

ASSESSMENT REPORT

Section 75W Modification

Orica Ammonium Nitrate Expansion Project – Layout Amendments

1. BACKGROUND

Orica Australia Pty Ltd (Orica) owns and operates an ammonium nitrate (AN) manufacturing facility at Kooragang Island in the Port of Newcastle (see Figure 1). The AN product is sold primarily to the mining industry for use in blasting agents. The facility has been operating since 1969 and is surrounded by various industrial and port-related activities.

The nearest residential community is located at Stockton, approximately 800 metres to the east of the Orica site. Other residential areas include Carrington and Mayfield, which are located between 1 and 2 kilometres to the south west and west of the site.

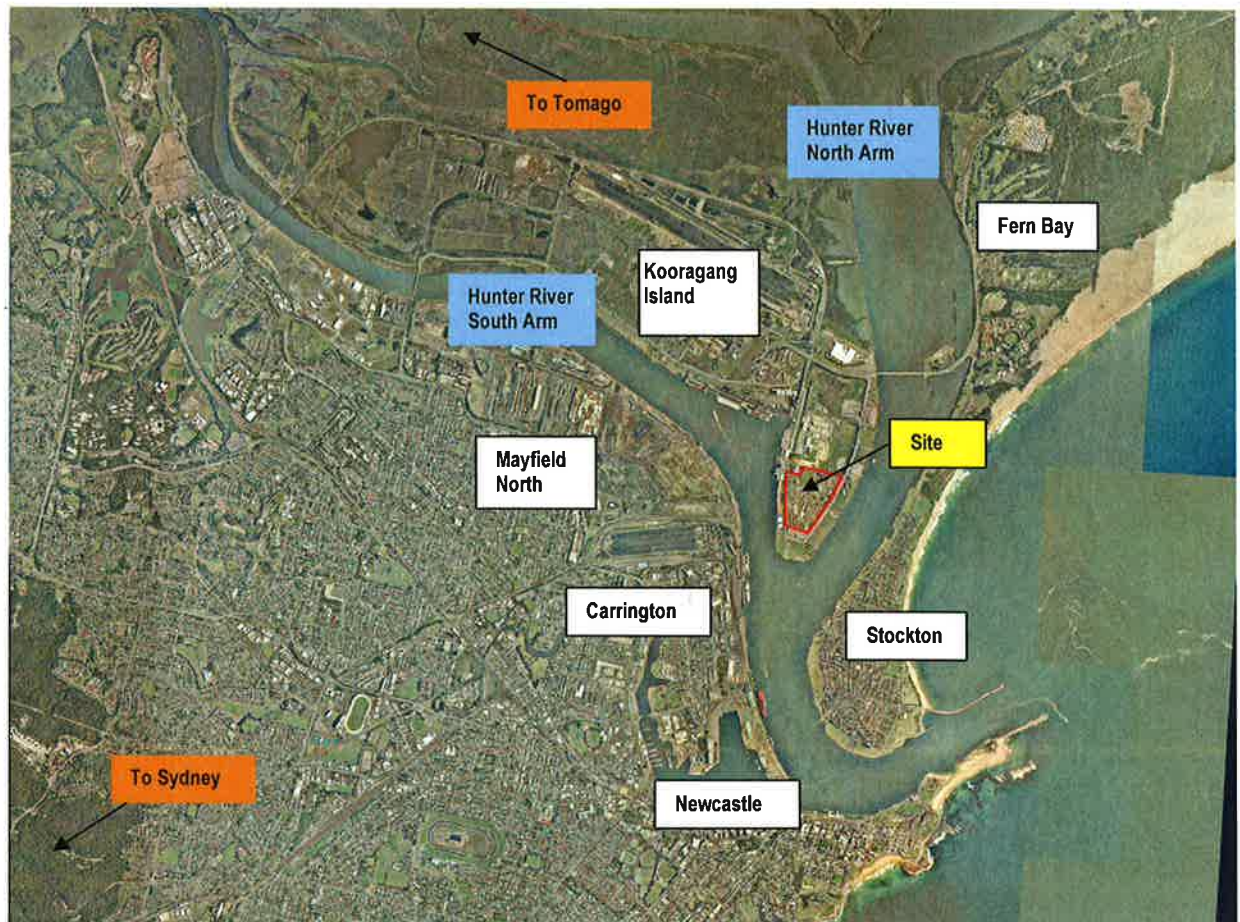


Figure 1: Regional Context

On 1 December 2009, the then Minister for Planning approved a Project Application (MP 08_0129) from Orica to increase its maximum production rates of ammonium nitrate from 500,000 to 750,000 tonnes per annum (tpa). As part of this approval, Orica is permitted to increase the production of ammonia product from 295,000 to 360,000 tpa and nitric acid from 345,000 to 605,000 tpa.

The approved Project included the following key components as depicted by Figure 2:

- construction of a third ammonium nitrate plant (AN3);

- construction of a fourth nitric acid plant (NAP4);
- upgrading the existing ammonia plant;
- increase in ammonium nitrate solution storage;
- reorganise the ammonia and AN storage;
- upgrades to ancillary infrastructure; and
- a series of risk reduction measures.

As the facility is a “potentially hazardous industry” (under the provisions of *State Environmental Planning Policy 33 – Hazardous and Offensive Development*), a Preliminary Hazard Analysis (PHA) was prepared as part of the Project’s environmental assessment to assess the potential risks from the facility to people, property and the environment. In preparing the PHA, Orica was required to estimate risks (and consider potential risk reduction) from the existing site and the expansion project.

The results showed that the off-site risks (fatality, injury and irritation) from the overall site (i.e. the existing site and the Project) would comply with risk criteria for new developments. The assessment also found that due to a series of risk reduction measures being implemented the risks from the overall site would be lower than the risks from the existing operations.

Orica has completed the upgrades to the ammonia plant and is now in the final stages of detailed design and pre-construction management planning for its two new plants (AN3 and NAP4). As a result of the detailed design reviews and technology selection, and to further improve safety and risk outcomes, Orica is now seeking to amend the plant and equipment layout and modify some plant design elements.

2. PROPOSED MODIFICATION

On 3 May 2011, the Department received a modification application from Orica, seeking approval to amend the layout of the Project, including:

- moving the new AN3 plant closer to the new NAP4 to minimise ammonia piping and improve integration;
- separating the AN wet section from the AN dry section (and relocating the AN wet section into NAP4);
- changing the layout for the storage of ammonium nitrate;
- rationalisation of the ammonia bullets and nitric acid storage;
- relocation of the approved boiler closer to its usage point at the NAP4; and
- a series of additional risk reduction measures (eg use of double contained liquid ammonia pipelines, minimisation of the length of the ammonia pipeline and reduction of the inventory in the ammonia vaporisers (see 5.1 for further details).

Further, as part of the detailed design process, Orica has selected its new NAP4 plant. This plant design has been based on the success of a similar plant that was recently built in Europe. Whilst this plant has an operational capacity 20% greater than the originally approved plant, Orica would still operate within its approved overall production limits by reducing production in its other plants.

The revised site layout proposed is illustrated in Figure 3 (overleaf).



Figure 2: Approved Site Layout, including Existing and Proposed Infrastructure

2011 Orica Incident

It should be noted that on **8 August 2011**, an incident occurred at the Orica site resulting in the accidental emission of a chemical compound (Chromium VI). As a result of the incident, the ammonia plant was shutdown. An inter-agency committee was established to oversee and review the progress of the safe restart of the plant.

Immediately after the incident, the Department placed its consideration of the modification application on hold due to the serious nature of the incident. This allowed the Department to focus on working with other key agencies as part of the Orica Start-Up Committee.

After reviewing the independent investigation report on the incident (which occurred during the start-up of the ammonia plant), the Department established that there was no fundamental inter-relationship between the modification proposal and the incident primarily because the modification does not seek to change or modify this plant.

The Orica plant was successfully restarted on **29 February 2012**. In addition, the Department also undertook additional consultation with regard to the modification application and the revised PHA with the relevant agencies involved in the Orica Start-Up Committee.

3. STATUTORY CONSIDERATION

Approval Authority

The Minister was the approval authority for the original project approval, and is consequently the approval authority for this application.

The Minister has delegated his functions to determine Section 75W modifications to the Department where:

- the council has not made an objection;
- there are less than 10 public submissions objecting to the proposal; and
- a political disclosure statement has not been made in relation to the application.

There have been no submissions received from the public and council has not made an objection to the proposal. There has also been no political disclosure statement made for this application or for any previous related applications.

Accordingly the application is able to be determined by the Executive Director, Major Projects Assessment under delegation.

Section 75W

In accordance with Clause 3 of Schedule 6A of the EP&A Act, section 75W of the Act as in force immediately before its repeal on 1 October 2011 and as modified by Schedule 6A, continues to apply to transitional Part 3A projects.

Under Section 75W of the EP&A Act, the Minister is obliged to be satisfied that what is proposed is indeed a modification of the original proposal, rather than being a new project in its own right.

The Department has reviewed the scale and nature of the proposed modification, and is satisfied that it can be characterised as a modification of the original project as:

- the environmental impacts of the proposed modification would be negligible;
- the essential function for which approval was granted would not change; and
- the project can be suitably regulated with some minor amendments to the existing conditions of approval.

It is therefore recommended that the Executive Director, Major Projects Assessment, as delegate of the Minister, agree that the modification request falls within section 75W of the EP&A Act.



Figure 3: Proposed Amendments to the Approved Site Layout, including changes to Existing and Proposed Infrastructure

4. CONSULTATION

Under section 75W of the Act, the Department is not required to notify or exhibit the application. However, following a review of the proposed modification, the Department decided to refer the application to Newcastle City Council (Council), the Environment Protection Authority (EPA, formerly the Office of Environment and Heritage), WorkCover NSW and NSW Health. The Department also referred the application to Incitec Pivot, which operates a fertiliser distribution centre immediately to the north of the site.

The modification was also placed on the Department's website in accordance with Clause 8G of the *Environmental Planning and Assessment Regulation 2000*. No public submissions were received.

The **EPA** did not object to the proposed modification; however raised concern that the proposal would result in one potential exceedance of fine particulate matter (PM10) criteria for the 24 hour averaging period at one sensitive receptor in Stockton. As such, the EPA recommended that a condition be included requiring Orica to investigate and implement options to reduce fine particulate emissions from its ANP1 Prill Tower within 2 years.

Council raised no objection to the proposed modification subject to Orica undertaking further investigations to reduce fine particulate emissions so as to comply with applicable criteria.

WorkCover NSW did not object to the proposed modification, however had some questions for further clarification in relation to the potential hazards and risks at the existing site. These questions were mainly related to the integrity of the bulk ammonia storage tank and the bund, which is part of the existing Orica site.

NSW Health did not object to the proposal, but raised a number of issues in relation to the existing site and approval conditions, rather than to the modification. These issues include site contamination, stormwater management, mosquito risk assessment and emergency response.

Incitec Pivot was concerned that the modification would increase individual fatality risks (IFR) at their southern boundary.

5. ASSESSMENT

The Department has assessed the modification application on its merits, and considers the key issues to be hazards and risks, and air quality. An assessment of all other issues is provided in Table 3.

The assessment of the key issues in this report makes reference to the 'existing site', the 'Project' (i.e. the expansion) and the overall site (both elements combined). References to the 'modified Project' relate to the project, as proposed to be modified.

5.1 Hazards and Risks

Background

In 1991, the Department undertook a risk assessment of the Newcastle Industrial Area, including the Kooragang Island area. The Study found that the risk contours for Kooragang Island were driven by what is now known as the Orica site.

In 2009, Orica lodged an application to uprate the Kooragang Island facility. Since the 1991 Study identified that Orica was the major contributor to the cumulative risk of the area, the Department requested that Orica undertake an assessment of the risks from the existing and the proposed Orica operations.

Orica's 2009 uprate project included a number of risk reduction measures to reduce the risks from the proposal. These measures were considered in the PHA which demonstrated that the risks from the overall facility would be further reduced. As such,

the Department concluded that the cumulative risks from Kooragang Island to surrounding land uses would also be reduced.

Current Modification

The EA for the modification included an updated PHA which examined the risks from the overall site and the modified project.

During the course of its assessment, the Department raised a number of issues with the PHA. This included issues relating to:

- the storage arrangement for both the ammonia bullets and ammonium nitrate product;
- clarification on frequency and consequence of some scenarios, given they were not consistent with the information provided in the PHA for the upgrade; and
- the use of the most recent version of risk software to update risk calculations.

These issues were addressed through the preparation of a revised PHA which was submitted to the Department in March 2012.

The modification application does not introduce new dangerous goods nor does it make significant process changes. As a result, no significant new accident events were identified.

As part of the modification application, Orica has proposed a number of additional risk reduction measures, including:

- replacement of the ammonia cooling system in the AN3 plant with a non-ammonia refrigeration system to lessen the number of failure scenarios involving ammonia;
- reducing the inventory of ammonia vaporisers to lower the consequence of potential equipment failure;
- installation of a chlorine monitoring system in the chlorine disinfection system for the ammonia cooling towers to improve monitoring and reduce the time for isolation in case of a leak;
- construction of double-contained (pipe inside pipe) liquid ammonia pipelines to reduce the frequency of failure of these pipelines; and
- minimising the length of the new ammonia pipelines as far as possible.

The PHA estimated the applicable risks in accordance with the Department's guidelines. These risks are:

- individual fatality risks (IFR);
- societal risk;
- overpressure explosion injury;
- toxic injury and toxic irritation risks; and
- overpressure damage and propagation risk.

All risks outlined above comply with the land use risk criteria for new development as published in the Department's *Hazardous Industry Planning Advisory Paper No. 4* (HIPAP) guidelines.

For example, the IFR adopts a criterion for various land uses which are outlined in Table 1 below. A comparison of the estimated IFR for the overall site, including the proposed modification, with this criterion is outlined in Figure 4.

Table 1: NSW IFR Criteria as published in the HIPAP No. 4

| Land Use | Suggested Criteria (acceptable fatality risk per million individuals, per year) |
|--|---|
| Hospitals, schools, child-care facilities, old age housing | 0.5 |
| Residential, hotels, motels, tourist resorts | 1 |
| Commercial developments including retail centres, offices and entertainment centres | 5 |
| Sporting complexes and active open space | 10 |
| Industrial | 50 |

Figure 4 demonstrates that the proposed modification complies with the criterion provided in Table 1 above. Furthermore, the PHA also demonstrated that the IFR for the proposed modification is also generally consistent with those presented in the original PHA for the overall site.

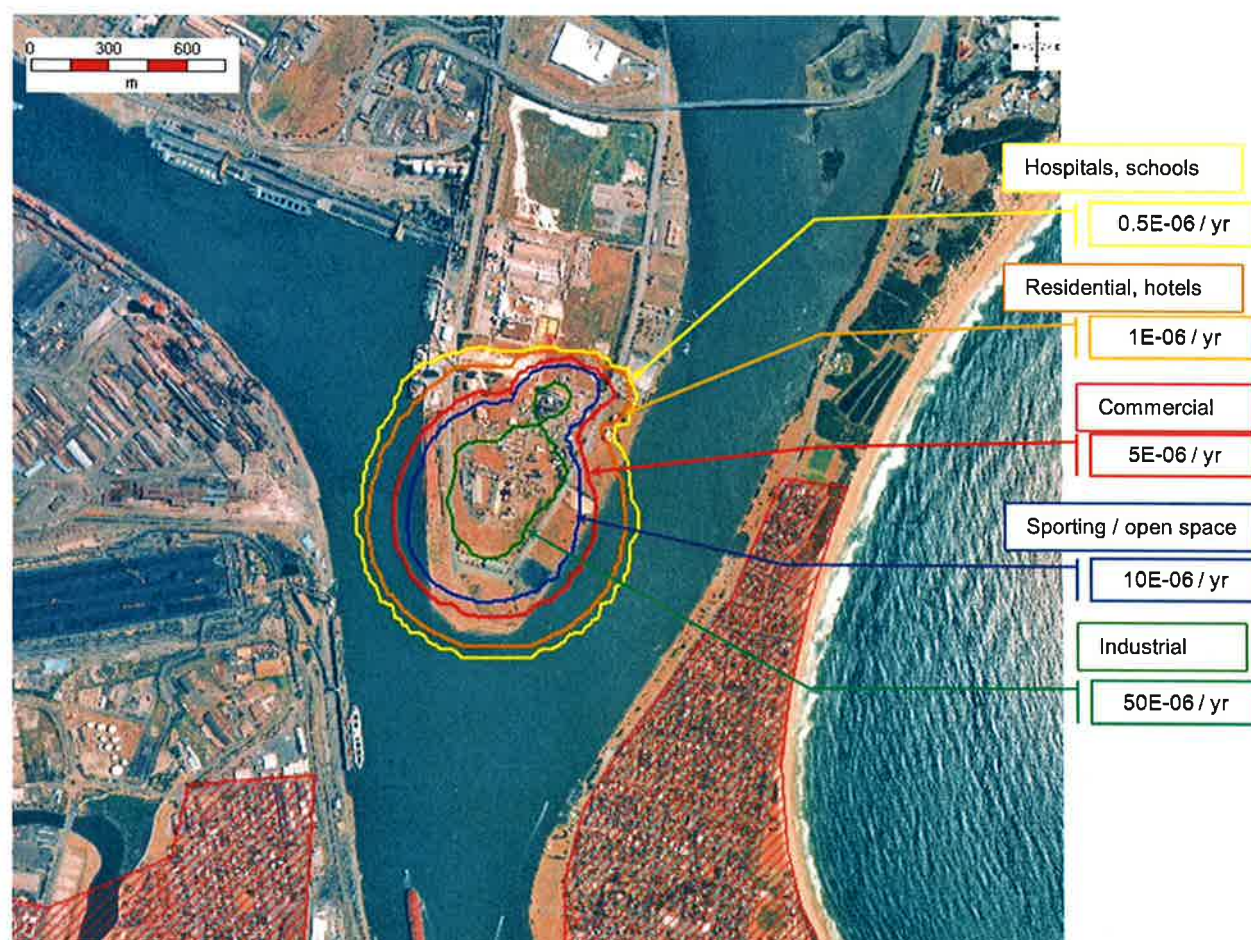


Figure 4: Individual Fatality Risk Contours – overall site after modification

The Department is satisfied that the modified Project would not increase off-site risks to people, property and the environment and that the key findings of the revised PHA are consistent with the findings of the original PHA provided as part of the 2009 application (as summarised above in Section 1).

Furthermore, the Department is also satisfied that the proposed modification would not increase the cumulative risks from the Kooragang Island area to surrounding land uses.

It is also noted that since the *revised* PHA now demonstrates that the IFR contours for the proposed modification are generally consistent with the IFR contours for the original Project, the concerns raised by Incitec Pivot in relation to the *first version* of the PHA, had now been satisfactorily addressed.

The Department also considers that the hazard related questions that were raised by WorkCover in its submission relate to Orica's existing site operations, rather than what is proposed by this modification. Notwithstanding this, it is considered that Orica provided an adequate response to these questions during the assessment.

The Department has carefully reviewed the existing conditions and recommends that some minor changes be made to Condition 15(a) (Transport of Hazardous Materials) and Condition 20(a) (Hazard Audit) to better reflect their original intent and to clarify some of the hazard-related audit requirements.

Overall, the Department is satisfied that the existing requirements, as stipulated by the existing approval conditions, will continue to ensure hazards and risks are monitored and managed to acceptable levels.

5.2 Air Quality

The EA included an updated air quality impact assessment as the modification application would result in changes to the site layout and to existing and proposed infrastructure and plant.

Dispersion modelling was carried out to assess how these changes could affect the outcome of the original air quality assessment. The results were compared against relevant EPA criteria at 40 sensitive receivers nearby.

The results of the modelling found that NO_x (as Nitrogen dioxide (NO₂)) and Total Suspended Particulate (TSP) emissions would increase slightly but emission levels would remain well within guideline criteria.

Similarly, there would be a slight increase in the level of fine particulate matter (PM₁₀) as a result of the modification. Whilst Annual Average PM₁₀ would continue to be met at all surrounding sensitive receivers, the modification would result in a slight exceedance of the short term cumulative (24-hour) PM₁₀ criteria of 50 µg/m³ at one sensitive receptor (receptor 3 in Stockton, see Table 2 and Figure 5 below).

Table 2: PM₁₀ ground level concentrations at sensitive receptor 3

| Receptor | 24 Hour PM ₁₀ (µg/m ³) | | |
|----------|---|------------------|------------|
| | Project | Modified Project | Difference |
| 3 | 24.5 (49.8*) | 24.9 (50.2*) | 0.39 |

Note: *Indicates the predicted cumulative level of PM₁₀, including background levels and Orica's predicted emissions.



Figure 5: PM₁₀ isopleths for the 24 hour averaging period for the approved and the modified Project

In its submission, the EPA recommended that Orica should be required to reduce its PM10 emissions within two years. Similarly, Council also recommended that Orica should be required to undertake further investigations to bring PM10 emissions in line with the criteria.

Orica has stated in its response to submissions that this predicted exceedance will not result from increased emissions (as the facility would still operate within its approved overall production limits), but from the site layout changes proposed. Orica also points out that the dispersion modelling was highly conservative as it assumed a worst case scenario of all plant and equipment on site operating at maximum throughput during adverse meteorological conditions.

The Department agrees that both of these points are valid and also notes that the predicted increase in PM10 ($0.4\mu\text{g}/\text{m}^3$) as a result of the modification is very minor and unlikely to be distinguishable from the concentration predicted in the original air quality assessment. Orica has also produced background monitoring results which demonstrate that PM10 concentrations in the area have consistently declined in recent years, which means that Orica's contribution to the background results could be lower than assumed in the model and assessment.

Furthermore, the existing Project approval already contains a series of conditions to effectively manage and mitigate air emissions. These include:

- a requirement for Orica to carry out an **Air Quality Verification Study** to compare the monitoring results with predictions and limits within the EPL. Should the Study indicate emissions from the Project exceed the air limits, the Department is able to request that Orica implement additional reasonable and feasible measures to further reduce its emissions; and
- a specific condition which requires Orica to **investigate and report on the implementation of additional emission control measures for its ANP1 Prill Tower**. Orica is required to report annually on its progress and proposed timeframes to the Department.

Orica has advised the Department that it has already initiated investigations into reducing emissions from the ANP1 Prill Tower, in accordance with the existing condition of approval. However Orica does not consider that the EPA's suggested timeframe is practical due to a number of inherent complexities (i.e. technical, economic, and structural constraints that require detailed investigation). The Department is also aware that the EPA is considering the inclusion of a Pollution Reduction Program through the sites EPL to investigate emissions from the AN1 Prill Tower, review the feasibility of options to reduce PM10 and undertake a detailed evaluation of the identified feasible options.

Therefore, whilst the modification *may* result in slightly higher concentrations of NO₂, TSP and PM10 experienced by surrounding sensitive receptors, Orica is likely to comply with applicable criteria, except for one potential minor exceedance of the short term 24-hour PM10 criteria. In addition, the Department notes that this is:

- likely to be indistinguishable from the approved pollutant levels;
- not considered to be significant as it is only predicted to occur at one (1) sensitive receiver out of a total of 40 modelled; and
- unlikely to occur at all due to the conservative nature of the modelling.

As such, the Department is satisfied that the existing conditions of approval would continue to adequately manage air quality impacts and implement further emission control measures would contribute to a reduction of PM10 concentrations in the area over time.

5.3 Other Issues

Table 3: Assessment of other issues

| Issue | Consideration | Recommended conditions of approval |
|--|--|--|
| <i>Noise</i> | <ul style="list-style-type: none"> • The Noise Impact Assessment (NIA) for the approved Project has been revised to include the amended layout and new plant technology. The revised NIA found that the modification improves noise emissions compared to the approved site layout (by between 1 dBA and 3.4 dBA) at the five reference assessment locations. • The reductions are primarily associated with the relocation of the AN3 plant which would be shielded by existing buildings on-site. • The EPA and Council did not raise any issues regarding noise. • The Department is satisfied that operational noise impacts can be managed through existing conditions of approval. | Existing conditions are considered adequate for managing noise impacts from the site. |
| <i>Visual Amenity</i> | <ul style="list-style-type: none"> • The proposed modification involves changes to the layout of the site, which may alter the visual impacts of the project. • The more visually intrusive elements such as the proposed AN3 and Prill Tower are to be relocated slightly further away from the nearest residents at Stockton. This is expected to result in a slightly better outcome with regard to visual impacts, as the taller and more visually obtrusive structures would be grouped together. • There are no changes to the dimensions of the plant and equipment, with the exception of the NAP4 which is anticipated to be an additional 0.4m in diameter and an additional 5m in height from the approved plant. • It is considered unlikely that these changes would result in any significant additional visual impact, particularly given that the project is located in an industrial setting. • The Department is therefore satisfied that visual impacts would be negligible and would not increase relative to the approved Project. | The existing conditions of approval are considered adequate in managing visual impacts off-site. |
| <i>Water usage and Stormwater Management</i> | <ul style="list-style-type: none"> • The revised plant selection would require a minor increase in water usage, from 3.6 to 3.8 ML/day, which would result in a total site water use of 5.0ML/day, up from 4.8ML/day. • Orica is in discussions with Hunter Water concerning the potential use of recycled water. • The hardstand areas would generally remain the same, and stormwater runoff would not change from the approved Project. • Effluent is expected to increase slightly as a result of the proposed modification, but it would remain within the effluent discharge flow limits for the site. • The Department considers that the slight changes to water usage and stormwater management on-site are acceptable. | The existing conditions of approval are considered adequate. |

6. CONCLUSION

The Department has assessed the merits of the proposal in accordance with the requirements of the EP&A Act. This assessment has found that the proposed modification is unlikely to cause any significant impacts.

As outlined in this report, the Department also delayed the determination of this modification application so that it could focus on working together with the other key government agencies to ensure the ammonia plant re-started safely. As this incident at Orica also related to the ammonia plant, the Department is satisfied that the modification application is not directly related to the incident and can be determined.

The Department therefore accepts the revised site layout and plant selection, and believes the proposal should be approved subject to minor amendments to some of the existing conditions of approval.

7. RECOMMENDATION

It is RECOMMENDED that, as delegate for the Minister, the Executive Director, Major Projects Assessment:

- **consider** the findings and recommendations of this report;
- **determine** that the proposed modification is within the scope of section 75W of the EP&A Act;
- **approve** the application subject to conditions; and
- **sign** the attached notice of modification.


Chris Ritchie
Manager
Industry Projects
5/7/12


Chris Wilson
Executive Director
Major Projects Assessment
11.7.12