any work for them since 2003. However, since being invited to make a submission to the Committee, I have obtained and studied Cockburn Cement's current operating licence: L4533/1967/14, with particular attention to the "Emission to Air" section. This licence covers the period 31 March 2009 to 30 March 2012.

I have long had concerns with the operating licences issued by the Department of Environment and Conservation (DEC). It has been my observation that the licences are often unsatisfactory and fail to adequately do their job as a tool to regulate industry and protect the environment from harmful emissions. Therefore, I believe an important first step in investigating the emission problem from Cockburn Cement is to review the following aspects of the licence:

- Are all the possible sources of air pollution included in the licence and required to be monitored?
- Does the licence target the most likely pollutant parameters for monitoring?
- Is the frequency of monitoring reasonable and appropriate?
- Are the monitoring methods which have been stipulated the most appropriate?
- Have emission limits been set for all sources, and if so are they appropriate for the source?
- Does the licence stipulate the operating conditions under which the monitoring is to be conducted?
- Does the licence stipulate appropriate quality assurance for the monitoring (ie is there a requirement for independent accreditation of the testing body?)
- Are the terms of the licence appropriate for the size of the emitter, the nature of the emissions, and the location of the plant and its proximity to residential or commercial areas?

My opinion is that the licence has a number of deficiencies and I will attempt to outline these by examining it with respect to the questions I have raised above.

1. Does the licence cover all the possible sources of air pollution at Cockburn Cement?

It is my understanding that there are five kilns (Kilns 2, 3, 4, 5, and 6) which are all currently operational and have the potential to emit pollution. All five kilns are included in the licence.

Conclusion: *The licence is adequate in this regard.*

2. Does the licence target the most likely pollutant parameters?

Table 5 of the licence stipulates bi-annual monitoring for:

- **Particulate**
- **Acid gases** as nitrogen oxides (NO_x), sulphur oxides (SO_x), hydrogen chloride (HCl), and hydrogen fluoride (HF).

and annual monitoring for:

- **Metals** including mercury, thallium, cadmium, antimony, arsenic, lead, chromium, cobalt, copper, manganese and nickel
- **Combustion indicators** as carbon monoxide (CO), poly-aromatic hydrocarbons (PAH's) and volatile organic compounds (VOC's)
- **Organic compounds** as dioxins and furans.

Cement and lime dust (ie particulate matter) are obviously the prime pollutants from this plant and it is essential that particulate emissions are regularly monitored. However, given the very fine nature of cement and lime dust, I believe that there should also be a requirement to test for Particulate Matter <10 microns (PM₁₀).

I question whether testing for many of the other parameters is really necessary. I suspect that dioxins and furans, VOC's, and PAH's are either going to be at very low concentrations or won't be present in emissions at all. Cement and lime kilns typically have long, high-temperature residence times which make these products of incomplete combustion (PIC's) unlikely emissions from these sources. In fact, cement kilns have been cited in USEPA literature as being more efficient than hazardous waste incinerators in the destruction of hazardous organic compounds.

Furthermore, in the alkaline environment of cement and lime kilns, acid gases such as NO_x and SO_2 are almost completely absorbed in the process as a general rule, and are unlikely to be a significant emission.

Clause 9 specifies that *"The Licensee shall continuously monitor and record the concentration and mass emission rate of nitrogen oxide (NO) in gases discharged from Kiln Stacks 2, 3 and 4"*. However, international consensus requires monitoring of oxides of nitrogen (NO_x) as nitrogen oxide (NO) + nitrogen dioxide (NO_2). Perhaps this is merely a typing error and the clause should read nitrogen oxides, as Table 5 specifies nitrogen oxides, which is inconsistent with the statement in Clause 9.

I think that the only metal of concern would be mercury, as it is a product of coal combustion, and it should definitely be included as a target parameter.

Chloride and fluoride salts from undersea shell banks may also be present in stack emissions from the lime kilns. Hydrogen chloride and hydrogen fluoride are therefore both potential emissions and should continue to be targeted by the licence.

Conclusion: *There is not a lot of technical rationale behind the parameters which have been targeted by the licence. Many of the parameters are unlikely emissions, which would require a lot of very expensive testing and analysis that is largely unnecessary. One of the most likely emissions (PM_{10}) is not included on the licence at all.*

3. *Is the frequency of monitoring reasonable and appropriate?*

Given that there is a continuous emission monitoring system (CEMS) installed to provide constant, real-time particulate emission data, it seems unnecessary to also require manual particulate monitoring on a bi-annual basis. If the CEMS system is correctly calibrated and maintained, then there should really be no need to continue with manual particulate testing. However, it would be necessary to conduct a series of particulate tests to initially calibrate the opacity monitor to be certain that it is giving accurate readings.

Given the fine nature of the particulate dust, it would be a more sensible requirement to test for PM₁₀ on a quarterly basis.

I believe that HF, HCl and mercury should also be monitored on a quarterly basis, as these are all likely emissions from this plant.

From a technical viewpoint, testing of all other parameters could be discontinued, as they are all unlikely emissions from this plant. This could be confirmed from either a review of historical data from the plant, or a once-off baseline test for all these parameters.

Conclusion: *I believe that the frequency of testing should be reviewed, and could quite appropriately be amended as per my recommendations above. These recommendations are based solely on a technical understanding of the likely emissions from the plant however, and a case could perhaps be made that other emissions could be monitored on an annual basis as per the current licence, merely as a public relations exercise to reassure local residents about the nature of the plant emissions.*

4. Are the monitoring methods which have been stipulated the most appropriate?

Section 7 of the licence deals with particulate measurement and concentration limits by the CEMS system, and asks that the licensee continuously monitors opacity with an opacity monitor and record the calculated concentration and mass emissions of particulates from all kiln stacks. It further asks that the Licensee develop and implement a quality assurance procedure to calibrate all opacity monitors.

I find that this section is ambiguous and open to being misunderstood, and does not demonstrate any technical understanding of the correlation process. Furthermore, it does not reference any standard methodology as the basis for conducting the correlation between the opacity monitor and manual, gravimetric particulate tests. If this is not done, the correlation can easily be mis-applied and produce meaningless data. Thus, there can be no reliable record of any exceedance of the 0.15 g/m³ limit. I believe it is quite likely that Cockburn Cement's opacity monitors are not accurately calibrated, and the data they provide is of little use.

In my opinion, the licence should stipulate that the opacity monitor correlation be conducted in accordance with USEPA Performance Specification 11: *"Specifications and Test Procedures for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources"* in USEPA 40CFR 60, Appendix B (2002).

However, this is a highly complex procedure, and also an expensive exercise, and a more sensible alternative could be for the DEC to simply set an opacity limit of 10% on all point sources of the plant, and refer to USEPA Performance Specification 1: *"Specifications and Test Procedures for Opacity Continuous Emissions Monitoring Systems at Stationary Sources"*. Ibid.

Additionally, the CEMS is required to report mass emissions in grams/second, but there is no reference to a method for determining stack volumetric flowrates which would be necessary to enable calculation of the required mass emission.

With regards to the other monitoring methods referenced in Table 5, as detailed above I query the necessity to even test for many of these parameters. However, if they are to be included on the licence I make the following points:

- While the measurement of particulate emissions by USEPA Method 5 is appropriate, this method is underpinned by a number of other methods, and it is not sufficient to simply reference Method 5. To successfully implement USEPA Method 5, one must also determine the number and location of sample points (USEPA Method 1 or AS4323.1), stack gas velocity/volumetric flowrate (USEPA Method 2), gas density (USEPA Method 3 or 3A), and moisture (USEPA Method 4). All these parameters and methods should be referenced in the licence.
- I query the use of USEPA Method 7D for the measurement of oxides of nitrogen. This is a wet chemistry method, and as far as I know there are no laboratories in Western Australia that are set up to conduct the analysis by this method. It would be much simpler and more appropriate to use an instrumental analyser method such as USEPA Method 7E or CTM 034. Also, Method 7D only reports concentrations (in mg/m^3), not emission rates (g/s) as the licence requires.
- USEPA Method 6 is stipulated for the measurement of sulphur oxides. However, this method only determines sulphur dioxide. USEPA Method 8 should be used to determine sulphur oxides including sulphur dioxide, sulphur trioxide and hydrogen sulphide mist. Additionally, Method 6 also only reports concentrations, not emission rates as licence requires.
- USEPA Method 10 is appropriate for carbon monoxide.
- Mercury could be determined by a specific mercury method: I "*Determination of Particulate and Gaseous Mercury Emissions from Chlor Alkali Plants*", or a general metals method USEPA Method 29.
- As discussed above, I see no necessity to test for PAH's, VOC's or dioxins and furans.

Conclusion: *The licence is deficient in many aspects. In Clause 7, there is no standard method referenced for the correlation of the opacity monitors. Table 5 omits some of the important methods which underpin Method 5, and some of the other methods referenced are not the most appropriate methods to use.*

5. Have emission limits been set for all sources, and if so are they appropriate for the source?

The only emission limit which has been set is for a particulate concentration of 150 mg/m^3 on all 5 kilns. While this is appropriate I believe that, given the fine nature of the dust produced by the plant, there should also be an emission limit set for PM_{10} emissions. I would suggest that a limit of 25 mg/m^3 would be appropriate.

No emission limits have been set for any of the other parameters which have been specified in Table 5. I see no point in monitoring unless it is to determine compliance with an emission limit, and for which consequences can be enforced for exceedance of that limit. Otherwise you are just collecting reams of meaningless data, at considerable expense to the client.

Conclusion: *The licence is inadequate in that it fails to set appropriate emission limits.*

6. Does the licence stipulate the operating conditions under which the monitoring is to be conducted?

It is extremely important that the tests are conducted under normal operations. Otherwise, it is possible that the kilns can be run at unusually low production levels during the tests to artificially achieve results that fall within the emission limit. Clause 12e states that *"The Licensee shall ensure that during all source testing, the kiln being tested is under steady state conditions. The additional of excess air during source air monitoring is not permitted"*. While this statement is appropriate, I believe that it should appear right up the front of the licence in its own Sub-Section entitled "Kiln Operating Conditions".

Additionally, it is important that the operating condition data is contained in the report, and a statement to this effect should also appear in the licence.

Conclusion: *The licence could be improved by placing greater emphasis on operating conditions and including a requirement to include this information in the report.*

7. Does the licence stipulate appropriate quality assurance for the monitoring (ie is there a requirement for independent accreditation of the testing body?)

Section 12b(i) stipulates that all sampling and analysis as stated in Table 5 should be conducted by companies with current NATA accreditation for the methods/analyses specified. Proposed use of methods not covered by NATA accreditation must be approved by the Director of the DEC, as per Section 12b(ii).

I believe that NATA accreditation is a fundamental requirement of any organisation that is conducting compliance testing, as specified in Section 12b(i). However, source testing is a highly specialised field, and I question whether there is anybody with the expertise in the DEC who would be able to make an informed judgement as required by Section 12b(ii).

Furthermore, while NATA-accreditation goes some way to ensure the quality and reliability of the test results, it would be desirable for the DEC to develop a set of operating guidelines for source testing companies to operate within, as a further quality assurance measure. I believe the DEC went a long way towards developing such guidelines a few years ago, but for some reason they have never been finalised or implemented.

Conclusion: *A number of improvements could be made to this section of the licence.*

8. Are the terms of the licence appropriate for the size of the emitter, the nature of the emissions, and the location of the plant and its proximity to residential or commercial areas?

It is my belief that due to a number of deficiencies in the licence it does not adequately achieve its primary goal of protecting the environment and the local populace.

Overall, my impression of this licence is that it is a poorly written and targeted document, which is largely ineffective in dealing with air pollution from this facility. Furthermore, this is a common problem with many of the operating licences in this state.

Pollution control and monitoring is a highly specialised and technical business, and I believe that for many years the DEC has lacked the resources, experience and expertise to write licences which are:

- a) appropriate for each individual facility
- b) target the likely emissions
- c) set appropriate emission limits
- d) specify the correct test procedures

It is also questionable whether they have the resources and expertise to review all the monitoring data from all the facilities within the state, and to respond in a timely and appropriate fashion to licence exceedances, or areas of concern that may be highlighted.

I believe that all licences issued by the DEC should set emission limits for each facility. While this may initially present some difficulties for DEC to achieve, once they are in place it actually would simplify the DEC's work. They would provide a clear benchmark, tailored appropriately for each facility, against which to measure whether they are operating within their licence. If an exceedance is determined, there can then be a standard procedure to follow to deal with this situation.



Current licences are often poorly written, inappropriate, inconsistent, and fail to clearly set emission limits, all of which make it very difficult for the DEC to use the licensing system as an effective tool in the regulation of industrial emissions.

I would be happy to appear before the Standing Committee if they require any further explanation of the technical matters I have raised in my response.

Yours faithfully,

KEITH JAMES

Director