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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

BTRT

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

BTRT

1. APPLICANT

Agfa-Gevaert Ltd of 372 Whitehorse Road NUNAWADING VICTORIA 3131 has submitted a limited notification statement in support of their application for an assessment certificate for BTRT.

2. IDENTITY OF THE CHEMICAL

BTRT is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae, molecular weight and spectral data have been exempted from publication in the Full Public Report and the Summary Report.

Trade names:	BTRT in formulation G5200B at <0.1% w/w
Other names:	substituted 1,2,4-triazolium-2,3 dihydro-3-thioxo, inner salt.
Molecular weight:	<1000

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	light yellow solid
Odour:	odourless
Melting Point:	122°C
Specific Gravity:	1.22
Vapour Pressure:	0.46 Pa ± 0.5 at 25°C
Water Solubility:	>1000 g/L at 20°C
Partition Co-efficient (n-octanol/water) log P_{ow}:	-0.9 at 20°C
Hydrolysis as a function of pH:	hydrolytically stable at pH 4,7,9

Adsorption/Desorption:	not expected to adsorb to soils or sediments due to low partition coefficient and high water solubility
Dissociation Constant pK_a**:**	not expected to dissociate in water
Flash Point:	not flammable
Flammability Limits:	not flammable
Combustion Products:	none
Decomposition Temperature:	none specified
Decomposition Products:	toxic fumes may be released
Autoignition Temperature:	not auto-flammable
Explosive Properties:	not explosive
Reactivity/Stability:	substance is stable and exhibits no oxidising properties or decomposition products
Particle size distribution: range -	20-250 µm (85.4% at 250µm)

Comments on physico-chemical data

Because of the high water solubility and low partition coefficient, little adsorption to sediments or organic matter would be expected.

Based on the chemical structure, the chemical is not expected to dissociate in water.

4. PURITY OF THE CHEMICAL

Degree of purity:	98%
Toxic or hazardous impurities:	none
Non-hazardous impurities (> 1% by weight):	water 2% w/w
Additives/Adjuvants:	none

5. INDUSTRIAL USE

The notified chemical will be not be imported as a single substance but as a component within formulated photographic activator solution G5200B at a concentration of < 0.1% w/w. The amount of BTRT to be imported over the next five years will be between 100 and 1000 kg.

6. OCCUPATIONAL EXPOSURE

The notified chemical will be imported in a formulation at < 0.1% and therefore there is not expected to be any major occupational exposure. The photographic activator formulation is packaged in strong plastic 5 or 1 litre bottles closed by a screw cap and packed in fibreboard cartons for transport and storage purposes. Up to sixty five workers will be involved in the transport and storage of the notified chemical in the imported formulation with little or no contact with the substance except in the case of an accidental spill.

The activator containing the notified chemical will be used in a processor/ platemaker unit by up to one hundred and twenty operators. An operator will fill the activator tank of the unit by pouring the activator directly from the bottles. During operation the photographically exposed film or paper plates are passed automatically by rollers through the activating solution which stimulates the development of an image. Operators of the units will wear protective neoprene or PVC gloves and eye goggles when loading the formulation containing the notified chemical to avoid exposure to spills and splashes. There will be exhaust ventilation systems installed in the photographic workrooms as standard practice.

At the end of every 4-6 weeks the used activator solutions are drained from the processor units into plastic bottles for disposal. The bottles will be collected by a waste disposal company who will dispose of the waste by incineration or landfill. The disposal will be performed by up to fifty five workers.

7. PUBLIC EXPOSURE

No public exposure to the notified chemical is expected to occur during its distribution to warehouses and printers. The activator solution, G5200B, will not be sold directly to the public.

Considering the concentration of BTRT in the activator solution (<0.1% w/w) disposal of BTRT via the sewerage, incineration or landfill is not likely to result in notable public exposure to the notified chemical.

8. ENVIRONMENTAL EXPOSURE

. Release

The number of sites in Australia where the activator is expected to be used is 120. No environmental exposure during transport of the chemical is expected. In the event of accidental spillages, environmental exposure would be minimal due to the small container size.

At each site, processing will take place in a platemaker unit. To prepare the unit for use an operator will fill the activator tank by pouring the formulation from 5 and 1 litre bottles. During operation the photographically exposed film or paper plates are automatically fed by rollers through the activator solution, and then transported through a stabiliser bath. Once the plate leaves the processor it is ready for printing. Throughout the process the activator liquid remains inside the machine. Empty bottles will be landfilled with residues either being washed to sewer, or remaining in the bottles when landfilled.

Greatest environmental exposure will come from disposal of the exhausted chemical solution from the tank. Every 4 to 6 weeks, the activator solution is replaced. The exhausted solution will be collected by a disposal company along with other photographic chemical waste, where it will be treated for the removal of solids and other substances, and then neutralised. The remaining liquid will be discharged to the sewer. Due to the high solubility and low potential of BTRT to adsorb to sludge, it is likely to remain in solution during the waste treatment process and on discharge to sewer.

. Fate

Under the P.U.R.E. guidelines (1), the preferred method of disposal of photographic chemicals is dilution and balancing with other photo chemicals and water, desilvering, then disposal to sewer. The notifier has indicated a procedure similar to this through removal of solids, neutralising, then disposal to sewer. Other disposal to sewer throughout this operation occurs when the tanks and transport rollers are cleaned (at the same time as the tanks being drained), or if any residues from refill bottles are rinsed. Any traces of BTRT remaining in the tanks and on the rollers are washed to the sewer.

The ready biodegradability of the substance was assessed in the Modified Sturm Test (CO_2 evolution test following OECD Guideline No. 301 B). Results showed that BTRT is not readily degradable, with <10% CO_2 (7.42 mg CO_2/2 L) produced in 29 days. Activated sludge tests however, showed that, although the substance is not readily biodegradable, it is not toxic to waste water bacteria, so will not affect the ability of these bacteria to biodegrade other materials.

Bioaccumulation is not expected due to the chemicals low Log P_{ow} and high water solubility (2).

9. EVALUATION OF TOXICOLOGICAL DATA

9.1 Acute Toxicity

Table 1 Summary of the acute toxicity of BTRT

Test	Species	Outcome	Reference
Acute oral toxicity	Rat	LD_{50} > 2000 mg/kg	(3)
Acute dermal toxicity	Rat	LD_{50} > 2000 mg/kg	(6)
Skin Irritation	Rabbit	not a skin irritant	(7)
Eye irritation	Rabbit	not an eye irritant	(8)
Skin sensitisation	Guinea-pig	not a skin sensitiser	(10)

9.1.1 Oral Toxicity (3)

LD_{50}: > 2000 mg/kg *Species/strain:* Albino Wistar Rats

Number/sex of animals: 5 males/5 females *Observation period:* 15 days

Method of administration (vehicle): 2000 mg/kg of the notified chemical was administered by oral gavage at a volume of 10 ml/kg. All animals were observed twice daily. After 15 days all surviving rats were sacrificed for pathological examination.

Clinical observations: Salivation was observed in two males and two females, and erythema developed in the right ear of one female. These are not considered to be treatment related.

Mortality: None *Morphological findings:* No treatment related observations were made.

Test Method: According to OECD Guidelines for the Testing of Chemicals (4) and EEC Directives (5).

Result: There were no significant toxicological observations which were considered to be treatment related. The notified chemical was not harmful when administered by acute oral administration.

9.1.2 Dermal Toxicity (6)

LD_{50}: > 2000 mg/kg *Species/strain:* Albino Wistar Rats

Number/sex of animals: 5 males/5 females *Observation period:* 15 days

Method of administration (vehicle): The notified chemical was applied (2000 mg/kg) to an area of 25 cm^2 for males and 18 cm^2 for females by application on a gauze patch fixed

successively to aluminium foil and flexible bandages, with drops of petrolatum. After 24 hours the dressings were removed. Rats were observed twice daily. After 15 days all surviving animals were sacrificed for pathological examination.

Clinical observations: Lethargy was noted in three males on day 1. Abnormalities on the treated skin area included erythema in one male on days 2 and 3. This may have been treatment related. No clinical signs were observed in other animals in the study.

Mortality: None

Morphological findings: Scab formation on the skin of one male.

Test Method: According to OECD Guidelines for the Testing of Chemicals (4) and EEC directives (5).

Result: There were minor clinical observations in one rat including dermal erythema which may have been treatment related. There were no significant pathological observations. The notified chemical was not harmful when administered by dermal application.

9.1.3 Skin Irritation (7)

Species/strain: New Zealand White rabbits.

Number/sex of animals: 3 males

Method of administration: 0.5 g of the notified chemical was moistened and applied to the intact skin of a 150 cm^2 shaved area on one flank, using non-woven patch of 2 x 3 cm. A similar patch without the test substance was applied to the contralateral flank to act as a control. Both patches were mounted on micropore tape which was wrapped around the abdomen and secured with elastic bandage. Four hours after application the dressing was removed. The rabbits were observed twice daily for 3 days.

Observations: There was no evidence of dermal irritation.

Test Method: According to OECD Guidelines for the Testing of Chemicals (4) and EEC directives (5).

Result: There were no significant observations. BTRT was not a skin irritant in rabbits.

9.1.4 Eye Irritation (8)

Species/strain: New Zealand White rabbits *Number of animals:* 3 males

Method of administration: The test substance (60 ± 1 mg per animal) was instilled in the conjunctival sac of one eye of each animal. The other eye remained untreated to serve as a control. After 24 hours observation, a solution of 2% fluorescein in water was instilled into both eyes of each animal to determine corneal epithelial damage. The eyes of each animal were examined 1, 24, 48 and 72 hours after instillation of the test material.

Observations: Instillation of the notified chemical into one eye of each animal resulted in minimal irritation of the conjunctivae consisting of redness and chemosis of the conjunctival tissues. All signs of irritation had resolved by 48 hours.

Test Method: According to OECD Guidelines for the Testing of Chemicals (4) and EEC directives (5).

Table 2: Draize (9) Scores[1]

Animal	Time after instillation											
	1 hour			1 day			2 days			3 days		
CORNEA	opacity area			opacity area			opacity area			opacity area		
1	0	0		0	0		0	0		0	0	
2	0	0		0	0		0	0		0	0	
3	0	0		0	0		0	0		0	0	
IRIS												
1	0			0			0			0		
2	0			0			0			0		
3	0			0			0			0		
CONJUNCTIVA	r[a]	c[b]	d[c]	r[a]	c[b]	d[c]	r[a]	c[b]	d[c]	r[a]	c[b]	d[c]
1	1	0	0	0	0	0	0	0	0	0	0	0
2	1	1	1	1	0	0	0	0	0	0	0	0
3	1	1	0	1	0	0	0	0	0	0	0	0

[1] see Attachment 1
[a] redness [b] chemosis [c] discharge

Result: There were observations of minor irritation to the conjunctivae which resolved within 48 hours. The notified chemical is not classified as an eye irritant.

9.1.5 Skin Sensitisation (10)

Species/strain: Himalayan Albino Guinea Pig

Number of animals: 15 females, 10 experimental and 5 control.

Induction: On day 1 the experimental animals were intradermally injected with three pairs of injections (0.1 ml/site) in the clipped scapular region as follows: a) test substance at 5% w/w in saline, b) Freunds' Complete Adjuvant 50% in water and c) the test substance at 10% emulsified in a 50% mixture of Freunds' Complete Adjuvant. Control animals were intradermally injected in a similar manner but without the test substance.

On day 7 the area of injection in the control and experimental animals was rubbed with 10% sodium-dodecyl-sulfate (SDS). On day 8 the experimental animals had 0.5 ml of a 50% (w/w) test substance concentration in distilled water applied to the area between the injection sites using a non-woven patch mounted on micropore tape and secured by a bandage. After 48 hours the dressing was removed and the skin reaction assessed. The control animals were similarly treated but only water was used.

Challenge: On day 22 all animals were treated epidermally with 0.05 ml of each of the following test substance concentrations, 50%, 25% and 10% w/w in distilled water using dressing secured with tape and a bandage. After 24 hours the dressing was removed and the treated sites assessed.

Results:

Table 3

animal number	24 hrs				48hrs			
	Challenge Concentration (%)							
	50	**25**	**10**	**0**	**50**	**25**	**10**	**0**
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	1	0	0	0	1	1	0	0

Test Method: According to OECD Guidelines for the Testing of Chemicals (4) and EEC directives (5).

Result: There were no significant skin sensitisation reactions. The notified chemical was not a skin sensitiser in guinea pigs.

9.2 Repeated Dose Toxicity (11)

Species/strain: Albino Wistar Rats *Number/sex:* 20 males/ 20 females.

Method of administration (vehicle): An oral gavage was used to daily deliver 5 ml/kg of the various dose levels of the notified chemical in distilled water. The rats were observed twice daily. At the end of the dosing period the rats had blood taken prior to culling for biochemical and haematological analysis. A pathological examination was performed on the rats after culling.

Dose/ Duration of administration: Rats were dosed once daily at either 0, 50, 200, or 1000 mg/kg/day at 5 ml/kg for 28 days.

Significant Observations:

1. Clinical

There were no cases of mortality throughout the study. There were no clinical signs of toxicity or behavioural changes over the 28 day observation period that were considered to be treatment related.

2. Clinical Chemistry/Haematology

The haematological parameters of treated rats were considered to not to have been effected by the treatment. There were also no differences noted in biochemical parameters between control and treated rats.

3. Necropsy Findings/ Histopathology

There were no microscopic or macroscopic observations which were considered to be treatment related. Organ weights of treatment animals were similar to those of control animals. There was an significant increase in the liver:body-weight ratio in males at 1000 mg/kg/day, however no other changes were evident to indicate as to whether this was treatment related.

Test Method: According to OECD Guidelines for the Testing of Chemicals (4) and EEC directives (5).

Result: There were no significant toxicological observations in this study. The notified chemical exhibited no organ toxicity in rats by repeated oral dose administered for 28 days.

9.3 Genotoxicity

9.3.1 Salmonella typhimurium Reverse Mutation Assay (12)

Strains: Salmonella typhimurium TA 1537, TA 98, TA 1535, TA 100

Concentration range: Eight concentrations ranging from 3-5000 µg/plate either with or without metabolic activation provided by S9 rat liver were tested in triplicate in each strain. Positive and negative controls were also used.

Test Method: According to OECD Guidelines for the Testing of Chemicals (4) and EEC directives (5).

Result: There was no induction of reverse mutations of the histidine gene in the bacterial strains.

9.3.2 Chromosomal Aberration Study in Cultured Human Lymphocytes (13)

Species/strain: Cultured human lymphocytes from healthy adult males.

Concentration range: Doses of either 333, 1000, 1778, 3330, 5000 µg/ml were administered to cultured lymphocytes for 24 and 48 hours without S9 rat liver metabolic activation mix, or for 3 hours with the S9 mix. After washing the cells they were fixed and stained for evaluation.

Test Method: According to OECD Guidelines for the Testing of Chemicals (4) and EEC directives (5).

Result: The notified chemical was found to induce chromosomal aberrations after a 48 hour treatment at 3330 and 5000 µg/ml in the absence of metabolic activation. The notified chemical was considered weakly clastogenic as there was no dose related increase in chromosomal aberrations with significant chromosomal aberrations occurring only at the highest concentrations.

9.4 Overall Assessment of Toxicological Data

There was no indication of significant toxicity in either the acute oral or dermal toxicity studies in rats. There was also no evidence of skin irritancy in rabbits, however the eye irritation study did suggest that while the notified chemical cannot be classed as an eye irritant, it may have some mild irritating properties. The repeat dose toxicity study failed to show signs of toxicity over 28 days when administered orally, nor was the chemical found to be mutagenic in bacteria. The notified chemical was found to be weakly genotoxic properties through chromosomal aberrations in cultured human lymphocytes.

The notified chemical is not classified as hazardous according to Worksafe Australia's *Approved Criteria for Classifying Hazardous Substances* (14) in relation to the toxicity data provided.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

Results of ecotoxicity tests are summarised in Table 4. Results indicate that the chemical can be classified as non-toxic to fish, algae and water fleas. In addition, the chemical does not appear to inhibit the respiration ability of bacteria in aerobic sludge.

Table 4. Ecotoxicity test results

Species	Test	Concentrations (mg/L)	Result (mg/L)
Carp *Cyprinus carpio*	96 h acute	100	LC_{50} > 100 NOEC > 100
Water Flea (*Daphnia magna*)	48 h acute	32, 100, 320, 1000	EC_{50} > 100 (=235) NOEC < 10
Algae (*Scenedesmus subspicatus*)	72 h growth	0.1, 1, 10, 100	E_BC_{50}>100[a] E_RC_{50}>100[b] NOEC > 100
Activated Sludge	30 min	100	> 100

a) E_BC_{50} =EC_{50} for cell growth inhibition. b) E_RC_{50} =EC_{50} for cell growth inhibition.

All ecotoxicity tests were performed to test methods following the EC Directive 92/69/EEC.

During the range finding test for *Daphnia magna*, total immobility of 30% was recorded at 100 mg/L, while 20% immobility was observed at 10 mg/L. No immobility was observed at or below 1 mg/L.

The activated sludge test used a rapid screening method whereby test substances which may adversely effect aerobic microbial treatment plants can be identified. The test followed OECD Guideline No. 209, and the results showed that there was no significant inhibition (<10%) of the respiration rate of the sludge at concentration of 100 ppm.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The chemical will be imported in a photographic activator solution at a stated concentration of less than 0.1% w/w. No repacking or reformulating will take place in Australia. Estimated import volumes are from 100 - 1000 kg, and it is anticipated the chemical will be used at around 120 sites throughout Australia, some which may contain more than one processing unit.

The greatest potential for environmental exposure from BTRT will result from disposal of the exhausted activator solution after draining the tanks from the

processor units. The solution, after solids removal and neutralising, is disposed of to sewer. The quantity drained from each tank is in the order of 7 litres, or 6g of BTRT, and the drainage is carried out every 4 to six weeks. The notifier estimates about 600 litres (6 litres of BTRT as the chemical is present in the activator solution at a level of approximately 0.1%w/w) of activator to be disposed of each week throughout the country.

The estimated weekly release of 600 litres is an average of 5 litres per site, or approximately 5.0g of BTRT per site per week. If this were released in a large country town, using 5 megalitres as a benchmark for sewage output, the chemical, once diluted in the sewage system, would be present in a concentration of 10 ppb. This is in a concentration several orders of magnitude below the most sensitive effects concentration (EC_{50} = 235 ppm for *Daphnia magna*).

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified chemical is not expected to exhibit acute oral or dermal toxicity in humans. While there is not likely to be skin irritation, there may be the chance of mild eye irritation based on the results of the eye irritation study in rabbits. The notified chemical is not expected to be toxic by repeated or prolonged administration. There is evidence that the notified chemical may be weakly genotoxic at high doses according to an *in vivo* human lymphocyte chromosome aberration study, however a bacterial reverse mutation assay failed to find any additional genotoxic properties.

During importation, storage and transport there is little chance of exposure to the notified chemical occurring except in the event of spill. There is negligible hazard from the notified chemical, however, the formulation is classed as hazardous due to the presence of sodium hydroxide. This requires protective gloves and eye goggles, the use of which will also serve to minimise exposure to the notified chemical.

During the loading and emptying of the activator tanks of the photographic processor units protective gloves and eye goggles will be utilised to prevent exposure by splashing to the sodium hydroxide contained in the solution containing the notified chemical. This will be complemented by mechanical ventilation in the work areas to remove any fumes. These will serve to reduce any possible exposure to the notified chemical in the course of normal work practices. There is negligible likelihood of exposure to the notified chemical during the use of the processing unit as the film is immersed in the activating solution automatically.

The final concentration of BTRT in the activator formulation of which it is a component is <0.1%. The minimisation of occupational exposure due to work practises and protective measures culminated with the notified chemical being not being classed as hazardous according to Worksafe Australia's *Approved Criteria for Classifying Hazardous Substances* (14) indicates that the risk of adverse health effects from this source is expected to be minimal.

The notified substance will not be sold to the public. The public will not be exposed to BTRT during its importation and industrial usage. Whilst the public may be

exposed to BTRT if an accidental spillage occurs, considering the clean-up procedures, its concentration in the activator solution and low acute toxicity, the notified chemical is unlikely to constitute a hazard to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to BTRT the following guidelines and precautions should be observed:

- local exhaust ventilation should be implemented where there is the likelihood dust generation. Any dust generation should be kept below the Australian Exposure Standard for nuisance dust: TWA 10 mg/m^3.

- The appropriate protective devices should be employed to minimise occupational exposure if engineering controls and work practices are insufficient to reduce exposure to a safe level. These should include:

  - the appropriate respiratory device should be selected and used in accordance to Australian Standard/ New Zealand Standard (AS/ NZS) 1715 (15) and should comply to AS/NZS 1716 (16).

  - eye protection should be selected and fitted in accordance to AS 1336 (17) and used in accordance to AS/NZS 1337 (18).

  - industrial clothing must conform to the specifications detailed in AS 2919 (19).

  - industrial gloves should conform to the standards detailed in AS 2161 (20).

- care should be taken to avoid spillage of the notified chemical. Should spillage occur the notified chemical should be swept or vacuumed for collection into a container for disposal by landfill or incineration.

- precautions for the use of formulation G5200B containing BTRT should take into account the presence of sodium hydroxide and the appropriate measures taken to minimise exposure.

- good personal hygiene should be practised to minimise the potential for ingestion.

- a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The MSDS for BTRT and the formulation G5200B containing the notified chemical were provided in an acceptable format in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (21).

These MSDS were provided by Agfa-Gevaert Ltd as part of their notification statement. The accuracy of this information remains the responsibility of Agfa-Gevaert Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of BTRT shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

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5. EEC Commission Directive 92/69 on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous preparations, *Official Journal of the European Communities* No. L 383 (29 December 1992).

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8. Draize, JH, 1959, 'Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics', *Association of Food and Drug Officials of the US,* **49**.

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15. Standards Australia, Standards New Zealand, 1994, *Australian/New Zealand Standard 1715-1994 Selection, Use and Maintenance of Respiratory Protective Devices.* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

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19. Standards Australia, 1987, *Australian Standard 2919 - 1987 Industrial Clothing,* Standards Association of Australia Publ., Sydney, Australia.

20. Standards Australia, 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves*), Standards Association of Australia Publ., Sydney, Australia.

21. National Occupational Health and Safety Commission,1994, *Guidance Note for the Completion of a Material Safety Data Sheet,* AGPS, Canberra.

Attachment 1

[1] The Draize scale for evaluation of eye reactions is as follows:

CORNEA

Opacity	**rating**	**Area of Cornea involved**	**rating**
No opacity	0 none	25% or less (not zero)	1
Diffuse area, details of iris clearly visible	1 slight	25% to 50%	2
Easily visible translu cent areas, details of iris slightly obscure	2 mild	50% to 75%	3
Opalescent areas, no details of iris visible, size of pupil barely discernible	3 moderate	Greater than 75%	4
Opaque, iris invisible	4 severe		

CONJUNCTIVAE

Redness	**rating**	**Chemosis**	**rating**	**Discharge**	**rating**
Vessels normal	0 none	No swelling	0 none	No discharge	0 none
Vessels definitely injected above normal	1 slight	Any swelling above normal	1 slight	Any amount different from normal	1 slight
More diffuse, deeper crimson red with individual vessels not easily discernible	2 mod.	Obvious swelling with partial eversion of lids	2 mild	Discharge with moistening of lids and adjacent hairs	2 mod.
Diffuse beefy red	3 severe	Swelling with lids half-closed	3 mod.	Disharge with moistening of lids and hairs and considerable area around eye	3 severe
		Swelling with lids half-closed to completely closed	4 severe		

IRIS

Values	**rating**
Normal	0 none
Folds above normal, congestion, swelling, circumcorneal injection, iris reacts to light	1 slight
No reaction to light, haemorrhage, gross destruction	2 severe