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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Platinum, chloro oxo aluminium complexes

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment, Water, Heritage and the Arts.

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at our NICNAS office by appointment only at 334-336 Illawarra Road, Marrickville NSW 2204.

This Full Public Report is also available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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**Director
NICNAS**

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FULL PUBLIC REPORT**Platinum, chloro oxo aluminium complexes****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Albemarle Australia Pty Ltd (ABN 38 110 954 599)
Level 10, 68 Pitt Street
Sydney, NSW 2000

NOTIFICATION CATEGORY

Standard: Chemical other than polymer (more than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

No details are claimed exempt from publication.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows: vapour pressure, water solubility, hydrolysis as a function of pH, partition coefficient, adsorption/desorption, dissociation constant, flash point, flammability limits, autoignition temperature, toxicological and ecotoxicological properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Chemical in ATIS-IL

CAS NUMBER

68987-88-2

CHEMICAL NAME

Platinum, chloro oxo aluminium complexes

OTHER NAME(S)

Chloroplatinic aluminate

MOLECULAR FORMULA

Unspecified

STRUCTURAL FORMULA

The chemical is an aluminium oxide substrate impregnated with platinum and chlorine at < 7% w/w.

MOLECULAR WEIGHT

Unspecified

ANALYTICAL DATA

Reference spectra were not provided due to the difficulties in analysing this moisture-sensitive material.

3. COMPOSITION

DEGREE OF PURITY > 99%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS None

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (> 1% by weight) None

ADDITIVES/ADJUVANTS None

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20°C AND 101.3 kPa: Grey, solid granules

Property	Value	Data Source/Justification
Melting Point/Freezing Point	> 1,200°C	Estimated
Boiling Point	Not determined	Not applicable as the chemical is a solid with a melting point > 1,200°C
Density	710-790 kg/m ³ (bulk, compacted)	MSDS
Vapour Pressure	Not expected to be volatile	Based on the chemical structure and the high melting point.
Water Solubility	Not determined	Not applicable as the chemical reacts with water.
Hydrolysis as a Function of pH	Not determined	The notified chemical is hydrolytically unstable.
Partition Coefficient (n-octanol/water)	Not determined	Not applicable as the chemical reacts with water.
Adsorption/Desorption	Not determined	Not applicable as the chemical reacts with water.
Dissociation Constant	Not determined	Not applicable as the chemical reacts with water.
Particle Size	Granules with an average diameter of 1.5 – 1.7 mm and an average length of 3.5 mm.	Measured, provided by notifier, report not sighted.
Flash Point	Not determined	Not conducted due to the notified chemical being a solid with a very high melting point.
Flammability	Not determined	Not expected to be flammable under normal conditions of use.
Autoignition Temperature	Not determined	Not expected to autoignite under normal conditions of use.
Explosive Properties	Not expected to be explosive	The structural formula contains no explosives.

DISCUSSION OF PROPERTIES

Reactivity

The notified chemical will react with water vapour in the air or water resulting in chlorine groups on the substrate surface forming gaseous hydrogen chloride (HCl) (strongly exothermic reaction), while hydroxyl (OH) groups would be generated on the substance surface. The notified chemical reacts rapidly when in direct contact with water, while the process is slower when it is exposed to water vapour in the air.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

The notified chemical will not be manufactured or reformulated in Australia. It will be imported as the product ATIS-1L (> 99% notified chemical).

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	60-100	60-100	60-100	60-100	60-100

PORT OF ENTRY

The notified chemical will be imported by sea through VIC, NSW, QLD and WA.

IDENTITY OF MANUFACTURER/RECIPIENTS

The notified chemical may be imported by Albemarle Australia Pty. Ltd and/or by individual refining companies in Victoria, NSW, QLD and WA.

TRANSPORTATION AND PACKAGING

The notified chemical will be packed in quantities of 110 kg inside sealed, metallised film bags in sealed steel drums. After the drums are unloaded from shipping containers they will be transported directly by road to petroleum refineries.

USE

The notified chemical will be used as an isomerisation catalyst in the refining of petroleum.

OPERATION DESCRIPTION

The notified chemical will not be manufactured or reformulated in Australia.

The notified chemical will be added directly from drums it is imported in to the refinery reactor. This will be done in a moisture free environment due to the notified chemical being very reactive with water. A temporary tarpaulin will be erected at the top of the reactor and will be fed with dry nitrogen to create a positive pressure and therefore dry environment inside the tarpaulin. Two to four operators inside the tarpaulin will wear full impervious chemical suits with self-contained breathing apparatus when handling the notified chemical. The notified chemical will be emptied from the drums directly into the top of the reactor. The emptied drums containing some residue will be resealed and taken back to the warehouse for use in the recollection of the notified chemical at a later date.

The notified chemical will be used as a catalyst for 1-10 years in the reactors before it needs to be replaced. The removal of the notified chemical will be by gravity feed through the bottom of the reactor where a temporary tarpaulin will be erected in a similar process to the addition described above. The spent notified chemical will be sealed within steel drums and sent to recyclers for reclamation of the platinum.

6. HUMAN HEALTH IMPLICATIONS**6.1 Exposure assessment****6.1.1 Occupational exposure****NUMBER AND CATEGORY OF WORKERS**

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency [days/(1-10 years)]</i>
Transportation	5	2	1
Warehousing	10	4	1
Refinery operator	10-20	8	1

EXPOSURE DETAILS

Exposure to transportation and warehouse workers will only occur in the event of an accident.

Refinery operators will be exposed to the notified chemical during the addition and removal of it to and from the reactor. However, exposure will be greatly minimised by the refinery operators wearing full impervious chemical suits with self-contained breathing apparatus when working with the notified chemical. Therefore, significant exposure is only expected in the event of an accident. The exposure to the refinery operators will also be reduced due to the infrequency of the handling of the notified chemical.

6.1.2. Public exposure

The products containing the notified chemical will not be sold to the public. Therefore the public will only be exposed to the notified chemical in the event of accidental spill during transportation.

6.2. Human health effects assessment

No toxicity data were submitted for the notified chemical. Generation of such data would be precluded by the hydrolytic instability.

Toxicokinetics, metabolism and distribution.

The notified chemical will react with water and water vapour in the air and hence any exposure will primarily be to the reaction products – hydrogen chloride and aluminium oxide substrate impregnated with platinum hydroxyl complexes.

Absorption of the aluminium oxide substrate impregnated with platinum through the gastrointestinal tract or skin is expected to be low based on the expected negligible lipophilicity.

Inhaled HCl gas (CAS number 7647-01-0) released when the notified chemical reacts with water will be partially neutralized before it reaches the lower respiratory tract by naturally occurring ammonia gas in the respiratory system (OECD 2002). Inhaled HCl gas will rapidly dissociate and the anion will enter the body electrolyte pool where chloride is a normal constituent of the blood and any excess is expected to be excreted in urine (OECD, 2002).

Acute toxicity.

HCl gas is classified as R23 toxic by inhalation (HSIS, 2009).

Irritation and Sensitisation.

HCl gas is classified as R35 causes severe burns.

Health hazard classification

Based on the available data the notified chemical is not classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

However, exposure of the notified chemical to water or moisture in the air liberates toxic and corrosive hydrogen chloride gas.

6.3. Human health risk characterisation

6.3.1. Occupational health and safety

Exposure to the notified chemical is only expected in the event of an accident during transport or storage. During the addition and removal of the notified chemical to the refinery reactor exposure will be negligible due to the refinery operators wearing full impervious chemical suits with self-contained breathing apparatus.

Given the corrosive and acute toxic effects of the HCl gas released when the notified chemical is in contact with water or water vapour in the air, the risk to workers is likely to only be acceptable when used under the highly controlled conditions described above.

6.3.2. Public health

The notified chemical or products containing it will not be sold to the public. Therefore the risk to the public from the notified chemical is expected to be negligible.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1 Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified chemical is manufactured overseas and will not undergo any local reformulation.

RELEASE OF CHEMICAL FROM USE

The notified chemical will be used within closed reactors with no environmental release anticipated.

RELEASE OF CHEMICAL FROM DISPOSAL

The notified chemical will be collected in the original containers for reprocessing to recover platinum when it is no longer fit for use. The residue after platinum recovery will mainly consist of aluminium oxide, and will be disposed of to landfill.

7.1.2 Environmental fate

There are no environmental fate data for the notified chemical. Generation of such data would be precluded by the hydrolytic instability.

The notified chemical will not be released to the environment. In the event that release occurs, the notified chemical will be hydrolysed to an inert solid in which the chlorine content is replaced by hydroxyl groups. Any spilt material would be recovered for reclamation of platinum.

7.1.3 Predicted Environmental Concentration (PEC)

The notified chemical will not be released to the aquatic environment. It would be rapidly hydrolysed if spilt to water.

7.2. Environmental effects assessment

There are no aquatic toxicity data for the notified chemical. Generation of such data would be precluded by the hydrolytic instability.

7.2.1 Predicted No-Effect Concentration (PNEC)

It is not possible to determine the PNEC as the aquatic toxicity is not known.

7.3. Environmental risk assessment

The Risk Quotient ($Q = \text{PEC}/\text{PNEC}$) cannot be determined as neither the PEC nor the PNEC have been calculated. The notified chemical is not considered to pose a risk to the environment, as it is unstable and used under highly controlled conditions which will preclude release to the environment.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

Based on the available data the notified chemical is not classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)].

However, exposure of the notified chemical to water or moisture in the air liberates toxic and corrosive hydrogen chloride gas.

and

As a comparison only, the classification of the notified chemical using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2003) is inapplicable as the notified chemical is unstable in water.

Human health risk assessment

Under the conditions of the occupational settings described, the notified chemical is not considered to pose an unacceptable risk to the health of workers.

When used in the proposed manner, the notified chemical is not considered to pose an unacceptable risk to public health.

Environmental risk assessment

On the basis of the reported use pattern, which will preclude release to the environment because of the highly controlled conditions, the notified chemical is not considered to pose a risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following isolation and engineering controls to minimise occupational exposure to the notified chemical:
 - Transfer of the notified chemical to the refinery reactor should only occur in a moisture free environment.
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified chemical:
 - Avoid inhalation
 - Avoid contact with skin and eyes
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified chemical:
 - Full impervious chemical suits with self-contained breathing apparatus.

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified chemical are classified as hazardous to health in accordance with the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)] workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Disposal

- The notified chemical should be reprocessed to recover platinum, with the residue disposed of to landfill.

Storage

- The following precautions should be taken regarding storage of the notified chemical:
 - Containers should be kept tightly closed and stored indoors in a dry, well-ventilated area.

Emergency procedures

- Spills or accidental release of the notified chemical should be handled by containment and collection for platinum reclamation. Contact with moisture should be avoided.

Regulatory Obligations

Secondary Notification

This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
 - the notified chemical is not used under the highly controlled conditions described;or
- (2) Under Section 64(2) of the Act; if
 - the function or use of the chemical has changed from a catalyst in the refining of petroleum, or is likely to change significantly;
 - the amount of chemical being introduced has increased from 100 tonnes, or is likely to increase, significantly;
 - the chemical has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the chemical on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

Material Safety Data Sheet

The MSDS of the notified chemical provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

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