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Remediation of CPWE Botany Industrial Park
Department of Planning
GPO Box 39
Sydney 2001
Email: ricardo.prieto-curiel@planning.nsw.gov.au

30th August 2007

Re: Remediation of land, Botany Industrial Park (MP 06_0197)

Dear Sir/Madam,

The Nature Conservation Council of NSW (NCC) would like to comment on the Environment Assessment (EA) for the Car Park Waste Encapsulation (CPWE) Remediation Project. We believe it is highly important to properly remediate this site to the highest standard. The situation at the Orica site is unacceptable and needs to be urgently rectified and we are supportive of steps to achieve this.

This submission looks at a number of technologies available to achieve this remediation. We have provided input to what we believe will be the most effective method with minimal environmental impacts and optimum health implications for surrounding residents.

We have significant concerns regarding the emissions from the project, including gases that could have adverse effect on human health. This is a serious concern as this industrial area is bordered by residential areas. We also believe that this project needs to properly remediate this area sufficiently so that all toxic materials are removed. This problem has been outstanding for many years and a proper long-term solution is required.

Choice of technology used

To remediate the waste on the site there are two technologies available and suitable to treat CPWE contaminated waste - Direct Heating Thermal Desorption (DTD) and Indirect Heating Thermal Desorption (ITD). The BCD (Base Catalyzed Decomposition) or

Plasma Arc Destruction process is required as a second step of ITD to destroy isolated contaminates.

While DTD has been selected as the preferred option, we believe that ITD has a number of significant advantages that make it a preferable option over DTD, as outlined below.

DTD has a significant problem as there is a serious risk of dioxin re-formation during processing. To eliminate this problem DTD plant requires sophisticated air emission control systems such as the addition of a rapid quench and scrubber, in which residence time and temperature are critical parameters to operate and maintain processes in accordance with the best practice guidance of the Stockholm Convention.

In contrast, ITD does not have a risk of the reformation of dioxins. In previous research it is shown that ITD can significantly reduce the concentration of persistent chlorinated organic compounds (including dioxins) without increased risks to local residents, nearby workers and the environment¹. The EA report also outlines that ITD has lower emission than DTD, which we believe is a serious concern.

Thiess have made a detailed evaluation of the former Lednez / Union Carbide site and the adjacent area of Homebush Bay on the Rhodes Peninsula. At this time Thiess indicated that ITD technology is “well established” for remediating contaminated sites in the USA and that about 80 projects have been carried out there in the last decade.

Thiess also conducted trials on dioxin contaminated concentrates to demonstrate the capability of BCD Technology, and the trials gave the best result in terms of reduction of concentrations of contaminants below required limits. The then Department of Public Works and Services, with respect to the potential success of the BCD process, also referred to a trial report by Egis¹.

The greenhouse gas emissions for the CPWE remediation project based on a preliminary mass and energy balance for the DTD Plant plus emissions from other plant and equipment for the project are 4 tonnes of CO, 11200 tonnes of CO₂, and 11 tonnes of NOx. These emissions could be reduced further through the use of an ITD plant.

Overall, we believe that ITD would provide a solution that would more adequately remediate the encapsulated waste with reduced environmental impacts to the solution proposed. Both technologies are in use in NSW and evidence would be available from these sites further highlighting the benefits of ITD - especially in regards to the reduced emissions from the site. It is important that potential health impacts are carefully considered when selecting a remediation technology that is less expensive but also with reduced effectiveness.

Scope of remediation

The present project will only remediate the car park waste – we believe that it is important to properly remediate the entire site where ‘heavy ends’ contamination is found. For Orica, not to remediate all of the ‘heavy ends’ on the site at this time is not

properly solving this very serious problem. It will be a lost opportunity to properly fix the problems and broaden the use of the technology.

There is little mention within the report about how this remediation project will halt further contamination of the Botany groundwater plume. We believe that this information and the ongoing link between the carpark waste remediation and the groundwater plume needs to be publicly available as to its effectiveness and success.

The surrounding land is already contaminated due to improper handling of highly toxic waste; toxic contamination needs to be remediated over the entire site so that health risks are reduced to safe levels. Presently the remediation is limited to a small section of the entire site, yet we lack confidence that this is the only area that is contaminated on the site and affecting the groundwater aquifer. With the nearest residential area only 300m from the car park waste it is vitally important to fix this serious problem in full and stop further contamination of this area.

Conclusion

This submission has outlined reasons why we are not supportive of using DTD technology to remediate the car park waste as there are superior alternatives available such as ITD technology incorporating BCD.

We have also identified that there is scope to broaden the remediation project so that a greater area is remediated and this toxic problem moves closer to a proper resolution.

If you have any further questions please contact Sam McGuinness on (02)92792466 or smcguinness@nccnsw.org.au.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Cate', followed by a long horizontal flourish.

Cate Faehrmann
Executive Director

References

1. Standing Committee on State Development, Report on Redevelopment and Remediation of the Rhodes Peninsula Parliamentary Paper Number 135, June 2002, Available at:
<http://www.rhodesremediation.nsw.gov.au/docs/Rhodes%20peninsula%20report.pdf>
2. Lodolo, A., Gonzalez-Valencia, E. & Miertus, S., Overview of Remediation Technologies for Persistent Toxic Substances; International Centre for Science and High Technology, UNIDO, Pure and Applied Chemistry, Trieste, Italy, Received October 2000; Available at:
http://hrcak.srce.hr/index.php?show=clanak_download&id_clanak_jezik=1145
3. US Navy, Application Guide for Thermal Desorption Systems, Naval Facilities Engineering Service Center, Port Hueneme, California 93043-4370, Available at:
https://portal.navfac.navy.mil/pls/portal/docs/PAGE/NAVFAC/NAVFAC_WW_PP/NAVFAC_NFESC_PP/ENVIRONMENTAL/ERB/RESOURCEERB/CR-98-008.PDF
4. Department of Environment and Heritage, Appropriate technologies for the treatment of scheduled wastes, CMPS&F - Environment Australia, Review Report Number 4 - November 1997, Chapter 5 & 16; Available at:
<http://www.environment.gov.au/settlements/publications/chemicals/scheduled-waste/swtt/thermal.html>
5. National Toxics Network, HCBS in Botany, Available at:
<http://www.oztoxics.org/ntn/botany.html>
6. Rhodes Remediation Project, Available at:
<http://www.rhodesremediation.com.au/>

H07/96868

Mr Ricardo Prieto-Curiel
Major Infrastructure Assessment
NSW Department of Planning
GPO Box 39
Sydney NSW 2001

Dear Mr Prieto-Curiel,

**R.e : NSW Health Review of the Environmental Assessment for Orica's
Remediation of Car Park Waste Encapsulation (CPWE) Site in the Botany
Industrial Park, Botany Bay Local Government Area**

NSW Health has reviewed the Environmental Assessment Report for the Remediation of Car Park Waste Encapsulation, Botany Industrial Park. NSW Health has some outstanding concerns regarding the potential for health impacts associated with this proposal.

We note that many of these concerns arise from deficiencies or inconsistencies in the assessment documentation that may be resolved with consolidation of the assessment into a single document. There are however some aspects of the proposal, in particular proposed residual contaminant concentrations in soil that require further assessment with regard to the potential for human health risk.

Recommendations:

1. It is important to have a consolidated air assessment document that includes the errata and addresses the additional information requested in matter 1.
2. It is important to have a complete, correct documentation of the health risk assessment available.
3. We recommend a comprehensive health risk assessment estimating any impact on mercury body burden of emissions from this plant on the local community given that there has been a significant local source of mercury from the chloride plant.
4. We recommend that WorkCover NSW are involved in assessing the risks to onsite workers at the earliest possible opportunity
5. We recommend that unless a complete health risk assessment of the RBC values incorporating all possible human exposure pathways and odour risk is undertaken and demonstrates acceptable outcomes, then it is preferable that all soil on the site is remediated to the guideline levels specified on page 3-4.
6. We recommend that the outstanding recommendation in the noise assessment (that receptors be notified of all works likely to cause excessive vibration or noise i.e. if sheet piling is required prior to commencement) should also be adopted.

Matter 1: AIR QUALITY ASSESSMENT (APPENDIX E & ERRATA)

1.1 Criteria Pollutants: From the air quality assessment, two criteria air pollutants; **PM₁₀** and **NO₂** have implications for human health. They are of concern because the incremental increases of both pollutants from the CPWE operations alone are significant contributions to the environment and the risk to human health.

- The maximum predicted ground level concentrations at discrete receptors for **NO₂** from the CPWE operations only for the one hour period is stated as 225 µg/m³. This exceeds health based guideline values for NO₂ (200µg/m³)
- The maximum predicted ground level concentrations at discrete receptors for **NO₂** (including background) for the one-hour period is 259 µg/m³. This also exceeds health based guideline values for NO₂ (200µg/m³)
- The maximum predicted ground level concentrations at discrete receptors for **NO₂** from the CPWE operations only for the annual period is stated as 14 µg/m³
- The maximum predicted GLC at discrete receptors (excluding background) for the 24-hour period for **PM₁₀** is 21 µg/m³.
- The maximum predicted ground level concentrations at discrete receptors (including background) for the 24-hour period for **PM₁₀** is 42 µg/m³.

There is no information provided in regards to the likely sources of **PM₁₀** and **NO₂**. There is also no analysis done to indicate the frequency of high **PM₁₀** and **NO₂** concentrations and the resulting top 50 worse days in a year and the likely ground level concentrations on days other than the maximum. We recommend that this data should be sought from the applicant.

Concentrations of nitrogen dioxide exceeding health based guideline values may impact on sensitive individuals such as those with asthma and chronic obstructive pulmonary disease by reducing lung function, making individuals more susceptible to effects of allergens or to infection. Significant increments in exposure to particulate matter such as those expected in the vicinity of the CPWE treatment plant increase the risk of adverse health effects such as respiratory and cardiovascular disease events in exposed people. We note in particular that the peak off-site impact area for particles and nitrogen dioxide is the Hensley Field where risks of adverse impacts may be further increased due to increased dose of pollutants for those exercising compared to those at rest (due to increased respiratory rate).

Management of these potential health risks partly depends on the expected frequency of the high pollution events in addition to their magnitude and we seek to provide further advice on this issue once the frequency information requested above is provided. It may be that an air monitoring program is required at the Hensley Field and other significantly impacted community locations to ensure impacts remain within acceptable limits and to provide advice to the community about the potential for health impacts from air pollutants.

1.2 Discrepancy between air assessment inputs and statement of commitments: The estimated emission rates from the DTD plant stack in the air assessment (Table 6.8, pg 25) do not match with the statement of commitments (#13). The values as listed in the air assessment are what have been used to calculate ground level concentrations and thus any health risks. Of particular concern is that the statement of commitments allows significantly higher emissions of cadmium, chlorine, hydrogen chloride and carbon monoxide than have been modelled in the air assessment. It is our view that if the proposal is approved the conditions should reflect the lower emission rates used in the modelling unless further modelling can demonstrate acceptable impacts of the emission rates in the statement of commitments.

We also note that both the air assessment and the statement of commitments specify a mercury emission concentration of $1\text{mg}/\text{m}^3$, which exceeds the POEO limit. The health considerations of this level of emissions will be discussed in section 2 below.

Matter 2: HUMAN HEALTH RISK ASSESSMENT (APPENDIX H AND ERRATA)

2.1 There are several errors remaining in the errata reports that should be corrected:

- Table 7-2 in assessment of acute risks needs to be reviewed for HCB and HCBd because these values appear to be incorrect.
- In Table 7-7b in the erratum the cumulative risk to adults from dioxins appears to be incorrectly misstated as 0.000065, which is less than the risk from the CPWE alone. This may be a transcription error because in Table 7-6 it appears to be listed as 0.007.
- In the CPWE only tables in Attachment A to the erratum the levels listed for TCE, HCBd, HCB, HCE and 1,1-DCE at the grandstand and the running track are inconsistent – the concentration at the grandstand for each of these chemicals is about 10 times lower than the running track – for all the other chemicals the value at the running track is lower than the value at the grandstand due to it being further away from the works.
- In the normal operations table in Attachment A to the erratum, the units stated for the max GLC is mg/m^3 . Assuming this is transcription error and should read as $\mu\text{g}/\text{m}^3$.

It is our view, that apart from the third dot-point, that correction of these errors are unlikely to change the conclusions of the health risk assessment, however it is important to have a complete correct documentation of the health risk assessment available.

With respect to the anomaly of the concentrations of toxic contaminants between the grandstand and the running track, this may have some impact on the conclusions of the health risk assessment as the use of lower values from the running track in the HRA may have underestimated potential health impacts. We would like the opportunity to review the HRA once the corrections are made.

2.2 Mercury impacts

In general the multi-pathway approach to assessing potential impacts of hazardous chemicals is acceptable. The health risk assessment identifies that off-site mercury impacts are of most significance for young children. We note that assumed background mercury intake is 50% of the TDI which provides some conservatism to the assessment as the most recent Australian dietary survey indicates that average mercury intake for this age group is 35% of TDI. However given that there has been a significant local source of mercury from the chloride plant a comprehensive health risk assessment should estimate any impact on mercury body burden of emissions from this plant on the local community. A comprehensive health risk assessment of mercury should also include pregnant women as a separate exposure group.

2.3 Occupational exposures

We note that there appear to be significant exposures to some toxic chemicals for onsite workers. We recommend that WorkCoverNSW are involved in assessing these risks at the earliest possible opportunity.

Matter 3: RISK ASSESSMENT TO DETERMINE SOIL BASED RISK CONCENTRATIONS

- In table 7-2, on page 7-3, we are concerned with the proposed values (human health risk based concentrations (RBC)) for chemicals of potential concern remaining in soil outdoors. The RBC surface values for each of the chemicals listed for outdoor soil exceeds the guidelines values listed as adopted on page 3-4. The adopted guideline levels in the document are based on USEPA Region 9. The levels recommended in table 7-2 exceed the odour thresholds for most of the chemicals.
- The risk assessment process to derive these values considered only one very specific exposure scenario – workers located above the buried material.
- The risk assessment did not consider whether the levels of chemicals that are proposed to remain in the soil:
 - might pose a risk to off site human receptors who live nearby given that they may be exposed 24 hours per day compared to 1 hour per day that the workers might be present;
 - might be odorous;
 - might be an ongoing source of contamination to the local groundwater;

We recommend that unless a complete health risk assessment of the RBC values incorporating all possible human exposure pathways and odour risk is undertaken and demonstrates acceptable outcomes, then it is preferable that all soil on the site is remediated to the guideline levels specified on page 3-4.

Matter 4: NOISE ASSESSMENT (APPENDIX F)

- The noise assessment highlights that the noise criteria goals would not be met if unmitigated for;
 - Hensley athletic field for each scenario and for either neutral or adverse meteorological conditions or daytime/evening.
 - The daytime goals for the Qenos building should sheet piling be required
 - With respect to residential receivers, the daytime goals are met unless sheet piling is required.
 - The night time goal for the residential receivers of 40 dBA would be exceeded by 6 dBA during normal and 9 dBA during adverse meteorological conditions.

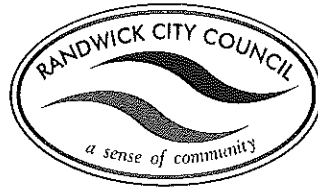
We note that the recommended mitigation measures achieve compliance with health-based noise objectives with the exception of sheet-piling activities, and that the recommended mitigation measures have been adopted in the statement of commitments with one exception. The outstanding recommendation in the noise assessment (that receptors be notified of all works likely to cause excessive vibration or noise i.e. if sheet piling is required prior to commencement) should also be adopted.

I hope that this feedback is of assistance to you in evaluating this proposal. Should you seek any clarification of NSW Health input please contact Ms Rabia Khan on 9816 0252.

Yours sincerely



Dr Wayne Smith
Director
September 1, 2007



RE (F2004/07897)
(Contact Officer: Bronwyn Englaro - 9399 0796)

28 August 2007

Remediation of Orica's CPWE - Submissions
Major Infrastructure Assessment
Department of Planning
GPO 39
Sydney NSW 2001

Attention: Ricardo Prieto-Curiel

Dear Sir,

RE: Orica's Remediation of Car Park Waste Site, Botany Industrial Park (06_0197)

I refer to your letter dated 23 July 2007, advising Council of the public exhibition of the Environmental Assessment (EA) for the proposed Remediation of Car Park Waste Site, Botany Industrial Park.

Randwick City Council does not object to the proposed remediation of the Car Park Waste site. Any approval is to provide appropriate environmental and operational conditions and is to ensure that community consultation, monitoring and reporting is implemented throughout the project.

The following are key matters relevant to Randwick City:

Potential Noise and Pollution Impacts

The proposal should ensure that the proposed remediation works and the operation of all plant and equipment shall not exceed noise requirements specified in Environmental Protection Licence 2148; particularly during the treatment of soil using the DTD Plant during the night-time which has the greatest potential to affect Randwick City residents. Precautionary noise mitigation measures referred to in the EA should be implemented up front to avoid any non compliance incidents and any undue discomfort to nearby residents. Department and Environment and Climate Changes (DECC) should ensure that all licence conditions are strictly adhered to and ensure that any incidents of non compliance are promptly communicated to all stakeholders and responded to.

Traffic

Council emphasises that the increase in vehicle movements resulting from the remediation projects with specific regard to the construction period will result in an increase in road traffic and that this increase, combined with other concurrent major development near by is likely to adversely impact on the surrounding road network. The EA does not categorically address the controls, measures and management practices that will be taken to ensure all vehicles adhere to designated routes. These measures and cumulative impacts should be identified and included in the proposed Traffic Management Plan or alternatively included as a condition in any Instrument of Approval for the project.

Resource Use

The associated consumption of natural gas, electricity and diesel associated with the proposed remediation is significant. The impact that this resource use has on the environment via greenhouse gas emission has not been sufficiently addressed in the EA. A commitment from Orica to reduce greenhouse gas emissions resulting from the remediation project should be made or mandated by DECC. This could be achieved by offsetting a proportion of the project's emissions by purchasing a percentage of Green Power sourced from an accredited renewable energy supplier.

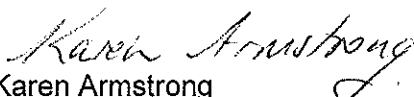
Remediation

Council is, however, concerned with the management of materials outside the encapsulation, with specific regard to the eastern embankment. The EA provides little surety with respect to the proposed management of this material, identified by the Director General to be one of the key assessment requirements for the EA. Any approval needs clear commitment to a sound process for remediation of the whole area.

Council reiterates that any approval and associated works are to ensure the protection of the environment and that the amenity of the nearby industrial and residential land is maintained particularly in regard to air emissions, traffic, water treatment and disposal, and acoustic comfort.

Should you have any questions or wish to discuss any of the comments, please contact Bronwyn Englaro, Senior Sustainability Officer on 9399 0796.

Yours faithfully,


Karen Armstrong
Manager – Strategic Planning

Our Ref: SDeards/EASub

30 August 2007



Remediation of Orica's CPWE – Submissions
Major Infrastructure Assessments
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Dear Sir,

**RE: Submission on Environmental Assessment for remediation of land
within the Botany Industrial Park known as the Car Park Waste Encapsulation
(CPWE) site (Application 06_0197)**

The City of Botany Bay (Council) has reviewed the Environmental Assessment (EA) for the remediation of the Car Park Waste Encapsulation (CPWE) at the Botany Industrial Park (BIP) prepared on behalf of Orica by HLA. Council generally supports the proposal as it will result in the removal of contaminated material from the CPWE and hence improve the environmental quality of the area, reduce risk to residents and allow the land to be returned to productive industrial use. However, Council also wishes to provide the following comments/ deficiencies:

1. Groundwater
2. Remediation and Development Control Plan 34
3. Remediation Approach, Performance and Justification
4. Air quality, including odour and dust
5. Other

1. Groundwater

- Council's previous submission for the CPWE EA dated 10 August 2006 stated that the EA should address management of contaminated groundwater. Although the EA states that contaminated groundwater associated with the CPWE will be managed as part of the existing groundwater containment and treatment program, it does not address the fact that groundwater in the vicinity of the CPWE does not migrate toward the south west as in the majority of the Botany aquifer, but to the north east, toward Hensley Athletic Field. Management of groundwater in this area must be addressed, and the risk to Field users assessed in light of this.
- A number of requirements of the Director-General in relation to water quality were not adequately addressed in the EA. These include:
 - Provide an accurate representation of the extent of the HCBP hotspot in groundwater adjacent to the CPWE and how this groundwater will be managed/ remediated.

- Details of how nearby production bores will be managed so as not to exacerbate migration of contaminants from the disturbed area.
- Provide details of the proposed monitoring of groundwater and surface water and include effective management strategies to manage the risk of water contamination.

2. Remediation and Development Control Plan 34

All remediation works should be in accordance with Council's development control plans and *Local Environmental Plan 1995*, in particular *Development Control Plan No. 34 – Contaminated Land* (DCP 34).

- In relation to vibration, the EA states that "*it is possible that vibration levels could, at times be perceptible at the residences...*(p.ES7)" This is not in accordance with DCP 34.
- Material stockpiled on site outside the Excavation Soil Building (ESB) or Feed Soil Building (FSB) shall be stored and managed in accordance with DCP 34.
- Section 4.3 describes working hours (for plant) in the ESB that do not comply with DCP 34.
- Upon completion of the remediation works and reinstatement of the CPWE material, landscaped areas of the site should be revegetated with a diversity of locally native trees, shrubs and groundcover propagated from local genetic stock where possible, in accordance with DCP 34.
- All fill imported to the site must be validated and comply with relevant NSW DECC guidelines, in accordance with DCP 34.
- Noise levels should comply with guidelines set out in DCP 34.

3. Remediation Approach, Performance and Justification

- The Construction Environment Management Plan (CEMP) referred to in Section 8.1.2 of the EA should be provided to the relevant authorities prior to works being undertaken.
- The EA does not adequately address how inorganic constituents which cannot be treated in the directly-heated thermal desorption (DTD) plant will be managed.
- A number of requirements of the Director-General in relation to the remediation approach, performance and justification of the remediation were not adequately addressed in the EA. These include:

- Clear details of the design and technology of the DTD plant.
- Description of the DTD commissioning program and verification of the technology and emissions controls.
- Details of the DTD operation including residence times for processing materials.
- Detailed information on the pre-treatment building including the ventilation system and worker and machinery movements.
- Details of the quantities and physico-chemical parameters (e.g. contaminant concentration, moisture content, particle size, bulk density etc) of the materials to be remediated.
- Details of how the technology has been proven acceptable for processing materials similar to those likely to be located on the site. Council notes that the ability of the technology to treat inorganic contaminants was not addressed.
- Council notes that the Director General's requirement in relation to remediation criteria was not adequately addressed. The EA did not clearly indicate the proposed remediation criteria to be applied to the site, and details of how these were derived. These criteria must be provided to the relevant authorities and certified by the site auditor prior to remediation works.

4. Air quality, including odour and dust

- A plan for the air monitoring program once the plant is operational should be designed, and should clearly state when monitoring will occur and how and when the results of this will be reported.
- In Council's previous submission for the CPWE EA dated 10 August 2006 it was proposed that an air quality communications strategy be developed to report emissions monitoring. Council also suggested fortnightly dioxin emission testing at a minimum during plant commissioning and initial operation. Neither of these items were addressed comprehensively, and time frames were not included for either dioxin monitoring or reporting to the Community Participation and Review Committee (CPRC).
- The quantitative air quality assessment utilised background pollutant concentration data obtained from a DECC ambient air monitoring site in Randwick. Only a subset of all pollutants required to be monitored was conducted in the vicinity of the BIP. The data obtained from the DECC monitoring station at Randwick should not be relied upon to be representative of that at the BIP, as the landscape character surrounding the Randwick site is not similar to the BIP. Use of this data and whether further monitoring should be conducted in the vicinity of the BIP should be considered.
- Section 8.1.2 of the EA states that *"potential odour impacts associated with the proposed remediation of the CPWE may be cause by the*

release of odours and vapours from the exposure of contaminated materials during excavation and handling."

The possible impact of odours from the emission control system and DTD plant stacks should also be considered.

- Section 8.1.4 states that a monitoring program will be designed for each of the ESB, FSB and DTD Plant stacks. More comprehensive details of the monitoring plans should be included in the EA.
- A number of requirements of the Director-General in relation to the air quality impact of the remediation works were not adequately addressed in the EA. These include:
 - Provide a description of baseline conditions including meteorology and topography.
 - Provide details of all air discharge points and characteristics.
 - Provide details of the proposed air quality and odour monitoring program.
 - Include a detailed dust impact assessment from soil disturbance and other remediation activities, and consider cumulative dust impacts from other relevant activities in the area.

5. Other

- The Human Health Impact Assessment prepared by URS and appended to the EA in Appendix H recommended that emissions from the plant associated with the CPWE remediation works should be monitored and re-evaluated against the assumptions used in the Assessment once the plant is operational. Council recommends this takes place within three months of commissioning of the plant.
- Orica has engaged a site auditor accredited under the *Contaminated Land Management Act 1997* to endorse the Remediation Action Plan (RAP) and for the duration of the remediation. An interim advice containing the auditor's comments on the RAP should be prepared and submitted to the Department of Planning, certifying that in the auditor's opinion the RAP will allow the site to be remediated to commercial/ industrial standard prior to remediation works beginning.

Upon completion of the works the validation report and a Site Audit Statement prepared by the auditor should be submitted to the consent authority.

- Upon completion of the detailed design of the DTD plant further environmental assessment should take place, particularly in relation to air and noise emissions.

Yours faithfully,

A handwritten signature in black ink, appearing to read "Paul Shepherd". The signature is fluid and cursive, with the first name "Paul" and last name "Shepherd" clearly distinguishable.

Paul Shepherd
DIRECTOR
TECHNICAL AND REGULATORY SERVICES

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Submission 6



BOTANY ENVIRONMENT WATCH



3 Queen Street
BOTANY NSW 2019
26TH August, 2007.

Submission to
Proposed Remediation Car Park Waste Encapsulation
Botany Industrial Park Environmental Assessment

Ricardo Prieto-Curiel
Senior Environmental Planning Officer
Major Infrastructure Assessment
GPO Box 39
SYDNEY NSW 2001

Submission on behalf of
Botany Environment Watch Members

Nancy Hillier OAM.

Yours faithfully
Nancy Hillier OAM
President of BEW

- Botany Independent Action Group
- Botany Bay Planning & Protection Council
- N.S.W. Urban Coalition
- B.E.W. P.O. Box 39

- Inner Sydney Regional Council for Social Development
- Airport Coalition Taskforce
- Towra Preservation Group

3 Queen St
BOTANY NSW 2019
26TH August, 2007

Ricardo Prieto-Curiel
Sen. Environmental Planning Officer
Major Infrastructure Assessment
GPO Box 39
SYDNEY NSW 2001

Proposed Remediation Car Park Waste Encapsulation

The Botany Environment Watch (BEW) have always deplored the burying of this hazardous waste and warned of the potential dangers which could occur.

Whilst we do not feel comfortable with the plan to excavate and destroy on site this waste, it must be destroyed as there are no suitable alternatives that are known to us.

BEW gave major input to the community forums which were held and is now recorded in the environmental assessment prepared by Orica.

At risk of repeating comments already made, we offer the submission for your consideration,

P.2.4 Site History

Concluding that workers associated with air from existing CPWE do not represent an unacceptable risk to human health.

Comment

Whether unacceptable or not, what is the risk? Where has the risk been proven to be harmless?

BEW have great fears for the workers dealing with this project and they must be protected no matter what the expense and monitoring of their health for at least five years after completion of destruction and de-commissioning must be written into the workers' contracts.

P.4.3 Doors double air lock entry. Is this a proven non failure? Will truck driver wear protective clothing and how often changed?

P.4.5 Directly heated Thermal Desorption Plant.

Mercury emission removal from process gas is poorly understood. This paragraph is frightening: Orica is not sure of the temperature to minimize potential emissions.

Comment

How can approval be given when this declaration of trial and error poses such a threat.

We are talking of human beings working and living with these uncertainties.

How often are safety proceedings, evacuation, etc. to be held during the time of destruction of waste?

P.4.12 Has there been a Hazard/Risk analysis for utilities and resources?

P 4.13 Auditor: will Cleanup Liaison com. receive a copy of review of auditing and validation.

I am sure the Government departments will understand our fears and we do not believe they would carelessly give an approval to a project which could endanger so many lives.

Executive Summary

ES 2 Project Description

1. No final design - this needs to be seen. Why wasn't it prepared for this Environmental Assessment?
2. Air Quality. Paragraph 3: building have control emission systems. So what about workers enclosed inside the buildings?

Dust – Paragraph 2

Again workers inside breathing in the dust?

Noise – Will noise measures be in place before or after noise problem is experienced?

“Would be” is continuously used, as detected after the event. P.E. 56.

ES 7 Vibration

Despite low risk this is a worry.

ES 8 Road Traffic detail assessment not necessary.

We are entitled to know traffic movements as all our streets and roads are threatened with the multitude of traffic generation caused by undesirable industry and their infrastructure,

ES 9 Hazard/risk mainly about outside the area.

Inside is also a worry!

ES 10 Environmental issues low to medium risk provided mitigation measures are provided?

So the measures will be in place before operations start and not after a problem occurs.

8.8.6 Conclusion 2nd paragraph.

The potential risk levels to personnel may be relatively high.

This comment is not good enough - in fact, is cruel.

Could a more detailed assessment be given and with proven results.

Appendix C p.43 Preventative Control.

How often is periodic inspection and maintenance?

p.54 Residual Risk potential to cause operator injury cannot be entirely eliminated.

This must not happen. Every attempt must be made at all times to protect these workers. If in doubt, don't do it.

p. 59 Recommendation.

5. More detailed risk assessment.

Will we know when that is completed?

This must be completed before any operations begin,

Submission 7

Ricardo Prieto-Curiel - MP 06_0197 Remediation of land, Botany Industrial Park

From: "ANNIE MANSON" <ANNIE.MANSON@sydneywater.com.au>
To: <ricardo.prieto-curiel@planning.nsw.gov.au>
Date: 06/09/2007 14:50
Subject: MP 06_0197 Remediation of land, Botany Industrial Park

Sydney Water

Hi Ricardo,

I have inspected our area plans and there does not appear to be major water or sewer infrastructure located in the subject site. However, the developer would still be required to obtain a Section 73 Compliance Certificate from Sydney Water. The Certificate will confirm that the developer meets Sydney Water's infrastructure requirements and has made payment of Sydney Water charges.

The developer must fund any adjustments needed to Sydney Water infrastructure. Developers should engage a Water Servicing Coordinator to get a Section 73 Certificate and manage the servicing aspects of the development. Details are available from Sydney Water's website www.sydneywater.com.au.

Please call me if you have any queries or concerns.

Cheers, Annie manson

Annie Manson
Strategic Project Officer,
Procurement and Urban Growth
Sydney Water Corporation
P: 02 9350 5243
E: annie.manson@sydneywater.com.au

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Our reference : LIC07/85-12:DOC07/28754:CP
Contact : Craig Patterson, (02) 4224 4100

Remediation of Orica's CPWE - Submissions
Major Infrastructure Assessments
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Dear Mr Ricardo Prieto-Curiel

PROJECT APPLICATION: 06-0197
ORICA PROPOSED REMEDIATION OF CAR PARK WASTE ENCAPSULATION
BOTANY INDUSTRIAL PARK

I am writing in reply to the exhibited Project Application and associated Environmental Assessment (EA) regarding Orica Australia Pty Ltd's proposal to remediate the land known as the Car Park Waste Encapsulation located within the Botany Industrial Park, received by the Department of Environment and Climate Change (DECC) on 26 July 2007. Additional information regarding the proposal was also received by the Department on 23 August 2007.

DECC has reviewed the information provided and has determined that it is able to support the proposal on the basis that the proposal is unlikely to result in any adverse impacts to the environment. This support is subject to the Department of Planning (DoP) seeking the amendments and additions to the draft Statement of Commitments identified in Attachment 1 which also includes the justification for the proposed amendments. DECC has also outlined in Attachment 2 a number of other issues with the EA which should be addressed to assist the DoP in its determination of the proposal.

Whilst DECC supports the proposal, a key issue that requires further examination by DECC and Orica is the issue of whether the proposed new plant will comply with the emission limits for mercury as specified by the *Protection of the Environment Operations (Clean Air) Regulation*. Orica has indicated that it is uncertain whether the mercury emissions from the new plant will comply with the regulatory limit.

Based on the information provided in the EA, DECC considers that Orica should be able to meet the regulatory limit if available control technology is fitted. DECC expects that new plant be designed to comply with regulatory limits.

An exemption from the standards is an option available in certain circumstances. Section 284 of the POEO Act outlines the circumstances where exemptions may be granted. Integral to any exemption is:

- a demonstration that it is not practicable for Orica to comply with the Regulation mercury standard when emissions have been reduced to the maximum extent achievable through application of best-practice process design and/ or emission controls; and,

The Department of Environment and Conservation NSW is now known as
the Department of Environment and Climate Change NSW

PO Box 668, Parramatta NSW 2124
Level 7, 79 George St, Parramatta NSW
Tel: (02) 9995 5000 Fax: (02) 9995 6900
ABN 30 841 387 271
www.environment.nsw.gov.au

Department of **Environment and Conservation** NSW

- a rigorous assessment demonstrating that non-compliance with the Regulation mercury standard will not have any significant adverse effect on public health, property or the environment.

Further information on this issue is provided in Attachment 3. DECC recommends that discussions on potential CAR exemptions continue between DECC and Orica in parallel with the Part 3A planning process and in close consultation with DoP. It is anticipated that this will facilitate a timely resolution of potential issues with CAR requirements without adversely impacting on the overall timetable for the project.

It is expected that DECC will be given an opportunity to review the draft Director-General's Environmental Assessment Report for this proposal. If the amendments to the draft Statement of Commitments are not included to the satisfaction of DECC, we will be recommending that they are included as Conditions of Approval, if approval is recommended by the Department of Planning. It should be noted that these amendments are important for DECC's ongoing support of the proposal.

It is noted that the project will need an Environment Protection Licence (EPL) to operate. The proponent will need to make a separate application to DECC to obtain this licence once development project approval is granted. Prior to the issue of the EPL, the DECC will undertake a Technology Assessment of the proposed treatment technology based on documentation that will be submitted by Orica. Following this assessment, DECC will provide more detailed comments in relation to the proposal which may include providing additional advice on appropriate licence conditions.

DECC would also appreciate receiving a copy of the submissions received by the Department of Planning (or a report summarising these submissions) received in response to the exhibition of the Environmental Assessment. This is to assist DECC to review the draft Director-General's Report and to recommend conditions of approval, if required.

Should you require any further information, please contact the officer above.

Yours sincerely

 06/09/07

JAMES GOODWIN
Unit Head Sydney Industry
Climate Change and Environment Protection Group

(N:\EPRD\CP\2007\DOC07-28754 - PART 3A - ORICA CPWE.DOC)

ATTACHMENT 1

The DECC considers that the draft Statement of Commitments (SOCs) detailed in the EA should be adopted in the development of any proposed approval conditions subject to the following amendments. In addition we have also provided comments and additional SOCs to address the issues that have arisen during DECC's assessment of the proposal.

Statutory Requirements

SOC 1

This commitment refers to the issue of an Environment Protection Licence for the proposed project. Prior to the issue of the EPL, the DECC will undertake a Technology Assessment of the proposed treatment technology based on documentation that will be submitted by Orica. Following this assessment, DECC will provide more detailed comments in relation to the proposal which may include providing additional advice on appropriate licence conditions.

Soil Remediation Requirements

SOC 4

This commitment states that *"Where the [soil remediation criteria] cannot be practically achieved or demonstrated (technical and economical), another best practice standard would be agreed with the DECC"*. This suggests that meeting the soil remediation criteria as specified in the Director General's Environmental Assessment Requirements (EARs) as defined by DECC may be negotiable if they cannot be met following optimisation trials.

DECC is supportive of optimisation of the Direct Thermal Desorption (DTD) plant operation and recognises that there may need to be some flexibility in operating parameters where appropriate. However such parameters will not be agreed at the expense of complying with the specified soil remediation criteria. DECC understands that similar DTD treatment technology is currently being used for the Allied Feeds site remediation at Rhodes Peninsula and the technology has been used extensively overseas. These projects have clearly demonstrated that the specified remediation criteria are achievable in practice using this technology and as such the remediation criteria which have been set for the project in the EARs should apply.

Please refer to Attachment 2 for additional comments regarding the soil remediation criteria and DTD optimisation.

Air Quality

SOC8

This commitment states that "the thermal oxidiser ... shall be designed to meet the requirements of best practice in terms of destruction efficiency and air pollutant emissions".

Whilst Appendix K of the EA appears to question the definition of "best-practice" for thermal oxidiser design, Orica is reminded of the need to meet the requirements of the Clean Air Regulation.

SOC13

This commitment lists the incorrect concentration limit for mercury. As discussed separately in this submission, the CAR limit for mercury is 0.2mg/m³ and not 1.0mg/m³. Orica could not lawfully operate its plant at the upper limit proposed by this commitment unless it had obtained an exemption from the CAR limit.

The commitment also states that Orica will comply with a stack concentration limit of 205mg/m³ for nitrogen oxides. However, the EA states that ground-level concentrations of NO₂ are predicted to exceed the DECC's 1-hour average impact assessment criterion when modelled assuming an in-stack NOx concentration of 234mg/m³.

DECC requests that Orica commit to meeting an emission concentration which enables compliance with the DECC's impact assessment criterion for 1-hour average NO₂.

SOC18

This commitment makes reference to the disposal of wastes removed from the site. DECC recommends that this SOC be amended as follows:

"Waste removed from the site will be assessed, classified and managed (where necessary) in accordance with the Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquids Wastes. All wastes will be disposed of to an appropriately licensed waste facility."

New SOC

DECC recommends that an additional SOC be included under the Air Quality section which commits Orica to implementing all practicable measures to eliminate or reduce, as far as practicable, all fugitive emissions from transport of material from the ESB to the FSB.

Noise

SOC20

This commitment identifies the requirements for the Construction Noise and Vibration Management Plan to be prepared for the project. DECC recommends that an additional point be included in this commitment which has been identified in Section 8.2.4 of the report and states:

"Notification to all those impacted by works likely to cause excessive vibration and noise i.e. if sheet piling is required"

In addition to the above, DECC recommends that the following SOC's also be included:

- (1) Noise generated at the premises must not exceed 55 dB(A) $L_{Aeq,15\text{minute}}$ during the day, 45 dB(A) $L_{Aeq,15\text{minute}}$ during the evening and 40dB(A) $L_{Aeq,15\text{minute}}$ at night at any residence within a residential area. The L_{Amax} noise limit for the night period is 63 dB(A).
- (2) For the purposes of condition (1)
 - Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public holidays'
 - Evening is defined as the period 6pm to 10pm,
 - Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.
- (3) Noise from the premises is to be measured at the most affected point within the residential boundary or at the most affect point within 30m of the dwelling (rural situations) where the dwelling is more than 30m from the boundary to determine compliance with the $L_{Aeq(15\text{minute})}$ noise limits in condition (1), unless otherwise noted.

Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance. See Chapter 11 of the NSW Industrial Noise Policy.

The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.

- (4) The noise emission limits identified in condition (1) applies under meteorological conditions of:
 - Wind speed up to 3m/s at 10 metres above ground level; and
 - Inversions of 3°C/100m and windspeeds of 2m/s at 10 metres above the ground.

- (5) To determine compliance with the L_{Amax} limit in condition (1) noise must be measured at, or computed for approximately 1 metre from the dwelling façade.
- (6) Construction shall be limited to the hours 7am to 6pm Monday to Friday and 8am to 1pm Saturdays and at no other time without the prior approval of the EPA unless inaudible at any noise sensitive location not associated with the development. Inaudible means the construction activities should not be heard by the human ear at the nearest affected receiver. The assessment location shall be in accordance with condition (3).

Water and Soils

SOC26

This commitment refers to the management of stormwater at the site. This commitment should be amended to cover all aspects of the project similar to SOC 24 and 25 including site establishment, excavation, construction, operation and decommissioning.

DECC also recommends an additional SOC be included which states:

"Only uncontaminated rainwater would be permitted to flow to stormwater drains"

SOC26 & 28

Both these SOC's make reference to a Commitment 44. However there does not appear to be a Commitment 44 included in the EA. DECC requests that the references in these commitments be updated to refer to the correct commitment (assumed to be 39).

ATTACHMENT 2

ISSUES WHICH REQUIRE FURTHER CONSIDERATION

Air Quality Assessment Issues

NO_x emissions

Ground-level concentrations of NO₂ are predicted to exceed the DECC's 1-hour average impact assessment criterion when modelled assuming an in-stack NO_x concentration of 234mg/m³. In point 13 of the Statement of Commitments, Orica commits to a stack concentration limit of 205mg/m³. DECC requests that Orica clarify whether an in-stack NO_x concentration of 205mg/m³ will enable compliance with the ground-level concentration criterion.

Fugitive emissions during transport of contaminated material

In advice to DoP regarding the draft assessment, DECC indicated that the measures proposed to reduce fugitive dust emissions from trucks (such as automated wheel washes) were not adequate given that the nature of the soil contamination.

DECC advised DoP that Orica must employ additional design measures to prevent contaminated soil coming into contact with trafficable surfaces and truck wheels, especially during truck loading and unloading. It was recommended that DoP request that these design features be described in detail in the final EA.

This issue has not been addressed in the final EA and DECC is concerned that Orica does not propose to employ any additional design measures to control the fugitive emissions during transportation of material from the ESB to the FSB. The control of fugitive emissions is critical to minimising the potential for adverse air quality impacts due to the proposal.

It is recommended that Orica be required to commit to redesign how the materials will be handled and transported between the two proposed buildings and to prepare a comprehensive plan to manage fugitive emissions from this source.

Compliance with the Regulatory Design Requirements for the Plant

Appendix K of the EA states that "the DTD Plant TO would be operated above the minimum temperature of 900°C, provided slagging of the TO due to melting of entrained dust was not encountered". However, the Clean Air Regulation requires operation at a temperature of more than 980°C and recent communication from Orica and Thiess Services (on behalf of Orica) indicates that, based on positive treatability trials, problems (such as slagging) are not expected at temperatures of 980°C.

Appendix K also discusses issues associated with meeting the required residence time (2 seconds) for the thermal oxidiser and does not commit to meeting the Clean Air Regulation requirements for this parameter. However DECC understands from information provided by Thiess Services (on behalf of Orica) that the plant will be designed to meet the Regulations for a residence time of more than 2 seconds.

While DECC acknowledges that these requirements can be further addressed by Orica during the Technology Assessment process, it is necessary for Orica to meet all regulatory requirements as specified in the CAR, specifically in relation to temperature, residence time and destruction efficiency.

Greenhouse gases

DECC also notes that Orica has addressed the issue of global warming and greenhouse gas emissions in relation to the operation of the rotary dryer and thermal oxidiser. Whilst we commend Orica for considering this issue, the specified soil remediation criteria must not be

compromised as a result of plant optimisation (ie lowering rotary dryer and thermal oxidiser operating temperatures to achieve greenhouse gas reductions). Notwithstanding this, Orica should consider more comprehensively additional reduction and energy efficiency opportunities across other aspects of the site operations and not limit this concern to rotary dryer and thermal oxidiser temperatures.

Revised Air Quality Assessment Report

An outcome of the meeting held between DECC, Orica and NSW Health on 24 August 2007 was that Orica will submit a revised Air Quality Assessment Report which will incorporate the changes included in the erratum report. In addition to the issues addressed in the erratum report, the revised report should also address the issues identified below.

- Baseline values for PM_{10} in Table 9.1 of the air assessment do not appear to be correct, as they do not match the values in Table A1 of the errata report. The values in the appendices (Table A1) are significantly higher than in Table 9.1.
- The maximum predicted off-site ground-level concentration (glc) for annual average TCE in Table 1 of the errata report does not appear to be correct. The value in Table A5 of the errata report is $0.18\mu\text{g}/\text{m}^3$, not $0.038\mu\text{g}/\text{m}^3$. It appears that this is a transcription error – $0.038\mu\text{g}/\text{m}^3$ is the maximum predicted glc at sensitive receptors surrounding the site, not at the boundary.
- The appendices in the errata report do not detail the predicted CHCl_3 concentrations for the baseline scenario. Similarly, the appendices do not detail predicted TSP concentrations for the normal or upset scenarios.
- The appendices in the errata report for the operation of the CPWE only (ie. excluding other sources at Botany Industrial Park) indicates that the predicted concentrations of HCB, HCB, HCE, 1,1-DCE and TCE are at least an order of magnitude higher at the Botany Athletic Centre Running Track than at the Grandstand. Given the relative locations of the running track and the grandstand, these results appear to be incorrect. Comparison of these values with the results for the normal scenario suggests that this may simply be a transcription error as it appears that the results for the CPWE only scenario have been shifted down a row. Since the values listed in the table have been used to calculate the risks associated with the proposed development, the risk estimates may change should these values be incorrect.
- It is not clear why predicted NO_2 concentration remain the same for the upset scenario, when a loss of natural gas supply would result in the shutdown of the thermal oxidiser, cessation of natural gas combustion, and consequently a decrease in the NO_x emitted from the DTD stack.
- Values for PCE in Table A.16 of the errata report appear to be incorrect. The maximum on-site and off-site glcs are lower than for the baseline scenario.
- The results in Table 9.3 of the air assessment for 1,1-DCE for the baseline and normal scenarios are incorrect (the table currently shows that the predicted concentration for the upset scenario is an order of magnitude lower than for the baseline and normal scenarios). The appendices indicate that the correct value for both scenarios is $0.04\mu\text{g}/\text{m}^3$, not $0.405\mu\text{g}/\text{m}^3$.
- Some of the emissions of the volatile chlorinated compounds jump dramatically between normal operation and upset conditions but others remain exactly the same (eg 1,1,2-trichloroethane compared to EDC or PCE or TCE). It is unclear from the assessment as to the reason for these increases and whether they are attributed to the fact that the main emissions for the latter chemicals originate from other parts of the site which then dominates the levels from the CPWE treatment.

Human Health Impact Assessment issues

Revised Human Health Impact Assessment Report

An outcome of the meeting held between DECC, Orica and NSW Health on 24 August 2007 was that Orica will submit a revised Human Health Impact Assessment Report which will incorporate the changes included in the erratum report. In addition to the issues addressed in the erratum report, the revised report should also address the issues identified below.

- The Human Health Impact Assessment is based on people being exposed for two years only which is only a few months longer than the proposed project currently plans to operate. The DECC understands that there is a possibility for the life of the plant to be extended to treat material from the Pacific National stockpile, contaminated material found during the remediation of Southlands and other stockpiles around the area. If the proposed treatment plant for the Orica site were to be utilised for this purpose, the DECC would be concerned about the adequacy of the current health impact assessment to cover such activities. We acknowledge however that to allow the treatment of other material using the proposed plant a Section 96 application would need to be submitted to the DoP at which time any associated risks with the extending the proposal would need to be assessed.
- Table 7-2 in assessment of acute risks needs to be reviewed for HCB and HCBd because these values appear to be incorrect.
- In Table 7-7b "Revised Calculation Threshold Risk – Total Residential Exposures" in the erratum report received by DECC on 23 August 2007, the calculated dioxin value provided for the cumulative impacts from CPWE Remediation and Other Sources (0.000065) is less than the value provided for the impacts from the CPWE Remediation only (0.00040). This suggests that the risk to adults from dioxins decreases when the baseline scenario is added. DECC has assumed that this anomaly may be as a result of a transcription error as Table 7-6 in the erratum report shows a value of 0.007 for dioxin. We request that the revised report as mentioned above clarifies this matter.
- In the risk tables provided in Attachment B – "Revised Risk Calculations for Workers" of the erratum report, there appears to be an incorrect heading in the tables associated with the CPWE only emissions provided under the "Summary of Risk – All chemicals" section. The last two columns of each table have the same heading (for example: "Calculated Threshold HI for CPWE Only"). DECC believes that one of the columns should reference daily intake values while the remaining column retains the existing heading. These tables should be reviewed with any modified table included in the revised Human Health Impact Assessment Report as mentioned above.

Risk Assessment to determine Soil Based Risk Concentrations

- DECC is concerned about the approach taken for the assessment of risk for contaminant levels in soil that could potentially remain in place or be reused on site. Based on the information provided in the EA, the assessment appears to be incomplete and hence is not acceptable as a basis for determining validation criteria and/or treatment outcomes.

The risk assessment determines what levels of contaminants could remain in the soil if there was one very specific exposure scenario, that is workers located above the buried material. It does not consider whether the proposed levels of chemicals that could remain in the soil:

- 1) might be an ongoing source of contamination to the local groundwater;
- 2) might be odorous;
- 3) might pose a risk to off site human receptors who live near by given that they are in place 24 hours per day compared to 1 hour per day that the workers might be present;
- 4) might be phytotoxic – whether a garden could be grown in the outdoor area.

These are critical aspects that should have been considered as it is unlikely that the current proposed values would have been as high as they are if these aspects were appropriately reviewed. According to USEPA region 9 preliminary remediation goals, soil containing PCE (tetrachloroethene) can be a source of contamination to groundwater at concentrations as low as 0.06 or 0.003mg/kg depending on how long it takes for the chemical to migrate or how far away the groundwater is. For proposed remediation works which is located in an area where it has been clearly demonstrated that the type of soil and the depth to groundwater make it quite easy for these chemicals to migrate to the groundwater, Orica has proposed PCE levels of 16, 1500 and 5000mg/kg depending on where the material is to be placed.

- The risk assessment also uses a number of incorrect or unsourced data as inputs to the volatilisation models, although it would appear that for the most obvious data errors it has resulted in a more conservative answer than if the correct value had been included. Whilst this does not impact on the overall assessment, Orica should ensure that a more thorough check of the data is undertaken for future assessments.
- The approach used in the EA for assessing exposure via the dermal pathway is quite old and does not take into account the advice released in 2004 by the USEPA (<http://www.epa.gov/oswer/riskassessment/ragse/index.htm>) and in 2006 by WHO (<http://www.who.int/ipcs/publications/ehc/ehc235.pdf>). The approach as detailed in the USEPA document should be adopted and would result in a higher contribution to risk for this pathway which would result in the risk based soil concentrations needing to be lower than currently calculated.
- The proposed uses of the Risk Based Soil Concentration criteria are unclear from the report given that most of the values listed in Table 5 and 6 in the Remedial Action Plan are significantly above the levels actually found in the material inside the encapsulation as listed in Table 1 of the RAP.

Remedial Action Plan issues

DECC understands that the RAP is subject to auditor approval and Orica is currently in the process of engaging an accredited contaminated sites auditor for this process. It should be noted that the comments provided below are based on the information submitted to the DECC to date. Should the RAP require refinement as a result of the auditor approval process, DECC would like the opportunity to review any proposed changes.

Soil Remediation Criteria

DECC has a number of concerns regarding the remediation criteria as presented in both the body of the Environmental Assessment (EA) and the Remedial Action Plan (RAP).

- It is noted that the remediation/validation criteria specified in the RAP are greater than DoP's EARs and the industrial waste guidelines for a range of compounds, including HCB. The EAR Scheduled Chemical Waste (SCW) criteria are based on the NSW Scheduled Chemical Wastes Chemical Control Order 2004 (SCW CCO) and are consistent with the limits set for the Allied Feeds remediation project. The CPWE site and surrounding materials contain only four chemicals (including hexachlorobenzene (HCB)) and low levels of the other SCW that are subject to the SCW CCO. DECC understands that Orica's treatability trials indicated HCB levels of less than 1mg/kg were achievable at the full range of potential rotary dryer operating temperatures. In this regard, the treatment goals for SCW must meet the regulatory level of less than 2mg/kg aggregate as was specified in DECC's EAR.
- Under Section 8.4.2, the EA states that "*The concentrations nominated in the Director General's EARs are more stringent than criteria currently in force in the relevant NSW CCOs. This is because they do not consider practicability (technical and economical) which is considered in the CCOs. The dioxin criteria is below that in the current CCO (1986)*". This statement is misleading as it is only the criterion for dioxins that differs between the requirements of the CCO and the EARs. DECC currently regulates licensees against the

WHO-TEQs for dioxins, furans and dioxin-like PCBs as this approach is in accordance with international best practice. The NSW Dioxin CCO (1986) approach is now outdated (rather than the CCO factoring in technical and economic practicabilities as suggested in the EA) and only applies to a single dioxin congener. It has been demonstrated through other thermal treatment operations that the destruction of the WHO-TEQ dioxins to the level specified by the DECC in the EARs is both feasible and reasonable and given the characterisation of material within the CPWE, DECC considers that Orica should be able to meet the remediation criterion specified for WHO-TEQs for dioxins, furans and dioxin-like PCBs.

- Section 11.4.3 of the RAP states that during the optimisation trials *"the potential for accelerated plant wear and tear and possibly of catastrophic failure (e.g. due to metal fatigue in the dryer) will also be considered particularly in terms of operating at the high end of the soil treatment temperature scale (around 500°C)"*. DECC considers that this statement may be slightly overstated as we are aware of other similar thermal plants which operate at temperatures between 500°C to 550°C which have not resulted in a catastrophic failure of the rotary dryer. Further explanatory information would need to be provided by Orica at the Technology Assessment stage to justify this statement.

Materials management

- The EA indicates that the material surrounding the CPWE (including the Hypalon liner, surrounding soil and the bitumen cap) is contaminated including reasonably high levels of contaminants (including HCBd at a level of 392 mg/kg) in the bitumen cap "attributable to its higher absorbing ability". The RAP implies the bitumen cap will not be treated and will be landfilled. Orica must ensure that these materials are dealt with in an appropriate manner during the process and if it proposed that the bitumen cap is to be landfilled, then it will need to be assessed in accordance with the DECC's Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquids Wastes. This is also applicable to any other waste materials which are not remediated through the proposed process. This requirement has been included as an amendment to SOC18.
- Section 3.5.2 of the RAP also indicates that the Hypalon liner itself has a very high concentration (35,100mg/kg) of HCBd. This is significantly higher than the concentrations in the CPWE soil. There also appears to be a gradient of increasing HCBd with depth and potentially very high HCBd concentrations in the soil below the CPWE. Careful analysis of the base excavation surface and treatment of the highly contaminated base soil should be ensured.
- The EA has proposed that treated material will be used as backfill into the excavation pit, with surplus material (approximately half) to be used at undisclosed locations across the BIP. It is unclear from the information provided as to exact locations of the proposed reuse sites and the type of backfilling that it would be used for (ie landscaping or beneath buildings). The RAP also does not identify the remediation criteria that would be adopted for this material and nor does it detail any proposed odour management options for the temporary storage of this material. Based on the proposed remediation goals, DECC is concerned about the potential generation of offensive odours from both the exposed encapsulation area and the storage of the material. Orica must ensure that appropriate measures are implemented to control any potentially offensive odours which may be generated as a result of the proposed remediation works.
- The EA states that the encapsulated material comprises a vast array of materials including ash, sand, peat, polythene granules, crushed drums, drum liners, steel reinforcement, scrap steel, scrap pipework, and timber amongst other materials. It is unclear from the EA as to whether the proposed thermal treatment process is capable of treating all these types of materials and how the material will be managed in the event that they cannot be treated.
- It is unclear from the EA as to the potential future uses of the site. Orica must ensure that any future uses of the site are allowable given the proposed site remediation criteria.

- The EA makes several references to Treatability Trial data throughout the EA but the data was not included in the report. This data would provide a clearer understanding of the remediation outcomes being proposed for the project, however DECC understands that the data will be provided for the Technology Assessment stage of the proposal.

Site validation plan

- As part of the validation process the RAP identifies the use of industry practice of 2.5 times the criteria in single sample and 95%UCL. However the RAP does not detail whether this practice will be adopted per stockpile, per excavation area, or adopted for a whole of treatment validation. DECC recommends that it should be adopted per stockpile, excavation area, and whole of treatment. It is also recommended that if different strata are encountered, then each strata layer should be individually validated.
- A 20m grid size and a 20m lineal spacing have been nominated for the proposed excavation and wall validation. In order to determine if this is adequate, an estimation of the size of the excavation and depth of the walls of the excavation would need to be provided. The RAP does not appear to address this information.
- Section 14.5 of the RAP indicates that for Suite 2 – Capping Material, one sample in 100m³ of the stockpiled material will be validated. However, it is not clear whether this refers to the current capping material on the site or any additional material that may be brought to the site for use as capping. If it refers to the current material, the different material types should be separated and classified independently. Furthermore, the proposed quantity of this material is unclear and therefore the sample density cannot be determined.
- Section 14.6 of the RAP indicates that for Suite 3 - Landscaping (embankment) material, one sample in 100m³ of stockpiled material would be validated. It is unclear from the report as to the proposed quantity of this material and as such it is difficult to determine the sample density. The RAP also identified a range of potential materials in the embankment. As for Suite 2, the different material types should be separated and classified independently. Table 7 also outlines details for the validation of Suite 3b landscaping materials however from the information provided in the report, the difference between Suite 3a and Suite 3b materials is not clear.
- Section 14.7 of the RAP states for Suite 4 – Treated Material, validation samples will be collected at a rate of one sample per eight hours of DTD Plant operation (approximately one sample per 160m³). It is not clear from the information provided as to how the validation process will be affected should the DTD plant not work for eight hours successively.

Water Reuse Criteria

- The EA states that all water collected on the site will be treated to a standard suitable for discharge to sewer or reused during excavation, remediation and reinstatement works, where possible. The SOCs (in particular 26) makes reference to criteria for treated water to enable its reuse on site. This criteria has not been included in the EA or the RAP. Until details of the water treatment plant technology and a list of proposed criteria are provided, the acceptability of the option of reusing this water cannot be assessed.

Other issues

- Section 12 of the RAP identifies four methods for the management, treatment or disposal of water encountered during the remediation works. One of the proposed methods involves the treatment of water in an on-site Wastewater Treatment Plant. Should this option be selected by Orica, additional information regarding its proposed location and the proposed remediation and reuse criteria for the contaminated water will need to be provided.
- On page 15 of the RAP the result for the one sample tested for dioxins is listed. Whilst DECC questions the use of only one sample, it should also be noted that the information on TEQs is inadequate and should be reported in terms of the 1998 WHO TEFs or the 2005 WHO TEFs.

- DECC notes that the Relative Percent Difference (RPD) recoveries for organics will be more than what is outlined in the RAP. Whilst this is acknowledged, no other limit of acceptability has been provided by Orica. In this case, industry best practice would be considered appropriate.
- DECC considers that all treated material will be considered contaminated until validated otherwise.

Noise issues

- In the event of sheet piling being required at the site, all associated noise impacts from piling operations will be controlled via the construction time limits provided in the Statement of Commitments detailed in Attachment 1. Respite periods should be implemented in to the sheet piling program if complaints are received in relation to sheet piling.
- Vibration impacts associated with piling would be regulated via the requirements of the DECC publication *Assessing Vibration: A Technical Guideline* dated February 2006.

Water Quality issues

- Section 8.6 of the EA discusses the issue of groundwater associated with the BIP. The report makes reference to the Qenos production bores and states that these bores have been active since the 1980s and are currently still active. From previous discussions with Orica, DECC was under the impression that some of these bores were no longer in use and, in fact, had been deregistered with Department of Water and Energy. We request that Orica clarify the bores that are currently in use as the DECC is concerned that if all these bores are still being used then their use may need to be limited given the close proximity of some these bores to the contamination.

Hydrocarbon contamination in the groundwater

- During the draft EA stage of the proposal, DECC requested that the final EA should address the issue of the presence of petroleum hydrocarbon contamination from an existing pipeline at the site and the possible implications it may have for the remediation. Whilst it has been acknowledged that the contamination is not as a result of Orica's activities, the EA does not appear to address this matter.
- DECC is aware that there are high levels of benzene, toluene and other C6-C9 hydrocarbons present in the area and we are concerned that the existing pipeline may still contain material contaminated with hydrocarbons, which if ruptured, will further contaminate the CPWE material and potentially contaminate the groundwater. We are also concerned about how such an incident could potentially impact on the pre treatment processes and the DTD if there are large amounts of BTEX and TPH in the soils (particularly those that are surrounding the encapsulation). The effectiveness of the emission controls for the FSB and DTD may need to be assessed once Orica has a better understanding of the level of contaminants present in the soil.

ATTACHMENT 3 - MERCURY EMISSIONS

Compliance with the Regulatory limit

Based on the information provided in the EA, it appears possible for Orica to comply with the regulatory limit for mercury.

The regulatory limit for mercury emissions in NSW is less stringent than the limits in the US and Europe. The US mercury emission limit applicable since 2005 for hazardous waste incinerators is 8.1 µg/dscm. The European Union emission limit applicable since 2000 for mercury for incineration plant is 50 µg/m³. These criteria indicate that compliance with the regulatory emission limit in NSW (0.2 mg/m³ or 200 µg/m³), could be achieved with the use of established control technologies, such as injection of activated carbon.

Information contained in attachments to Appendix K of the EA shows that Orica can achieve compliance with the regulatory limit for mercury with the application of available mercury control technology. Table 2 of Attachment C shows that, assuming the mercury concentration in the feed soil is 2 mg/kg, the concentration of mercury in the stack will be 0.15 mg/m³ with the use of powdered activated carbon injection. This level is well below the regulatory limit for mercury of 0.2 mg/m³. It appears the conclusions made in Appendix K are based on incorrect assumptions about oxygen corrections that approximately halve the mercury concentration limit that would apply.

Some of the statements in Appendix K also appear to be based on historical emission results from similar plants in the US. However, it appears that many of these remediation projects were undertaken between 1989 and 1998, and therefore would not have been required to meet the current US standards.

The Statement of Commitments states that *"mercury may exceed the maximum allowable stack concentration in which case a best practice standard would be developed"*.

An exemption from the limits is an option available in certain circumstances. Section 284 of the POEO Act outlines the circumstances where exemptions may be granted. Integral to any exemption is:

- a demonstration that it is not practicable for Orica to comply with the Regulation mercury standard when emissions have been reduced to the maximum extent achievable through application of best-practice process design and/ or emission controls; and,
- a rigorous assessment demonstrating that non-compliance with the Regulation mercury standard will not have any significant adverse effect on public health, property or the environment.

Best Available Control Technologies

While the EA discusses the potential for reducing mercury by injection of powdered activated carbon, Orica does not demonstrate that it is not practicable to implement this technology (or any other technology or practice) and does not commit to employing any such control technology or practices. For example, controlling the soil feed rate¹ is a potential option to reduce mercury emissions to comply with the regulatory limit. This option has not been discussed in the EA, and as such, it is unclear if this option has been explored by Orica and Thiess.

Orica proposes to consider the option of reducing the concentration of mercury in the stack gases by lowering the temperature of the rotary dryer, which will consequently reduce the degree of

¹ US EPA 2004. National Emission Standards for Hazardous Air Pollutants: Proposed Standards for Hazardous Air Pollutants for Hazardous Waste Combustors (Phase I Final Replacement Standards and Phase II) <http://www.epa.gov/fedrgstr/EPA-AIR/2004/April/Day-20/a7858a.htm>

mercury removal from the soil. DECC is concerned that this method of mercury control may compromise the effectiveness of soil remediation.

Orica must rigorously demonstrate that it is proposing to reduce mercury emissions to the maximum extent achievable through application of best-practice process design and/ or emission controls.

Impact of Mercury Emissions

The air quality impact assessment (AQIA), the human health impact assessment (HHIA) and the associated errata reports show that ground-level concentrations of mercury will comply with the relevant criteria and should not result in adverse impacts on human health, with the possible exception of organic mercury:

- It has been assumed for the assessment that all mercury emissions from the DTD plant will be in the form of inorganic mercury. However, it is DECC's understanding that there is considerable uncertainty regarding the form of mercury will take in emissions from the plant, and this uncertainty will not be resolved until the proof of performance trials have been undertaken.
- The impact assessment criterion for organic mercury is one tenth of the criterion for inorganic mercury. If all mercury were to be emitted from the plant as organic mercury, the maximum predicted glc would be almost double the criterion for organic mercury. Thus, if more than approximately 50% of mercury is emitted as organic mercury, the assessment predicts that there may be impacts at receptors for the plant as proposed. This is unlikely to be an issue for a plant that complies with the regulatory limit for mercury emissions.

It should be noted that CPWE emissions will have a significant impact on maximum predicted glcs at nearby sensitive receptors.

Table 1 of the errata report to the air quality assessment demonstrates that the CPWE is not the major contributor to the maximum on-site and off-site mercury glcs, as the predicted concentrations are the same for the baseline and normal scenarios. The results appear to indicate that the impact of CPWE remediation emissions will be negligible. However, closer inspection reveals that the CPWE remediation has a significant effect on maximum glc concentrations of mercury at many sensitive receptors, often more than 50% and up to 100% of the total level at receptors. A summary of the predicted mercury concentrations, showing the relative contributions of the CPWE remediation and other sources to maximum predicted glcs, is shown in Table 1.

Table 1: Maximum Predicted Ground Level Concentrations of Mercury ($\mu\text{g}/\text{m}^3$)

Receptor	Baseline		CPWE Only		Normal		Upset
	1 hour	Annual	1 hour	Annual	1 hour	Annual	1 hour
Maximum GLC	5.33	0.56	0.56	0.017	5.33	0.560	5.33
Maximum Offsite GLC	0.85	0.015	0.31	0.015	0.85	0.016	0.85
Botany Golf Course	0.052	0.0005	0.08	0.001	0.08	0.002	0.06
Banksmeadow Primary School	0.031	0.0002	0.05	0.001	0.05	0.001	0.04
Garnet Jackson Reserve	0.027	0.0002	0.09	0.001	0.09	0.001	0.08
Pagewood Primary School	0.019	0.0002	0.10	0.002	0.11	0.002	0.09
Botany Athletic Centre Grandstand	0.042	0.0004	0.23	0.006	0.23	0.006	0.19
Botany Athletic Centre Running Track	0.039	0.0004	0.21	0.005	0.21	0.005	0.17
Denison Street North	0.076	0.0007	0.20	0.008	0.20	0.009	0.16
Denison Street North 2	0.073	0.0007	0.20	0.008	0.20	0.009	0.16
Denison Street South	0.299	0.002	0.12	0.003	0.30	0.005	0.30
Guides Hall	0.180	0.003	0.10	0.001	0.18	0.005	0.18
Retirement Village	0.018	0.0001	0.10	0.001	0.10	0.001	0.08
Our Lady of Annunciation School	0.033	0.0002	0.11	0.002	0.12	0.002	0.09
Marist Brothers High School	0.035	0.0002	0.10	0.002	0.10	0.003	0.08
Childcare Centre	0.048	0.0003	0.10	0.003	0.11	0.003	0.09
St Agnes Primary School	0.051	0.001	0.08	0.002	0.09	0.004	0.07
South Sydney High School	0.022	0.0002	0.07	0.001	0.07	0.002	0.06
Matraville Primary School	0.088	0.001	0.13	0.003	0.13	0.005	0.11
Kelloggs (manufacturing plant)	0.035	0.0003	0.09	0.001	0.09	0.002	0.07

Main contributor to predicted concentrations for normal scenario

	CPWE Remediation project
	Other sources (eg. old chlorine plant)
	Combination of CPWE and other sources

Conclusion

While DECC acknowledges that the control of mercury emissions is technically complex and difficult to predict with great certainty, DECC expects that new plant is designed to comply with regulatory limits. Based on the information provided in the EA, DECC considers that Orica should be able to meet the regulatory limit, especially if available control technology is fitted.

An exemption from the standards is an option available in certain circumstances. Section 284 of the POEO Act outlines the circumstances where exemptions may be granted. Integral to any exemption is:

- a demonstration that it is not practicable for Orica to comply with the Regulation mercury standard when emissions have been reduced to the maximum extent achievable through application of best-practice process design and/ or emission controls; and,
- a rigorous assessment demonstrating that non-compliance with the Regulation mercury standard will not have any significant adverse effect on public health, property or the environment.

Recommendation

Given the uncertainty expressed by Orica to date regarding this issue and based on the information presented above, DECC recommends that:

- Orica design the proposed plant to meet all regulatory requirements;
- Orica implement, either upfront or at the technology assessment and/ or proof of performance stage of the project, all measures necessary to ensure that all regulatory requirements are met. Any additional information on the proposed measures to be implemented should be provided at the Technology Assessment stage of the project.
- Alternatively Orica may apply the provisions of section 284 of the POEO Act and seek an exemption from meeting the Regulation limit. For DECC to support such an application, Orica would need to rigorously demonstrate that it is not practicable to achieve compliance with the limit and that there is no impact from non-compliance. This option has already been discussed with Orica and DECC would be willing to participate in further discussion on this matter.