MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

February 7, 1995

TO: File for Igepal CO-630 (CAS# 9016-45-9)

FROM: Michael Depa, Toxics Unit

SUBJECT: Screening Level Determination

The initial threshold screening level (ITSL) for Igepal CO-630 is 18 $\mu g/m^3$ based on an annual averaging time.

The following references or databases were searched to identify data to determine the ITSL: IRIS, RTECS, ACGIH Threshold Limit Values, NIOSH Pocket Guide to Hazardous Chemicals, Environmental Protection Bureau Library, IARC Monographs, CAS Online (1967-August 20, 1994), National Library of Medicine, Health Effects Assessment Summary Tables, and NTP Status Report. Review of these sources found that EPA has not established an RfC or RfD for Igepal CO-630. Occupational exposure limits were not available. A 90 day feed study was available and is described below.

Groups of 15 Sherman Wistar albino rats of mixed sexes weighing 95-210 g received diets containing 0.01 to 0.04, 0.16, 0.64, 2.5 and 5.0% of Igepal CO-630 for 90 days (Smyth, 1969). A control group consisted of 30 rats. Body weight, diet eaten, and hematological parameters were followed. After 8 weeks the 2 lightest male and female rats in each group were sacrificed, gross examination was made, and 19 tissues were examined histopathologically from rats receiving the greatest dosage. At the end of the 90 day feeding period all surviving rats were sacrificed and gross examination was made. Nine organs were weighed. Histopathologic study was made of 19 tissues from the 2 lightest males and females in each group. No histopathologic changes indicating toxic effects were seen. Rats receiving diets containing 2.5 and 5% surfactants were emaciated, had scanty body fat and poor organ development, interpreted as due to partial starvation. Red and white blood cell counts, differential white blood cell counts, and hemoglobin remained normal. Table 1 describes the pathological findings of this study.

Table 1. Mortality and Organ Weights of Rats Fed Diets containing Igepal CO-630 for 90 days

	Control	0.01%	0.04%	0.16%	0.64%	2.5%	5.0%
Rats/Group	30	15	15	15	15	15	15
Mortality	3	0	2	0	0	2	11
Ave. weight gain in grams (Males)	217	191	183	201	104	55	-5
Ave. weight gain in grams (Females)	94.9	86.1	87.0	85.7	48.7	21.3	-20.5
Organ Weight as Percentage of Body Weight							
Heart	0.33	0.30	0.32	0.29	0.40	0.38	
Liver	3.08	2.87	3.64	3.17	4.04	4.00	
Kidney	0.62	0.44	0.71	0.55	0.84	0.78	
Testes	0.82	1.03	1.00	0.75	1.58	1.22	
Brain	0.51	0.60	0.58	0.55	0.79	0.89	

Table 2. Food, Body Weight Data and Dose Levels of Igepal CO-630

	Control	0.01%	0.04%	0.16%	0.64%	2.5%	5.0%
Male- Ave. Food Intake per day (g/rat/day)	13.2	12.9	12.0	12.4	11.1	10.3	10.0
Male Dose (mg/day)	-	1.29	4.80	19.84	71.04	275.50	500.00
Ave. Body Weight of Males (g)	338	325	318	321	228	194	Not Given
Male Dose (mg/kg/day)	0	3.97	15.09	61.81	311.58	1420.1	-
Female- Ave. Food Intake per day (g/rat/day)	10.6	10.6	10.4	10.5	10.1	9.7	9.4
Female Dose (mg/day)	-	1.06	4.16	16.8	64.64	242.50	470.00
Female Dose* (mg/kg/day)	0	3.26	13.08	52.33	283.51	1250.00	

*Based on the body weight of the male Wistar rats at that dose level because the female body weight was not provided.

Statistical procedures were not described, however, it was mentioned that at the 0.64 % and higher dose groups there was a significant retardation of weight gain. Because only the two lightest males and females in each group were examined instead of all the animals it was decided to use a modifying factor to account for quality of the study.

In the female rats a NOAEL was identified as 52.33 mg/kg/day based on decreased weight gain. Using this NOAEL the ITSL was determined as follows:

$$ITSL = \frac{NOAEL}{UF_1 x\ UF_2 x\ UF_3 x\ MF} x \frac{W_a}{I_a}$$

$$ITSL = \frac{52.33 \frac{mg}{kg}}{10\ x\ 10\ x\ 10\ x\ 3} x \frac{0.32\ kg}{0.31\ m^3}$$

$$ITSL = 0.018\ x\ 10^{-3} \frac{mg}{m^3}$$

$$ITSL = 18 \frac{\mu g}{m^3}$$

Where :

W_a = Weight of the male Sherman Wistar albino rat.

I_a = Default inhalation rate of the rat (EPA, 1988).

UF_1=Uncertainty factor of 10 to account for differences between humans and experimental species.

UF_2 = Uncertainty factor of 10 to account for sensitive individuals within the human population.

UF_3=Uncertainty factor of 10 to account for experimental conditions that are less than chronic.

MF = Modifying factor of 3 to account for the incomplete histopathological analysis and description of the rats, and the inadequate statistical summary

The ITSL for Igepal CO-630 is 18 µg/m^3 based on an annual averaging time.

REFERENCES

EPA. 1988. Recommendation for and documentation of biological values for use in risk assessment. PB 88-179874.

Smyth, H. and Calandra, J. 1969. Toxicologic studies of alkylated polyoxyethylene surfactants. Toxicology and Applied Pharmacology. 14: 315-334.