File No: PLC/162

July 2000

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

RC 49133

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (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 National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Family Services.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, National Occupational Health and Safety Commission, 92-94 Parramatta Road, Camperdown NSW 2050, between the following hours:

Monday – Wednesday	8.30 am - 5.00 pm
Thursday	8.30 am - 8.00 pm
Friday	8.30 am - 5.00 pm

Copies of the full public report may also be requested, free of charge, by contacting the Administration Coordinator.

Please direct enquiries or requests for full public reports to the Administration Coordinator at:

Street Address:	92 Parramatta Road, CAMPERDOWN NSW 2050, AUSTRALIA
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA
Telephone:	(61) (02) 9577 9514
Facsimile:	(61) (02) 9577 9465

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

RC 49133

1. APPLICANT

Du Pont (Australia) Ltd of 49-59 Newton Road, WETHERILL PARK, NSW 2164 (ACN 000 716 469) has submitted a Polymer of Low Concern notification statement in support of their application for an assessment certificate for RC 49133.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition, reactive functional groups manufacture/import details have been exempted from publication in the Full Public Report.

Marketing Name: RC 49133

Characterisation as a Synthetic Polymer of Low Concern

Number-Average Molecular Weight (NAMW):	>1 000
Maximum Percentage of Low Molecular Weight Species	
Molecular Weight < 500:	<10%
Molecular Weight < 1 000:	<25%
Polymer Stability	Highly stable. Decomposition starts to occur at temperatures in excess of 250ºC
Reactivity	The hydroxyl groups of the notified polymer will crosslink with isocyanate agents to form a layer of coating.
Particle Size	The polymer is manufactured as a resin solution and is not in a particulate form.
Charge Density	Polymer contains no charged groups.
Water Solubility	Not determined, but expected to have negligible water

	solubility.
Method of Detection and Determination:	Gel permeation chromatography and infrared spectroscopy.

The polymer meets the criteria for assessment as a synthetic polymer of low concern under Regulation 4A of the *Industrial Chemicals (Notification and Assessment) Act 1989*.

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	Pale yellow viscous solution.
Melting Point:	Not supplied, as the polymer is never isolated from solution.
Specific Gravity:	1.16 g/cm^3.
Vapour Pressure:	Not provided.
Water Solubility:	Immiscible with water.
Flash Point:	28°C (ZK135 Centari 5035 2K Binder).
Flammability Limits:	Upper Explosive Limit = 7% (ZK135 Centari 5035 2K Binder). Lower Explosive Limit = 0.7% (ZK135 Centari 5035 2K Binder).
Autoignition Temperature:	204°C (ZK135 Centari 5035 2K Binder).
Reactivity:	The polymer is not considered reactive under normal conditions.

Comments on Physico-Chemical Properties

The polymer was never isolated as a defined entity and the data provided were for RC 49133, as a solution of the polymer (80%) in butyl acetate. The notifier did not determine the boiling point but stated that the polymer RC 49133 is highly stable under normal conditions but decomposition will start at temperatures in excess of 250ºC.

Density was measured using a method based on ASTM D-1475, a commonly used method in the paint industry.

The notifier did not determine the water solubility of the notified polymer. The notifier indicates that the notified chemical is expected to be of low solubility due to its high

molecular weight and relatively hydrophobic character. Given the lack of polar functionality the water solubility of the notified chemical would be low, that is <1 mg/L.

The polymer contains ester linkages that could be expected to undergo hydrolysis under extreme pH conditions. However, due to the expected low water solubility, this is unlikely in the environmental pH range of between 4 and 9.

The notifier did not determine the partition coefficient and adsorption/desorption of the notified polymer. These are not PLC requirements and this assessment notes that the determination of partition coefficient and adsorption/desorption would be difficult. Due to its low water solubility, the polymer is expected to become associated with the organic component of soils and sediments.

4. PURITY OF THE CHEMICAL

Degree of Purity: RC 49133 is never isolated from the polymerisation solution. The solution is used directly in making ZK135 binder.

5. USE, VOLUME AND FORMULATION

The notified polymer is an automotive binder resin for use in the refinish industry on heavy vehicles and machinery. It will be imported into Australia as a component (30-78%) of finished paint formulation, which will be sold under the name ZK 135 Centari 5035 2K Binder.

No reformulation will take place in Australia, and the product containing the notified polymer will be sold only to licensed spray painters. Prepared spray paints would contain approximately 40% of notified polymer.

Anticipated import quantities for RC 49133 over the next five years are less than 5 tonnes per annum.

6. OCCUPATIONAL EXPOSURE

Transport, storage and retailing

The polymer will be imported as a part of paint in 0.9 L and 3.78 L Dangerous Goods compliant containers (Federal Office of Road Safety, 1998) and combination packaging. It will be transported by licensed contractors. The paint will be stored in a warehouse, which is licensed for storage of Dangerous Goods. Exposure to the notified polymer during transporting, storage and retail processes is unlikely except when packaging is breached in an accident.

End-use
The notified polymer could be used by around 600 spray painting businesses, employing around 1 200 to 6000 qualified spray painters. The professional painters will handle the products containing the notified polymer on a daily basis.

The spray painters who will be exposed to the notified polymer will be fully trained in use of such chemicals. Typically, the spray painter will open the container and mix the contents with other components (pigments, binder, thinner, activator) and transfer the paint into a spray gun. This operation will be carried out in a well-ventilated area.

The spraying of the automobile will be carried out in a laminar flow downdraft spray booth, which is designed to rapidly remove aerosol particles and solvent vapour from the atmosphere. Several possible booth designs may be used. In a dry floor booth, the overspray will be collected in filters contained in the floor of the booth; any unremoved particulates will reach the exhaust stack with the solvent vapours. In a wet floor booth, overspray will collect in a pool of water below the grill floor or in a wet scrubber in the exhaust and will be removed with a filter. The residual solids will be disposed of to a secure landfill. The spray booths are subject to AS/NZS/4114.1:1995 *Spray Painting Booths – Design, Construction and Testing* (Standards Australia/Standards New Zealand, 1995a) and AS/NZS/4114.1:1995 *Spray Painting Booths – Selection, Installation and Maintenance* (Standards Australia/Standards New Zealand, 1995b).

After spraying, the spray equipment will be washed with solvents. Residual paint mixture will be washed from the equipment manually, using recycled paint solvent and the washings will be disposed of by solvent recyclers.

Once residual final paint mixture has dried, the notified polymer will be irreversibly bound within the cured matrix and not separately available for either exposure to workers, or for dermal absorption.

The main exposure routes will be dermal and inhalation. Spray painters will wear appropriate personal protective equipment at all times; gloves and overalls while mixing the paint, and, in addition, a full face shield and respirator while inside the spray booth.

7. PUBLIC EXPOSURE

There is little potential for exposure of the public to the notified polymer because the formulated end-use product containing the notified polymer will not be available to the general public. Paint will only be applied by professional spray painters, therefore public contact will only occur from touching the dried paint film on automobiles. The paint film consists of polymer that has crosslinked to form a continuous polymer film in matrix with pigments and other polymers. There are no chemically reactive components in the dried paint film. Consequently, the potential for public exposure to the notified polymer during all phases of its life cycle, is considered to be negligible.

8. ENVIRONMENTAL EXPOSURE

Release

There is potential for release of the notified polymer during the paint formulation and the paint application. The paint is applied to automotive surfaces with approximately 50-80% efficiency in spray booths with control measures, such as a filtering system and masking materials, in place. Cleaning of the spray gun and mixing equipment will generate waste that will be collected and disposed of in the same manner as wastewater from the spray booth.

During coating application it is expected that up to 2 500 kg/annum of notified polymer waste will be produced (assuming maximum annual imports of 5 000 kg).

Some residue will also remain in the 'empty' containers after use. It is estimated that up to 250 kg of the notified polymer, 5% of the container contents, will remain as residue in the 'empty' import containers.

A further 5%, up to 250 kg of the notified polymer, will be lost due to cleaning of the spray equipment.

Fate

Once applied to the metal panels of heavy vehicles, the notified polymer will be incorporated in a hard, durable, inert film and will not present a significant hazard. Any fragments, chips and flakes of the lacquer will be of little concern as they are expected to be inert. The metal panels coated with the polymer are likely to be either recycled for steel reclamation or placed into landfill at the end of their useful life. During steel reclamation, the polymer would be incinerated in the blast furnaces and converted to water vapour and oxides of carbon.

The solid waste generated in the formulation and application of the coating will be disposed of to landfill or by incineration. The product when sprayed will be catalysed with an isocyanate activator, resulting in all overspray being crosslinked and becoming inert due to the very high molecular weight. The containers and their residue will also be disposed in this manner. Leaching of the notified polymer from landfill sites is unlikely, given the expected low solubility of the substance and very high molecular weight. The notified polymer waste would be very slowly degraded to gases such as carbon dioxide through the agency of abiotic and bacteriological processes.

Mixing containers and spray equipment will be washed with solvent that is collected and sent to solvent recycling. The resulting dried solid residues will also be disposed of to landfill.

The notified polymer is not expected to cross biological membranes, due to the expected low solubility, high molecular weight and strong adsorption to soil, and should not bioaccumulate (Connell, 1989).

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicity studies were provided in the notification, which is acceptable for Synthetic Polymers of Low Concern.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for Synthetic Polymers of Low Concern.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The notified polymer crosslinks with other paint components to form a very high molecular weight and stable film that adheres firmly to the primer layer to which it is applied. The notified chemical, as part of this surface coating, will share the fate of the vehicle panel. The paint will slowly deteriorate under the action of UV light, but this is not expected to release the polymer over the useful life of the heavy vehicle surfaces. When the vehicle panel is recycled, the notified chemical would be destroyed through incineration.

No repackaging of the notified polymer occurs. It will be supplied to licensed professional spray painters who will formulate it with pigments and activator on site directly prior to use. Paint residues in empty cans and captured overspray will be disposed of to landfill or by incineration. Equipment residues will be washed with solvent and sent for solvent recycling, with disposal of solid residues to landfill. An estimated 3 000 kg/annum of the notified polymer will be released to the environment due to the application process. The paint film will contain the notified polymer as part of a crosslinked polymer matrix. The final fate of the notified chemical will presumably be the same as the final fate of the vehicle, namely landfill or steel recycling where the polymer will be incinerated to water vapour and oxides of carbon.

In the event of accidental spillage of the polymer solution into waterways, the polymer is not expected to disperse into the water, but settle out onto sediments. If the polymer is spilt on land, either during usage or transport, it is expected to become immobilised in the soil layer. Contaminated soil can then be collected and disposed to landfill. The small container sizes would also limit any hazard in the event of a spill.

Given the above, environmental exposure and hazard are expected to be low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

No toxicological data on the notified polymer have been submitted. The notified polymer is not expected to traverse biological membranes due to its high molecular weight and low residual monomer content. Based on the available data, the notified polymer would not be classified as a hazardous substance according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999c). No

adverse health effects have been characterised following human exposure overseas, according to the notifier.

Toxicology information on the supplied MSDS for ZK135 Centari 5035 2K Binder, the product containing RC 49133 and solvents, indicates that the product may be absorbed through the skin and may cause removal of lipid from the skin resulting in non-allergic contact dermatitis. The liquid may cause eye irritation and reversible eye damage. Data on the individual components indicate that the product is likely to possess moderate acute oral toxicity.

The MSDS also lists a number of potential health effects, namely mucous membrane and respiratory system irritation and adverse effect on kidney, liver and central nervous system. These are related to the solvents and additives in the mixture rather than the notified polymer itself.

Occupational Exposure
Health risk for workers in transporting, storage and retailing is expected to be low unless the cans are damaged and spills occur. However, personal protective safety equipment such as chemically resistant gloves, and electric torch should be carried with transport vehicles, as the product is classified as a Class 3 Dangerous Good (Federal Office of Road Safety, 1998).

The final paint mix, including the pre-prepared paint containing the notified polymer, could contain a wide variety of additional ingredients once fully mixed. This is likely to introduce human health hazards because, apart from a range of potentially toxic solvents, there may be components containing resins with pendant isocyanate groups. The spraying procedure also produces a dense aerosol of paint particles, which would adversely affect human health even in the absence of additional hazardous components. It is also probable that professionals involved in the spray painting industry will use a number of different paint formulations.

For these reasons, the notified polymer must be assessed for the contribution it makes to the hazards associated with use of the spray paints. The presence of many potential and actual hazardous substances in the formulations requires the use of stringent engineering controls, such as a correctly constructed and maintained spray booth, and of a high level of personal protective equipment, such as impermeable overalls and gloves and a full face shield and respirator. The use of the paint containing the notified polymer should be in accordance with NOHSC *National Guidance Material for Spray Painting* (National Occupational Health and Safety Commission, 1999b). The level of protection from exposure afforded by the standard protective measures will provide adequate protection from the notified polymer, which is likely to be less intrinsically toxic than most of the solvents, pigments and other paint resins. Once the applied final paint mix has hardened, the polymer will not be separately available for exposure or absorption.

There are NOHSC exposure standards for n-butyl acetate, methyl-n-amyl ketone and xylene, identified as ingredients in the pre-prepared paint, ZK135 Centari 5035 2K-Binder (National Occupational Health and Safety Commission, 1995). The employer is responsible for ensuring that these exposure standards, and exposure standards pertaining to other final paint mix additives, are not exceeded in the workplace.

The paint components containing the notified polymer are flammable due to their solvent content. Precautions must be taken to avoid sources of ignition, e.g. use of earthing leads. Operators should wear antistatic overalls and footwear.

Similar considerations apply in the disposal of the polymer. The wastes containing the notified polymer may be hazardous substances on the basis of the solvent and other resin content, and the precautions used on the basis of these additional materials should be adequate for protection from the notified polymer. In addition, much of the polymer will be crosslinked, hardened and immobilised by the time of disposal.

Public Health
Based on the use pattern of RC 49133 and its physico-chemical properties, it is considered that the notified polymer will not pose a significant hazard to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to RC 49133, the following guidelines and precautions should be observed:

- Use of the paint containing the notified polymer by spray application should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c);
- Safety goggles, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use of the products containing the notified polymer; where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used;
- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified chemical are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of goggles may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in

AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c).

14. MATERIAL SAFETY DATA SHEET

The MSDS for ZK135 Centari 5035 2K Binder that contains the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (National Occupational Health and Safety Commission, 1994).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

(i) any of the circumstances stipulated under subsection 64(2) of the Act arise. If any importer or manufacturer of (the notified chemical) becomes aware of any of these circumstances, they must notify the Director within 28 days; or

(ii) the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

16. REFERENCES

Connell DW, (1989) General characteristics of organic compounds which exhibit bioaccumulation. In Connell DW, (Ed) *Bioaccumulation of Xenobiotic Compounds*. CRC Press, Boca Raton, USA.

Federal Office of Road Safety (1998) Australian Code for Transport of Dangerous Goods by Road and Rail; 6th Edition, 1998. Canberra, Australian Government Publishing Service.

National Occupational Health and Safety Commission (1999a) List of designated Hazardous Substances [NOHSC: 10005(1999)]. Canberra, Australian Government Publishing Service.

National Occupational Health and Safety Commission (1999b) Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(1999)]. Canberra, Australian Government Publishing Service.

National Occupational Health and Safety Commission (1999c) National Guidance Material for Spray Painting [NOHSC: 10005(1999)]. Sydney, Australian Government Publishing Service.

National Occupational Health and Safety Commission (1994) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC: 2011(1994)]. Canberra, Australian Government Publishing Service.

National Occupational Health and Safety Commission (1995) Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC: 1003(1995)]. In: ed. Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards. Australian Government Publishing Service, Canberra.

Standards Australia (1987) Australian Standard 2919-1987, Industrial Clothing. Sydney, Standards Association of Australia.

Standards Australia (1990) Australian Standard 3765.1-1990, Clothing for Protection against Hazardous Chemicals Part 1 Protection against General or Specific Chemicals. Sydney, Standards Association of Australia.

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Sydney, Standards Association of Australia.

Standards Australia/Standards New Zealand (1992) Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications. Sydney/Wellington, Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994a) Australian/New Zealand Standard 1715-1994, Selection, Use and Maintenance of Respiratory Protective Devices. Sydney/Wellington, Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994b) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Sydney/Wellington, Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1995a) Australian/New Zealand Standard 4114.1-1995, Spray painting booths - Design, construction and testing. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1995b) Australian/New Zealand Standard 4114.2-1995, Spray painting booths - Selection, installation and maintenance. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1998) AS/NZS 2161.2:1998 Occupational protective gloves, Part 2: General requirements, Standards Australia/Standards New Zealand.