

October 10, 2018

Mr. Don Weaver  
President, Green Valley Council  
Green Valley Mall  
101-14B S. La Canada Dr.  
Green Valley, AZ 856 14-2633

**RE:       Freeport-McMoRan Sierrita Inc.**  
**Human Health Risk Assessment of Windblown Tailings**

Dear Mr. Weaver,

Attached please find a human health risk assessment for windblown tailings from the Freeport-McMoRan Sierrita Tailing Impoundment (FMSTI). The risk assessment was prepared by ARCADIS for Freeport-McMoRan Sierrita Inc. (FMSI) in response to three wind-blown tailings events that affected parts of Green Valley during August and September of 2006. FMSI submits this information to the Green Valley Council following the October 6 and 7, 2018, wind-blow tailings events as this information is relevant to these recent events. The report includes analytical results for metals, semi-volatile organic compounds and volatile organic compounds and it evaluates the cumulative and chronic human health risk of metals and organics present in the windblown tailings.

Also enclosed, are the Safety Data Sheets for seven reagents used in FMSI's copper concentrating process which have the potential to be present in the tailing impoundment. Neither the ore being mined nor the reagents used in the process have changed in any substantive way since the Human Health Risk Assessment was performed in 2006.

Conclusions from the report are summarized as follows:

- Metal values are similar in tailing to natural desert dust found around Green Valley and that present a similar risk during moderate to severe dust storms.
- Organic constituents used in the copper concentrating process are not present in detectable quantities in the FMSTI.
- The findings of this human health risk assessment are similar to those conclusions made by the Arizona Department of Health Services (ADHS) in that the tailing dust was comparable to dust from other sources; and any health effects would be those associated with dust in general. Also, attached is an ADHS fact sheet on dust storms and human health that address tailings dust.

October 10, 2018

Mr. Don Weaver  
Page 2 of 2

If you have any questions regarding the report or attachments, please do not hesitate to contact me at (520) 393-4426.

Very truly yours,



David A. Barnes  
Manager Environment, Land, and Water

Attachments - 3

Cc:

Ursula Nelson, PDEQ  
Dustin Fitzpatrick, PDEQ  
David Rhoades, FMSI  
William Cobb, FCX  
Ned Hall, FCX  
Todd Weaver, FCX



Mr. Chad Fretz  
Phelps Dodge Sierrita, Inc.  
6200 W. Duval Mine Road  
P.O. Box 527  
Green Valley, AZ 85622-0527

Subject:

Phelps Dodge Sierrita Inc. – Human Health Risk Assessment of Windblown Tailing

Dear Mr. Fretz:

BBL has prepared a risk evaluation of wind-blown tailing for Phelps Dodge Sierrita, Inc. (PDSI) which includes samples collected and analyzed in September 2006 and March 2007. In September 2006, Arizona Department of Health Service (ADHS) compared concentrations of metals detected in tailing to that of background and essentially found that the levels in tailing were similar to or below that of background. They concluded that exposure to tailing dust is no different than natural background dust in the area and, furthermore, that both exposures (tailing and background) would have an EPA Air Quality Index (AQI) for PM<sub>10</sub> of 153 during a moderate to severe dust storm, which is considered unhealthy, suggesting that both exposures would contain air that would be unhealthy to breath, particularly for sensitive subpopulations, over a short period of time. ADHS indicates that dust storms may cause other health concerns due to the source, composition and other characteristics of the particulate matter depending on the makeup of soil and dust such as that for tailing but they provided no further detail. As such, BBL has prepared a more detailed evaluation of human health risk in order to better understand the cumulative (and chronic) risk of metals and organics present in windblown tailing and the potential for exposure via other constituents and pathways not included in the Arizona Remediation Levels or U.S. Environmental Protection Agency (USEPA) Region 9 preliminary screening goals (PRGs).

It has been reported that about a quarter inch of dust was found near residences after several dust storms in September 2006; however, it is unknown specifically how much of the dust was from Sierrita tailing versus dust particulate from the nearby surrounding area. Therefore, in an effort to bound the potential human health risk from tailing, several different scenarios were evaluated including health risk due to exposure to tailing itself, exposure to tailing modeled as dust located a mile and a

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63527.001

half away from the tailing pond, and exposure to dust collected from a home by a Green Valley resident. The results of these analyses are summarized below.

### **Data Collection and Analysis**

In order to characterize the constituents present in PDSI tailing and dust occurring in the town of Green Valley, there were several sampling events that occurred in September 2006 and in March 2007.

On September 8, 2006, the PDSI Environment, Land & Water Department collected 10 grab samples of representative tailing from the top surface of Sierrita Tailing Pond (see Figure 1 – black locations). These samples were collected in a location where the tailing operations crew indicated could be a potential source of fine tailing particles that ultimately might generate wind blown tailing. The samples were shipped to SVL Laboratories located in Kellogg, ID, composited into a single sample by the laboratory and analyzed by EPA Method ILM04.0. In addition to the tailing pond sample, another sample collected by a Green Valley resident labeled “Dust from G.V. South 9.2.06” was also submitted to SVL for similar analyses. This sample was collected from the south Green Valley area according to representatives of Green Valley Community. Both samples were sieved to 250  $\mu\text{m}$  in the laboratory prior to analysis. SVL was also requested to report the particle size distribution to 250  $\mu\text{m}$ . These sample results were received on September 27, 2006.

On September 13, 2006, Golder Associates collected 10 samples from Sierrita Tailing Impoundment (see Figure 1 – red locations), composited the samples, split the sample, and shipped one sample to Turner Labs and one sample to Transwest Geochem, both located in Phoenix, AZ. The samples were sieved to 250  $\mu\text{m}$  and analyzed for USEPA SW846 6010B. The sample results were received on September 15, 2006.

On September 21, 2006, Golder Associates collected six samples from locations near the town of Green Valley (see Figure 2, Table 1). The target area was southwest of town which was identified by Golder Associates to be the general source area for dust blowing into town from strong prevailing winds and excluded the area at or near the southeast corner of the tailings ponds. Within this general target area, six samples were collected from 0 – 3 inches from disturbed areas with the potential to generate dust. The samples were sieved to 250  $\mu\text{m}$  in the laboratory

prior to analysis, and analyzed for USEPA Method SW846 6010B. The sample results were received on September 29, 2006.

On March 20, 2007, Golder Associates collected 10 samples (and 1 duplicate) from Sierrita Tailing Impoundment (see Figure 3) and shipped them to TestAmerica Labs located in Phoenix, AZ. The samples were analyzed for metals via USEPA SW 846 6010B, volatile organic constituents (USEPA Method 8260B), semi-volatile organic compounds (USEPA Method 8270C), and diesel range organics and oil range organics (ADHS Method 8015 AZR1). The sample results were received on April 2, 2007.

## SCREENING RISK EVALUATION

Table 2 summarizes the results from the September 2006 and March 2007 sampling events, USEPA Region 9 PRGs, and State of Arizona residential standards. All reported concentrations were less than their respective human health screening criteria.

## COMPARISON TO EXISTING GREEN VALLEY SOIL

Figures 4a, 4b and 4c show a box-whisker comparison of PDSI Tailing samples, Green Valley dust sample (sample no. GK23), and the six samples of Green Valley soil (background) collected by Golder Associates on September 21, 2006. The metals are not listed alphabetically, but rather grouped with other metals with similar concentration ranges (for y-axis scaling). The box-whisker plots represent the six Green Valley soil samples. The PDSI tailing pond and Green Valley dust samples are plotted in color on the box-whisker plot as indicated by the legend and note. Metals reported in the PDSI Tailing Pond and the Green Valley dust samples were generally within or below the range detected in the six Green Valley samples, except for copper. Non-detected metals in the tailing pond and Green Valley dust are not shown even if they were detected in the Green Valley soil samples, i.e., arsenic. Upon quick review, it may seem odd that the metals concentrations in samples of tailing are so similar, although generally less than those in the Green Valley soil samples; however, it is important to note two key metals that appear to distinguish the tailing from the soil: arsenic and copper. The arsenic concentrations in the Green Valley soil were detected at a greater concentration than the tailing pond samples, which were all non-detect. The copper concentrations in the tailing were about 5 to 35 times higher than those detected in Green Valley soil in all but one

sample. Albeit not a comprehensive fingerprinting analysis, there appears to be key distinguishing factors between the two locations. This analysis further supports the ADHS conclusions in that the relative exposure to metals contained in tailing dust is similar to that of natural background dust.

## **HUMAN HEALTH RISK ASSESSMENT**

A more detailed evaluation of human health risk was conducted in order to better understand the cumulative (and chronic) risk of metals present in windblown tailing and the potential for exposure via other constituents and pathways not included in the PRGs. The information below summarizes the technical rationale for exposure point concentrations, conceptual site model, exposure algorithms and input parameters, toxicity information, and risk characterization.

### **Exposure Point Concentrations**

The data collected in September 2006 and March 2007 were assessed for use in the human health risk assessment. The organics analysis conducted in March 2007 was based upon a review of material safety data sheets (MSDS) available from PDSI (see Attachment 1). Some of the MSDS did not identify specific organic compounds due to their proprietary nature; however, the analyte lists used in USEPA Methods 8260 and 8270 are exhaustive with respect to identifying any toxic compounds that could exist in these samples.

The dust sample collected from Green Valley on September 2, 2006 generally had slightly higher metals concentrations than those samples collected from the PDSI Tailing Pond (in September 2006 and March 2007). However, the Green Valley sample was collected by unknown methods and does not have an intact chain of custody, and while it may represent most closely what residents were and are currently being exposed to in and around their homes, it is unknown what portion of the sample could be allocated to PDSI versus natural dust from the surrounding area. Therefore, while risks were estimated for this single sample, risk estimates were also derived for estimated metals concentrations using an USEPA air dispersion model (see Attachment 2) as well as the 95<sup>th</sup> percent upper confidence limit on the arithmetic mean (95UCL) of metals detected in tailing during the March

2007 sampling event (and maximum concentration for organics<sup>1</sup>). Modeled dust concentrations are summarized in Table 3. Input concentrations for the air model were based on the 95UCL concentration of the March 2007 data and organics data.

The modeled dust concentrations are based on a single storm event. The dust concentrations are very low compared to tailing due to several assumptions, one of which is that the modeled dust was averaged over a one inch soil depth. This assumption is consistent with a longer-term exposure in which the dust settles into the top inch of soil. If this assumption is varied such that the dust instead overlays the soil, then the metals concentrations essentially could be equivalent to the tailing itself which was also evaluated as an upperbound on the risk discussed above.

### **Conceptual Site Model**

Complete exposure pathways were determined based on source, transport mechanism, exposure pathway, and exposure point. Based on an analysis of potential exposure pathways, it was determined that child and adult residents would be evaluated because they are the most sensitive receptors. The exposure pathways were determined to be: incidental ingestion of soil, dermal contact with soil, inhalation of particulate, and ingestion of vegetables. The current exposure scenario was evaluated for chronic long-term exposure.

### **Non-Cancer and Cancer Dose Equations and Exposure Parameters**

BBL calculated non-cancer and cancer risks using USEPA accepted human health risk assessment methodology for metals (USEPA 1989). Risk estimates were

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<sup>1</sup> 2-Methyl-4-pentanone (methyl isobutyl ketone (MIBK) was the only volatile organic detected and it was detected in one out of 10 locations; therefore, the maximum was used to represent the exposure point concentration because there were too few detections to estimate a 95UCL. In addition, diesel range organics were detected in sample T-8; however it was not included in the risk estimates due to lack of toxicity criteria. The toxicity of diesel range organics can more accurately be represented by compounds such as naphthalene and benzo(a)pyrene which were analyzed at much lower detection limits than those identified in ADHS Method 8015. Naphthalene and benzo(a)pyrene were not detected in any sample.

developed for chronic exposure which assumes that residential homes would not be cleaned. The actual exposures, especially for those residents whose homes were cleaned by Phelps Dodge, would be subchronic and thus risk estimates may be slightly lower than those presented herein. Hazard quotients (HQs) and cancer risk were based on reasonable maximum exposure (RME). RME parameter estimates were obtained from USEPA and professional judgment. Particulate emission factor calculations and chemical-specific parameters, such as absorption fractions and transfer factors were based on USEPA guidance or based on professional judgment.

### **Toxicity**

Toxicity factors were based on the EPA's Integrated Risk Information System (IRIS), the National Center for Environmental Assessment (NCEA), and EPA's Health Effects Assessment Summary Tables (HEAST). It is important to note that many of the metals do not have additive or synergistic effects and thus the total hazard indices described below are over-estimates.

### **Risk Characterization**

Pathway-specific HQs and cancer risk calculated by BBL are presented in Tables 4 through 10. Child and adult cancer risk estimates for the Green Valley dust samples are  $4 \times 10^{-8}$  and  $2 \times 10^{-7}$  and non cancer risk estimates are 2.4 and 0.6, respectively, shown in Tables 4 and 5. Child and adult cancer risk estimates for the modeled windblown tailing are  $6 \times 10^{-12}$  and  $2 \times 10^{-11}$  and non cancer risk estimates are 0.1 and 0.1, respectively, shown in Tables 6 and 7. Child and adult cancer risk estimates for the average tailing pond sample are  $4 \times 10^{-8}$  and  $2 \times 10^{-7}$  and non cancer risk estimates are 2.0 and 0.6, respectively, shown in Tables 8 and 9. Table 10 summarizes total risks for all three exposure point concentrations. All cancer risk estimates are either below a  $1 \times 10^{-6}$  point of departure. The non-cancer risk estimates are slightly elevated above one for children (2.4 and 1.6 for Green Valley dust and PDSI tailing, respectively); however, metals such as iron do not have additive or synergistic effects with other metals and thus these risks are conservative and do not require further evaluation.

### **SUMMARY**

In September 2006, ADHS compared concentrations of metals detected in tailing to that of background and essentially found that the levels in tailing were similar to or

below that of background. The analysis presented above corroborates the ADHS conclusions. ADHS concluded that both exposures (tailing and background) would have an EPA Air Quality Index (AQI) for PM<sub>10</sub> of 153 during a moderate to severe dust storm, which is considered unhealthy, suggesting that both exposures would contain air that would be unhealthy to breath, particularly for sensitive subpopulations, over a short period of time (for acute exposure). ADHS indicated that dust storms may cause other health concerns due to the source, composition and other characteristics of the particulate matter depending on the makeup of soil and dust such as that for tailing but they provided no further detail. As such, BBL prepared a more detailed evaluation of human health risk in order to better understand the cumulative (and chronic) risk of metals and organics present in windblown tailing and the potential for exposure via other constituents and pathways not included in the Arizona Remediation Levels or U.S. Environmental Protection Agency (USEPA) Region 9 preliminary screening goals (PRGs). The analysis presented above indicates that the chronic risk due to exposure of windblown tailing from PDSI is not significant.

Please feel free to call me at (303) 231-9115 with any comments or questions.

Sincerely,

ARCADIS U.S., Inc.

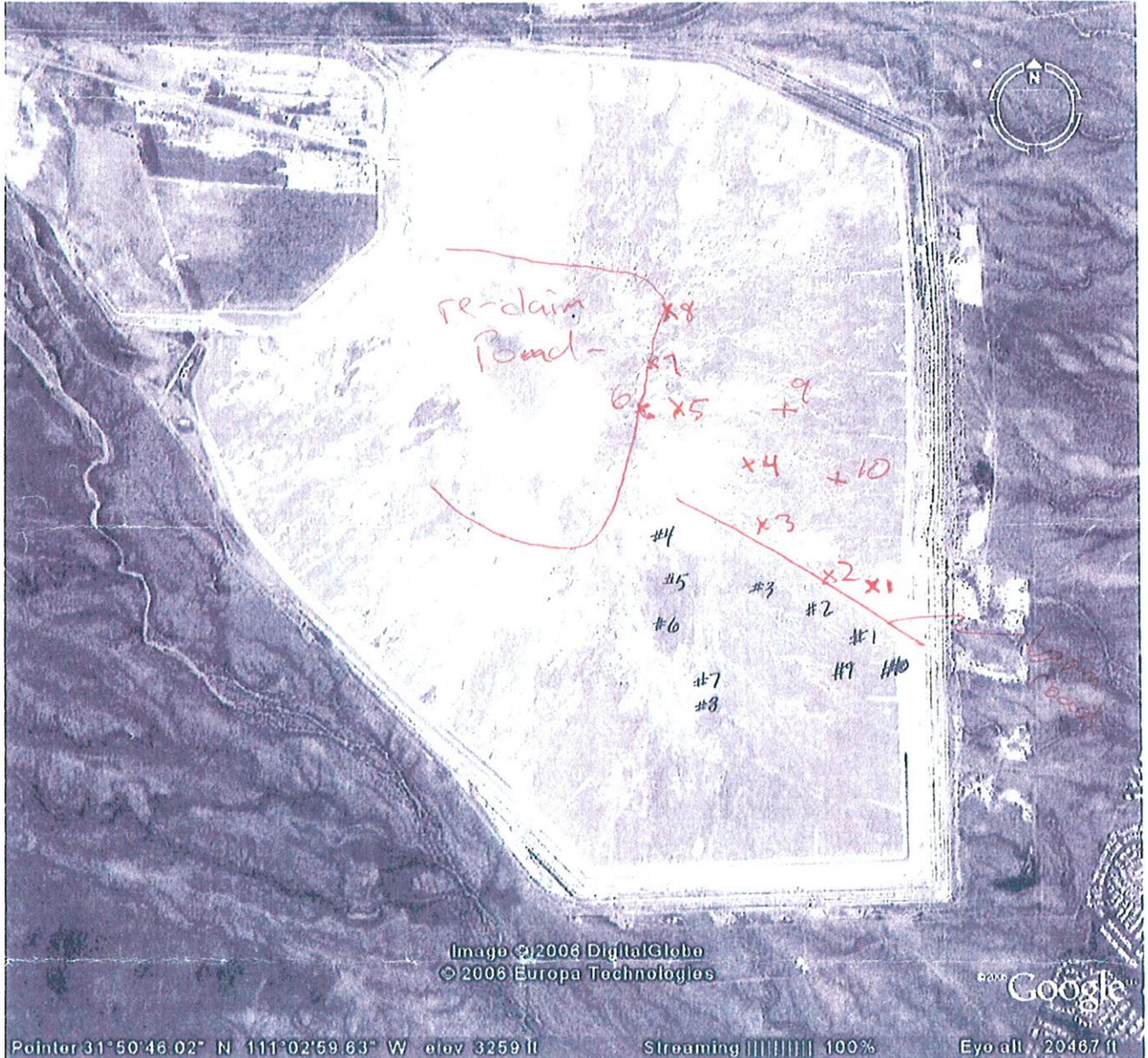


Anne Thatcher  
Principal Scientist

Copies:

Mr. Ned Hall, Phelps Dodge Sierrita, Inc.  
File

FIGURE 1

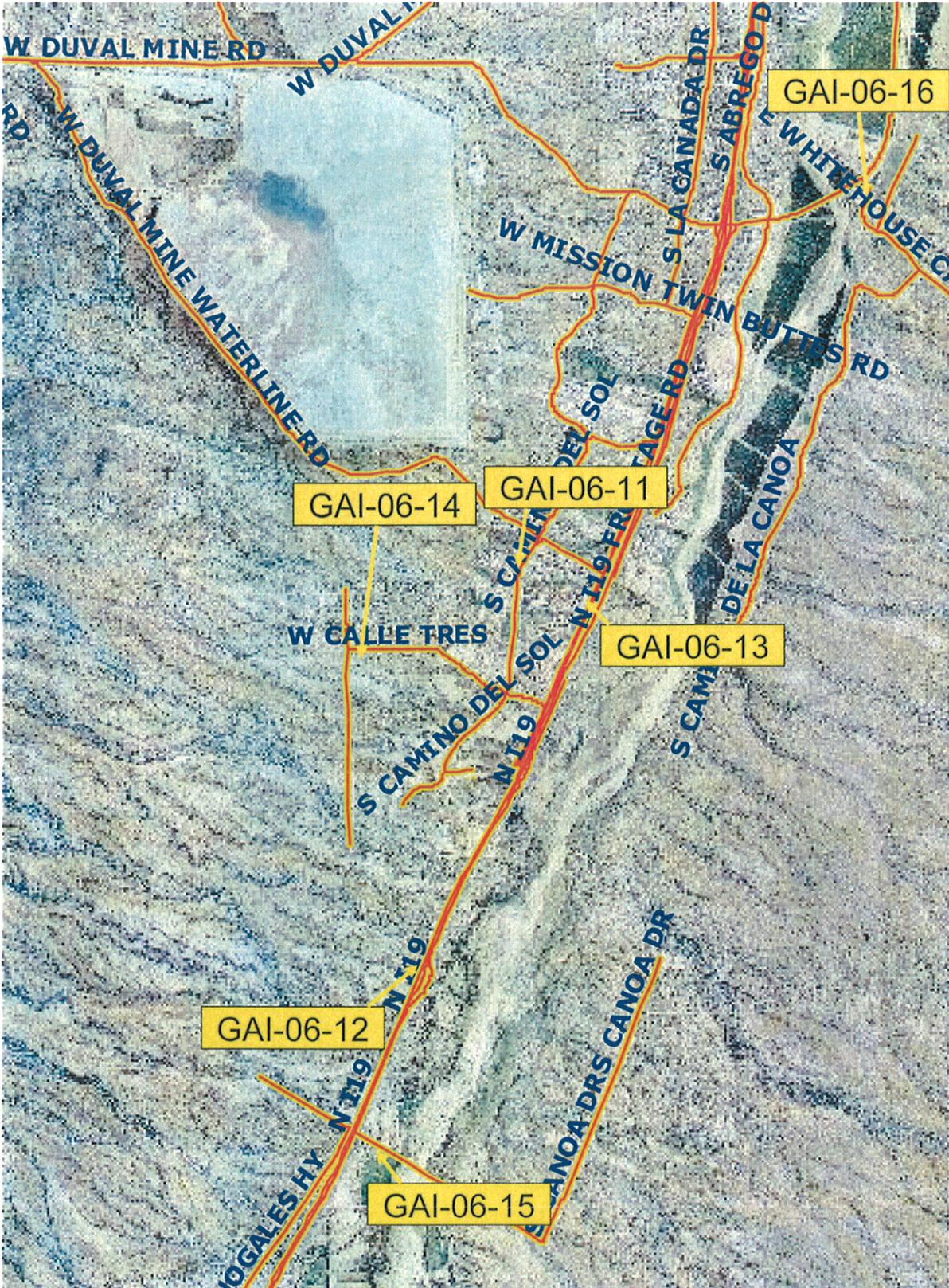


*Approximate locations of samples #1-10 on the Sierrita Tailings Dam.*

*Billy Dorris*

RED INDICATES SAMPLE LOCATIONS TAKEN  
SEPTEMBER 13, 2006

FIGURE 2

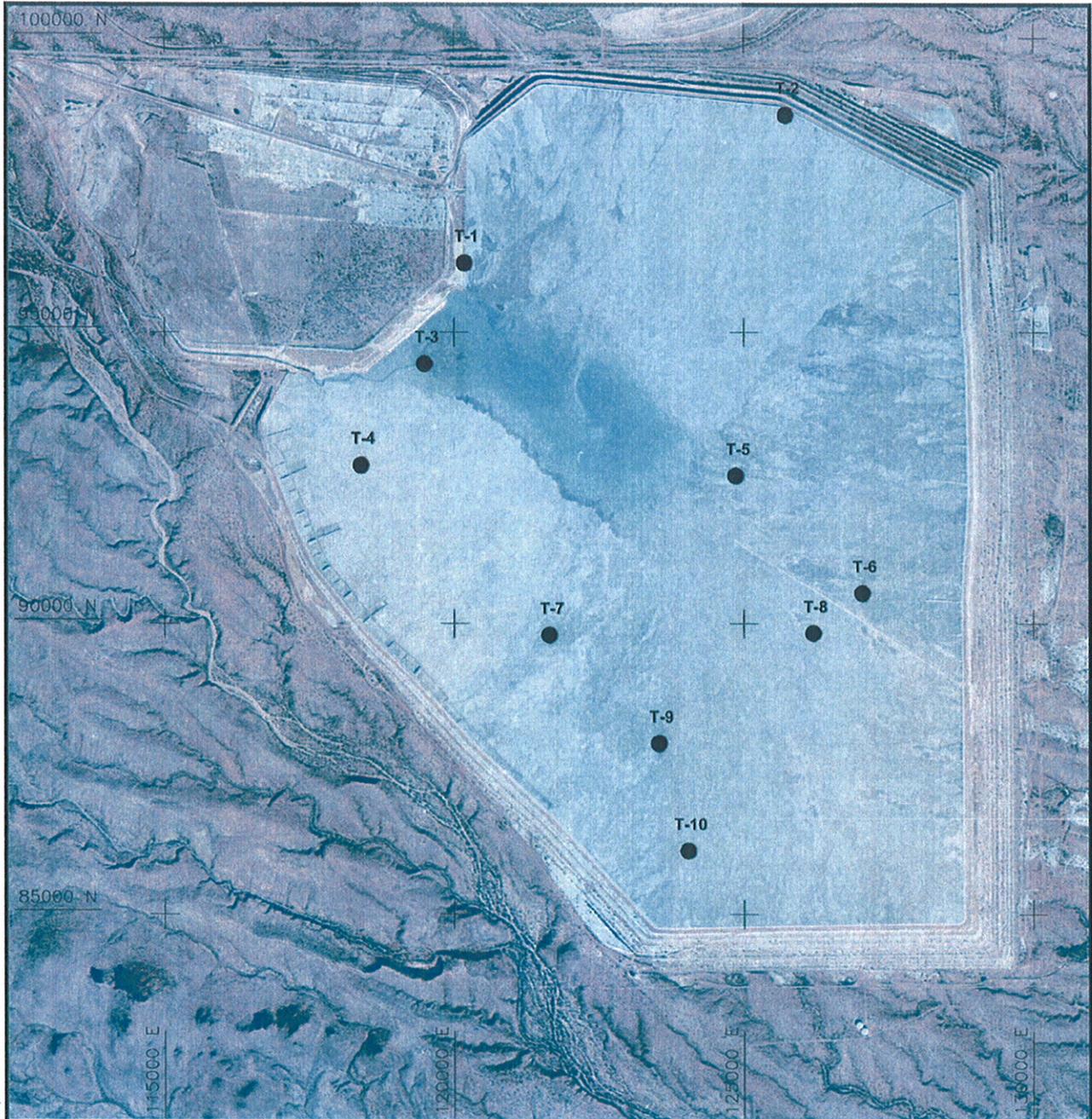


PDSI – Tailings Investigation

## Background Soil Sample Locations

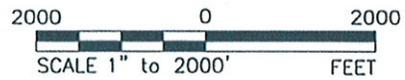
Sampled on September 21, 2006

FIGURE 3



**LEGEND**

- T-1
- APPROXIMATE SAMPLE LOCATION



**REFERENCES**

- 1.) AERIAL PHOTO PROVIDED BY COOPER AERIAL SURVEYS CO. (PHOTO DATES JUNE 6 AND NOVEMBER 28, 2006).



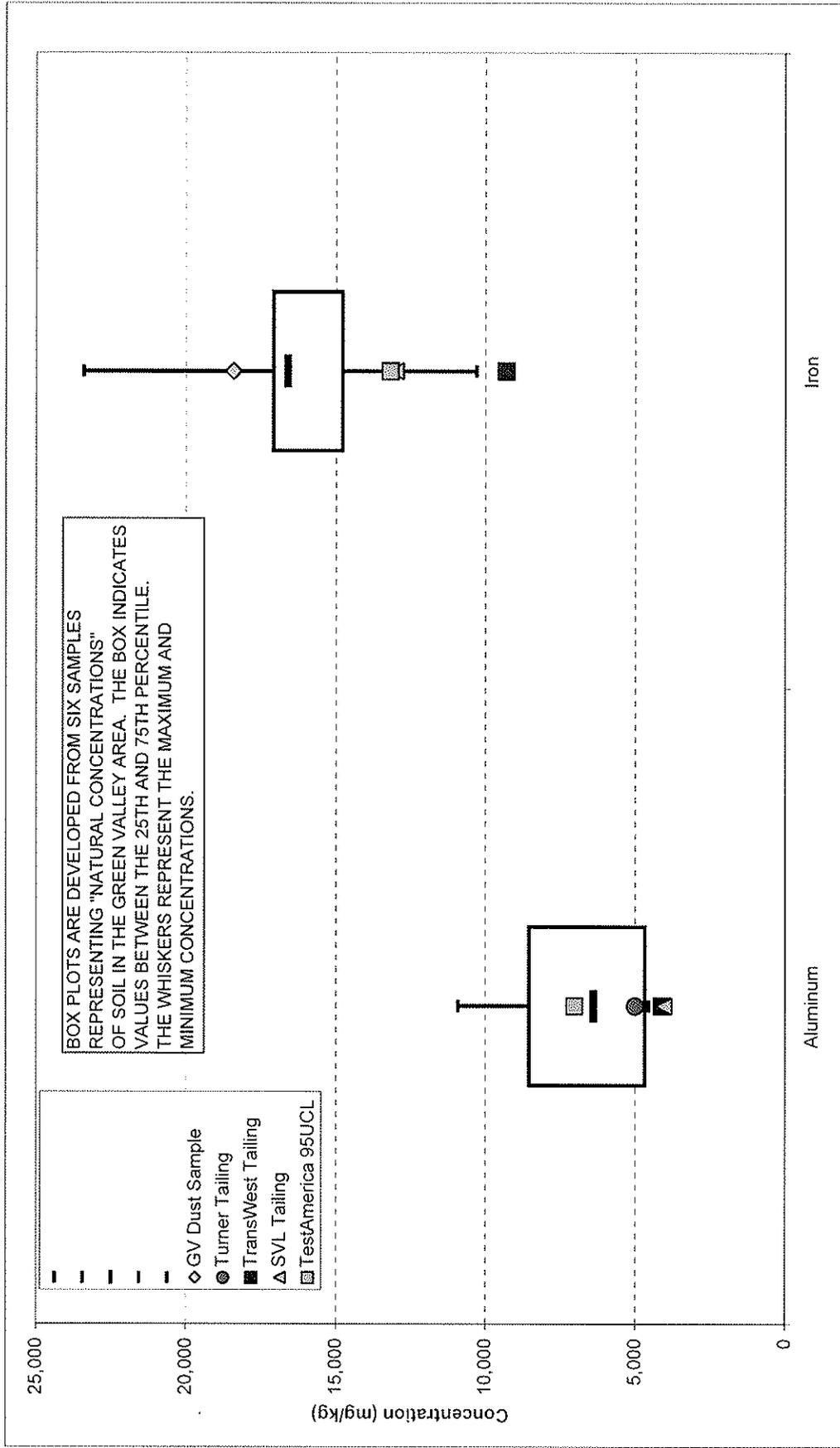
PROJECT		SIERRITA TAILINGS ORGANICS SAMPLING GREEN VALLEY, ARIZONA	
 Phelps Dodge Sierra Inc.			
TITLE			
<b>SAMPLE LOCATION MAP</b>			
PROJECT No. 073-92520		FILE No. 07392520A001	
DESIGN	JC	03/09/07	SCALE AS SHOWN REV. A
CADD	NIL	03/09/07	
CHECK	JC	03/27/07	
REVIEW	KRJ	04/02/07	



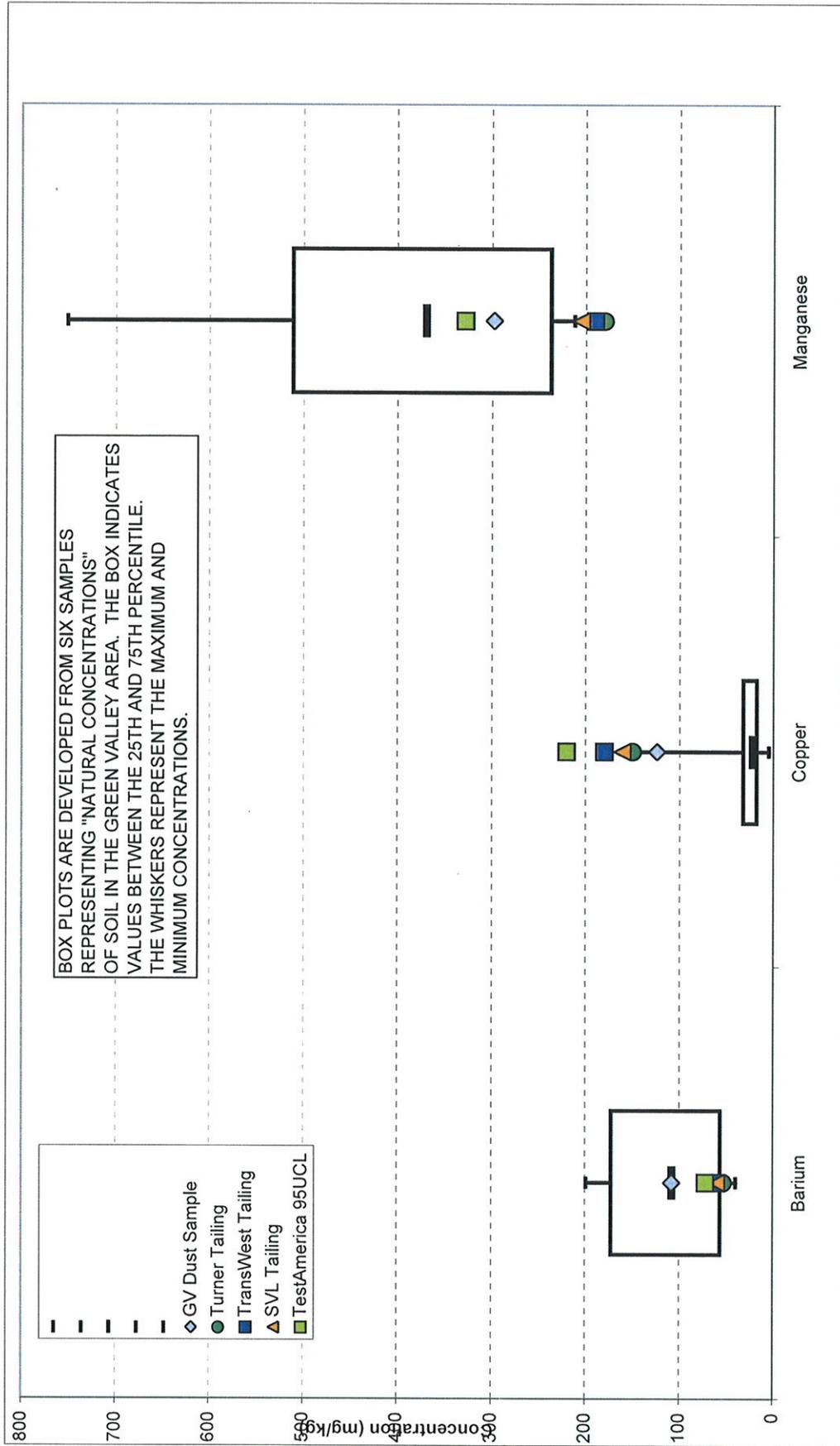
Drawing file: 07392520A001.dwg Apr 03, 2007 - 1:40pm

**FIGURE 4A**  
**COMPARISON TO SIERRITA TAILING POND DUST,**  
**GREEN VALLEY DUST, AND GREEN VALLEY SOIL SAMPLES**

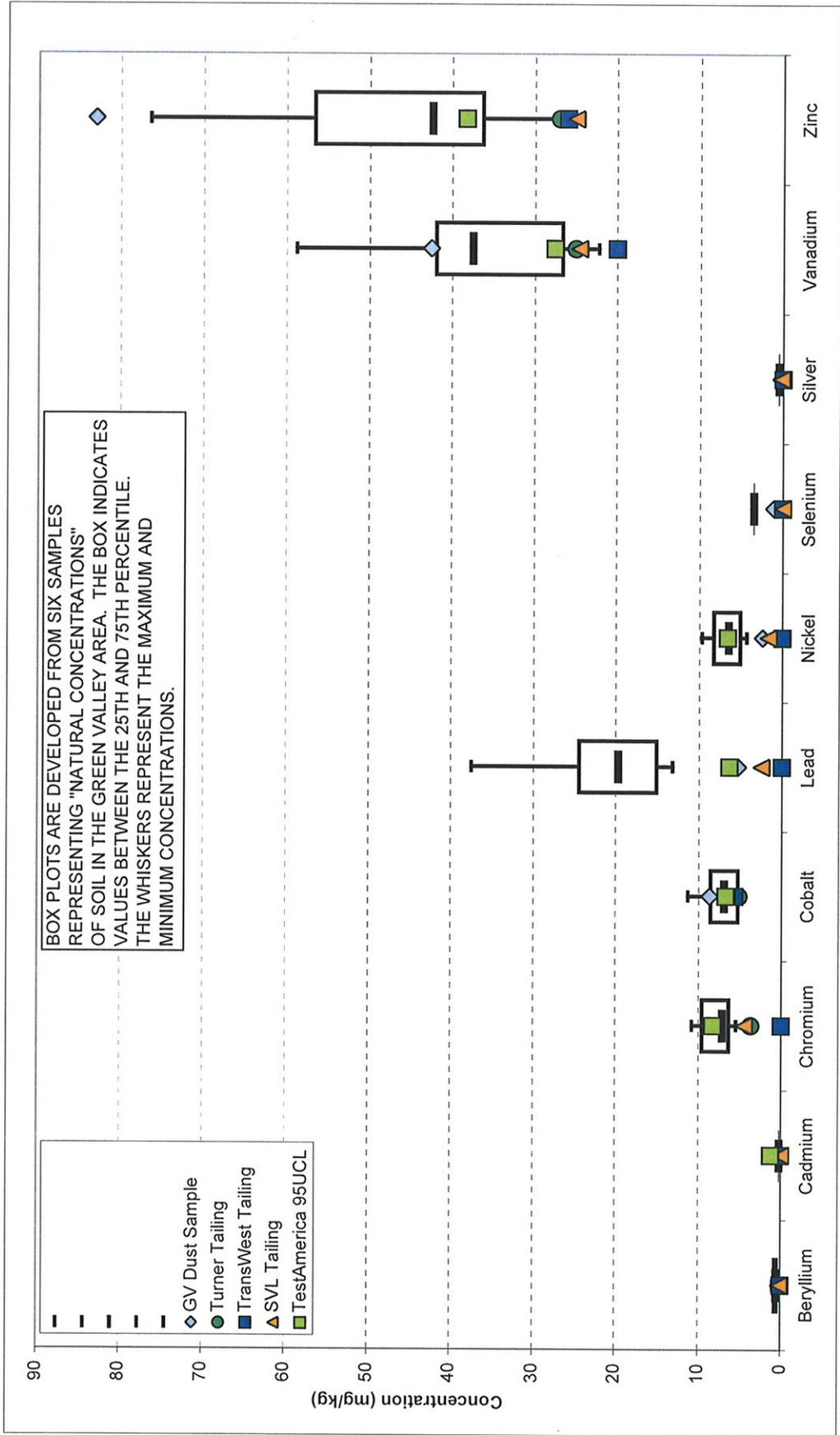
**PHELPS DODGE SIERRITA INC. - GREEN VALLEY, AZ**



**FIGURE 4B**  
**COMPARISON TO SIERRITA TAILING POND DUST,**  
**GREEN VALLEY DUST, AND GREEN VALLEY SOIL SAMPLES**  
**PHELPS DODGE SIERRITA INC. - GREEN VALLEY, AZ**



**FIGURE 4C**  
**COMPARISON TO SIERRITA TAILING POND DUST,**  
**GREEN VALLEY DUST, AND GREEN VALLEY SOIL SAMPLES**  
**PHELPS DODGE SIERRITA INC. - GREEN VALLEY, AZ**



**TABLE 1**  
**SUMMARY OF GREEN VALLEY, AZ SOIL SAMPLES**  
**Phelps Dodge Sierrita, Inc.**

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Vanadium	Thallium	Zinc
<b>GAI-06-11</b>	10,900	2U	4.5	199	0.96	0.2U	6.5	11.3	145	17,200	37.5	751	0.033U	8.5	3.5U	0.5U	35.1	1.5U	76.4
<b>GAI-06-12</b>	7,820	2U	4.9	184	0.62	0.2U	10.2	7.68	21.8	16,500	20.1	471	0.033U	9.7	3.5U	0.5U	42.6	1.5U	42.1
<b>GAI-06-13</b>	8,770	2U	4.8	138	0.79	0.2U	7.79	8.89	4.6	16,700	25.9	525	0.033U	7.7	3.5U	0.5U	39.9	1.5U	61.3
<b>GAI-06-14</b>	4,550	2U	3.7	49.1	0.42	0.2U	10.8	6.19	35.2	23,400	19.3	227	0.033U	5.3	3.5U	0.5U	58.8	1.5U	34.4
<b>GAI-06-15</b>	4,580	2U	3.1	77.4	0.44	0.2U	5.47	4.98	16.3	10,300	13.7	268	0.033U	5	3.5U	0.5U	23.8	1.5U	25.5
<b>GAI-06-16</b>	4,940	2U	2.1	39.5	0.38	0.2U	6.32	4.97	22.4	14,200	13.2	212	0.033U	4.3	3.5U	0.5U	22.2	1.5U	42.7

units - milligrams per kilogram (mg/kg)

U - non detect at detection limit provided

**TABLE 2  
SUMMARY OF SAMPLES AND SCREENING LEVELS  
Phelps Dodge Sierrita, Inc.**

Constituent	Turner	Transwest	SVL	SVL	TestAmerica	EPA R9	AZ	AZ											
	9/14/2006	9/14/06	9/27/06	9/27/06	3/20/2007	3/20/2007	3/20/2007	3/20/2007	3/20/2007	3/20/2007	3/20/2007	3/20/2007	3/20/2007	3/20/2007	3/20/2007	3/20/2007	SSL	Res SRLs	Res SRLs
	Tailing	Dup Tailing	Tailing	GV Dust	T-1	T-1 (Dup)	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9	T-10	95UCL		(current)	(effec 5/4/07)
Aluminum	5,000	4,100	4,050	7,030	6,300	9,400	7,300	7,100	5,400	5,600	5,800	6,300	1,600	6,300	4,300	7,004	76,000	--	76,000
Antimony	10U	<5U	0.38U	0.38U	10U	ND	31	--	--										
Arsenic	5U	<5U	0.38U	0.38U	5U	ND	0.39	10	10										
Barium	53	60	59.9	108	64	90	70	66	59	66	71	58	14	70	51	72	5,400	--	15,000
Beryllium	5U	<1U	0.14	0.23	0.44U	ND	150	--	--										
Cadmium	0.77	<1U	0.02U	0.13	1	1.7	1.1	1.2	1.1	0.89	0.91	1.1	0.59	1.4	0.71	1.2	37	70	39
Chromium	3.7	<5U	4.5	8.7	7.6	10	8.9	9.7	6.7	6.8	6.9	7.7	1.7	6.7	4.2	8.3	210	230	30
Cobalt	5.2	5.7	6.6	8.7	6.9	8.9	6.8	5.8	5U	5.1	6.4	6	5U	5.8	5U	6.7	900	--	900
Copper	150	180	161	124	130	230	240	150	190	160	230	160	130	280	220	220	3,100	--	3,100
Iron	--	9,300	13,000	18,400	12,000	18,000	16,000	14,000	9,200	8,500	9,400	12,000	2,000	9,600	8,100	13,169	23,000	--	--
Lead	10U	<5U	2.5	5.3	5.0U	7.5	5.8	5U	5U	5U	5U	5U	5U	6.1	5.6	6.3	400	400	400
Lithium	--	--	--	--	9.7	7	7.2	6.3U	7.8	8.4	7.5	8.6	6.7	7.1	6.6	8	1,600	--	1,600
Manganese	180	190	205	298	240	340	280	270	240	230	250	230	43	240	200	328	1,800	--	3,300
Mercury	--	--	0.05U	0.05U	--	--	--	--	--	--	--	--	--	--	--	--	23	23	23
Molybdenum	21	--	--	--	19	39	57	30	26	23	32	25	100	36	40	52	390	--	390
Nickel	5U	<5U	1.7	2.4	5.0U	6.6	5U	5.1	5U	5U	5U	5U	5U	5.2	5U	6.6	11,000	--	1,600
Selenium	5U	<5U	0.76U	1.1	5U	ND	390	--	--										
Silver	1U	<5U	0.21	0.3	0.5U	ND	390	--	--										
Strontium	--	--	--	--	100U	120	48	100U	43	34	36	100U	100U	100U	40	62	47,000	--	47,000
Thallium	5U	<5U	0.22U	0.22U	5U	ND	5.2	--	--										
Tin	--	--	--	--	15	18	15	17	15	13	14	9.8	17	13	15.8	47,000	--	47,000	
Titanium	--	--	--	--	510	690	580	490	490	420	490	600	39	460	480	692	--	--	310,000
Vanadium	25	20	24.6	42.5	24	34	29	27	24	23	26	27	5U	25	20	27.6	78	--	78
Zinc	27	26	25	83	34	49	39	34	30	29	42	34	12	34	28	38.3	23,000	--	23,000
4-Methyl-2-pentanone (MIBK)	--	--	--	--	0.58	0.66	0.61	0.5U	0.66	790	--	5,300							
EFH (C10-C32)	--	--	--	--	130U	350	130U	130U	350	--	4,300	--							

units: milligrams per kilogram (mg/kg)

Note: calcium, magnesium and potassium were not included in risk assessment because they are essential nutrients

EPA R9 SSL = U.S. Environmental Protection Agency Region 9 Soil Screening Level

AZ Res SRL = Arizona Residential Soil Remediation Level

GV = Green Valley, AZ

U - non detect at detection limit provided

**TABLE 3**  
**MODELED DUST CONCENTRATIONS**  
**IN TOWN OF GREEN VALLEY**  
**Phelps Dodge Sierrita, Inc.**

Analyte	Deposited Concentrations (mg/kg) <sup>1</sup>
Aluminum	1.0708
Antimony	ND
Arsenic	ND
Barium	0.0110
Beryllium	ND
Cadmium	0.0002
Chromium	0.0013
Cobalt	0.0010
Copper	0.0337
Iron	2.0134
Lead*	0.0011
Lithium	0.0012
Manganese	0.0502
Mercury	NA
Molybdenum	0.0079
Nickel*	0.0010
Selenium	ND
Silver	ND
Strontium	0.0094
Tin	0.0024
Titanium	0.1059
Vanadium	0.0042
Thallium	ND
Zinc	0.005850979
Methyl isobutyl ketone	0.0001

Note 1: The deposited concentration assumes a sample collected from the ground surface to a depth of 1 inch. It further assumes the soil beneath the deposited dust has a natural concentration of 0 mg/kg.

ND = All samples non-detect

NA = No sample data

\* Frequency of detect insufficient to compute UCL using ProUCL 4.0 (beta). Max detected value used as an alternative.

**TABLE 4  
RISK CALCULATIONS FOR THE CHILD RESIDENT**

**Windblown Tailing (Green Valley, AZ)  
Phelps Dodge Sierrita, Inc.**

Constituent	Exposure Point Concentrations			Carcinogenic Risk Estimates				Total Risks	Non-carcinogenic Hazard Estimates				Total Hazard
	soil (0-1")	air	plant	soil			soil-indirect		soil			soil-indirect	
	<250 EPCs mg/kg	calc (PEF) EPCa mg/m <sup>3</sup>	calc (BAF/reg) EPCp mg/kg ww	ing	dermal	inh	veg		ing	dermal	inh	veg	
				unitless	unitless	unitless	unitless		unitless	unitless	unitless	unitless	
aluminum	7,030.0	1.4E-04	6.9E-01	NA	NA	NA	NA	0.00E+00	5.84E-02	3.60E-02	NA	7.89E-04	0.10
barium	108	2.2E-06	2.5E+00	NA	NA	NA	NA	0.00E+00	6.90E-03	2.76E-03	4.17E-03	1.45E-02	0.03
beryllium	0.2	4.6E-09	5.2E-05	NA	NA	9.14E-10	NA	9.14E-10	1.47E-03	5.88E-03	2.22E-04	2.98E-05	0.01
cadmium	0.1	2.6E-09	3.1E-02	NA	NA	3.87E-10	NA	3.87E-10	1.66E-03	1.86E-04	1.26E-05	3.52E-02	0.04
chromium	8.7	1.8E-07	5.9E-03	NA	NA	NA	NA	0.00E+00	7.42E-05	1.60E-04	NA	4.50E-06	0.00
cobalt	9	1.8E-07	9.7E-03	NA	NA	4.03E-08	NA	4.03E-08	5.56E-03	3.11E-03	8.40E-03	5.59E-04	0.02
copper	124	2.5E-06	2.0E+00	NA	NA	NA	NA	0.00E+00	3.96E-02	NA	NA	5.63E-02	0.10
iron	18,400	3.7E-04	2.8E+00	NA	NA	NA	NA	0.00E+00	7.84E-01	NA	NA	1.06E-02	0.79
lead	5.3	1.1E-07	1.0E-01	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	0.00
manganese	298.0	6.0E-06	3.5E+00	NA	NA	NA	NA	0.00E+00	2.72E-02	1.91E-02	1.15E-01	2.91E-02	0.19
molybdenum	21.0	4.2E-07	1.9E-01	NA	NA	NA	NA	0.00E+00	5.37E-02	3.01E-02	NA	4.35E-02	0.13
nickel	2.4	4.8E-08	3.1E-02	NA	NA	1.91E-09	NA	1.91E-09	1.53E-03	1.07E-03	NA	1.80E-03	0.00
selenium	1.1	2.2E-08	8.5E-02	NA	NA	NA	NA	0.00E+00	2.81E-03	9.84E-05	NA	1.95E-02	0.02
silver	0.3	6.0E-09	6.3E-04	NA	NA	NA	NA	0.00E+00	7.67E-04	5.37E-04	NA	1.45E-04	0.00
vanadium	42.5	8.6E-07	1.9E-02	NA	NA	NA	NA	0.00E+00	5.43E-01	3.80E-01	NA	2.20E-02	0.95
zinc	83.0	1.7E-06	8.4E+00	NA	NA	NA	NA	0.00E+00	3.54E-03	9.90E-05	NA	3.23E-02	0.04
<b>Total</b>				<b>0E+00</b>	<b>0E+00</b>	<b>4E-08</b>	<b>0E+00</b>	<b>4E-08</b>	<b>1.5</b>	<b>0.5</b>	<b>0.1</b>	<b>0.3</b>	<b>2.4</b>
Pathway Percent of Total				<1%	<1%	100%	<1%	100%	64%	20%	5%	11%	100%

**TABLE 5  
RISK CALCULATIONS FOR THE ADULT RESIDENT**

**Windblown Tailing (Green Valley, AZ)  
Phelps Dodge Sierrita, Inc.**

Constituent	Exposure Point Concentrations			Carcinogenic Risk Estimates				Total Risks	Non-carcinogenic Hazard Estimates				Total Hazard
	soil (0-1")	air	plant	soil		soil-indirect			soil		soil-indirect		
	<250	calc (PEF)	calc (BAF/reg)	ing	dermal	inh	veg		ing	dermal	inh	veg	
	EPCs mg/kg	EPCa mg/m <sup>3</sup>	EPCp mg/kg ww	unitless	unitless	unitless	unitless		unitless	unitless	unitless	unitless	
aluminum	7,030.0	1.4E-04	6.9E-01	NA	NA	NA	NA	0.00E+00	6.26E-03	5.49E-03	NA	7.89E-04	0.01
barium	108	2.2E-06	2.5E+00	NA	NA	NA	NA	0.00E+00	7.40E-04	4.22E-04	4.17E-03	1.45E-02	0.02
beryllium	0.2	4.6E-09	5.2E-05	NA	NA	3.66E-09	NA	3.66E-09	1.58E-04	8.98E-04	2.22E-04	2.98E-05	0.00
cadmium	0.1	2.6E-09	3.1E-02	NA	NA	1.55E-09	NA	1.55E-09	1.78E-04	2.84E-05	1.26E-05	3.52E-02	0.04
chromium	8.7	1.8E-07	5.9E-03	NA	NA	NA	NA	0.00E+00	7.95E-06	2.44E-05	NA	4.50E-06	0.00
cobalt	9	1.8E-07	9.7E-03	NA	NA	1.61E-07	NA	1.61E-07	5.96E-04	4.76E-04	8.40E-03	5.59E-04	0.01
copper	124	2.5E-06	2.0E+00	NA	NA	NA	NA	0.00E+00	4.25E-03	NA	NA	5.63E-02	0.06
iron	18,400	3.7E-04	2.8E+00	NA	NA	NA	NA	0.00E+00	8.40E-02	NA	NA	1.06E-02	0.09
lead	5.3	1.1E-07	1.0E-01	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	0.00
manganese	298.0	6.0E-06	3.5E+00	NA	NA	NA	NA	0.00E+00	2.92E-03	2.91E-03	1.15E-01	2.91E-02	0.15
molybdenum	21.0	4.2E-07	1.9E-01	NA	NA	NA	NA	0.00E+00	5.75E-03	4.59E-03	NA	4.35E-02	0.05
nickel	2.4	4.8E-08	3.1E-02	NA	NA	7.63E-09	NA	7.63E-09	1.64E-04	1.64E-04	NA	1.80E-03	0.00
selenium	1.1	2.2E-08	8.5E-02	NA	NA	NA	NA	0.00E+00	3.01E-04	1.50E-05	NA	1.95E-02	0.02
silver	0.3	6.0E-09	6.3E-04	NA	NA	NA	NA	0.00E+00	8.22E-05	8.20E-05	NA	1.45E-04	0.00
vanadium	42.5	8.6E-07	1.9E-02	NA	NA	NA	NA	0.00E+00	5.82E-02	5.81E-02	NA	2.20E-02	0.14
zinc	83.0	1.7E-06	8.4E+00	NA	NA	NA	NA	0.00E+00	3.79E-04	1.51E-05	NA	3.23E-02	0.03
<b>Total</b>				<b>0E+00</b>	<b>0E+00</b>	<b>2E-07</b>	<b>0E+00</b>	<b>2E-07</b>	<b>0.2</b>	<b>0.1</b>	<b>0.1</b>	<b>0.3</b>	<b>0.6</b>
Pathway Percent of Total				<1%	<1%	100%	<1%	100%	26%	12%	20%	42%	100%

**TABLE 6  
RISK CALCULATIONS FOR THE CHILD RESIDENT**

**Modeled Windblown Dust (Green Valley, Arizona)  
Phelps Dodge Sierrita, Inc.**

Constituent	Exposure Point Concentrations			Carcinogenic Risk Estimates				Total Risks	Non-carcinogenic Hazard Estimates				Total Hazard
	soil (0-1")	air	plant	soil					soil				
	<250 EPCs mg/kg	calc (PEF) EPCa mg/m <sup>3</sup>	calc (BAF/reg) EPCp mg/kg ww	ing	dermal	inh	soil-indirect		ing	dermal	inh	soil-indirect	
				unitless	unitless	unitless	unitless		unitless	unitless	unitless	unitless	
aluminum	1.0700	2.2E-08	1.0E-04	NA	NA	NA	NA	0.00E+00	8.89E-06	5.47E-06	NA	1.20E-07	0.00
barium	0.0110	2.2E-10	2.6E-04	NA	NA	NA	NA	0.00E+00	7.03E-07	2.81E-07	4.25E-07	1.48E-06	0.00
cadmium	0.0002	4.0E-12	3.1E-02	NA	NA	5.96E-13	NA	5.96E-13	2.56E-06	2.86E-07	1.93E-08	3.52E-02	0.04
chromium	0.0013	2.6E-11	8.8E-07	NA	NA	NA	NA	0.00E+00	1.11E-08	2.39E-08	NA	6.73E-10	0.00
cobalt	0.0010	2.0E-11	1.1E-06	NA	NA	4.64E-12	NA	4.64E-12	6.39E-07	3.58E-07	9.66E-07	6.43E-08	0.00
copper	0.0337	6.8E-10	2.0E+00	NA	NA	NA	NA	0.00E+00	1.08E-05	NA	NA	5.63E-02	0.06
iron	2.0130	4.1E-08	3.0E-04	NA	NA	NA	NA	0.00E+00	8.58E-05	NA	NA	1.16E-06	0.00
lead	0.0011	2.2E-11	1.0E-01	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	0.00
lithium	0.0012	2.4E-11	2.8E-05	NA	NA	NA	NA	0.00E+00	7.67E-07	3.07E-07	NA	1.62E-06	0.00
manganese	0.0502	1.0E-09	6.0E-04	NA	NA	NA	NA	0.00E+00	4.58E-06	3.21E-06	1.94E-05	4.90E-06	0.00
molybdenum	0.0079	1.6E-10	7.1E-05	NA	NA	NA	NA	0.00E+00	2.02E-05	1.13E-05	NA	1.64E-05	0.00
nickel	0.0010	2.0E-11	3.1E-02	NA	NA	7.95E-13	NA	7.95E-13	6.39E-07	4.47E-07	NA	1.80E-03	0.00
strontium	0.0094	1.9E-10	2.2E-04	NA	NA	NA	NA	0.00E+00	2.00E-07	8.01E-08	NA	4.22E-07	0.00
tin	0.0024	4.8E-11	5.6E-05	NA	NA	NA	NA	0.00E+00	5.11E-08	2.05E-08	NA	1.08E-07	0.00
titanium	0.1059	2.1E-09	2.5E-03	NA	NA	NA	NA	0.00E+00	2.26E-06	9.03E-07	NA	4.75E-06	0.00
vanadium	0.0042	8.5E-11	1.9E-06	NA	NA	NA	NA	0.00E+00	5.37E-05	3.76E-05	NA	2.17E-06	0.00
zinc	0.0058	1.2E-10	8.4E+00	NA	NA	NA	NA	0.00E+00	2.47E-07	6.92E-09	NA	3.23E-02	0.03
Methyl isobutyl ketone	0.0001	2.0E-12	--	NA	NA	NA	NA	0.00E+00	NA	NA	6.44E-13	NA	0.00
<b>Total</b>				<b>0E+00</b>	<b>0E+00</b>	<b>6E-12</b>	<b>0E+00</b>	<b>6E-12</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>
Pathway Percent of Total				<1%	<1%	100%	<1%	100%	<1%	<1%	<1%	100%	100%

**TABLE 7  
RISK CALCULATIONS FOR THE ADULT RESIDENT**

**Modeled Windblown Dust (Green Valley, Arizona)  
Phelps Dodge Sierrita, Inc.**

Constituent	Exposure Point Concentrations			Carcinogenic Risk Estimates				Total Risks	Non-carcinogenic Hazard Estimates				Total Hazard
	soil (0-1")	air	plant	soil		soil-indirect			soil		soil-indirect		
	<250	calc (PEF)	calc (BAF/reg)	ing	dermal	inh	veg		ing	dermal	inh	veg	
	EPCs mg/kg	EPCa mg/m <sup>3</sup>	EPCp mg/kg ww	unitless	unitless	unitless	unitless		unitless	unitless	unitless	unitless	
aluminum	1.0700	2.2E-08	1.0E-04	NA	NA	NA	NA	0.00E+00	9.53E-07	8.35E-07	NA	1.20E-07	0.00
barium	0.0110	2.2E-10	2.6E-04	NA	NA	NA	NA	0.00E+00	7.53E-08	4.29E-08	4.25E-07	1.48E-06	0.00
cadmium	0.0002	4.0E-12	3.1E-02	NA	NA	2.38E-12	NA	2.38E-12	2.74E-07	4.37E-08	1.93E-08	3.52E-02	0.04
chromium	0.0013	2.6E-11	8.8E-07	NA	NA	NA	NA	0.00E+00	1.19E-09	3.64E-09	NA	6.73E-10	0.00
cobalt	0.0010	2.0E-11	1.1E-06	NA	NA	1.85E-11	NA	1.85E-11	6.85E-08	5.47E-08	9.66E-07	6.43E-08	0.00
copper	0.0337	6.8E-10	2.0E+00	NA	NA	NA	NA	0.00E+00	1.15E-06	NA	NA	5.63E-02	0.06
iron	2.0130	4.1E-08	3.0E-04	NA	NA	NA	NA	0.00E+00	9.19E-06	NA	NA	1.16E-06	0.00
lithium	0.0011	2.2E-11	2.6E-05	NA	NA	NA	NA	0.00E+00	7.53E-08	4.29E-08	NA	1.48E-06	0.00
lead	0.0012	2.4E-11	1.0E-01	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	0.00
manganese	0.0502	1.0E-09	6.0E-04	NA	NA	NA	NA	0.00E+00	4.91E-07	4.90E-07	1.94E-05	4.90E-06	0.00
molybdenum	0.0079	1.6E-10	7.1E-05	NA	NA	NA	NA	0.00E+00	2.16E-06	1.73E-06	NA	1.64E-05	0.00
nickel	0.0010	2.0E-11	3.1E-02	NA	NA	3.18E-12	NA	3.18E-12	6.85E-08	6.83E-08	NA	1.80E-03	0.00
strontium	0.0094	1.9E-10	2.2E-04	NA	NA	NA	NA	0.00E+00	2.15E-08	1.22E-08	NA	4.22E-07	0.00
tin	0.0024	4.8E-11	5.6E-05	NA	NA	NA	NA	0.00E+00	5.48E-09	3.12E-09	NA	1.08E-07	0.00
titanium	0.1059	2.1E-09	2.5E-03	NA	NA	NA	NA	0.00E+00	2.42E-07	1.38E-07	NA	4.75E-06	0.00
vanadium	0.0042	8.5E-11	1.9E-06	NA	NA	NA	NA	0.00E+00	5.75E-06	5.74E-06	NA	2.17E-06	0.00
zinc	0.0058	1.2E-10	8.4E+00	NA	NA	NA	NA	0.00E+00	2.65E-08	1.06E-09	NA	3.23E-02	0.03
Methyl isobutyl ketone	0.0001	2.0E-12	NA	NA	NA	NA	NA	0.00E+00	NA	NA	6.44E-13	NA	0.00
<b>Total</b>				<b>0E+00</b>	<b>0E+00</b>	<b>2E-11</b>	<b>0E+00</b>	<b>2E-11</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>
Pathway Percent of Total				<1%	<1%	100%	<1%	100%	<1%	<1%	<1%	100%	100%

**TABLE 8  
RISK CALCULATIONS FOR THE CHILD RESIDENT**

**Sierrita Tailing Pond Dust  
Phelps Dodge Sierrita, Inc.**

Constituent	Exposure Point Concentrations			Carcinogenic Risk Estimates				Total Risks	Non-carcinogenic Hazard Estimates				Total Hazard
	soil (0-1")	air	plant	soil		soil-indirect			soil		soil-indirect		
	<250 EPCs mg/kg	calc (PEF) EPCa mg/m <sup>3</sup>	calc (BAF/reg) EPCp mg/kg ww	ing unitless	dermal unitless	inh unitless	veg unitless		ing unitless	dermal unitless	inh unitless	veg unitless	
aluminum	7,004.0	1.4E-04	6.8E-01	NA	NA	NA	NA	0.00E+00	5.82E-02	3.58E-02	NA	7.86E-04	0.09
barium	72	1.5E-06	1.7E+00	NA	NA	NA	NA	0.00E+00	4.60E-03	1.84E-03	2.78E-03	9.69E-03	0.02
beryllium	1.0	2.1E-08	2.4E-04	NA	NA	4.16E-09	NA	4.16E-09	6.69E-03	2.68E-02	1.01E-03	1.35E-04	0.03
cadmium	1.2	2.5E-08	3.1E-02	NA	NA	3.67E-09	NA	3.67E-09	1.57E-02	1.76E-03	1.19E-04	3.52E-02	0.05
chromium	8.3	1.7E-07	5.6E-03	NA	NA	NA	NA	0.00E+00	7.07E-05	1.52E-04	NA	4.30E-06	0.00
cobalt	7	1.4E-07	7.6E-03	NA	NA	3.15E-08	NA	3.15E-08	4.35E-03	2.43E-03	6.57E-03	4.37E-04	0.01
copper	220	4.4E-06	2.0E+00	NA	NA	NA	NA	0.00E+00	7.03E-02	NA	NA	5.63E-02	0.13
iron	13,170	2.7E-04	2.0E+00	NA	NA	NA	NA	0.00E+00	5.61E-01	NA	NA	7.58E-03	0.57
lead	6.0	1.2E-07	1.0E-01	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	0.00
lithium	8.1	1.6E-07	1.9E-01	NA	NA	NA	NA	0.00E+00	5.18E-03	2.07E-03	NA	1.09E-02	0.02
manganese	328.0	6.6E-06	3.9E+00	NA	NA	NA	NA	0.00E+00	3.00E-02	2.10E-02	1.27E-01	3.20E-02	0.21
molybdenum	21.0	4.2E-07	1.9E-01	NA	NA	NA	NA	0.00E+00	5.37E-02	3.01E-02	NA	4.35E-02	0.13
nickel	6.6	1.3E-07	3.1E-02	NA	NA	5.24E-09	NA	5.24E-09	4.22E-03	2.95E-03	NA	1.80E-03	0.01
selenium	0.0	0.0E+00	8.5E-02	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	1.95E-02	0.02
silver	0.0	0.0E+00	0.0E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00
strontium	61.8	1.2E-06	1.4E+00	NA	NA	NA	NA	0.00E+00	1.32E-03	5.27E-04	NA	2.77E-03	0.00
tin	15.8	3.2E-07	3.7E-01	NA	NA	NA	NA	0.00E+00	3.37E-04	1.35E-04	NA	7.09E-04	0.00
titanium	692.0	1.4E-05	1.6E+01	NA	NA	NA	NA	0.00E+00	1.47E-02	5.90E-03	NA	3.11E-02	0.05
vanadium	27.6	5.6E-07	1.2E-02	NA	NA	NA	NA	0.00E+00	3.53E-01	2.47E-01	NA	1.43E-02	0.61
zinc	38.0	7.7E-07	8.4E+00	NA	NA	NA	NA	0.00E+00	1.62E-03	4.53E-05	NA	3.23E-02	0.03
Methyl isobutyl ketone	0.7	1.3E-08	--	NA	NA	NA	NA	0.00E+00	NA	NA	4.25E-09	NA	0.00
<b>Total</b>				<b>0E+00</b>	<b>0E+00</b>	<b>4E-08</b>	<b>0E+00</b>	<b>4E-08</b>	<b>1.2</b>	<b>0.4</b>	<b>0.1</b>	<b>0.3</b>	<b>2.0</b>
Pathway Percent of Total				<1%	<1%	100%	<1%	100%	59%	19%	7%	15%	100%

**TABLE 9  
RISK CALCULATIONS FOR THE ADULT RESIDENT**

**Sierrita Tailing Pond Dust  
Phelps Dodge Sierrita, Inc.**

Constituent	Exposure Point Concentrations			Carcinogenic Risk Estimates				Total Risks	Non-carcinogenic Hazard Estimates				Total Hazard
	soil (0-1")	air	plant	soil		soil-indirect			soil		soil-indirect		
	<250	calc (PEF)	calc (BAF/reg)	ing	dermal	inh	veg		ing	dermal	inh	veg	
	EPCs mg/kg	EPCa mg/m <sup>3</sup>	EPCp mg/kg ww	unitless	unitless	unitless	unitless		unitless	unitless	unitless	unitless	
aluminum	7,004.0	1.4E-04	6.8E-01	NA	NA	NA	NA	0.00E+00	6.24E-03	5.47E-03	NA	7.86E-04	0.01
barium	72	1.5E-06	1.7E+00	NA	NA	NA	NA	0.00E+00	4.93E-04	2.81E-04	2.78E-03	9.69E-03	0.01
beryllium	1.0	2.1E-08	2.4E-04	NA	NA	1.66E-08	NA	1.66E-08	7.17E-04	4.09E-03	1.01E-03	1.35E-04	0.01
cadmium	1.2	2.5E-08	3.1E-02	NA	NA	1.47E-08	NA	1.47E-08	1.68E-03	2.69E-04	1.19E-04	3.52E-02	0.04
chromium	8.3	1.7E-07	5.6E-03	NA	NA	NA	NA	0.00E+00	7.58E-06	2.33E-05	NA	4.30E-06	0.00
cobalt	7	1.4E-07	7.6E-03	NA	NA	1.26E-07	NA	1.26E-07	4.66E-04	3.72E-04	6.57E-03	4.37E-04	0.01
copper	220	4.4E-06	2.0E+00	NA	NA	NA	NA	0.00E+00	7.53E-03	NA	NA	5.63E-02	0.06
iron	13,170	2.7E-04	2.0E+00	NA	NA	NA	NA	0.00E+00	6.01E-02	NA	NA	7.58E-03	0.07
lithium	8	1.6E-07	1.9E-01	NA	NA	NA	NA	0.00E+00	5.55E-04	3.16E-04	NA	1.09E-02	0.01
lead	6.0	1.2E-07	1.0E-01	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	0.00
manganese	328.0	6.6E-06	3.9E+00	NA	NA	NA	NA	0.00E+00	3.21E-03	3.20E-03	1.27E-01	3.20E-02	0.17
molybdenum	21.0	4.2E-07	1.9E-01	NA	NA	NA	NA	0.00E+00	5.75E-03	4.59E-03	NA	4.35E-02	0.05
nickel	6.6	1.3E-07	3.1E-02	NA	NA	2.10E-08	NA	2.10E-08	4.52E-04	4.51E-04	NA	1.80E-03	0.00
selenium	0.0	0.0E+00	8.5E-02	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	1.95E-02	0.02
silver	0.0	0.0E+00	0.0E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00
strontium	61.8	1.2E-06	1.4E+00	NA	NA	NA	NA	0.00E+00	1.41E-04	8.04E-05	NA	2.77E-03	0.00
tin	15.8	3.2E-07	3.7E-01	NA	NA	NA	NA	0.00E+00	3.61E-05	2.06E-05	NA	7.09E-04	0.00
titanium	692.0	1.4E-05	1.6E+01	NA	NA	NA	NA	0.00E+00	1.58E-03	9.01E-04	NA	3.11E-02	0.03
vanadium	27.6	5.6E-07	1.2E-02	NA	NA	NA	NA	0.00E+00	3.78E-02	3.77E-02	NA	1.43E-02	0.09
zinc	38.0	7.7E-07	8.4E+00	NA	NA	NA	NA	0.00E+00	1.74E-04	6.92E-06	NA	3.23E-02	0.03
Methyl isobutyl ketone	0.7	1.3E-08	NA	NA	NA	NA	NA	0.00E+00	NA	NA	4.25E-09	NA	0.00
<b>Total</b>				<b>0E+00</b>	<b>0E+00</b>	<b>2E-07</b>	<b>0E+00</b>	<b>2E-07</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.3</b>	<b>0.6</b>
Pathway Percent of Total				<1%	<1%	100%	<1%	100%	20%	9%	22%	48%	100%

**TABLE 10**  
**SUMMARY OF RISK ESTIMATES FOR CHILD AND ADULT RESIDENT**  
**Phelps Dodge Sierrita, Inc.**

Constituent	Cancer Risk	
	Metals (not including U isotopes)	
	Child	Adult
Green Valley dust	4E-08	2E-07
Modeled GV dust	6E-12	2E-11
Tailing pond dust	4E-08	2E-07

Constituent	Non-Cancer Hazard Indices	
	Metals (not including U isotopes)	
	Child	Adult
Green Valley dust	2.4	0.6
Modeled GV dust	0.1	0.1
Tailing pond dust	2.0	0.6

**ATTACHMENT 1**

**MATERIAL SAFETY DATA SHEETS  
PHELPS DODGE SIERRITA INC.**



## MATERIAL SAFETY DATA

MSDS No: 10071  
Date: 11/11/98  
Supersedes: 06/30/98

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **OrePrep® X-133 Frother**

SYNONYMS: None

CHEMICAL FAMILY: Mixed alcohols, heavy aldehydes, esters and mixed polyglycols

MOLECULAR FORMULA: Mixture

MOLECULAR WGT: Mixture

CYTEC INDUSTRIES INC., FIVE GARRET MOUNTAIN PLAZA, WEST PATERSON, NEW JERSEY 07424, USA

For Product Information call 1-800/652-6013. Outside the USA and Canada call 973/357-3193.

EMERGENCY PHONE: For emergency involving spill, leak, fire, exposure or accident call CHEMTREC: 1-800/424-9300. Outside the USA and Canada call 703/527-3887.

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

#### OSHA REGULATED COMPONENTS

COMPONENT	CAS. NO.	%	TWA/CEILING	REFERENCE
2-Ethylhexanol	000104-76-7	0.6-1.3	not established	
Complex oxygenate/ hydrocarbon mixture		Proprietary	not established	

### 3. HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

APPEARANCE AND ODOR: Liquid, variable light to dark straw, mixed alcohols and glycol esters odor.

#### STATEMENTS OF HAZARD:

WARNING! CAUSES EYE AND SKIN IRRITATION  
COMBUSTIBLE LIQUID AND VAPOR

#### POTENTIAL HEALTH EFFECTS

##### EFFECTS OF OVEREXPOSURE:

The estimated acute oral (rat) LD50, acute dermal (rabbit) LD50 and 4-hour inhalation (rat) LC50 values for this material are >2500 mg/kg, >2000 mg/kg and >2.0 mg/L, respectively. Overexposure to vapors may cause irritation of the respiratory tract and eyes and may cause central nervous system effects.

Direct contact with this material may cause moderate eye and skin irritation.

### 4. FIRST AID MEASURES

Material is not expected to be harmful by ingestion. No specific first aid measures are required.

In case of skin contact, remove contaminated clothing without delay. Flush skin thoroughly with water. Do not reuse clothing without laundering.

In case of eye contact, immediately irrigate with plenty of water for 15 minutes. Obtain medical attention if irritation persists or if otherwise necessary.

If vapor or dust of this material is inhaled, remove from exposure. Administer oxygen if there is difficulty in breathing. Obtain medical attention immediately if necessary.

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## 5. FIRE FIGHTING MEASURES

### FLAMMABLE PROPERTIES

FLASH POINT: 153 F; 67 C

METHOD: Pensky-Martens Closed Cup

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### FLAMMABLE LIMITS

(% BY VOL): Not available

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AUTOIGNITION TEMP: Not available

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DECOMPOSITION TEMP: Not available

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### EXTINGUISHING MEDIA AND FIRE FIGHTING INSTRUCTIONS

Use water spray, alcohol foam, carbon dioxide or dry chemical to extinguish fires. Water stream may be ineffective. Use water to keep containers cool. Wear self-contained positive pressure breathing apparatus and full firefighting protective clothing. See Section 8 (Exposure Controls/Personal Protection) for special protective clothing.

---

## 6. ACCIDENTAL RELEASE MEASURES

### STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove sources of ignition.

Where exposure level is not known, wear NIOSH approved, positive pressure, self-contained respirator. Where exposure level is known, wear NIOSH approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impervious boots. Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush area with water.

---

## 7. HANDLING AND STORAGE

Avoid contact with eyes, skin and clothing. Keep away from heat and flame. Wash thoroughly after handling. Areas containing this material should have fire-safe practices and electrical equipment in accordance with Electrical and Fire Protection Codes (NFPA-30) governing Class III A Combustible Liquids and OSHA Instruction STD 1-5.14A and state and local requirements.

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure. Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands with soap and water. Avoid skin contact. Protective clothing such as impervious gloves, apron, workpants, long sleeve work shirt, or disposable coveralls are recommended to prevent skin contact. For operations where eye or face contact can occur, wear eye protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure. For operations where inhalation exposure can occur, a NIOSH approved respirator recommended by an industrial hygienist may be necessary. A full facepiece respirator also provides eye and face protection.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR: Liquid, variable light to dark straw, mixed alcohols and glycol esters odor.

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BOILING POINT: Not available

---

MELTING POINT: <-60 F; -51 C

---

VAPOR PRESSURE: 0.30 psia

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---

SPECIFIC GRAVITY: 0.89 @ 25 C

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VAPOR DENSITY: >1

---

% VOLATILE (BY WT): Not available

---

pH: 5.0

---

SATURATION IN AIR (% BY VOL): Not available

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EVAPORATION RATE: Not available

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SOLUBILITY IN WATER: Not available

---

VOLATILE ORGANIC CONTENT: Not available

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## 10. STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID: None known

POLYMERIZATION: Will Not Occur

CONDITIONS TO AVOID: None known

INCOMPATIBLE MATERIALS: Strong oxidizers, heat, spark and flames.

HAZARDOUS DECOMPOSITION PRODUCTS: carbon monoxide; oxides of nitrogen; oxides of sulfur (includes sulfur di and tri oxides)

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## 11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3. HAZARDS IDENTIFICATION. Toxicological information on the OSHA regulated components of this product is as follows:

2-Ethylhexanol has an acute oral (rat) LD50 and acute dermal (rabbit) LD50 values of 2 g/kg each. The 6-hour inhalation LC50 (rat) is >4,000 ppm (31.92 mg/L/4h). 2-Ethylhexanol is a severe eye and moderate skin irritant. Inhalation overexposure to 2-ethylhexanol may produce central nervous system depression and irritation of the eyes and respiratory tract. Chronic overexposure to 2-ethylhexanol may cause liver damage, pulmonary edema, or renal damage with glycosuria. In a teratology study in rats 3 ml/kg applied to the skin during the most critical part of gestation produced evidence of maternal toxicity, but no evidence of injury to the offspring. In a separate study, fetal toxicity and an increased incidence of birth defects were noted when pregnant rats were administered 2 ml/kg by stomach tube during gestation.

Complex oxygenate/hydrocarbon mixture's toxicological properties have not been fully investigated. The acute oral (rat) LD50 and dermal (rabbit) LD50 values are estimated to both be > 2000 mg/kg. Direct contact may cause moderate eye and skin irritation. Overexposure to vapor may cause irritation of the respiratory tract and eyes and may cause central nervous system effects..

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## 12. ECOLOGICAL INFORMATION

No aquatic LC50, BOD, or COD data available.

OCTANOL/H<sub>2</sub>O PARTITION COEF.: Not available

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## 13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the Cytec product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristics: There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, see Section 5 of this MSDS (flash point). For Corrosivity, see

Sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material if it is to be disposed. Cytec encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. Cytec recommends that organic materials classified as RCRA hazardous wastes be disposed of by thermal treatment or incineration at EPA approved facilities. Cytec has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

## 14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

	<b>D.O.T. SHIPPING INFORMATION</b>	<b>IMO SHIPPING INFORMATION</b>
SHIPPING NAME:	COMBUSTIBLE LIQUID, N.O.S.	NOT APPLICABLE/NOT REGULATED
HAZARD CLASS/ PACKING GROUP:	COMBUSTIBLE LIQUID	Not Applicable
UN NUMBER:	NA1993	Not Applicable
IMDG PAGE:	Not Applicable	Not Applicable
D.O.T. HAZARDOUS SUBSTANCES:	(PRODUCT REPORTABLE QUANTITY) Not Applicable	Not Applicable
TRANSPORT LABEL REQUIRED:	None	None Required
	<b>ICAO/IATA</b>	<b>TRANSPORT CANADA</b>
SHIPPING NAME:	NOT APPLICABLE/NOT REGULATED	NOT APPLICABLE/NOT REGULATED
HAZARD CLASS:	Not Applicable	Not Applicable
SUBSIDIARY CLASS:	Not Applicable	Not Applicable
UN / ID NUMBER:	Not Applicable	Not Applicable
PACKING GROUP:	Not Applicable	Not Applicable
TRANSPORT LABEL REQUIRED:	None Required	None Required
PACKING INSTR:	PASSENGER Not Applicable CARGO Not Applicable	Not Applicable
MAX NET QTY:	PASSENGER Not Applicable CARGO Not Applicable	Not Applicable

### ADDITIONAL TRANSPORT INFORMATION

TECHNICAL NAME (N.O.S.): (Contains mixed alcohols, aldehydes and esters)

## 15. REGULATORY INFORMATION

### INVENTORY INFORMATION

US TSCA:	All components of this product are included on the TSCA Inventory in compliance with the Toxic Substances Control Act, 15 U. S. C. 2601 et. seq. This product contains a chemical substance that is subject to export notification under Section 12 (b) of the Toxic Substances Control Act, 15 U. S. C. 2601 et. seq. (This requirement applies to exports from the United States only.)
CANADA DSL:	This product contains components not on the Domestic Substances List.
EEC EINECS:	Product is not included in the European Inventory of Existing Chemical Substances (EINECS). The product can be supplied in quantities less than 10 kg/year according to Council Directive 67/548/EEC and its amendments.

### OTHER ENVIRONMENTAL INFORMATION

The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product.

COMPONENT	CAS. NO.	%	TPQ(lbs)	RQ(lbs)	S313	TSCA 12B
2-Ethylhexanol	000104-76-7	0.6-1.3	NONE	NONE	NO	YES

PRODUCT CLASSIFICATION UNDER SECTION 311 OF SARA				
ACUTE (Y)	CHRONIC (N)	FIRE (Y)	REACTIVE (N)	PRESSURE (N)

## 16. OTHER INFORMATION

### NFPA HAZARD RATING (National Fire Protection Association)

Fire 2	FIRE: Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.
Health 2    0 Reactivity —	HEALTH: Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given
Special	REACTIVITY: Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.

### REASON FOR ISSUE:

Revised All Sections

Randy Deskin, Ph.D., DABT

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**MSDS:** 0009650  
**Print Date:** 03-Dec-2006  
**Revision Date:** 03-Dec-2006

## MATERIAL SAFETY DATA SHEET

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product name:** SUPERFLOC® A-1885 RS Flocculant  
**Synonyms:** None  
**Product Description:** Anionic polyacrylamide in water-in-oil emulsion  
**Intended/Recommended Use:** Water treating chemical

#### CYTEC AUSTRALIA HOLDINGS PTY LIMITED

ABN : 45 081 148 629

SUITE 1, LEVEL 1, 21 SOLENT CIRCUIT, BAULKHAM HILLS, NSW, 2153, AUSTRALIA

TELEPHONE (business hours only): 61 2 9846 6200

EMERGENCY PHONE (24 hours/day): IN AUSTRALIA: 1800 033 111; IN NEW ZEALAND: 0800 734 607; All other locations: +61 3 9663 2130

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### 2. HAZARDS IDENTIFICATION

**Classified according to the Australian Approved Criteria for Classifying Hazardous Substances and the ADG Code**

**Hazard Classification:** HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.  
Xi - Irritant

#### HUMAN AND ENVIRONMENTAL HAZARDS

R38 - Irritating to skin.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### HAZARDOUS INGREDIENTS

Component / CAS No.	%	(w/w)	Symbols	Risk Phrases
Petroleum distillate hydrotreated light 64742-47-8	22 - 24		Xn	R:65
Alcohols (C10-16), ethoxylated 68002-97-1	0 - 3.5		Xn; N	R:22-38-41-50
C12-C14 Alcohol ethoxylated 68439-50-9	0 - 3.5		Xn, N	R:22-38-41-50
Alcohols (C12-16), ethoxylated 68551-12-2	0 - 3.5		Xn; N	R:22-38-41-50

Other non-hazardous ingredients to 100%

---

## 4. FIRST AID MEASURES

### Ingestion:

If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

### Skin contact:

Remove contaminated clothing and shoes without delay. Wash immediately with plenty of water. Do not reuse contaminated clothing without laundering. Get medical attention if pain or irritation persists after washing or if signs and symptoms of overexposure appear.

### Eye contact:

Rinse immediately with plenty of water for at least 15 minutes.

### Inhalation:

Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms.

---

## 5. FIRE-FIGHTING MEASURES

### Suitable Extinguishing Media:

Use water spray, carbon dioxide or dry chemical.

### Protective Equipment:

Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing. See MSDS Section 8 (Exposure Controls/Personal Protection).

### Special Hazards:

Keep containers cool by spraying with water if exposed to fire.

**HAZCHEM Code:** Not applicable

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## 6. ACCIDENTAL RELEASE MEASURES

### Personal precautions:

Where exposure level is not known, wear approved, positive pressure, self-contained respirator. Where exposure level is known, wear approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impermeable boots.

### Methods for cleaning up:

Product may cause a slip hazard. Spilled material should be absorbed onto an inert material and scooped up. Flush spill area with water. If slipperiness remains apply more dry-sweeping compound.

---

## 7. HANDLING AND STORAGE

### Handling

**Precautionary Measures:** Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

**Special Handling Statements:** None

**Storage**

To avoid product degradation and equipment corrosion, do not use iron, copper or aluminum containers or equipment. Flashpoint determinations on materials of this type are required by certain regulations and scientific standards to be performed using a Pensky-Martens type closed cup test method. This method indicates a flash point greater than 93.3 C (200 F). Although there was no flashpoint detected below 93.3 C (200 F) by the Pensky-Martens Closed Tester method, some flammable vapors were evolved during the test as evidenced by the enlargement of the test flame; therefore, caution should be exercised during storage and handling.

**Storage Temperature:** Store at 16 - 30 °C

**Reason:** Integrity.

**Australian AS 1940 Storage Classification:** C1 combustible liquid

---

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### CONTROL PARAMETERS - Limits

**Petroleum distillate hydrotreated light 64742-47-8**

ACGIH (TLV)	(skin)
<b>Other Value</b>	1200 mg/m <sup>3</sup> (Supplier)
	165 ppm (Supplier)

**Engineering measures:**

Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

**Respiratory protection:**

Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure.

**Eye protection:**

Wear eye/face protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure.

**Skin Protection:**

Avoid skin contact. Wear impermeable gloves and suitable protective clothing.

**Additional advice:**

Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Colour:</b>	white
<b>Appearance:</b>	emulsion liquid
<b>Odour:</b>	hydrocarbon
<b>Boiling Point:</b>	~100 - 260 °C
<b>Melting Point:</b>	~-18 °C
<b>Vapour pressure:</b>	similar to water
<b>Specific Gravity/Density:</b>	~8.76lbs/gal @ 25 °C
<b>Vapour density:</b>	Not available
<b>Percent Volatile (% by wt.):</b>	50 - 60
<b>pH:</b>	~7 - 9
<b>Saturation In Air (% By Vol.):</b>	Not available

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Evaporation rate:	<1
Solubility In Water:	Limited by viscosity
Volatile Organic Content (EU):	Not available
Flash point:	>93 °C closed cup
Flammable Limits (% By Vol):	Not available
Autoignition temperature:	Not available
Decomposition temperature:	Not available
Partition coefficient (n-octanol/water):	Not available

## 10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions To Avoid:	None known
Polymerization:	Will not occur
Conditions To Avoid:	None known
Materials to avoid:	Avoid contact with strong oxidizing agents.
Hazardous decomposition products:	Carbon monoxide Carbon dioxide ammonia oxides of nitrogen

## 11. TOXICOLOGICAL INFORMATION

### Potential health effects

Irritating to skin.

### PRODUCT TOXICITY INFORMATION

#### ACUTE TOXICITY DATA

Oral	rat	Acute LD50	>5000 mg/kg
dermal	rabbit	Acute LD50	>2000 mg/kg
Inhalation	rat	Acute LC50 4 hr	>20.0 mg/l

#### LOCAL EFFECTS ON SKIN AND EYE

Acute Irritation	dermal	irritating
Acute Irritation	eye	Not irritating

#### ALLERGIC SENSITIZATION

Sensitization	dermal	No data
Sensitization	Inhalation	No data

#### GENOTOXICITY

##### Assays for Gene Mutations

Ames Salmonella Assay	No data
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### HAZARDOUS INGREDIENT TOXICITY DATA

Alcohols (C10-16), ethoxylated toxicological properties have not been fully investigated. Based on similar materials, the acute oral (rat) LD50 is estimated to range from 1600 - 2500 mg/kg and the acute dermal (rabbit) LD50 value is estimated to be >2000 mg/kg. Similar materials produced severe eye irritation and moderate skin irritation in studies with rabbits.

C12-14 alcohol ethoxylated toxicological properties have not been fully investigated. The oral LD50 (rat) of this mixture is expected to be consistent with the chemical family of ethoxylated alcohol surfactants, and range from 1.6 to 2.5 g/kg. The acute dermal (rabbit) LD50 value is estimated to be > 2.0 g/kg. One expected component of this mixture was severely irritating to rabbit eyes (undiluted, Draize score = 60). This mixture is expected to be moderately irritating to skin, based on data reported for C9-C11 6EO: (primary irritation index) PII = 5.3/8.

Alcohols (C12-16), ethoxylated toxicological properties have not been fully investigated. Based on similar materials, the acute oral (rat) LD50 is estimated to range from 1600 - 2500 mg/kg and the acute dermal (rabbit) LD50 value is estimated to be >2000 mg/kg. Similar materials produced severe eye irritation and moderate skin irritation in studies with rabbits.

Petroleum distillates, hydrotreated light (CAS# 64742-47-8) has acute oral (rat) and dermal (rabbit) LD50 values of >5 g/kg and >3.16 g/kg, respectively. Prolonged or repeated skin contact tends to remove skin oils, possibly leading to irritation and dermatitis. Direct contact may cause eye irritation. Overexposure to high vapor concentrations, >~700 ppm, are irritating to the eyes and respiratory tract and may cause headaches, dizziness, drowsiness, and other central nervous system effects, including death. Aspiration of minute amounts during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death. In a 90-day oral gavage (rats) study at 100, 500, or 1000 mg/kg, no treatment-related mortalities were observed. There were no significant changes in body weights or food consumption in any dose groups. Increased liver weights were observed in male and female rats at 500 and 1000 mg/kg. Increased kidney weights were observed only in male rats at 500 and 1000 mg/kg. Testes weights were significantly elevated in male rats at 1000 mg/kg. Kidney effects, indicative of light hydrocarbon nephropathy, occurred in male rat kidneys at all dose levels. Histological findings of hepatocellular hypertrophy were seen in the livers of male rats at 1000 mg/kg and in female rats at 500 and 1000 mg/kg. All treatment-related effects were reversible within the 4-week recovery period. Observed kidney effects (including light hydrocarbon nephropathy and increased kidney weight) are a unique response by male rats to chronic hydrocarbon exposure, which the U.S. EPA has declared "not relevant to humans". High-dose liver effects (including hepatocellular hypertrophy, or enlarged liver cells) are a direct consequence of the sustained high-fat "hydrocarbon diet". The No Observed Adverse Effect Level (NOAEL) for this study was 1000 mg/kg.

---

## 12. ECOLOGICAL INFORMATION

This material is not classified as dangerous for the environment.

All ecological information provided was conducted on a structurally similar product.

Acute toxicity tests conducted on the polymer using environmentally representative water gave the following results:

### ALGAE TEST RESULTS

**Test:** Growth Inhibition (OECD 201)

**Duration:** 72 hr

**Species:** Green Algae (*Selenastrum capricornutum*)

>100 mg/l                      IC50

### FISH TEST RESULTS

**Test:** Acute toxicity, freshwater (OECD 203)

**Duration:** 96 hr.

**Species:** Zebra Fish (*Brachydanio rerio*)

>100 mg/l                      LC50

## 12. ECOLOGICAL INFORMATION

### INVERTEBRATE TEST RESULTS

**Test:** Acute Immobilisation (OECD 202)

**Duration:** 48 hr

**Species:** Water Flea (Daphnia magna)

>100 mg/l                      EC50

### DEGRADATION

**Test:** CO2 Evolution: Modified Sturm (OECD 301B)

The polymeric ingredient is not readily biodegradable. The large polymer size is incompatible with transport across biological membranes and diffusion; the bioconcentration factor is therefore considered to be zero.

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## 13. DISPOSAL CONSIDERATIONS

The Company encourages the recycle, recovery and reuse of materials, where permitted. If disposal is necessary, The Company recommends that organic materials, especially when classified as hazardous waste, be disposed of by thermal treatment or incineration at approved facilities. All local and national regulations should be followed.

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## 14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

### Australia (ADG)

Proper shipping name: Not applicable/Not regulated

HAZCHEM Code: Not applicable

### IMO

Proper shipping name: Not applicable/Not regulated

### ICAO / IATA

Proper shipping name: Not applicable/Not regulated

Packing Instructions/Maximum Net Quantity Per Package:

Passenger Aircraft: -

Cargo Aircraft: -

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## 15. REGULATORY INFORMATION

### MARKING AND LABELING

**Symbol(s):** Xi - Irritant

**Risk Phrases:**  
R38 - Irritating to skin.

**Safety Phrases:**  
S81 - Spills are very slippery.

### OTHER AUSTRALIAN INFORMATION

**Poison Schedule No.:** 5

### INVENTORY INFORMATION

**Australia:** All components of this product are included in the Australian Inventory of Chemical Substances (AICS).

**European Union (EU):** All components of this product are included on the European Inventory of Existing Chemical Substances (EINECS) or are not required to be listed on EINECS.

**United States (USA):** All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.

**Canada:** All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.

**China:** All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.

**Japan:** All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese inventory.

**Korea:** All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean inventory.

**Philippines:** All components of this product are included on the Philippine (PICCS) inventory or are not required to be listed on the Philippine inventory.

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## 16. OTHER INFORMATION

**Reasons for Issue:** Revised Section 7

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Randy Deskin, Ph.D., DABT  
Australian Contact Point: Regulatory Manager (02) 9846 6200

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This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.

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# MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO 9725**  
APPLICATION : SCALE CONTROL  
COMPANY IDENTIFICATION : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 3/3 FLAMMABILITY : 1/1 INSTABILITY : 0/0 OTHER :

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Nitritotris(Methylenephosphonic Acid)	6419-19-8	30.0 - 60.0
Inorganic acid	Proprietary	5.0 - 10.0
Hydrochloric Acid	7647-01-0	1.0 - 5.0
Formaldehyde	50-00-0	0.0 - 0.1

## 3. HAZARDS IDENTIFICATION

### \*\*EMERGENCY OVERVIEW\*\*

#### DANGER

Corrosive. May cause tissue damage. Contains formaldehyde, a probable human carcinogen based on sufficient animal studies and limited human data.  
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Keep container tightly closed and in a well-ventilated place. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.  
Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.  
Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin



## MATERIAL SAFETY DATA SHEET

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**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :

May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

INGESTION :

Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

INHALATION :

Not a likely route of exposure. Irritating, in high concentrations, to the eyes, nose, throat and lungs.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

## 4. FIRST AID MEASURES

EYE CONTACT :

PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get immediate medical attention.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Get immediate medical attention. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :

DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink. Get immediate medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. Get medical attention.

NOTE TO PHYSICIAN :

Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### 5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 F/ > 93.3 C

EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

### 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

### 7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :

Store the containers tightly closed. Store in suitable labelled containers. Store separately from bases.

UNSUITABLE CONSTRUCTION MATERIAL :

Product is corrosive to aluminum. Aluminum should not be used for feed, storage, or transportation systems.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

#### ACGIH/TLV :

Substance(s)

Formaldehyde CEILING: 0.3 ppm , 0.37 mg/m<sup>3</sup>

Hydrochloric Acid CEILING: 5 ppm , 7.5 mg/m<sup>3</sup>

#### OSHA/PEL :

Substance(s)

Formaldehyde TWA: 0.75 ppm  
STEL: 2 ppm

Hydrochloric Acid CEILING: 5 ppm , 7 mg/m<sup>3</sup>

#### ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

#### RESPIRATORY PROTECTION :

If significant mists, vapors or aerosols are generated an approved respirator is recommended. An organic vapor/acid gas cartridge with dust/mist prefilter may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

#### HAND PROTECTION :

Neoprene gloves, PVC gloves, Butyl gloves

#### SKIN PROTECTION :

Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

#### EYE PROTECTION :

Wear a face shield with chemical splash goggles.

#### HYGIENE RECOMMENDATIONS :

Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

#### HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Moderate



## MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Colorless
ODOR	
SPECIFIC GRAVITY	1.33 @ 70 °F / 21.1 °C
DENSITY	11.05 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	1
VISCOSITY	15 cps @ 73 °F / 22.8 °C
FREEZING POINT	-22 °F / -29.9 °C
BOILING POINT	212 °F / 100 °C

Note: These physical properties are typical values for this product and are subject to change.

### 10. STABILITY AND REACTIVITY

**STABILITY :**

Stable under normal conditions.

**HAZARDOUS POLYMERIZATION :**

Hazardous polymerization will not occur.

**CONDITIONS TO AVOID :**

Freezing temperatures.

**MATERIALS TO AVOID :**

Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

**HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: None known

### 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

**SENSITIZATION :**

This product is not expected to be a sensitizer.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

### HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

## 12. ECOLOGICAL INFORMATION

### ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

## 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

## 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

### LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	AMINO-TRI(METHYLENEPHOSPHONIC ACID), HYDROCHLORIC ACID
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II



## MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Flash Point : > 200 F/ > 93.3 C

### AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.  
Technical Name(s) : AMINO-TRI(METHYLENEPHOSPHONIC ACID),  
HYDROCHLORIC ACID  
UN/ID No : UN 3265  
Hazard Class - Primary : 8  
Packing Group : II  
IATA Cargo Packing Instructions : 812  
IATA Cargo Aircraft Limit : 30 L (Max net quantity per package)

### MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.  
Technical Name(s) : AMINO-TRI(METHYLENEPHOSPHONIC ACID),  
HYDROCHLORIC ACID  
UN/ID No : UN 3265  
Hazard Class - Primary : 8  
Packing Group : II

## 15. REGULATORY INFORMATION

### NATIONAL REGULATIONS, USA :

#### OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Nitritotris(Methylenephosphonic Acid) : Eye irritant

Inorganic acid : Corrosive

Hydrochloric Acid : Corrosive

Formaldehyde : Cancer suspect agent (refer to Section 3), Sensitizer, Irritant

#### CERCLA/SUPERFUND, 40 CFR 117, 302 :

Notification of spills of this product is not required.

#### SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

#### SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product contains the following substance(s) which is listed in Appendix A and B as an Extremely Hazardous Substance. Listed below are the statutory Threshold Planning Quantity (TPQ) for the substance(s) and the Reportable Quantity (RQ) of the product. If a reportable quantity of product is released, it requires notification to your State Emergency Response Commission. You may also be required to notify the National Response Center - See CERCLA/SUPERFUND, above.



# MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Extremely Hazardous Substance

Hydrochloric Acid

TPQ

500 lbs

RQ

10,000 lbs

## SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

- X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

## SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

<u>Hazardous Substance(s)</u>	<u>CAS NO</u>	<u>% (w/w)</u>
Hydrochloric Acid	7647-01-0	1.0 - 5.0
Formaldehyde	50-00-0	0.1 - 1.0

## TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

## FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

<u>Substance(s)</u>	<u>Citations</u>
<ul style="list-style-type: none"> <li>• Hydrochloric Acid</li> <li>• Formaldehyde</li> </ul>	Sec. 311

## CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

This product contains the following substances listed in the regulation:

<u>Substance(s)</u>	<u>Citations</u>
<ul style="list-style-type: none"> <li>• Formaldehyde</li> </ul>	Sec. 111, Sec. 112
<ul style="list-style-type: none"> <li>• Hydrochloric Acid</li> </ul>	Sec. 112

## CALIFORNIA PROPOSITION 65 :

This product contains the following substances which require warning under California Proposition 65.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Substance(s)	Concentration	EFFECTS
• Formaldehyde	1 %	Causes Cancer

### MICHIGAN CRITICAL MATERIALS :

This product contains the following substances listed in the regulation:

Formaldehyde

### STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Hydrochloric Acid	7647-01-0
Phosphonic Acid	13598-36-2
Formaldehyde	50-00-0

### NATIONAL REGULATIONS, CANADA :

#### WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

#### WHMIS CLASSIFICATION :

E - Corrosive Material

#### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

#### INTERNATIONAL CHEMICAL CONTROL LAWS

##### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS) and are listed on the Australian Inventory of Chemical Substances (AICS).

##### EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

##### JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

##### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)



## MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### THE PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

## 16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

\* The human risk is: Moderate

\* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**NALCO 9725**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC**

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Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Prepared By : Product Safety Department

Date issued : 02/22/2004

Version Number : 1.4



# Material Safety Data Sheet

## ORFOM® MCO FLOTATION OIL

April 30, 1998

MSDS #: 59730

CHEVRON PHILLIPS CHEMICAL COMPANY LP  
1301 McKinney Street  
Houston, Texas 77010-3030

### PHONE NUMBERS

Emergency: (800) 231-0623 or  
(510) 231-0623 (International)  
TRANSPORTATION (24 HR): CHEMTREC  
(800) 424-9300 OR (703) 527-3887  
Technical Services: (800) 852-5531  
For Additional MSDSs: (800) 852-5530

### A. Product Identification

Synonyms: Flotation Oil  
Chemical Name: Mixture  
Chemical Family: Hydrocarbon  
Chemical Formula: Mixture  
CAS Reg. No.: Mixture  
Product No.: Not Applicable

Product and/or Components Entered on EPA's TSCA Inventory: YES  
This product is in U.S. commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals; hence, it may be subject to applicable TSCA provisions and restrictions.

Canadian Inventory Listing Status: DSL  
All ingredients are listed in the Domestic Substances List (DSL).  
Impurities are exempt in accordance with Section 3 of the Canadian Environmental Protection Act (CEPA).

### B. Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
Decant (clarified) Oil	64741-62-4	59-63	NE	NE
Light Cycle Oil	64741-59-9	37-41	NE	NE
May include: Polynuclear Aromatics (PNAs)	Various	35-49	0.2 mg/m3*	0.2 mg/m3*

\* As Coal Tar Pitch Volatiles

## C. Personal Protection Information

Ventilation: Use adequate ventilation to control exposure to below recommended levels.

Respiratory Protection: For concentrations exceeding the recommended exposure limits, use NIOSH/MSHA approved air purifying respirator for protection against not more than 1000 ppm by volume, and equipped with filter for protection against dusts and mists having an exposure limit measured as a time weighted average not less than 0.05 mg/m<sup>3</sup>. In case of spill or leak resulting in unknown concentrations, use NIOSH/MSHA approved supplied air respirator.

Eye Protection: Use chemical goggles. For splash protection, use face shield with chemical goggles.

Skin Protection: Use neoprene or nitrile rubber gloves and long sleeved clothing to prevent skin contact. Use rubber boots as necessary to prevent contact with shoes.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

## D. Handling and Storage Precautions

Do not get in eyes, on skin or on clothing. Do not breathe vapor or mists. Do not swallow, may be aspirated into lungs. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Wash thoroughly after handling. Immediately remove and launder contaminated clothing before reuse. Use only with adequate ventilation.

Store in a well-ventilated area. Keep away from heat, sparks, and flames. Bond and ground during transfer. Store in a closed container.

## E. Reactivity Data

Stability: Stable

Conditions to Avoid: Not Applicable

Incompatibility (Materials to Avoid): Oxygen and strong oxidizing agents

Hazardous Polymerization: Will Not Occur  
Conditions to Avoid: Not Applicable  
Hazardous Decomposition Products: Carbon oxides and various hydrocarbons  
formed when burned.

## F. Health Hazard Data

### Recommended Exposure Limits:

See Section B.

### Acute Effects of Overexposure:

Eye: May be irritating.

Skin: May be moderately to severely irritating. Prolonged and repeated contact can cause severe irritation.

Inhalation: May cause headache, dizziness, nausea, and unconsciousness.

Ingestion: May be irritating to stomach and intestines. If swallowed, may be aspirated resulting in inflammation and possible fluid accumulation in the lungs.

### Subchronic and Chronic Effects of Overexposure:

Polynuclear aromatic (PNA's) hydrocarbons are a complex combination of hydrocarbons from heavy paraffinic distillate. PNA's are designated carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), and the Occupational Safety and Health Administration (OSHA). Kidney, lung, and skin tumors have been reported in laboratory animals repeatedly exposed to PNAs. Lung tumors have been reported in humans repeatedly exposed to PNAs. Stillbirths, mutagenesis (DNA) and liver damage have been reported in laboratory animals exposed to PNA's.

(See Section N. for information about the risk of developing PNAs-related cancer from use of this product.)

Decant (clarified) oil, when administered repeatedly to the skin, caused liver damage and skin tumors in laboratory animals. Decant (clarified) oil was also strongly carcinogenic when administered to the skin of mice. This component is designated a carcinogen by IARC.

### Other Health Effects:

Decant (clarified) oil has been tested for the ability to damage the DNA of both cellular systems and laboratory animals. This component caused

DNA damage, with and without metabolic activation, in the Mouse Lymphoma assay, but failed to damage DNA in the Bone Marrow Cytogenetic assay.

### Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	<u>  X  </u>	<u>      </u>	Toxic	<u>      </u>	<u>      </u>
Suspect Carcinogen	<u>      </u>	<u>  X  </u>	Corrosive	<u>      </u>	<u>      </u>
Mutagen	<u>  X  </u>	<u>      </u>	Irritant	<u>      </u>	<u>      </u>
Teratogen	<u>      </u>	<u>      </u>	Target Organ Toxin	<u>  X  </u>	<u>  X  </u>
Allergic Sensitizer	<u>      </u>	<u>      </u>	Specify - Liver, Kidney, and Lung Toxin;		
Highly Toxic	<u>      </u>	<u>      </u>	Reproductive Toxin - Embryo/fetotoxin;		
			Lung - Aspiration Hazard; Skin Hazard		
			- Photosensitizer		

Canadian WHMIS:

#### CLASS D: POISONOUS AND INFECTIOUS MATERIAL CATEGORIES

##### 1. Materials Causing Immediate and Serious Toxic Effects

- A. Very Toxic         
 B. Toxic

##### 2. Materials Causing Other Toxic Effects

###### A. Very Toxic

1. Chronic Toxic Effects         
 2. Teratogen/Embryo Toxin   X    
 3. Carcinogen   X    
 4. Reproductive Toxin   X    
 5. Respiratory Tract Sensitizer         
 6. Mutagen   X

###### B. Toxic

1. Chronic Toxic Effects   X    
 2. Skin or Eye Irritant   X    
 3. Skin Sensitizer         
 4. Mutagen

Specify: Embryotoxin; Carcinogen; Reproductive - Toxin; Mutagen  
 Lung - Toxin; Liver - Toxin; Kidney - Toxin  
 Eye - Possible Irritant.

Other: Lung - Aspiration Hazard.

### First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

**Skin:** Immediately wash skin with soap and water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

**Inhalation:** Immediately remove from exposure. If breathing is difficult, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Seek immediate medical attention.

**Ingestion:** Do not induce vomiting. Seek immediate medical attention.

**Note to Physician:** Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

## G. Physical Data

Appearance: Black Liquid

Odor: Mild

Boiling Point: 330 to >1000F (165-538C)

Vapor Pressure: <1mm Hg (ESTIMATED) @ 70F (21C)

Vapor Density (Air = 1): >3

Solubility in Water: Negligible

Specific Gravity (H<sub>2</sub>O = 1): 1.017 @ 60F (15.6C)

Percent Volatile by Volume: Negligible

Evaporation Rate (Butyl Acetate = 1): <1

Viscosity: 35 - 45 centistokes @ 71F (25C)

## H. Fire and Explosion Data

Flash Point (Method Used): >150F (>66C) (PMCC, ASTM D93)

Flammable Limits (% by Volume in Air): LEL - Not Established

UEL - Not Established

Fire Extinguishing Media: Dry chemical, foam or carbon dioxide (CO<sub>2</sub>)

Special Fire Fighting Procedures: Evacuate area of all unnecessary personnel. Use NIOSH/MSHA approved self-contained breathing apparatus and other protective equipment and/or garments described in Section C if conditions warrant. Shut off source, if possible. Water fog or spray may be used to cool exposed equipment and containers.

Fire and Explosion Hazards: Carbon oxides and various hydrocarbons formed when burned.

## I. Spill, Leak and Disposal Procedures

### Precautions Required if Material is Released or Spilled:

Evacuate area of all unnecessary personnel. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Shut off source, if possible and contain spill. Protect from ignition. Keep out of water sources and sewers. Absorb in dry, inert material (sand, clay, sawdust, etc.). Transfer to disposal drums using non-sparking equipment.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):  
Incinerate or place in a permitted waste management facility.

## J. DOT Transportation

Shipping Name: Petroleum products, n.o.s.

Hazard Class: Combustible liquid

ID Number: UN 1268

Packing Group: III

Marking: 1268 (Bulk packages only)

Label: None

Placard: Combustible/1268

Hazardous Substance/RQ: Not Applicable

Shipping Description: Petroleum products, n.o.s., Combustible liquid,  
UN 1268, PG III

Packaging References: 49 CFR 173.150, 173.203, 173.241

NOTE: This product is not regulated by DOT when shipped domestically by highway or rail in non-bulk packagings.

## K. RCRA Classification - Unadulterated Product as a Waste

Prior to disposal, consult your environmental contact to determine if the TCLP (Toxicity Characteristic Leaching Procedure, EPA Test Method 1311) is required. Reference 40 CFR Part 261.

## L. Protection Required for Work on Contaminated Equipment

Contact immediate supervisor for specific instructions before work is initiated. Wear protective equipment and/or garments described in Section C if exposure conditions warrant.

## M. Hazard Classification

This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

<input checked="" type="checkbox"/> Combustible Liquid	<input type="checkbox"/> Flammable Aerosol	<input type="checkbox"/> Oxidizer
<input type="checkbox"/> Compressed Gas	<input type="checkbox"/> Explosive	<input type="checkbox"/> Pyrophoric
<input type="checkbox"/> Flammable Gas	<input checked="" type="checkbox"/> Health Hazard (Section F)	<input type="checkbox"/> Unstable
<input type="checkbox"/> Flammable Liquid	<input type="checkbox"/> Organic Peroxide	<input type="checkbox"/> Water Reactive
<input type="checkbox"/> Flammable Solid		

Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

Canadian WHMIS:

Class B: Flammable and Combustible Material  
 Class D: Poisonous and Infectious Material  
 Division 2. Materials Causing Other Toxic Effects

## N. Additional Comments

SARA 313

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Risk of Developing Cancer

Orfom<sup>®</sup> MCO Flotation Oil is not considered to pose any realistic risk for the development of cancer under normal working conditions. This oil is a blend of middle distillate oils and is not unique in its health hazards or health risk concerns. As Polynuclear Aromatics (PNAs) are designated as carcinogens by health advisory and regulatory agencies (e.g., IARC, US EPA, US OSHA), Chevron Phillips Chemical Company LP has an obligation to identify the potential health hazard of PNAs because of the percentage composition of PNAs in this product.

The boiling point range of Orfom<sup>®</sup> MCO Flotation Oil begins at 300 degrees F (165 degrees C) and extends to greater than 1000 degrees F (538 degrees C). This range is higher than any expected workplace ambient temperature. As a result of this physical characteristic of this product, the likelihood of the generation of any PNAs-containing vapor in the workplace would be so slight that no additional risk of adverse health effects to workers would be expected. The PNAs content of this product is more applicable to an exposure-risk consideration only if workers were to get the product on their skin and leave it on the skin throughout the workday, repeatedly for several months. As skin irritation would likely develop in this circumstance, continual skin contact with the oil would not be expected to be possible or tolerable.

Research underway on petroleum middle distillates is beginning to show they do not cause cancer on skin contact, but may promote cancer that might already exist. Regardless, workers should be cautioned to keep it off of their skin and wash any contacted material off of the skin.

NFPA 704 Hazard Codes - - - - - Signals

Health	: 2	Least	- 0
Flammability:	2	Slight	- 1
Reactivity	: 0	Moderate	- 2
Special Haz.:	-	High	- 3
		Extreme	- 4

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# MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)  
(800) 424-9300 (24 Hours) CHEMTREC

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **PINNACLE 9740**

COMPANY IDENTIFICATION :  
Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 2/2 FLAMMABILITY : 2/2 INSTABILITY : 0/0 OTHER :  
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Heavy Aromatic Naphtha	64742-94-5	30.0 - 60.0
Naphthalene	91-20-3	5.0 - 10.0
Alkyl mercaptan	Proprietary	10.0 - 30.0
Thio-ester	Proprietary	10.0 - 30.0

## 3. HAZARDS IDENTIFICATION

### \*\*EMERGENCY OVERVIEW\*\*

#### WARNING

Combustible. Irritating to eyes and skin.

Keep away from heat. Keep away from sources of ignition - No smoking. Keep container tightly closed. Do not get in eyes, on skin, on clothing. Do not take internally. Avoid breathing vapor. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water.

Wear suitable protective clothing.

Combustible Liquid; may form combustible mixtures at or above the flash point. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin, Inhalation



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### HUMAN HEALTH HAZARDS - ACUTE :

#### EYE CONTACT :

Can cause moderate irritation.

#### SKIN CONTACT :

Can cause moderate irritation.

#### INGESTION :

Not a likely route of exposure. There may be irritation to the gastro-intestinal tract. May cause nausea and vomiting. Can cause chemical pneumonia if aspirated into lungs following ingestion. Can cause central nervous system depression.

#### INHALATION :

Repeated or prolonged exposure may irritate the respiratory tract.

#### SYMPTOMS OF EXPOSURE :

##### Acute :

Inhalation of high concentrations of organic solvents can cause nausea, dizziness, vomiting, stupor or unconsciousness.

##### Chronic :

Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

#### AGGRAVATION OF EXISTING CONDITIONS :

Skin contact may aggravate an existing dermatitis condition.

### HUMAN HEALTH HAZARDS - CHRONIC :

This product contains naphthalene. The International Agency for Research on Cancer (IARC) has evaluated naphthalene and determined it to be possibly carcinogenic to humans (Group 2B, based on sufficient evidence in experimental animals and inadequate evidence in humans).

## 4. FIRST AID MEASURES

#### EYE CONTACT :

Get medical attention. Immediately flush eye with water for at least 15 minutes while holding eyelids open.

#### SKIN CONTACT :

Immediately wash with plenty of soap and water. If symptoms develop, seek medical advice.

#### INGESTION :

Get medical attention. Do not induce vomiting: contains petroleum distillates and/or aromatic solvents. If conscious, washout mouth and give water to drink.

#### INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

#### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### 5. FIRE FIGHTING MEASURES

FLASH POINT : 141 - 200 F / 60.5 - 93.3 C

**EXTINGUISHING MEDIA :**

Foam, Carbon dioxide, Dry powder, Other extinguishing agent suitable for Class B fires, For large fires, use water spray or fog, thoroughly drenching the burning material. Water mist may be used to cool closed containers.

**UNSUITABLE EXTINGUISHING MEDIA :**

Do not use water unless flooding amounts are available.

**FIRE AND EXPLOSION HAZARD :**

Combustible Liquid; may form combustible mixtures at or above the flash point. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (CO<sub>x</sub>) under fire conditions. May evolve oxides of sulfur (SO<sub>x</sub>) under fire conditions.

**SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :**

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

### 6. ACCIDENTAL RELEASE MEASURES

**PERSONAL PRECAUTIONS :**

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Remove sources of ignition. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

**METHODS FOR CLEANING UP :**

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

**ENVIRONMENTAL PRECAUTIONS :**

This product may pose a risk to the aquatic ecosystem if released., Prevent material from entering sewers or waterways.

### 7. HANDLING AND STORAGE

**HANDLING :**

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks,



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

etc.) readily available. Ensure all containers are labeled. Do not use, store, spill or pour near heat, sparks or open flame.

### STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed. Store away from heat and sources of ignition. Have appropriate fire extinguishers available in and near the storage area. Connections must be grounded to avoid electrical charges. Store separately from oxidizers.

### SUITABLE CONSTRUCTION MATERIAL :

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

### ACGIH/TLV :

Substance(s)

Naphthalene	TWA: 10 ppm , 52 mg/m <sup>3</sup> STEL: 15 ppm , 79 mg/m <sup>3</sup>
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### OSHA/PEL :

Substance(s)

Naphthalene	TWA: 10 ppm , 50 mg/m <sup>3</sup> STEL: 15 ppm , 75 mg/m <sup>3</sup>
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### Manufacturer's Recommendation :

Substance(s)

Heavy Aromatic Naphtha	TWA: 100 mg/m <sup>3</sup>
------------------------	----------------------------

### ENGINEERING MEASURES :

Use general ventilation with local exhaust ventilation.

### RESPIRATORY PROTECTION :

Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Acid gas cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

### HAND PROTECTION :

When handling this product, the use of chemical gauntlets is recommended., The choice of work glove depends on work conditions and what chemicals are handled, but we have positive experience under light handling conditions using gloves made from, PVC, ., Gloves should be replaced immediately if signs of degradation are observed., Breakthrough time not determined as preparation, consult PPE manufacturers.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### SKIN PROTECTION :

When handling this product, the use of overalls is recommended.

### EYE PROTECTION :

Wear safety glasses with side-shields.

### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Yellow
ODOR	Hydrocarbon
SPECIFIC GRAVITY	0.9585
DENSITY	8.0 lb/gal
SOLUBILITY IN WATER	Partial
VOC CONTENT	74.0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

## 10. STABILITY AND REACTIVITY

### STABILITY :

Stable under normal conditions.

### HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

### CONDITIONS TO AVOID :

Heat and sources of ignition including static discharges.

### MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

### HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of sulfur

## 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### SENSITIZATION :

This product is not expected to be a sensitizer.

### CARCINOGENICITY :

This product contains naphthalene. The International Agency for Research on Cancer (IARC) has evaluated naphthalene and determined it to be possibly carcinogenic to humans (Group 2B, based on sufficient evidence in experimental animals and inadequate evidence in humans).

### HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

## 12. ECOLOGICAL INFORMATION

### ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

### MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
10 - 30%	10 - 30%	<5%

The portion in water is expected to float on the surface.

### BIOACCUMULATION POTENTIAL

Component substances have a potential to bioaccumulate.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

## 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

#### LAND TRANSPORT :

For Packages Less Than Or Equal To 119 Gallons:

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING  
TRANSPORTATION

For Packages Greater Than 119 Gallons:

Proper Shipping Name :

COMBUSTIBLE LIQUID, N.O.S.

Technical Name(s) :

Heavy Aromatic Naphtha, Isopropanol

UN/ID No :

NA 1993

Hazard Class - Primary :

COMBUSTIBLE

Packing Group :

III

Flash Point :

141 - 200 F / 60.5 - 93.3 C

DOT Reportable Quantity (per package) :

4,545 lbs

DOT RQ Component :

NAPHTHALENE

#### AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID,  
N.O.S.

Technical Name(s) :

Naphthalene, Heavy Aromatic Naphtha

UN/ID No :

UN 3082

Hazard Class - Primary :

9

Packing Group :

III

IATA Cargo Packing Instructions :

914

IATA Cargo Aircraft Limit :

NO LIMIT (Max net quantity per package)

#### MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :

ENVIRONMENTALLY HAZARDOUS SUBSTANCE,  
LIQUID, N.O.S.

Technical Name(s) :

Heavy Aromatic Naphtha, Naphthalene

UN/ID No :

UN 3082

Hazard Class - Primary :

9

Packing Group :

III



# MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

## 15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Heavy Aromatic Naphtha : Combustible., Irritant

Naphthalene : Skin irritant, Combustible., Cancer suspect agent (refer to Section 3)

Alkyl mercaptan : Irritant, Toxic

Thio-ester :

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

<u>RQ Substance</u>	<u>RQ</u>
Naphthalene	4,545 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
X	Delayed (Chronic) Health Hazard
X	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

<u>Hazardous Substance(s)</u>	<u>CAS NO</u>	<u>% (w/w)</u>
Naphthalene	91-20-3	5.0 - 10.0

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Naphthalene	Sec. 307, Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Naphthalene	Sec. 112

CALIFORNIA PROPOSITION 65 :

This product contains the following substances which require warning under California Proposition 65.

Substance(s)	Concentration	EFFECTS
• Naphthalene	<= 10 %	Causes Cancer

MICHIGAN CRITICAL MATERIALS :

This product contains the following substances listed in the regulation:

Naphthalene

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Naphthalene	91-20-3
Alkyl mercaptan	Proprietary

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

B3 - Combustible Liquids, D2A - Materials Causing Other Toxic Effects - Very Toxic Material

### 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC**

be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Date issued : 09/27/2006

Version Number : 1.2



# MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)  
(800) 424-9300 (24 Hours) CHEMTREC

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **PINNACLE 9740**

COMPANY IDENTIFICATION :  
Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 2/2 FLAMMABILITY : 2/2 INSTABILITY : 0/0 OTHER :  
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Heavy Aromatic Naphtha	64742-94-5	30.0 - 60.0
Naphthalene	91-20-3	5.0 - 10.0
Alkyl mercaptan	Proprietary	10.0 - 30.0
Thio-ester	Proprietary	10.0 - 30.0

## 3. HAZARDS IDENTIFICATION

### \*\*EMERGENCY OVERVIEW\*\*

#### WARNING

Combustible. Irritating to eyes and skin.

Keep away from heat. Keep away from sources of ignition - No smoking. Keep container tightly closed. Do not get in eyes, on skin, on clothing. Do not take internally. Avoid breathing vapor. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water.

Wear suitable protective clothing.

Combustible Liquid; may form combustible mixtures at or above the flash point. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin, Inhalation



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### HUMAN HEALTH HAZARDS - ACUTE :

#### EYE CONTACT :

Can cause moderate irritation.

#### SKIN CONTACT :

Can cause moderate irritation.

#### INGESTION :

Not a likely route of exposure. There may be irritation to the gastro-intestinal tract. May cause nausea and vomiting. Can cause chemical pneumonia if aspirated into lungs following ingestion. Can cause central nervous system depression.

#### INHALATION :

Repeated or prolonged exposure may irritate the respiratory tract.

#### SYMPTOMS OF EXPOSURE :

##### Acute :

Inhalation of high concentrations of organic solvents can cause nausea, dizziness, vomiting, stupor or unconsciousness.

##### Chronic :

Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

#### AGGRAVATION OF EXISTING CONDITIONS :

Skin contact may aggravate an existing dermatitis condition.

### HUMAN HEALTH HAZARDS - CHRONIC :

This product contains naphthalene. The International Agency for Research on Cancer (IARC) has evaluated naphthalene and determined it to be possibly carcinogenic to humans (Group 2B, based on sufficient evidence in experimental animals and inadequate evidence in humans).

## 4. FIRST AID MEASURES

#### EYE CONTACT :

Get medical attention. Immediately flush eye with water for at least 15 minutes while holding eyelids open.

#### SKIN CONTACT :

Immediately wash with plenty of soap and water. If symptoms develop, seek medical advice.

#### INGESTION :

Get medical attention. Do not induce vomiting: contains petroleum distillates and/or aromatic solvents. If conscious, washout mouth and give water to drink.

#### INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

#### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### 5. FIRE FIGHTING MEASURES

FLASH POINT : 141 - 200 F / 60.5 - 93.3 C

**EXTINGUISHING MEDIA :**

Foam, Carbon dioxide, Dry powder, Other extinguishing agent suitable for Class B fires, For large fires, use water spray or fog, thoroughly drenching the burning material. Water mist may be used to cool closed containers.

**UNSUITABLE EXTINGUISHING MEDIA :**

Do not use water unless flooding amounts are available.

**FIRE AND EXPLOSION HAZARD :**

Combustible Liquid; may form combustible mixtures at or above the flash point. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

**SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :**

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

### 6. ACCIDENTAL RELEASE MEASURES

**PERSONAL PRECAUTIONS :**

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Remove sources of ignition. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

**METHODS FOR CLEANING UP :**

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

**ENVIRONMENTAL PRECAUTIONS :**

This product may pose a risk to the aquatic ecosystem if released., Prevent material from entering sewers or waterways.

### 7. HANDLING AND STORAGE

**HANDLING :**

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks,



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

etc.) readily available. Ensure all containers are labeled. Do not use, store, spill or pour near heat, sparks or open flame.

### STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed. Store away from heat and sources of ignition. Have appropriate fire extinguishers available in and near the storage area. Connections must be grounded to avoid electrical charges. Store separately from oxidizers.

### SUITABLE CONSTRUCTION MATERIAL :

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

### ACGIH/TLV :

Substance(s)

Naphthalene	TWA: 10 ppm , 52 mg/m <sup>3</sup> STEL: 15 ppm , 79 mg/m <sup>3</sup>
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### OSHA/PEL :

Substance(s)

Naphthalene	TWA: 10 ppm , 50 mg/m <sup>3</sup> STEL: 15 ppm , 75 mg/m <sup>3</sup>
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### Manufacturer's Recommendation :

Substance(s)

Heavy Aromatic Naphtha	TWA: 100 mg/m <sup>3</sup>
------------------------	----------------------------

### ENGINEERING MEASURES :

Use general ventilation with local exhaust ventilation.

### RESPIRATORY PROTECTION :

Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Acid gas cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

### HAND PROTECTION :

When handling this product, the use of chemical gauntlets is recommended., The choice of work glove depends on work conditions and what chemicals are handled, but we have positive experience under light handling conditions using gloves made from, PVC, ., Gloves should be replaced immediately if signs of degradation are observed., Breakthrough time not determined as preparation, consult PPE manufacturers.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### SKIN PROTECTION :

When handling this product, the use of overalls is recommended.

### EYE PROTECTION :

Wear safety glasses with side-shields.

### HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Yellow
ODOR	Hydrocarbon
SPECIFIC GRAVITY	0.9585
DENSITY	8.0 lb/gal
SOLUBILITY IN WATER	Partial
VOC CONTENT	74.0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

## 10. STABILITY AND REACTIVITY

### STABILITY :

Stable under normal conditions.

### HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

### CONDITIONS TO AVOID :

Heat and sources of ignition including static discharges.

### MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

### HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of sulfur

## 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### SENSITIZATION :

This product is not expected to be a sensitizer.

### CARCINOGENICITY :

This product contains naphthalene. The International Agency for Research on Cancer (IARC) has evaluated naphthalene and determined it to be possibly carcinogenic to humans (Group 2B, based on sufficient evidence in experimental animals and inadequate evidence in humans).

### HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

## 12. ECOLOGICAL INFORMATION

### ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

### MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
10 - 30%	10 - 30%	<5%

The portion in water is expected to float on the surface.

### BIOACCUMULATION POTENTIAL

Component substances have a potential to bioaccumulate.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

## 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

#### LAND TRANSPORT :

For Packages Less Than Or Equal To 119 Gallons:

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING  
TRANSPORTATION

For Packages Greater Than 119 Gallons:

Proper Shipping Name :

COMBUSTIBLE LIQUID, N.O.S.

Technical Name(s) :

Heavy Aromatic Naphtha, Isopropanol

UN/ID No :

NA 1993

Hazard Class - Primary :

COMBUSTIBLE

Packing Group :

III

Flash Point :

141 - 200 F / 60.5 - 93.3 C

DOT Reportable Quantity (per package) :

4,545 lbs

DOT RQ Component :

NAPHTHALENE

#### AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID,  
N.O.S.

Technical Name(s) :

Naphthalene, Heavy Aromatic Naphtha

UN/ID No :

UN 3082

Hazard Class - Primary :

9

Packing Group :

III

IATA Cargo Packing Instructions :

914

IATA Cargo Aircraft Limit :

NO LIMIT (Max net quantity per package)

#### MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :

ENVIRONMENTALLY HAZARDOUS SUBSTANCE,  
LIQUID, N.O.S.

Technical Name(s) :

Heavy Aromatic Naphtha, Naphthalene

UN/ID No :

UN 3082

Hazard Class - Primary :

9

Packing Group :

III



# MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

## 15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Heavy Aromatic Naphtha : Combustible., Irritant

Naphthalene : Skin irritant, Combustible., Cancer suspect agent (refer to Section 3)

Alkyl mercaptan : Irritant, Toxic

Thio-ester :

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

<u>RQ Substance</u>	<u>RQ</u>
Naphthalene	4,545 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
X	Delayed (Chronic) Health Hazard
X	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

<u>Hazardous Substance(s)</u>	<u>CAS NO</u>	<u>% (w/w)</u>
Naphthalene	91-20-3	5.0 - 10.0

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Naphthalene	Sec. 307, Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Naphthalene	Sec. 112

CALIFORNIA PROPOSITION 65 :

This product contains the following substances which require warning under California Proposition 65.

Substance(s)	Concentration	EFFECTS
• Naphthalene	<= 10 %	Causes Cancer

MICHIGAN CRITICAL MATERIALS :

This product contains the following substances listed in the regulation:

Naphthalene

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Naphthalene	91-20-3
Alkyl mercaptan	Proprietary

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

B3 - Combustible Liquids, D2A - Materials Causing Other Toxic Effects - Very Toxic Material

### 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should



## MATERIAL SAFETY DATA SHEET

PRODUCT

**PINNACLE 9740**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC**

be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Date issued : 09/27/2006

Version Number : 1.2



## MATERIAL SAFETY DATA SHEET

PRODUCT

**SCALE GUARD® 9731**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **SCALE GUARD® 9731**

COMPANY IDENTIFICATION :  
Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 0 / 1    FLAMMABILITY : 1 / 1    INSTABILITY : 0 / 0    OTHER :  
0 = Insignificant    1 = Slight    2 = Moderate    3 = High    4 = Extreme

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

### 3. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### CAUTION

May cause irritation with prolonged contact.  
Do not get in eyes, on skin, on clothing. Do not take internally. Wear suitable protective clothing. Keep container tightly closed. Flush affected area with water.  
May evolve oxides of carbon (CO<sub>x</sub>) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :  
May cause irritation with prolonged contact.

SKIN CONTACT :  
May cause irritation with prolonged contact.

INGESTION :  
Not a likely route of exposure. No adverse effects expected.

INHALATION :  
Not a likely route of exposure. No adverse effects expected.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**SCALE GUARD® 9731**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

### AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

## 4. FIRST AID MEASURES

### EYE CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

### SKIN CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

### INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

### INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

## 5. FIRE FIGHTING MEASURES

FLASH POINT : > 212 °F / > 100 °C ( PMCC )

### EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

### FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions.

### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

## 6. ACCIDENTAL RELEASE MEASURES

### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Stop or reduce any leaks if it is safe to do so. Do not touch spilled material. Ventilate spill area if possible. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).



## MATERIAL SAFETY DATA SHEET

PRODUCT

**SCALE GUARD® 9731**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

### ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

## 7. HANDLING AND STORAGE

### HANDLING :

Avoid eye and skin contact. Do not take internally. Ensure all containers are labelled. Keep the containers closed when not in use.

### STORAGE CONDITIONS :

Store the containers tightly closed.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

### ENGINEERING MEASURES :

General ventilation is recommended.

### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed.

### HAND PROTECTION :

Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

### SKIN PROTECTION :

Wear standard protective clothing.

### EYE PROTECTION :

Wear chemical splash goggles.

### HYGIENE RECOMMENDATIONS :

Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

### HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low



## MATERIAL SAFETY DATA SHEET

PRODUCT

**SCALE GUARD® 9731**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow Tan
ODOR	None
SOLUBILITY IN WATER	Complete
VAPOR PRESSURE	Same as water
EVAPORATION RATE	Same as water

Note: These physical properties are typical values for this product and are subject to change.

### 10. STABILITY AND REACTIVITY

STABILITY :  
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :  
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :  
Freezing temperatures.

MATERIALS TO AVOID :  
None known

HAZARDOUS DECOMPOSITION PRODUCTS :  
Under fire conditions: Oxides of carbon

### 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :  
This product is not expected to be a sensitizer.

CARCINOGENICITY :  
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :  
Based on our hazard characterization, the potential human hazard is: Low



## MATERIAL SAFETY DATA SHEET

PRODUCT

**SCALE GUARD® 9731**

EMERGENCY TELEPHONE NUMBER(S)  
(800) 424-9300 (24 Hours) CHEMTREC

### 12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

### 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### 15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :



## MATERIAL SAFETY DATA SHEET

PRODUCT

**SCALE GUARD® 9731**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC**

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :

Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Sodium Sulfate

7757-82-6

NATIONAL REGULATIONS, CANADA :



## MATERIAL SAFETY DATA SHEET

PRODUCT

**SCALE GUARD® 9731**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC**

### WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

### WHMIS CLASSIFICATION :

Not considered a WHMIS controlled product.

### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

## 16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

\* The human risk is: Low

\* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**SCALE GUARD® 9731**

EMERGENCY TELEPHONE NUMBER(S)

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Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Prepared By : Product Safety Department

Date issued : 02/22/2004

Version Number : 1.4



1. MATERIAL AND COMPANY IDENTIFICATION

**Material Name** : **Methyl Isobutyl Carbinol**  
**Uses** : Use as a solvent only in industrial manufacturing processes.  
**Product Code** : S1216  
**Company** : **Shell Chemical LP**  
 PO Box 2463  
 HOUSTON TX 77252-2463  
 USA  
**MSDS Request** : 1-800-240-6737  
**Customer Service** : 1-866-897-4355  
  
**Emergency Telephone Number**  
**Chemtrec Domestic (24 hr)** : 1-800-424-9300  
**Chemtrec International (24 hr)** : 1-703-527-3887

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Concentration
Methyl Isobutyl Carbinol	108-11-2	100.00%W

3. HAZARDS IDENTIFICATION

Emergency Overview	
<b>Appearance and Odour</b>	: Clear. Liquid. Sweet.
<b>Health Hazards</b>	: Irritating to eyes. Irritating to respiratory system.
<b>Safety Hazards</b>	: Combustible liquid and vapour. Vapours are heavier than air. Vapours may travel across the ground and reach remote ignition sources causing a flashback fire danger. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.

**Health Hazards**  
**Inhalation** : Irritating to respiratory system. Vapours may cause drowsiness and dizziness.  
**Skin Contact** : May cause moderate irritation to skin. Repeated exposure may cause skin dryness or cracking.  
**Eye Contact** : Moderately irritating to eyes.  
**Signs and Symptoms** : Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. Other signs and symptoms of central nervous system (CNS)



**Aggravated Medical Condition** : depression may include headache, nausea, and lack of coordination.  
: Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Respiratory system. Central nervous system (CNS). Skin. Eyes.

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#### 4. FIRST AID MEASURES

**General Information** : In general no treatment is necessary, however, obtain medical advice.  
**Inhalation** : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.  
**Skin Contact** : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.  
**Eye Contact** : Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. Transport to the nearest medical facility for additional treatment.  
**Ingestion** : If swallowed, do not induce vomiting; transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.  
**Advice to Physician** : Causes central nervous system depression. Consult a Poison Control Centre for guidance.

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#### 5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

**Flash point** : 41 °C / 106 °F (IP 170)  
**Explosion / Flammability limits in air** : 1 - 5.5 %(V)  
**Auto ignition temperature** : 305 °C / 581 °F (ASTM E-659)  
**Specific Hazards** : Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. The vapour is heavier than air, spreads along the ground and distant ignition is possible.  
**Extinguishing Media** : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only. Do not discharge extinguishing waters into the aquatic environment.  
**Unsuitable Extinguishing Media** : Do not use water in a jet.  
**Protective Equipment for Firefighters** : Wear full protective clothing and self-contained breathing apparatus.  
**Additional Advice** : Keep adjacent containers cool by spraying with water.

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#### 6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

**Protective measures** : Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material



Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Monitor area with combustible gas indicator.

- Clean Up Methods** : For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
- For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
- Additional Advice** : See Chapter 13 for information on disposal. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Vapour may form an explosive mixture with air.

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## 7. HANDLING AND STORAGE

- General Precautions** : Avoid breathing of or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
- Handling** : Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge ( $\leq 10$  m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Handling Temperature: Ambient.
- Storage** : Keep away from aerosols, flammables, oxidizing agents, corrosives and from products harmful or toxic to man or to the environment. Must be stored in a well-ventilated area, away from sunlight, ignition sources and other sources of heat. Storage Temperature: Ambient.
- Product Transfer** : Keep containers closed when not in use. Do not use



- Recommended Materials** : compressed air for filling, discharging or handling. For container paints, use epoxy paint, zinc silicate paint. For containers, or container linings use mild steel.
- Unsuitable Materials** : Aluminium if > 50 °C. Most plastics.
- Container Advice** : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Methyl Isobutyl Carbinol	ACGIH	TWA	25 ppm		
	ACGIH	STEL	40 ppm		
	ACGIH	SKIN_DES			Can be absorbed through the skin.
	OSHA Z1	PEL	25 ppm	100 mg/m3	
	OSHA Z1	SKIN_DES			Can be absorbed through the skin.
	OSHA Z1A	TWA	25 ppm	100 mg/m3	
	OSHA Z1A	STEL	40 ppm	165 mg/m3	
	OSHA Z1A	SKIN_FINAL			Can be absorbed through the skin.

**Additional Information** : Shell has adopted as Interim Standards, the OSHA PELs that were established in 1989 and later rescinded. Skin notation means that significant exposure can also occur by absorption of liquid through the skin and of vapour through the eyes or mucous membranes. Wash hands before eating, drinking, smoking and using the toilet.

**Exposure Controls** : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Eye washes and showers for emergency use.

**Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

**Respiratory Protection** : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN141. Where



- Hand Protection** : air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Longer term protection: Butyl rubber. Incidental contact/Splash protection: Neoprene rubber. Nitrile rubber. Viton. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.
- Eye Protection** : Chemical splash goggles (chemical monogoggles).
- Protective Clothing** : Use protective clothing which is chemical resistant to this material. Safety shoes and boots should also be chemical resistant.
- Monitoring Methods** : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Examples of sources of recommended air monitoring methods are given below or contact supplier. Further national methods may be available. National Institute of Occupational Safety and Health (NIOSH), USA: Manual of analytical Methods <http://www.cdc.gov/niosh/nmam/nmammenu.html> Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha-slc.gov/dts/sltc/methods/toc.html> Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances <http://www.hsl.gov.uk/search.htm>
- Environmental Exposure Controls** : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

- Appearance : Clear. Liquid.
- Odour : Sweet.
- Boiling point : 130 - 133 °C / 266 - 271 °F
- Flash point : 41 °C / 106 °F (IP 170)
- Explosion / Flammability limits in air : 1 - 5.5 %(V)
- Auto-ignition temperature : 305 °C / 581 °F (ASTM E-659)
- Vapour pressure : 420 Pa at 20 °C / 68 °F
- Specific gravity : 0.81 at 20 °C / 68 °F
- Density : 806 - 808 kg/m3 at 20 °C / 68 °F (ASTM D-4052)
- Water solubility : 16 g/l at 20 °C / 68 °F
- Vapour density (air=1) : 3.5
- Volatile organic carbon content : 100 %
- Evaporation rate (nBuAc=1) : 0.3 (ASTM D 3539, nBuAc=1)



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**10. STABILITY AND REACTIVITY**

- Stability** : Stable under normal conditions of use. Reacts with strong oxidising agents. Reacts with strong acids.
- Conditions to Avoid** : Avoid heat, sparks, open flames and other ignition sources.
- Materials to Avoid** : Strong oxidising agents. Strong acids.
- Hazardous Decomposition Products** : Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

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**11. TOXICOLOGICAL INFORMATION**

- Basis for Assessment** : Information given is based on product testing.
- Acute Oral Toxicity** : Low toxicity: LD50 >2000 mg/kg , Rat
- Acute Dermal Toxicity** : Low toxicity: LD50 >2000 mg/kg , Rabbit
- Acute Inhalation Toxicity** : Low toxicity: LC50 greater than near-saturated vapour concentration. / 1 hours,  
High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.
- Skin Irritation** : May cause moderate irritation to skin.  
Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.
- Eye Irritation** : Moderately irritating to eyes.
- Respiratory Irritation** : Inhalation of vapours or mists may cause irritation to the respiratory system.
- Repeated Dose Toxicity** : Kidney: caused kidney effects in male rats which are not considered relevant to humans

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**12. ECOLOGICAL INFORMATION**

- Acute Toxicity**
- Fish** : Low toxicity: LC/EC/IC50 > 100 mg/l
- Aquatic Invertebrates** : Expected to have low toxicity: LC/EC/IC50 > 100 mg/l
- Microorganisms** : Expected to have low toxicity: LC/EC/IC50 > 100 mg/l
- Mobility** : Floats on water.  
If product enters soil, it will be highly mobile and may contaminate groundwater.
- Persistence/degradability** : Readily biodegradable meeting the 10 day window criterion.  
Oxidises rapidly by photo-chemical reactions in air.
- Bioaccumulation** : Not expected to bioaccumulate significantly.

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**13. DISPOSAL CONSIDERATIONS**

- Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical



properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.

**Container Disposal** : Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer.

**Local Legislation** : Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

14. TRANSPORT INFORMATION

**US Department of Transportation Classification (49CFR)**

Identification number UN 2053  
Proper shipping name Methyl isobutyl carbinol  
Class / Division 3  
Packing group III

Emergency Response Guide No . 129

**IMDG**

Identification number UN 2053  
Proper shipping name METHYL ISOBUTYL CARBINOL  
Class / Division 3  
Packing group III  
Marine pollutant: No

**IATA (Country variations may apply)**

Identification number UN 2053  
Proper shipping name Methyl isobutyl carbinol  
Class / Division 3  
Packing group III

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

**Federal Regulatory Status**

**Notification Status**

AICS Listed.  
DSL Listed.  
INV (CN) Listed.  
ENCS (JP) Listed. (2)-217  
TSCA Listed.  
EINECS Listed. 203-551-7



KECI (KR) Listed. KE-24720
PICCS (PH) Listed.

SARA Hazard Categories (311/312)

Immediate (Acute) Health Hazard. Fire Hazard.

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

New Jersey Right-To-Know Chemical List

Methyl Isobutyl Carbinol (108-11-2) 100.00% Listed.

Pennsylvania Right-To-Know Chemical List

Methyl Isobutyl Carbinol (108-11-2) 100.00% Listed.

16. OTHER INFORMATION

HMIS Rating (Health, Fire, Reactivity) : 2, 2, 0

NFPA Rating (Health, Fire, Reactivity) : 2, 2, 0

MSDS Version Number : 13.2

MSDS Effective Date : 11/26/2005

MSDS Revisions : A vertical bar (|) in the left margin indicates an amendment from the previous version.

MSDS Regulation : The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Uses and Restrictions : Use as a solvent only in industrial manufacturing processes.

MSDS Distribution : The information in this document should be made available to all who may handle the product

Disclaimer : The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to



**Shell Chemicals**

**Material Safety Data Sheet**

**Methyl Isobutyl Carbinol**

MSDS# 5020

Version 13.2

Effective Date 11/26/2005

According to OSHA Hazard Communication Standard, 29 CFR  
1910.1200

be obtained from the use of the product.

**ATTACHMENT 2**

**DERIVATION OF EXPOSURE POINT CONCENTRATIONS  
IN THE TOWN OF GREEN VALLEY  
BASED UPON TAILING SAMPLES**

## ATTACHMENT 2

### DERIVATION OF EXPOSURE POINT CONCENTRATIONS IN THE TOWN OF GREEN VALLEY BASED UPON TAILING SAMPLES

The estimate for the concentration of materials that were deposited on the town of Green Valley were generated in part with an atmospheric transport model produced by the United States Environmental Protection Administration (USEPA). The model used is AERMOD version 04300.

A storm event similar to the recent storm that created a large dust cloud that impacted the town was approximated using a similar storm extracted from data collected at the Tucson, Arizona airport. The storm lasted approximately 7 hours and maintained winds in excess of 20 miles per hour (MPH).

The rate of release of dust from the tailings pile was calculated using the EPA's AP 42, Fifth Edition *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources*. Section 13.2.5 of the EPA's document describes the calculation of the release rate of dust due to wind at industrial facilities. Using the EPA's methodology, a release of 0.00199 g/(m<sup>2</sup> - s) from the tailings pile was calculated for the duration of the storm.

An array of particle sizes were entered into the model to evaluate the potential amount of deposition that may have occurred in the town. Of the particles transported from the tailings pile, 10% were assumed to be 100 micrometers in size, 25% 80 micrometers, 30% 60 micrometers, 20% 40 micrometers, 10% 20 micrometers, and 5% 10 micrometers. Smaller grain sizes were not considered in this evaluation as an appreciable amount would not be anticipated to be deposited in the town due to their small size and subsequent tendency to remain airborne.

The model predicted a total mass flux of 5.825 grams per square meter (g/m<sup>2</sup>) of dust to be deposited on the town as a result of the tailings material picked up by the wind during the seven hour storm. The following equation was used to convert the total mass of dust into a corresponding concentration of potential contaminants:

$$\text{Deposited Concentration} = [\text{Output} * (\text{Average Concentration})] / (\text{Density} * \text{Depth})$$

where: Output = Output mass flux reported by AERMOD (g/m<sup>2</sup>)

Average Concentration = Measured concentrations reported in Table 1

Density = Approximate density of the soil being blown = 1500 kg/m<sup>3</sup>

Depth = Depth over which the concentration was calculated = 0.1 inch

Conversions Used = 39.37 inch/meter; 1 kg/1000grams

## 1. Identification

<b>Product identifier</b>	<b>CHLORINE</b>	
<b>Other means of identification</b>	Not available.	
<b>Recommended use</b>	Chlorinating and oxidizing agent, Water treatment chemicals, pharmaceutical, Synthesis, Disinfectants and general biocidal products, Plastics	
<b>Recommended restrictions</b>	None known.	
<b>Manufacturer / Importer / Supplier / Distributor information</b>		
<b>Company name</b>	Olin Chlor Alkali Products	
<b>Address</b>	490 Stuart Road, NE Cleveland, TN 37312	
<b>Company name</b>	Pioneer Americas, LLC (d/b/a Olin Chlor Alkali Products)	
<b>Address</b>	490 Stuart Road, NE Cleveland, TN 37312	
<b>Company name</b>	Olin Canada ULC (d/b/a Olin Chlor Alkali Products)	
<b>Address</b>	2020 University, Suite 2190 Montreal, Quebec H3A 2A5	
<b>General Information</b>		
<b>Telephone</b>	(888) 658-MSDS (6737)	
<b>Website</b>	olinchloralkali.com	
<b>Contact person</b>	ORC MSDS Control Group	
<b>Emergency phone number</b>	CHEMTREC	
	US: 1-800-424-9300	Canada: 1-800-567-7455

## 2. Hazard(s) identification

<b>Physical hazards</b>	Oxidizing gases	Category 1
	Gases under pressure	Liquefied gas
<b>Health hazards</b>	Acute toxicity, inhalation	Category 2
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, repeated exposure	Category 1 (Lung)
<b>OSHA defined hazards</b>	Not classified.	

### Label elements



<b>Signal word</b>	Danger
<b>Hazard statement</b>	May cause or intensify fire; oxidizer. Contains gas under pressure; may explode if heated. Causes severe skin burns and eye damage. Fatal if inhaled. May cause respiratory irritation. Causes damage to organs (lung) through prolonged or repeated exposure.
<b>Precautionary statement</b>	
<b>Prevention</b>	Keep/Store away from clothing//combustible materials. Keep reduction valves/valves and fittings free from oil and grease. Do not breathe gas. Use only outdoors or in a well-ventilated area. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection. Wash thoroughly after handling.
<b>Response</b>	In case of fire: Stop leak if safe to do so. Get medical advice/attention if you feel unwell. If inhaled: Remove person to fresh air and keep comfortable for breathing. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Specific treatment is urgent. Wash contaminated clothing before re-use.
<b>Storage</b>	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations.

**Hazard(s) not otherwise classified (HNOC)**

Not classified.

**Environmental hazards**

Hazardous to the aquatic environment, acute hazard Category 1

**Supplemental information**

**Hazard symbol**



**Hazard statement**

Very toxic to aquatic life.

**Precautionary statement**

**Prevention**

Avoid release to the environment.

**Response**

Collect spillage.

### 3. Composition/information on ingredients

**Substances**

Chemical name	Common name and synonyms	CAS number	%
CHLORINE		7782-50-5	98-100

### 4. First-aid measures

**Inhalation**

Move to fresh air. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration. Get medical attention immediately!

**Skin contact**

Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately! Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

**Eye contact**

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

**Ingestion**

Ingestion is not a typical route of exposure for gases or liquefied gases. Contact with liquid form may cause frostbite. Immediately call a poison control center or doctor for treatment advice.

**Most important symptoms/effects, acute and delayed**

Contact with this material will cause burns to the skin, eyes and mucous membranes. Unconsciousness. Cough, shortness of breath, headache, nausea, vomiting. May cause lung damage.

**Indication of immediate medical attention and special treatment needed**

For liquid contact, treat the affected person for frostbite if necessary. If the product is ingested, probable mucosal damage may contraindicate the use of gastric lavage. Treat the affected person appropriately. Provide general supportive measures and treat symptomatically. Symptoms may be delayed.

**General information**

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

**Suitable extinguishing media**

Use fire-extinguishing media appropriate for surrounding materials.

**Unsuitable extinguishing media**

Direct water spray. Direct water spray jet.

**Specific hazards arising from the chemical**

May cause fire or explosion; strong oxidizer. Contents under pressure. Pressurized container may explode when exposed to heat or flame. Contact with reactive metals e.g., aluminum, zinc and tin may result in the generation of flammable hydrogen gas. Water used for fire extinguishing, which has been in contact with the product, may be corrosive. Water spray on active leak may promote accelerated corrosion of container and accelerate rate of leakage.

**Special protective equipment and precautions for firefighters**

Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to: boots gloves, hard hat, splash-proof goggles, full face shield and impervious clothing, i.e. chemically impermeable suit. Compatible materials for response to this material are neoprene and butyl rubber.

**Fire-fighting equipment/instructions**

In case of fire and/or explosion do not breathe fumes. Remove pressurized gas cylinders from the immediate vicinity. Cylinders can burst violently when heated, due to excess pressure build-up. Cool containers / tanks with water spray. Evacuate area and fight fire remotely due to the risk of explosion.

## 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Immediately evacuate personnel to safe areas. Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Keep people away from and upwind of spill/leak. Keep out of low areas. Keep unnecessary personnel away. Ventilate closed spaces before entering them. Wear appropriate protective equipment and clothing during clean-up. Local authorities should be advised if significant spillages cannot be contained.

For response to Chlorine gas it is recommended to use as a minimum level "B" protection that is compatible to Chlorine. For Liquid spills it is recommended to utilize as a minimum enhanced level "B" (Enhanced Level "B" is the addition of a splash hood). Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Responders can reference Chlorine Institute pamphlet #65 on PPE.

### Methods and materials for containment and cleaning up

Extinguish all flames in the vicinity. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Ventilate well, stop flow of gas or liquid if possible. If possible, turn leaking containers so that gas escapes rather than liquid. Dike far ahead of spill for later disposal. Isolate area until gas has dispersed. Neutralize spilled material with crushed limestone, soda ash or lime. Collect spillage.

Never return spills to original containers for re-use. Clean up in accordance with all applicable regulations. For waste disposal, see section 13 of the MSDS.

### Environmental precautions

Avoid discharge into drains, water courses or onto the ground. Contact local authorities in case of spillage to drain/aquatic environment.

## 7. Handling and storage

### Precautions for safe handling

Avoid heat, sparks, open flames and other ignition sources. Keep away from clothing and other combustible materials. Use only chlorine-compatible lubricants. Do not use greases and oils. Do not breathe gas. Do not get in eyes, on skin, on clothing. Use in a sealed system and/or a well-ventilated area. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Avoid release to the environment.

### Conditions for safe storage, including any incompatibilities

Contents under pressure. Keep away from heat, sparks and open flame. Secure cylinders in an upright position at all times, close all valves when not in use. Store in a well-ventilated place. Store away from incompatible materials.

Store at temperatures not exceeding 55°C/131°F. For the above specified temperature the system pressure is 225 psig (1551kPa).

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value
CHLORINE (CAS 7782-50-5)	Ceiling	3 mg/m <sup>3</sup>
		1 ppm

#### US. ACGIH Threshold Limit Values

Material	Type	Value
CHLORINE (CAS 7782-50-5)	STEL	1 ppm
	TWA	0.5 ppm

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Exposure guidelines

Check State and local regulations for other applicable exposure limits.

### Appropriate engineering controls

Should be handled in closed systems, if possible. Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Wear goggles/face shield. Gas-proof goggles are recommended.

#### Skin protection

##### Hand protection

Wear cold insulating gloves. Suitable gloves can be recommended by the glove supplier.

##### Other

Wear appropriate chemical resistant clothing.

#### Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

**General hygiene considerations**

Do not eat, drink or smoke when using the product. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

**9. Physical and chemical properties**

<b>Appearance</b>	Compressed liquefied gas.
<b>Physical state</b>	Gas Compressed, liquified.
<b>Form</b>	Liquefied gas.
<b>Color</b>	Yellow green.
<b>Odor</b>	Pungent.
<b>Odor threshold</b>	1.7 ppm
<b>pH</b>	Not available.
<b>Melting point/freezing point</b>	-149.8 °F (-101 °C) (1 atm)
<b>Initial boiling point and boiling range</b>	-29.27 °F (-34.04 °C) (1 atm)
<b>Flash point</b>	Not applicable.
<b>Evaporation rate</b>	Not available.
<b>Flammability (solid, gas)</b>	Not available.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not applicable.
<b>Flammability limit - lower (%) temperature</b>	Not applicable.
<b>Flammability limit - upper (%)</b>	Not applicable.
<b>Flammability limit - upper (%) temperature</b>	Not applicable.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	113 psia (25°C/77°F) 779 kPa (25 °C/77 °F) 4800 mm Hg (25°C/77°F)
<b>Vapor density</b>	2.5
<b>Relative density</b>	Not available.
<b>Solubility(ies)</b>	0.73 g/100g H <sub>2</sub> O (20°C/68°F) (760 mm Hg)
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	Not available.
<b>Other information</b>	
<b>Bulk density</b>	88.76 lb/ft <sup>3</sup> 59.8 °F (15.6 °C)
<b>Density</b>	0.76 lb/ft <sup>3</sup> 32 °F (0 °C) 53.51 psia
<b>Heat of vaporization</b>	123.9 BTU/lb
<b>Molecular formula</b>	Cl <sub>2</sub>
<b>Molecular weight</b>	70.906 g/mol

**10. Stability and reactivity**

<b>Reactivity</b>	Contact with combustible material may cause fire.
<b>Chemical stability</b>	Stable under normal temperature conditions and recommended use.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.

**Conditions to avoid** Avoid heat, sparks, open flames and other ignition sources. Titanium will react vigorously, resulting in spontaneous ignition, when contacted by Dry Chlorine. Combustion will be supported in carbon steel systems and equipment containing a Chlorine environment at temperatures greater than 480 °F (248.9 °C). Properly purge systems and equipment PRIOR to conducting Hot Work.

**Incompatible materials** Reducing agents. Organic material. Alkalis.

**Hazardous decomposition products** Hydrogen chloride. Hypochlorous acid.

## 11. Toxicological information

### Information on likely routes of exposure

**Ingestion** Causes digestive tract burns.  
**Inhalation** Fatal if inhaled. Irritating to respiratory system.  
**Skin contact** Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.  
**Eye contact** Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. Can cause blurred vision, redness, pain, severe tissue burns and eye damage.

**Symptoms related to the physical, chemical and toxicological characteristics** Contact with this material will cause burns to the skin, eyes and mucous membranes. Cough, shortness of breath, headache, nausea, vomiting. May cause lung damage. Unconsciousness.

### Information on toxicological effects

**Acute toxicity** Fatal if inhaled.  
Irritation Threshold: approximately 0.5 ppm  
Immediately Dangerous to Life or Health: 10.0 ppm.

Product	Species	Test Results
CHLORINE (CAS 7782-50-5)		
<b>Acute</b>		
<i>Inhalation</i>		
LC50	Rat	293 ppm, 1 hr
<b>Skin corrosion/irritation</b>	Causes severe skin burns.	
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.	
<b>Respiratory sensitization</b>	No data available.	
<b>Skin sensitization</b>	No data available.	
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.	
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.	
<b>Reproductive toxicity</b>	No data available.	
<b>Specific target organ toxicity - single exposure</b>	Not available.	
<b>Specific target organ toxicity - repeated exposure</b>	Causes damage to organs (lungs) through prolonged or repeated exposure.	
<b>Aspiration hazard</b>	Due to the physical form of the product it is not an aspiration hazard.	
<b>Chronic effects</b>	Prolonged exposure may cause chronic effects.	
<b>Further information</b>	Be aware that symptoms of lung edema (shortness of breath) may develop up to 24 hours after exposure.	

## 12. Ecological information

**Ecotoxicity** Very toxic to aquatic life with long lasting effects.

Product	Species	Test Results
CHLORINE (CAS 7782-50-5)		
<b>Aquatic</b>		
Crustacea	LC50	Pacific oyster ( <i>Crassostrea gigas</i> ) 637.5 mg/l, 1 hours
		Water flea ( <i>Daphnia magna</i> ) 0.017 mg/l, 46 hours
Fish	LC50	Bluegill ( <i>Lepomis macrochirus</i> ) 0.44 mg/l, 96 hours
		Bullhead, catfish ( <i>Ictalurus sp.</i> ) 0.07 mg/l, 96 hours
		Yellow perch ( <i>Perca flavescens</i> ) 0.88 mg/l, 1 hours

**Persistence and degradability** No data available.

**Bioaccumulative potential** Will not bio-accumulate.

**Mobility in soil** The Gas will disperse in the air. This product is miscible in water.  
**Other adverse effects** No data available.

### 13. Disposal considerations

**Disposal instructions** Return the empty cylinder to the supplier. Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

**Local disposal regulations** Dispose in accordance with all applicable regulations.

**Hazardous waste code** D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]

**Waste from residues / unused products** Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). Avoid discharge into water courses or onto the ground.

**Contaminated packaging** Since emptied cylinders may retain product residue, follow label warnings even after cylinder is emptied.

### 14. Transport information

#### DOT

**UN number** UN1017  
**UN proper shipping name** Chlorine  
**Transport hazard class(es)** 2.3  
**Subsidiary class(es)** 5.1, 8  
**Packing group** Not available.  
**Environmental hazards**  
**Marine pollutant** Yes  
**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.  
**Special provisions** 2, B9, B14, N86, T50, TP19  
**Packaging exceptions** None  
**Packaging non bulk** 304  
**Packaging bulk** 314, 315

#### IATA

**UN number** UN1017  
**UN proper shipping name** Chlorine  
**Transport hazard class(es)** 2.3  
**Subsidiary class(es)** 5.1, 8  
**Packaging group** Not available.  
**Environmental hazards** No  
**Labels required** Not available.  
**ERG Code** 2CP  
**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.

#### IMDG

**UN number** UN1017  
**UN proper shipping name** CHLORINE  
**Transport hazard class(es)** 2.3  
**Subsidiary class(es)** 5.1, 8  
**Packaging group** Not available.  
**Environmental hazards**  
**Marine pollutant** Yes  
**Labels required** Not available.  
**EmS** F-C, S-U  
**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** Not applicable.

### 15. Regulatory information

**US federal regulations** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

Not regulated.

**US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

**CERCLA Hazardous Substance List (40 CFR 302.4)**

CHLORINE (CAS 7782-50-5)

LISTED

## Superfund Amendments and Reauthorization Act of 1986 (SARA)

**Hazard categories**  
Immediate Hazard - Yes  
Delayed Hazard - Yes  
Fire Hazard - No  
Pressure Hazard - Yes  
Reactivity Hazard - Yes

**SARA 302 Extremely hazardous substance** Yes

**SARA 311/312 Hazardous chemical** Yes

### SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
CHLORINE	7782-50-5	98-100

## Other federal regulations

### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

CHLORINE (CAS 7782-50-5)

### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

CHLORINE (CAS 7782-50-5)

**Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)** Hazardous substance

**Safe Drinking Water Act (SDWA)** 4 mg/l  
4.0 mg/l

**Food and Drug Administration (FDA)** Not regulated.

## US state regulations

### US. Massachusetts RTK - Substance List

CHLORINE (CAS 7782-50-5)

### US. New Jersey Worker and Community Right-to-Know Act

CHLORINE (CAS 7782-50-5) 100 lbs

### US. Pennsylvania RTK - Hazardous Substances

CHLORINE (CAS 7782-50-5)

### US. Rhode Island RTK

CHLORINE (CAS 7782-50-5)

### US. California Proposition 65

This product is not listed, but it may contain elements known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 Safe Drinking Water and Toxic Enforcement Act. For additional information, contact Olin Technical Services (800-299-6546).

### US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

## International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

## 16. Other information, including date of preparation or last revision

**Issue date** 23-August-2013

CHLORINE

914483 Version #: 01 Revision date: - Issue date: 23-August-2013

SDS US

7 / 8

**Revision date**  
**Version #**  
**NFPA Ratings**

-  
01



**List of abbreviations**

LD50: Lethal Dose, 50%.  
LC50: Lethal Concentration, 50%.  
EC50: Effective concentration, 50%.  
TWA: Time weighted average.

**References**

EPA: AQUIRE database  
HSDB® - Hazardous Substances Data Bank  
US. IARC Monographs on Occupational Exposures to Chemical Agents  
IARC Monographs. Overall Evaluation of Carcinogenicity  
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

**Disclaimer**

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

**Sulfuric acid**  
Safety Data Sheet

Date of issue: 03/07/2008

Revision date: 05/13/2015

Supersedes: 01/17/2013

Version: 3.0

**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Product form : Substance  
Substance name : Sulfuric acid  
Chemical name : Sulfuric acid  
CAS No : 7664-93-9  
Formula : H<sub>2</sub>SO<sub>4</sub>  
Synonyms : Sulfuric Acid, Mineral Acid, Hydrogen Sulfate, Oil of Vitriol

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

Use of the substance/mixture : Mining  
Fertilizer  
Chemicals

**1.3. Details of the supplier of the safety data sheet**

Freeport-McMoRan Copper and Gold  
333 N. Central Ave  
Phoenix AZ 85004  
Phone: 602-366-8100

**1.4. Emergency telephone number**

Carechem 24 International call centers

US/Canada +1 866 928 0789  
Mexico +52 55 5004 8763  
EU Regional +441235 239670  
Africa/South Africa +44 1235 239671  
Asia/Pacific Regional +65 3158 1074

**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****GHS-US classification**

Skin Corr. 1A H314  
Carc. 1A H350

**2.2. Label elements**

Other hazards which do not result in classification : May cause severe chemical burns to skin and cornea. Respiratory disorders such as bronchitis or asthma; pre-existing skin dermatitis may occur. Irritating to the nose, throat, and respiratory tract.

**2.4. Unknown acute toxicity (GHS US)**

No data available

**SECTION 3: Composition/information on ingredients****3.1. Substances**

Substance type : Mono-constituent  
Name : Sulfuric acid.  
CAS No : 7664-93-9  
EC no : 231-639-5  
EC index no : 016-020-00-8

Name	Product identifier	%	GHS-US classification
Sulfuric acid	(CAS No) 7664-93-9	93 - 98	Skin Corr. 1A, H314 Carc. 1A, H350

Full text of H-phrases: see section 16

**3.2. Mixture**

Not applicable

# Sulfuric acid.

## Safety Data Sheet

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

First-aid measures general	: Speed in removing acid is essential. Treat most urgent symptoms first: cessation of breathing, eye injury, skin contact, or shock. Seek medical attention even if injury appears slight. Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
First-aid measures after inhalation	: IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Immediately call a POISON CENTER or doctor/physician.
First-aid measures after skin contact	: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash off immediately with soap and plenty of water. Immediately call a POISON CENTER or doctor/physician. Wash contaminated clothing before reuse.
First-aid measures after eye contact	: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately flush eyes thoroughly with water for at least 15 minutes. Immediately call a POISON CENTER or doctor/physician.
First-aid measures after ingestion	: IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Do not give an unconscious person anything to drink. Immediately call a POISON CENTER or doctor/physician.

#### 4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries	: Causes severe skin burns and eye damage. Prickling or burning sensation of skin and mucous membranes. Coughing, sneezing, tightness of chest, difficulty in breathing may occur.
Symptoms/injuries after inhalation	: Irritating to the nose, throat, and respiratory tract.
Symptoms/injuries after skin contact	: Can cause chemical burns.
Symptoms/injuries after eye contact	: Corrosive to eyes. contact can cause corneal burns,. Severe eye irritation.
Symptoms/injuries after ingestion	: Severe irritation or burns to the mouth, throat, oesophagus, and stomach.

#### 4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media	: For small fire : Foam. Dry powder. Carbon dioxide. Sand. For large fire : Water spray.
Unsuitable extinguishing media	: Do not use a heavy water stream.

#### 5.2. Special hazards arising from the substance or mixture

Fire hazard	: This material may burn but will not ignite readily. Will not burn but can start fires with organic material, nitrates, carbides, chlorates and metal powders.
Reactivity	: Reacts with most metals to produce hydrogen gas, which can form an explosive mixture with air.

#### 5.3. Advice for firefighters

Firefighting instructions	: Evacuate area and fight fire from a safe distance. Do not direct water into acid tanks. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Avoid (reject) fire-fighting water to enter environment. Hydrogen may accumulate in containers, avoid ignition sources. Addition of water to acid causes heat and potentially explosive mixtures. Spill over into sewers may generate hydrogen gas or sulfides.
Protective equipment for firefighters	: Do not enter fire area without proper protective equipment, including respiratory protection. As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear.
Other information	: For concentrations up to 10 times the exposure limit, use NIOSH approved half- or full-face, air-purifying respirator with acid gas cartridges in combination with particulate filter. For higher concentrations, consult a professional industrial hygienist. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant respirator use.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

##### 6.1.1. For non-emergency personnel

Protective equipment	: For further information refer to section 8 : Exposure-controls/personal protection.
Emergency procedures	: Evacuate unnecessary personnel.

##### 6.1.2. For emergency responders

Protective equipment	: Equip cleanup crew with proper protection. For further information refer to section 8 : Exposure-controls/personal protection.
Emergency procedures	: Ventilate area. Small quantities of liquid spill: neutralize with sodium bicarbonate soda (sodium carbonate) lime or soda ash.

#### 6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

# Sulfuric acid.

## Safety Data Sheet

### 6.3. Methods and material for containment and cleaning up

- For containment : Do not add water to spilled material. Contain and/or absorb spill with inert material (sand, vermiculite or other appropriate material), then place in suitable container.
- Methods for cleaning up : Store away from other materials. Any waste must be disposed of in accordance with federal, state, and local environmental regulations.

### 6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

- Additional hazards when processed : Never add water to containers of acid. If dilution is desired, add acid to water.
- Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapour. Do not breathe dust/fume/gas/mist/vapours/spray. Avoid contact during pregnancy/while nursing. Avoid contact with skin, eyes and clothing. Wear protective gloves/protective clothing and eye/face protection. Chemical manufacturer, importer, or distributor to specify parts of the body to be washed after handling.
- Hygiene measures : Wash thoroughly after handling. Handle in accordance with good industrial hygiene and safety practices.

### 7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Comply with applicable regulations. Provide local exhaust or general room ventilation.
- Storage conditions : Keep container closed when not in use. Do not store near organic or other incompatible materials. Store in a cool and well-ventilated place. Locate tanks away from heat and other sources of ignition. Keep out of direct sunlight.
- Incompatible materials : Strong acid. Strong bases. Organic materials.
- Storage area : Do not store at elevated temperatures.

### 7.3. Specific end use(s)

No additional information available

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Sulfuric acid (7664-93-9)		
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>

### 8.2. Exposure controls

- Appropriate engineering controls : Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Local ventilation at the workplace is recommended. Control airborne concentrations below the exposure limits.
- Personal protective equipment : Gloves. Protective goggles. Insufficient ventilation: wear respiratory protection. Protective clothing.
- Materials for protective clothing : Long sleeved protective clothing. protective clothing.
- Hand protection : Wear protective gloves.
- Eye protection : Wear chemical splash goggle. (ANSI Z87.1 or approved equivalent). Face shield.
- Skin and body protection : Wear suitable protective clothing. wear rubber covers (boots, aprons) when splashing may occurs. Wear protective gloves. Impermeable acid resistant gloves.
- Respiratory protection : Wear appropriate mask. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant respirator use. For concentrations up to 10 times the exposure limit, use NIOSH approved half- or full-face, air-purifying respirator with acid gas cartridges in combination with particulate filter. For higher concentrations, consult a professional industrial hygienist.
- Other information : Do not eat, drink or smoke during use.



## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

- Physical state : Liquid
- Appearance : Oily.
- Molecular mass : 98.08 g/mol
- Colour : Colourless. light brown.

# Sulfuric acid.

## Safety Data Sheet

odour	: characteristic.
Odour threshold	: No data available
pH	: 0 - 2
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: -25.6 °F (-32° C)
Freezing point	: No data available
Boiling point	: 554 °F (290° C)
Flash point	: No data available
Self ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapour pressure	: 0.001 mm Hg at 294.8° F (146 ° C)
Relative vapour density at 20 °C	: 3.4 (Air = 1)
Relative density	: No data available
Solubility	: completely soluble.
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: No data available

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Reacts with most metals to produce hydrogen gas, which can form an explosive mixture with air.

### 10.2. Chemical stability

Stable at normal conditions.

### 10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

### 10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.

### 10.5. Incompatible materials

Strong acids. Strong bases. Avoid contact with metal powders and specifically toxic materials such as cyanide. Contact with these and organic materials, nitrates, carbides and chlorates may cause ignition or generation of toxic gases.

### 10.6. Hazardous decomposition products

Thermal decomposition generates : Corrosive vapours. Sulfur oxides are formed at high temperatures. Acid reacts with incompatible substances to form highly toxic hydrogen cyanide and/or hydrogen sulfide gas.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity : Not classified

Sulfuric acid. ( f )7664-93-9	
LD50 oral rat	2140 mg/kg
LC50 inhalation rat (mg/l)	510 mg/m <sup>3</sup>
ATE (oral)	2140.000 mg/kg

Sulfuric acid (7664-93-9)	
LD50 oral rat	2140 mg/kg
LC50 inhalation rat (mg/l)	510 mg/m <sup>3</sup> (Exposure time: 2 h)

Skin corrosion/irritation : Causes severe skin burns and eye damage.

pH: 0 - 2

Serious eye damage/irritation : Not classified

pH: 0 - 2

Respiratory or skin sensitisation : Not classified

# Sulfuric acid.

## Safety Data Sheet

Germ cell mutagenicity : Not classified. Based on available data, the classification criteria are not met  
Carcinogenicity : May cause cancer.

Sulfuric acid (7664-93-9)	
IARC group	1
Reproductive toxicity	: Not classified. Based on available data, the classification criteria are not met
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: Not classified. Based on available data, the classification criteria are not met
Aspiration hazard	: Not classified. Based on available data, the classification criteria are not met
Potential Adverse human health effects and symptoms	: Based on available data, the classification criteria are not met.
Symptoms/injuries after inhalation	: Irritating to the nose, throat, and respiratory tract.
Symptoms/injuries after skin contact	: Can cause chemical burns.
Symptoms/injuries after eye contact	: Corrosive to eyes. contact can cause corneal burns., Severe eye irritation.
Symptoms/injuries after ingestion	: Severe irritation or burns to the mouth, throat, oesophagus, and stomach.

### SECTION 12: Ecological information

#### 12.1. Toxicity

Sulfuric acid (7664-93-9)	
LC50 fishes 1	> 500 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static])
EC50 Daphnia 1	29 mg/l (Exposure time: 24 h - Species: Daphnia magna)

#### 12.2. Persistence and degradability

Sulfuric acid. (7664-93-9)	
Persistence and degradability	Not established.

#### 12.3. Bioaccumulative potential

Sulfuric acid. (7664-93-9)	
Bioaccumulative potential	Not established.
Sulfuric acid (7664-93-9)	
BCF fish 1	(no bioaccumulation)

#### 12.4. Mobility in soil

No additional information available

#### 12.5. Other adverse effects

Other information : Avoid release to the environment.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Waste disposal recommendations : Waste must be disposed of in accordance with federal, state, and local environmental regulations.  
Additional information : Not a listed RCRA hazardous waste, but if released the material, could be a characteristic hazardous waste (D002).

### SECTION 14: Transport information

In accordance with ADR / RID / ADNR / IMDG / ICAO / IATA

#### 14.1. UN number

UN-No.(DOT) : 1830

#### 14.2. UN proper shipping name

DOT Proper Shipping Name : UN 1830, Sulfuric Acid, 8, II

#### 14.3. Additional information

Other information : Reportable Quantity (RQ) = 1000 lbs.

#### Overland transport

Packing group (ADR) : II  
Class (ADR) : 8 - Corrosive substances  
Hazard identification number (Kemler No.) : 80  
Classification code (ADR) : C1

#### Commented [MC1]:

**DOT:**  
UN 1830 Sulfuric Acid  
Class 8  
Packing Group II

Sulfuric Acid has a reportable quantity of 1000 lbs.

**IATA:**  
UN 1830 Sulfuric Acid  
Class 8  
Packing Group II

**IMDG:**  
UN 1830 Sulfuric Acid  
Class 8  
Packing Group II

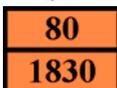
# Sulfuric acid.

## Safety Data Sheet

Danger labels (ADR) : 8 - Corrosive substances



Orange plates :



Tunnel restriction code : E

Excepted quantities (ADR) : E2

### Transport by sea

No additional information available

### Air transport

No additional information available

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

Sulfuric acid. (7664-93-9)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory	
CERCLA Reportable Quantity (RQ)	1000 lb (Regulated. Sulfuric Acid 1000 lbs RQ)
SARA Section 304 Reportable Quantity (RQ)	1000 lb (Regulated. Sulfuric Acid 1000 lbs RQ)
SARA Section 302 Threshold Planning Quantity (TPQ)	1000 lb (Regulated. Sulfuric Acid 1000 lbs TPQ)
SARA Section 313 (TRI) (aerosol forms only)	

### 15.2. International regulations

#### CANADA

Sulfuric acid. (7664-93-9)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class E - Corrosive Material

Sulfuric acid (7664-93-9)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class E - Corrosive Material

### EU-Regulations

Sulfuric acid (7664-93-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances) substances.

### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Skin Corr. 1A H314

Full text of H-phrases: see section 16

### Classification according to Directive 67/548/EEC or 1999/45/EC

C; R35

Full text of R-phrases: see section 16

### 15.2.2. National regulations

Sulfuric acid. (7664-93-9)
Listed (40 CFR 116.4)

Commented [RD2]: This seems like it belongs with rest of US regs in 15.1.

# Sulfuric acid.

## Safety Data Sheet

### Sulfuric acid (7664-93-9)

Listed on IARC (International Agency for Research on Cancer)  
Listed on the AICS (the Australian Inventory of Chemical Substances)  
Listed on Inventory of Existing Chemical Substances (IECSC)  
Listed on the Japanese ENCS (Existing & New Chemicals Substances) inventory.  
Listed on the Korean ECL (Existing Chemical List) inventory.  
Listed on New Zealand - Inventory of Chemicals (NZIoC)  
Listed on Inventory of Chemicals and Chemical Substances (PICCS)  
Poisonous and Deleterious Substances Control Law  
Listed on the Canadian Ingredient Disclosure List

### 15.3. US State regulations

### Sulfuric acid (7664-93-9)

U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Acute  
U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Chronic  
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)  
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)  
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)  
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities  
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations  
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)  
U.S. - Idaho - Occupational Exposure Limits - TWAs  
U.S. - Illinois - Toxic Air Contaminant Carcinogens  
U.S. - Illinois - Toxic Air Contaminants  
U.S. - Louisiana - Reportable Quantity List for Pollutants  
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants  
U.S. - Massachusetts - Allowable Ambient Limits (AALs)  
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Right To Know List  
U.S. - Massachusetts - Threshold Effects Exposure Limits (TELs)  
U.S. - Massachusetts - Toxics Use Reduction Act  
U.S. - Michigan - Occupational Exposure Limits - TWAs  
U.S. - Michigan - Polluting Materials List  
U.S. - Minnesota - Chemicals of High Concern  
U.S. - Minnesota - Hazardous Substance List  
U.S. - Minnesota - Permissible Exposure Limits - TWAs  
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour  
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual  
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances  
U.S. - New Jersey - Environmental Hazardous Substances List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - New Jersey - Special Health Hazards Substances List  
U.S. - New York - Occupational Exposure Limits - TWAs  
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances  
U.S. - North Carolina - Control of Toxic Air Pollutants  
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour  
U.S. - Ohio - Extremely Hazardous Substances - Threshold Quantities  
U.S. - Oregon - Permissible Exposure Limits - TWAs  
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List  
U.S. - Pennsylvania - RTK (Right to Know) List  
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 1-Hour  
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - Annual  
U.S. - South Carolina - Toxic Air Pollutants - Maximum Allowable Concentrations  
U.S. - South Carolina - Toxic Air Pollutants - Pollutant Categories  
U.S. - Tennessee - Occupational Exposure Limits - TWAs  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term  
U.S. - Vermont - Permissible Exposure Limits - TWAs  
U.S. - Washington - Permissible Exposure Limits - STELs  
U.S. - Washington - Permissible Exposure Limits - TWAs  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

# Sulfuric acid.

## Safety Data Sheet

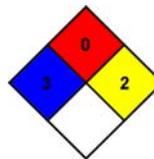
### SECTION 16: Other information

Indication of changes : Revision - 3  
Sources of Key data : REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.  
Other information : None.

Full text of H-phrases: see section 16:

Carc. 1A	Carcinogenicity, Category 1A
Skin Corr. 1A	skin corrosion/irritation Category 1A
H314	Causes severe skin burns and eye damage
H350	May cause cancer

NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.  
NFPA fire hazard : 0 - Materials that will not burn.  
NFPA reactivity : 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.



### HMIS III Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given  
Flammability : 0 Minimal Hazard  
Physical : 2 Moderate Hazard

**Disclaimer:** The information contained herein was obtained from sources we believe to be accurate and is based on the available scientific evidence known to Freeport-McMoRan Corporation. It is provided solely for compliance with various national and international Health and Safety Standards and is not meant to convey analytical information. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this material. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. This document provides transportation and environmental information, but is not the definitive resource and does not replace required training and knowledge required to address transportation and environmental-related requirements, language, or actions. No representations, guarantees or warranties of any kind are made as to the accuracy of the information contained herein, the suitability of the material or the information contained herein for particular applications, the hazards connected with the use of the material, or the results to be obtained from the use thereof. The user assumes all risks and liability of any use, processing, handling or storage of the material, variations in methods, conditions and equipment used to store, handle or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at user's sole discretion. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user.

# SAFETY DATA SHEET



## Orfom® MC 37 Collector

Version 2.3

Revision Date 2017-01-30

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### Product Information

Product Name : Orfom® MC 37 Collector  
Material : 1119737, 1119735, 1119734, 1119733, 1119732, 1119711,  
1108011, 1106092, 1106090, 1106089, 1106091, 1105818

Use : Mineral Collector

Company : Chevron Phillips Chemical Company LP  
Mining Chemicals  
10001 Six Pines Drive  
The Woodlands, TX 77380

#### Emergency telephone:

##### Health:

866.442.9628 (North America)  
1.832.813.4984 (International)

##### Transport:

CHEMTREC 800.424.9300 or 703.527.3887(int'l)  
Asia: +800 CHEMCALL (+800 2436 2255) China:+86-21-22157316  
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)  
Mexico CHEMTREC 01-800-681-9531 (24 hours)  
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

Responsible Department : Product Safety and Toxicology Group  
E-mail address : SDS@CPChem.com  
Website : www.CPChem.com

This product is for experimental uses only. The product has not been completely analyzed and all of the hazards may not be known. Please use caution while handling this product.

### SECTION 2: Hazards identification

#### Classification of the substance or mixture

This product has been classified in accordance with the hazard communication standard 29 CFR 1910.1200; the SDS and labels contain all the information as required by the standard.

#### Classification

: Flammable liquids, Category 4  
Skin irritation, Category 2  
Eye irritation, Category 2A  
Skin sensitization, Category 1  
Carcinogenicity, Category 1B

Reproductive toxicity, Category 2  
 Specific target organ systemic toxicity - repeated exposure,  
 Category 2, Blood, Liver, thymus gland  
 Aspiration hazard, Category 1

**Labeling**

Symbol(s)



Signal Word

: Danger

Hazard Statements

H227: Combustible liquid.  
 H304: May be fatal if swallowed and enters airways.  
 H315: Causes skin irritation.  
 H317: May cause an allergic skin reaction.  
 H319: Causes serious eye irritation.  
 H350: May cause cancer.  
 H361: Suspected of damaging fertility or the unborn child.  
 H373: May cause damage to organs (Blood, Liver, thymus gland) through prolonged or repeated exposure.

Precautionary Statements

**Prevention:**  
 P201 Obtain special instructions before use.  
 P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
 P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.  
**Response:**  
 P302 + P352 IF ON SKIN: Wash with plenty of soap and water.  
 P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
 P331 Do NOT induce vomiting.  
 P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.  
 P337 + P313 If eye irritation persists: Get medical advice/ attention.  
 P362 Take off contaminated clothing and wash before reuse.  
 P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.  
**Storage:**  
 P403 + P235 Store in a well-ventilated place. Keep cool.  
 P405 Store locked up.  
**Disposal:**  
 P501 Dispose of contents/ container to an approved waste disposal plant.

**Carcinogenicity:****IARC**

Group 2B: Possibly carcinogenic to humans  
 Decant (clarified) Oils 64741-62-4

**Orfom® MC 37 Collector**

Version 2.3

Revision Date 2017-01-30

**NTP** Light Cycle Oil 64741-59-9  
 Known to be human carcinogen  
 Light Cycle Oil 64741-59-9

**SECTION 3: Composition/Information on Ingredients**

Synonyms : None Established

Molecular formula : Mixture

Component	CAS-No.	Weight %
Light Cycle Oil	64741-59-9	25 - 75
tert-Dodecanethiol	25103-58-6	25 - 75
Decant (clarified) Oils	64741-62-4	25 - 75

This is an experimental material: The composition of this material may vary.

**SECTION 4: First aid measures**

General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

If inhaled : Consult a physician after significant exposure. If unconscious, place in recovery position and seek medical advice.

In case of skin contact : If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact : Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

**SECTION 5: Firefighting measures**

Flash point : 93 °C (199 °F)

Autoignition temperature : 260 °C (500 °F)

Suitable extinguishing media : Carbon dioxide (CO<sub>2</sub>).

Unsuitable extinguishing media : High volume water jet.

Specific hazards during fire fighting : Do not allow run-off from fire fighting to enter drains or water courses.

Special protective equipment for fire-fighters : Wear self-contained breathing apparatus for firefighting if necessary.

- Further information** : Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.
- Fire and explosion protection** : Do not spray on an open flame or any other incandescent material. Keep away from open flames, hot surfaces and sources of ignition.
- Hazardous decomposition products** : Carbon oxides. Sulfur oxides.

**SECTION 6: Accidental release measures**

- Personal precautions** : Use personal protective equipment. Ensure adequate ventilation.
- Environmental precautions** : Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
- Methods for cleaning up** : Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

**SECTION 7: Handling and storage****Handling**

- Advice on safe handling** : Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
- Advice on protection against fire and explosion** : Do not spray on an open flame or any other incandescent material. Keep away from open flames, hot surfaces and sources of ignition.

**Storage**

- Requirements for storage areas and containers** : No smoking. Keep in a well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

**Ortom® MC 37 Collector**

Version 2.3

Revision Date 2017-01-30

**SECTION 8: Exposure controls/personal protection****Ingredients with workplace control parameters****Chevron Phillips Chemical Company LP**

Ingredients	Basis	Value	Control parameters	Note
tert-Dodecanethiol	Manufacturer	TWA	0.1 ppm,	

**US**

Ingredients	Basis	Value	Control parameters	Note
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## Hazardous components without workplace control parameters

**Engineering measures**

Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

**Personal protective equipment**

- Respiratory protection** : Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as: Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.
- Hand protection** : The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
- Eye protection** : Eye wash bottle with pure water. Tightly fitting safety goggles.
- Skin and body protection** : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate: Flame retardant protective clothing. Remove and wash contaminated clothing before re-use. Skin should be washed after contact. Footwear protecting against chemicals.
- Hygiene measures** : When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

**SECTION 9: Physical and chemical properties****Information on basic physical and chemical properties****Appearance**

Physical state : Liquid  
 Color : Dark Brown  
 Odor : Pungent

**Safety data**

Flash point : 93 °C (199 °F)  
 Lower explosion limit : 0.6 %(V)  
 Oxidizing properties : no  
 Autoignition temperature : 260 °C (500 °F)  
 Molecular formula : Mixture  
 Molecular weight : Not applicable  
 pH : Not applicable  
 Pour point : No data available  
 Boiling point/boiling range : 110 - 427 °C (230 - 801 °F)  
 Vapor pressure : 1.00 MMHG  
 at 25 °C (77 °F)  
 Relative density : No data available  
 Density : 0.9529 g/cm3  
 Water solubility : Negligible  
 Partition coefficient: n-  
 octanol/water : No data available  
 Viscosity, kinematic : No data available  
 Relative vapor density : 1  
 (Air = 1.0)  
 Evaporation rate : < 1

**SECTION 10: Stability and reactivity**

Chemical stability : This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Orfom® MC 37 Collector**

Version 2.3

Revision Date 2017-01-30

**Possibility of hazardous reactions**

Conditions to avoid : Heat, flames and sparks.  
 Hazardous decomposition products : Carbon oxides  
 Sulfur oxides

Other data : No decomposition if stored and applied as directed.

**SECTION 11: Toxicological information****THE TOXICITY OF THIS MATERIAL HAS NOT BEEN FULLY ASSESSED**

Since this is an experimental material, limited data are available regarding potential health effects following exposure to it. Therefore, we strongly recommend that this document be read carefully and the precautions outlined in it be followed to minimize exposure.

This product is for experimental uses only. The product has not been completely analyzed and all of the hazards may not be known. Please use caution while handling this product.

**Orfom® MC 37 Collector**

**Acute oral toxicity** : LD50: > 3,000 mg/kg  
 Method: Acute toxicity estimate

**Orfom® MC 37 Collector**

**Acute inhalation toxicity** : LC50: > 14 mg/l  
 Exposure time: 4 h  
 Test atmosphere: vapor  
 Method: Acute toxicity estimate

**Orfom® MC 37 Collector**

**Acute dermal toxicity** : LD50: > 3,000 mg/kg  
 Method: Acute toxicity estimate

**Orfom® MC 37 Collector**

**Skin irritation** : Skin irritation

**Orfom® MC 37 Collector**

**Eye irritation** : Eye irritation

**Orfom® MC 37 Collector**

**Sensitization** : Causes sensitization.

**Repeated dose toxicity**

Light Cycle Oil : Species: Rat, males  
 Sex: males  
 Application Route: Dermal  
 Dose: 0, 8, 25, 125, 500, 1250 mg/kg  
 Exposure time: 90 day  
 Number of exposures: 5 days/wk  
 NOEL: 25 mg/kg  
 Target Organs: Blood, Liver, Thymus

tert-Dodecanethiol

Species: Rat, females  
Sex: females  
Application Route: Dermal  
Dose: 0, 8, 25, 125, 500, 1250 mg/kg  
Exposure time: 90 day  
Number of exposures: 5 days/wk  
NOEL: 125 mg/kg  
Target Organs: Blood, Liver, Thymus

Species: Rat, male  
Sex: male  
Application Route: Inhalation  
Dose: 0, 26, 98 ppm  
Exposure time: 4 wk  
Number of exposures: 6 h/d, 5 d/wk  
Lowest observable effect level: 26 ppm  
Method: OECD Test Guideline 412  
Target Organs: Kidney, Liver

Species: Rat, female  
 Sex: female  
 Application Route: Inhalation  
 Dose: 0, 26, 98 ppm  
 Exposure time: 4 wk  
 Number of exposures: 6 h/d, 5 d/wk  
 NOEL: 26 ppm  
 Method: OECD Guideline 412  
 Target Organs: Liver, Kidney

Species: Dog, male and female  
 Sex: male and female  
 Application Route: Inhalation  
 Dose: 0, 25, 106 ppm  
 Exposure time: 4 wk  
 Number of exposures: 6 h/d, 5 d/wk  
 NOEL: 25 ppm  
 Lowest observable effect level: 109 ppm  
 Method: OECD Test Guideline 412  
 Target Organs: Liver

Species: Mouse, male and female  
 Sex: male and female  
 Application Route: Inhalation  
 Dose: 0, 25, 109 ppm  
 Exposure time: 4 wk  
 Number of exposures: 6 h/d, 5 d/wk  
 Lowest observable effect level: 25 ppm  
 Method: OECD Test Guideline 412  
 Target Organs: Liver

Species: Rat, male  
 Sex: male  
 Application Route: oral gavage  
 Dose: 10, 50, 250 mg/kg  
 Exposure time: 35 d  
 Number of exposures: once daily  
 NOEL: 50 mg/kg  
 Method: OECD Guideline 422  
 Target Organs: Liver, spleen  
 Information given is based on data obtained from similar substances.

Species: Rat, female  
 Sex: female  
 Application Route: oral gavage  
 Dose: 10, 50, 250 mg/kg  
 Exposure time: 53 d  
 Number of exposures: once daily  
 NOEL: 50 mg/kg  
 Method: OECD Guideline 422  
 Target Organs: Liver, spleen  
 Information given is based on data obtained from similar substances.

Decant (clarified) Oils

Species: Rat  
 Application Route: Dermal  
 Dose: 0, 8, 30, 125, 500 mg/kg  
 Exposure time: 13 wk  
 Lowest observable effect level: 8 mg/kg

Target Organs: Liver

**Orfom® MC 37 Collector  
Carcinogenicity**

: Method: Expected to be carcinogenic based on individual component data.

**Reproductive toxicity**

tert-Dodecanethiol

: Species: Rat  
Sex: male  
Application Route: oral gavage  
Dose: 10, 50, 250 mg/kg/d  
Exposure time: 35 d  
Number of exposures: Daily  
Method: OECD Guideline 422  
NOAEL Parent:  $\geq$  250 mg/kg  
Information given is based on data obtained from similar substances.Species: Rat  
Sex: female  
Application Route: oral gavage  
Dose: 10, 50, 250 mg/kg/d  
Exposure time: 53 d  
Number of exposures: Daily  
Method: OECD Guideline 422  
NOAEL Parent: 50 mg/kg  
NOAEL F1: 50 mg/kg  
Information given is based on data obtained from similar substances.  
Decrease in Delivery Index

Decant (clarified) Oils

Suspected of damaging fertility or the unborn child.

**Developmental Toxicity**

Light Cycle Oil

: Species: Rat  
Application Route: Dermal  
Dose: 1, 50, 250 mg/kg/d  
Number of exposures: once daily  
Test period: GD 0-19  
Method: OECD Guideline 414  
NOAEL Teratogenicity: 1 mg/kg  
NOAEL Maternal: 1 mg/kg

tert-Dodecanethiol

Species: Rat  
Application Route: Inhalation  
Dose: 0, 22.7, 88.6 ppm  
Number of exposures: 6 hrs/d  
Test period: GD 6-19  
Method: OECD Guideline 414  
NOAEL Teratogenicity:  $\geq$  88.6 ppm  
No adverse effects expected

	<p>Species: Mouse          Application Route: Inhalation          Dose: 0, 22.7, 88.6 ppm          Number of exposures: 6 hrs/d          Test period: GD 6-19          Method: OECD Guideline 414          NOAEL Teratogenicity: <math>\geq</math> 88.6 ppm          No adverse effects expected</p>
Decant (clarified) Oils	<p>Species: Rat          Application Route: Dermal          Dose: 0, 0.05, 1, 50, 250 mg/kg/bw/d          Exposure time: 6h/d          Number of exposures: daily          Test period: GD 0-19          NOAEL Teratogenicity: 0.05 mg/kg          NOAEL Maternal: 0.05 mg/kg          Suspected of damaging fertility or the unborn child.</p>
<b>Orfom® MC 37 Collector</b>	
<b>Aspiration toxicity</b>	: May be fatal if swallowed and enters airways.
<b>CMR effects</b>	
Light Cycle Oil	: Carcinogenicity: Possible human carcinogen
tert-Dodecanethiol	<p>Carcinogenicity: Not available          Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.          Teratogenicity: Animal testing did not show any effects on fetal development.          Reproductive toxicity: No toxicity to reproduction</p>
Decant (clarified) Oils	<p>Carcinogenicity: Possible human carcinogen          Reproductive toxicity: Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.</p>
<b>Orfom® MC 37 Collector</b>	
<b>Further information</b>	: Solvents may degrease the skin.

**SECTION 12: Ecological information****Toxicity to fish**

Light Cycle Oil	: LL50: > 0.3 mg/l Exposure time: 96 h Species: <i>Oncorhynchus mykiss</i> (rainbow trout) semi-static test Method: OECD Test Guideline 203
tert-Dodecanethiol	<p>LL50: &gt; 100 mg/l          Exposure time: 96 h          Species: <i>Danio rerio</i> (Zebra Fish)          static test Method: OECD Test Guideline 203          No toxicity at the limit of solubility.</p>
Decant (clarified) Oils	LL50: 79 mg/l

Exposure time: 96 h  
 semi-static test Method: OECD Test Guideline 203  
 Information given is based on data obtained from similar substances.

#### Toxicity to daphnia and other aquatic invertebrates

Light Cycle Oil : EL50: 0.32 mg/l  
 Exposure time: 48 h  
 Species: *Daphnia magna* (Water flea)  
 Immobilization Method: OECD Test Guideline 202

tert-Dodecanethiol EC50: > 0.056 mg/l  
 Exposure time: 48 h  
 Species: *Daphnia magna* (Water flea)  
 semi-static test Method: OECD Test Guideline 202  
 No toxicity at the limit of solubility.

Decant (clarified) Oils EL50: 0.22 mg/l  
 Exposure time: 48 h  
 Species: *Daphnia magna* (Water flea)  
 static test Method: OECD Test Guideline 202

#### Toxicity to algae

Light Cycle Oil : EL50: 0.51 mg/l  
 Exposure time: 72 h  
 Species: *Pseudokirchneriella subcapitata* (green algae)  
 Growth inhibition Method: OECD Test Guideline 201

Decant (clarified) Oils EL50: 0.32 mg/l  
 Exposure time: 72 h  
 static test Method: OECD Test Guideline 201

M-Factor  
 Distillates (petroleum), light catalytic cracked : 1  
 Clarified oils (petroleum), catalytic cracked : 1

#### Toxicity to bacteria

tert-Dodecanethiol : NOEC: 8.6 mg/l  
 Exposure time: 3 h  
 Growth rate  
 Respiration inhibition  
 Method: OECD Test Guideline 209

NOEC: > 10 mg/l  
 Exposure time: 3 h  
 Growth rate  
 Respiration inhibition  
 Method: OECD Test Guideline 209

#### Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

tert-Dodecanethiol : NOEC: 0.0108 mg/l  
 Exposure time: 21 d  
 Species: Daphnia magna (Water flea)  
 semi-static test  
 Method: OECD Test Guideline 211  
 No toxicity at the limit of solubility.

#### Elimination information (persistence and degradability)

#### Bioaccumulation

tert-Dodecanethiol : Species: Danio rerio (zebra fish)  
 Exposure time: 15 d  
 Bioconcentration factor (BCF): > 500 - < 1,950  
 Method: OECD Test Guideline 305  
 Biomagnification factor <1  
 The product may be accumulated in organisms.

Biodegradability : Taking into consideration the properties of several ingredients, the product is estimated not to be readily biodegradable according to OECD classification.

#### Ecotoxicology Assessment

Acute aquatic toxicity  
 Light Cycle Oil : Very toxic to aquatic life.

tert-Dodecanethiol : No toxicity at the limit of solubility.

Decant (clarified) Oils : Very toxic to aquatic life.

Chronic aquatic toxicity  
 Light Cycle Oil : Very toxic to aquatic life with long lasting effects.

tert-Dodecanethiol : May cause long lasting harmful effects to aquatic life.

Decant (clarified) Oils : Very toxic to aquatic life with long lasting effects.

Toxicity Data on Soil  
 tert-Dodecanethiol : Adsorbs on soil.

Results of PBT assessment  
 Light Cycle Oil : Non-classified PBT substance, Non-classified vPvB substance

tert-Dodecanethiol : Non-classified PBT substance, Non-classified vPvB substance

Decant (clarified) Oils : Non-classified PBT substance, Non-classified vPvB substance

Additional ecological  
 information : Very toxic to aquatic life with long lasting effects.

#### SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

- Product : The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
- Contaminated packaging : Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

**SECTION 14: Transport information**

**The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).**

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

**US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)**

UN1268, PETROLEUM DISTILLATES, N.O.S., COMBUSTIBLE LIQUID, III

**IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (LIGHT CYCLE OIL, DECANT (CLARIFIED) OILS), 9, III, (93 °C), MARINE POLLUTANT, (LIGHT CYCLE OIL, DECANT (CLARIFIED) OILS)

**IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)**

UN3334, AVIATION REGULATED LIQUID, N.O.S., (LIGHT CYCLE OIL, DECANT (CLARIFIED) OILS), 9, III

**ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (LIGHT CYCLE OIL, DECANT (CLARIFIED) OILS), 9, III, (E)

**RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (LIGHT CYCLE OIL, DECANT (CLARIFIED) OILS), 9, III

**ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (LIGHT CYCLE OIL, DECANT (CLARIFIED) OILS), 9, III

Transport In bulk according to Annex II of MARPOL 73/78 and the IBC Code

### SECTION 15: Regulatory information

#### National legislation

**SARA 311/312 Hazards** : Fire Hazard  
Acute Health Hazard  
Chronic Health Hazard

#### EPCRA - EMERGENCY PLANNING COMMUNITY RIGHT - TO - KNOW

**CERCLA Reportable Quantity** : This material does not contain any components with a CERCLA RQ.

**SARA 302 Reportable Quantity** : This material does not contain any components with a SARA 302 RQ.

**SARA 302 Threshold Planning Quantity** : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 304 Reportable Quantity** : This material does not contain any components with a section 304 EHS RQ.

**SARA 313 Ingredients** : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

#### Clean Air Act

**Ozone-Depletion Potential** : This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCM! Intermediate or Final VOC's (40 CFR 60.489).

### US State Regulations

#### Pennsylvania Right To Know

: tert-Dodecanethiol - 25103-58-6

#### California Prop. 65 Ingredients

: WARNING! This product contains a chemical known in the State of California to cause cancer.  
Decant (clarified) Oils 64741-62-4

### Notification status

#### Europe REACH

: A substance or substances in this product is not registered or notified to be registered. Importation or manufacture of this product is still permitted provided that it does not exceed the REACH minimum threshold quantity of the non-regulated substances.

#### Switzerland CH INV

: On the inventory, or in compliance with the inventory

#### United States of America (USA)

: On TSCA Inventory

#### TSCA

#### Canada DSL

: All components of this product are on the Canadian DSL

#### Australia AICS

: On the inventory, or in compliance with the inventory

#### New Zealand NZIoC

: Not in compliance with the inventory

#### Japan ENCS

: On the inventory, or in compliance with the inventory

#### Korea KECI

: On the inventory, or in compliance with the inventory

#### Philippines PICCS

: Not in compliance with the inventory

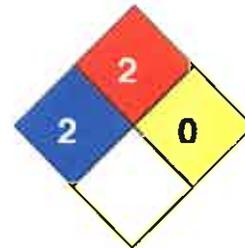
#### China IECSC

: On the inventory, or in compliance with the inventory

## SECTION 16: Other Information

### NFPA Classification

: Health Hazard: 2  
Fire Hazard: 2  
Reactivity Hazard: 0



### Further information

Legacy SDS Number : CPC00568

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		



## ORFOM® MCO Collector

Version 2.1

Revision Date 2015-10-15

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### Product information

Product Name : ORFOM® MCO Collector  
 Material : 1117263, 1114151, 1108013, 1104301, 1096190, 1086158,  
 1016847, 1016846

Use : Mineral Processing Aide

Company : Chevron Phillips Chemical Company LP  
 Specialty Chemicals  
 10001 Six Pines Drive  
 The Woodlands, TX 77380

#### Emergency telephone:

##### Health:

866.442.9628 (North America)

1.832.813.4984 (International)

##### Transport:

CHEMTREC 1.800.424.9300 (within USA and Canada) or 703.527.3887 (outside USA and Canada)

Asia: +800 CHEMCALL (+800 2436 2255) China: +86-21-22157316

EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

Responsible Department : Product Safety and Toxicology Group  
 E-mail address : SDS@CPChem.com  
 Website : www.CPChem.com

### SECTION 2: Hazards identification

#### Classification of the substance or mixture

This product has been classified in accordance with the hazard communication standard 29 CFR 1910.1200; the SDS and labels contain all the information as required by the standard.

#### Emergency Overview

#### Danger

**Physical state:** Liquid    **Color:** Black    **Odor:** Mild

OSHA Hazards : Combustible Liquid, Aspiration hazard, Carcinogen, Moderate skin irritant, Target Organ Effects

#### Classification

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

: Flammable liquids , Category 4  
 Skin irritation , Category 2  
 Carcinogenicity , Category 1B  
 Specific target organ systemic toxicity - repeated exposure ,  
 Category 2 , Blood, Liver, thymus gland  
 Aspiration hazard , Category 1

**Labeling**

Symbol(s)



Signal Word

: Danger

Hazard Statements

: H227: Combustible liquid.  
 H304: May be fatal if swallowed and enters airways.  
 H315: Causes skin irritation.  
 H350: May cause cancer.  
 H373: May cause damage to organs (Blood, Liver, thymus)  
 through prolonged or repeated exposure.

Precautionary Statements

: **Prevention:**  
 P201 Obtain special instructions before use.  
 P202 Do not handle until all safety precautions have been read and understood.  
 P210 Keep away from heat/sparks/open flames/hot surfaces.  
 - No smoking.  
 P260 Do not breathe dust/fume/gas/mist/vapor/spray.  
 P264 Wash skin thoroughly after handling.  
 P271 Use only outdoors or in a well-ventilated area.  
 P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.  
**Response:**  
 P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.  
 P302 + P352 IF ON SKIN: Wash with plenty of soap and water.  
 P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.  
 P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
 P331 Do NOT induce vomiting.  
 P332 + P313 If skin irritation occurs: Get medical advice/ attention.  
 P362 Take off contaminated clothing and wash before reuse.  
 P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.  
**Storage:**  
 P403 + P235 Store in a well-ventilated place. Keep cool.  
 P405 Store locked up.  
**Disposal:**  
 P501 Dispose of contents/ container to an approved waste disposal plant.

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

**Carcinogenicity:****IARC**

Group 2B: Possibly carcinogenic to humans

Decant (clarified) Oils 64741-62-4

Light Cycle Oil 64741-59-9

**NTP**

No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

**ACGIH**

No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

**SECTION 3: Composition/information on ingredients**

Synonyms : Flotation Oil

Molecular formula : Mixture

Component	CAS-No.	Weight %
Decant (clarified) Oils	64741-62-4	0 - 80
Light Cycle Oil	64741-59-9	0 - 80

**SECTION 4: First aid measures**

General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

If inhaled : Consult a physician after significant exposure. If unconscious place in recovery position and seek medical advice.

In case of skin contact : If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact : Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

**SECTION 5: Firefighting measures**

Flash point : 91 °C (196 °F)  
Method: PMCC

Autoignition temperature : No data available

Suitable extinguishing media : Carbon dioxide (CO<sub>2</sub>).

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

- |  |   |  |
|--|---|--|
| Unsuitable extinguishing media                 | : | High volume water jet.   |
| Specific hazards during fire fighting          | : | Do not allow run-off from fire fighting to enter drains or water courses.  |
| Special protective equipment for fire-fighters | : | Wear self-contained breathing apparatus for firefighting if necessary.   |
| Further information                            | : | Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers. |
| Fire and explosion protection                  | : | Do not spray on an open flame or any other incandescent material. Keep away from open flames, hot surfaces and sources of ignition.  |
| Hazardous decomposition products               | : | Carbon oxides. Sulfur oxides.  |

**SECTION 6: Accidental release measures**

- |                           |   |   |
|---------------------------|---|---|
| Personal precautions      | : | Use personal protective equipment. Ensure adequate ventilation.   |
| Environmental precautions | : | Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.   |
| Methods for cleaning up   | : | Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal. |

**SECTION 7: Handling and storage****Handling**

- |   |   |  |
|---|---|--|
| Advice on safe handling                         | : | Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. Dispose of rinse water in accordance with local and national regulations. |
| Advice on protection against fire and explosion | : | Do not spray on an open flame or any other incandescent material. Keep away from open flames, hot surfaces and sources of ignition.  |

**Storage**

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

Requirements for storage areas and containers : No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

**SECTION 8: Exposure controls/personal protection****Engineering measures**

Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

**Personal protective equipment**

- Respiratory protection : Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as: Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.
- Hand protection : The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
- Eye protection : Eye wash bottle with pure water. Tightly fitting safety goggles.
- Skin and body protection : Choose body protection according to the amount and concentration of the dangerous substance at the work place. Wear as appropriate: Flame retardant protective clothing. Footwear protecting against chemicals.
- Hygiene measures : When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

**SECTION 9: Physical and chemical properties****Information on basic physical and chemical properties****Appearance**

Physical state : Liquid

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

Color	: Black
Odor	: Mild
<b>Safety data</b>	
Flash point	: 91 °C (196 °F) Method: PMCC
Lower explosion limit	: No data available
Upper explosion limit	: No data available
Autoignition temperature	: No data available
Molecular formula	: Mixture
Molecular weight	: Not applicable
pH	: Not applicable
Pour point	: No data available
Boiling point/boiling range	: 165 - 538 °C (329 - 1,000 °F)
Vapor pressure	: 1.00 MMHG at 21 °C (70 °F) estimated
Relative density	: 0.985 at 15.6 °C (60.1 °F)
Water solubility	: Negligible
Partition coefficient: n-octanol/water	: No data available
Viscosity, kinematic	: 35 - 45 cSt at 25 °C (77 °F)
Relative vapor density	: 3 (Air = 1.0)
Evaporation rate	: 1

**SECTION 10: Stability and reactivity**

Chemical stability : This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Possibility of hazardous reactions**

Conditions to avoid : Heat, flames and sparks.

Materials to avoid : May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

Hazardous decomposition products : Carbon oxides  
Sulfur oxides

Other data : No decomposition if stored and applied as directed.

**SECTION 11: Toxicological information****ORFOM® MCO Collector**

**Acute oral toxicity** : : 3,678 mg/kg  
Method: Acute toxicity estimate

Acute toxicity estimate: 2,298 mg/kg  
Method: Calculation method

**ORFOM® MCO Collector**

**Acute inhalation toxicity** : Acute toxicity estimate: 1.42 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: Calculation method

: > 5 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: Acute toxicity estimate

Acute toxicity estimate: 2.72 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: Calculation method

**ORFOM® MCO Collector**

**Acute dermal toxicity** : : > 2,000 mg/kg  
Method: Acute toxicity estimate

**ORFOM® MCO Collector**

**Skin irritation** : Irritating to skin.

**ORFOM® MCO Collector**

**Eye irritation** : Vapors may cause irritation to the eyes, respiratory system and the skin.

**ORFOM® MCO Collector**

**Sensitization** : Contains no substance or substances classified as sensitizing. Information refers to the main ingredient.

**Repeated dose toxicity**

Decant (clarified) Oils : Species: Rat  
Application Route: Dermal  
Dose: 0, 8, 30, 125, 500 mg/kg  
Exposure time: 13 wk  
Lowest observable effect level: 8 mg/kg  
Target Organs: Liver

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

Light Cycle Oil

Species: Rat, males  
 Sex: males  
 Application Route: Dermal  
 Dose: 0, 8, 25, 125, 500, 1250 mg/kg  
 Exposure time: 90 day  
 Number of exposures: 5 days/wk  
 NOEL: 25 mg/kg  
 Target Organs: Blood, Liver, Thymus

Species: Rat, females  
 Sex: females  
 Application Route: Dermal  
 Dose: 0, 8, 25, 125, 500, 1250 mg/kg  
 Exposure time: 90 day  
 Number of exposures: 5 days/wk  
 NOEL: 125 mg/kg  
 Target Organs: Blood, Liver, Thymus

**Reproductive toxicity**

Decant (clarified) Oils : Suspected of damaging fertility or the unborn child.

**Developmental Toxicity**

Decant (clarified) Oils : Species: Rat  
 Application Route: Dermal  
 Dose: 0, 0.5, 1, 10, 50, 250 mg/kg  
 Exposure time: 6h/d  
 Number of exposures: daily  
 Test period: GD 0-19  
 NOAEL Teratogenicity: 0.05 mg/kg  
 NOAEL Maternal: 0.05 mg/kg  
 Suspected of damaging fertility or the unborn child.

Light Cycle Oil

Species: Rat  
 Application Route: Dermal  
 Dose: 0, 25, 50, 125, 250, 500, 1...  
 Number of exposures: daily  
 Test period: GD 0-19  
 NOAEL Maternal: 125 mg/kg

**ORFOM® MCO Collector  
Aspiration toxicity**

: May be fatal if swallowed and enters airways.

**CMR effects**

Decant (clarified) Oils : Carcinogenicity: Possible human carcinogen  
 Reproductive toxicity: Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

Light Cycle Oil

Carcinogenicity: Possible human carcinogen

**ORFOM® MCO Collector  
Further information**

: Solvents may decrease the skin. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

**SECTION 12: Ecological information****Toxicity to fish**

Decant (clarified) Oils : LL50: 79 mg/l  
 Exposure time: 96 h  
 semi-static test Method: OECD Test Guideline 203  
 Information given is based on data obtained from similar substances.

Light Cycle Oil LL50: > 0.3 mg/l  
 Exposure time: 96 h  
 Species: Oncorhynchus mykiss (rainbow trout)  
 semi-static test Method: OECD Test Guideline 203

**Toxicity to daphnia and other aquatic invertebrates**

Decant (clarified) Oils : EL50: 0.22 mg/l  
 Exposure time: 48 h  
 Species: Daphnia magna (Water flea)  
 static test Method: OECD Test Guideline 202

Light Cycle Oil EL50: 0.32 mg/l  
 Exposure time: 48 h  
 Species: Daphnia magna (Water flea)  
 Immobilization Method: OECD Test Guideline 202

**Toxicity to algae**

Decant (clarified) Oils : EL50: 0.32 mg/l  
 Exposure time: 72 h  
 static test Method: OECD Test Guideline 201

Light Cycle Oil EL50: 0.51 mg/l  
 Exposure time: 72 h  
 Species: Pseudokirchneriella subcapitata (green algae)  
 Growth inhibition Method: OECD Test Guideline 201

M-Factor  
 Clarified oils (petroleum), catalytic cracked : 1  
 Distillates (petroleum), light catalytic cracked : 1

Elimination information (persistence and degradability)

Biodegradability : This material is not expected to be readily biodegradable.

**Ecotoxicology Assessment**

Acute aquatic toxicity  
 Decant (clarified) Oils : Very toxic to aquatic life.

Light Cycle Oil : Very toxic to aquatic life.

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

Chronic aquatic toxicity Decant (clarified) Oils	: Very toxic to aquatic life with long lasting effects.
Light Cycle Oil	: Very toxic to aquatic life with long lasting effects.
Results of PBT assessment Decant (clarified) Oils	: Non-classified PBT substance, Non-classified vPvB substance
Light Cycle Oil	: Non-classified PBT substance, Non-classified vPvB substance
Additional ecological information	: Very toxic to aquatic life with long lasting effects.

**SECTION 13: Disposal considerations**

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product	: The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	: Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

**SECTION 14: Transport information**

**The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).**

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

**US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)**

UN1268, PETROLEUM DISTILLATES, N.O.S., COMBUSTIBLE LIQUID, III

**IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DECANT (CLARIFIED) OILS, LIGHT CYCLE OIL), 9, III, (91 °C), MARINE POLLUTANT, (DECANT (CLARIFIED) OILS, LIGHT CYCLE OIL)

**IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DECANT

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

(CLARIFIED) OILS, LIGHT CYCLE OIL), 9, III

**ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DECANT (CLARIFIED) OILS, LIGHT CYCLE OIL), 9, III, (E)

**RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DECANT (CLARIFIED) OILS, LIGHT CYCLE OIL), 9, III

**ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DECANT (CLARIFIED) OILS, LIGHT CYCLE OIL), 9, III

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code****SECTION 15: Regulatory information****National legislation**

<b>SARA 311/312 Hazards</b>	: Fire Hazard Acute Health Hazard Chronic Health Hazard
CERCLA Reportable Quantity	: This material does not contain any components with a CERCLA RQ.
SARA 302 Reportable Quantity	: This material does not contain any components with a SARA 302 RQ.
SARA 302 Threshold Planning Quantity	: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 304 Reportable Quantity	: This material does not contain any components with a section 304 EHS RQ.
SARA 313 Ingredients	: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

**Clean Air Act**

Ozone-Depletion Potential : This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 12 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMII Intermediate or Final VOC's (40 CFR 60.489).

**US State Regulations****Pennsylvania Right To Know**

: Decant (clarified) Oils - 64741-62-4  
Light Cycle Oil - 64741-59-9

**New Jersey Right To Know**

: Decant (clarified) Oils - 64741-62-4  
Light Cycle Oil - 64741-59-9

**California Prop. 65  
Ingredients**

: WARNING! This product contains a chemical known in the State of California to cause cancer.

WARNING! This product contains a chemical known in the State of California to cause cancer.

Decant (clarified) Oils 64741-62-4

**Notification status**

Europe REACH : Not in compliance with the inventory  
United States of America TSCA : On TSCA Inventory  
Canada DSL : All components of this product are on the Canadian DSL.  
Australia AICS : On the inventory, or in compliance with the inventory  
New Zealand NZIoC : Not in compliance with the inventory  
Japan ENCS : On the inventory, or in compliance with the inventory  
Korea KECI : On the inventory, or in compliance with the inventory  
Philippines PICCS : Not in compliance with the inventory  
China IECSC : On the inventory, or in compliance with the inventory

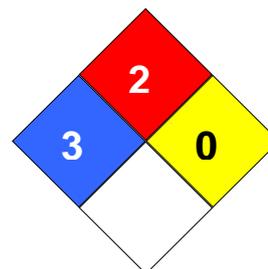
**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

**SECTION 16: Other information**

**NFPA Classification** : Health Hazard: 3  
Fire Hazard: 2  
Reactivity Hazard: 0

**Further information**

Legacy SDS Number : 59730

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical	TWA	Time Weighted Average

**ORFOM® MCO Collector**

Version 2.1

Revision Date 2015-10-15

	Substances in China		
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

#### Section: 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : NALCO® 8338

Other means of identification : Not applicable.

Recommended use : CLOSED SYSTEM CORROSION INHIBITOR

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois 60563-1198  
USA  
TEL: (630)305-1000

Emergency telephone number : (800) 424-9300 (24 Hours) CHEMTREC

Issuing date : 05/24/2016

#### Section: 2. HAZARDS IDENTIFICATION

##### GHS Classification

Oxidizing liquids : Category 3

Acute toxicity (Oral) : Category 4

Skin corrosion : Category 1

Serious eye damage : Category 1

Specific target organ toxicity - single exposure (Oral) : Category 1 (Blood)

##### GHS Label element

Hazard pictograms : 

Signal Word : Danger

Hazard Statements : May intensify fire; oxidiser.  
Harmful if swallowed.  
Causes severe skin burns and eye damage.  
Causes damage to organs (Blood) if swallowed.

Precautionary Statements : **Prevention:**  
Keep away from heat. Keep/Store away from clothing and other combustible materials. Do not breathe dust/fume/gas/mist/vapours/spray. Wear protective gloves/ protective clothing/ eye protection/ face protection.  
**Response:**  
IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing.

# SAFETY DATA SHEET

**NALCO® 8338**

Rinse skin with water/shower. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.  
IF exposed: Call a POISON CENTER or doctor/ physician.

**Other hazards** : None known.

## Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Concentration: (%)
Sodium Nitrite	7632-00-0	10 - 30
Inorganic salt	Proprietary	1 - 5
Substituted Triazole	Proprietary	1 - 5
Sodium Tetraborate	1330-43-4	0.1 - 1
Sodium Hydroxide	1310-73-2	0.1 - 1

## Section: 4. FIRST AID MEASURES

- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.
- In case of skin contact : Wash off immediately with plenty of water for at least 15 minutes. Use a mild soap if available. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
- If swallowed : Rinse mouth with water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- If inhaled : Remove to fresh air. Treat symptomatically. Get medical attention if symptoms occur.
- Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.
- Notes to physician : Treat symptomatically.
- Most important symptoms and effects, both acute and delayed : See Section 11 for more detailed information on health effects and symptoms.

## Section: 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting : Oxidizer. Contact with other material may cause fire.

# SAFETY DATA SHEET

**NALCO® 8338**

- Hazardous combustion products : Decomposition products may include the following materials: Carbon oxides nitrogen oxides (NOx) Sulphur oxides Oxides of phosphorus
- Special protective equipment for firefighters : Use personal protective equipment.
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. In the event of fire and/or explosion do not breathe fumes.

## Section: 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid inhalation, ingestion and contact with skin and eyes. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Ensure clean-up is conducted by trained personnel only. Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : Do not allow contact with soil, surface or ground water.
- Methods and materials for containment and cleaning up : Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Flush away traces with water.

## Section: 7. HANDLING AND STORAGE

- Advice on safe handling : Do not ingest. Do not breathe dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Wash hands thoroughly after handling. Use only with adequate ventilation.
- Conditions for safe storage : Keep in a cool, well-ventilated place. Do not store near acids. Keep away from reducing agents. Keep away from combustible material. Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.
- Suitable material : The following compatibility data is suggested based on similar product data and/or industry experience: Shipping and long term storage compatibility with construction materials can vary; we therefore recommend that compatibility is tested prior to use.
- Unsuitable material : not determined

## Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Components with workplace control parameters

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Sodium Tetraborate	1330-43-4	TWA	1 mg/m <sup>3</sup>	NIOSH REL
		TWA (Inhalable fraction)	2 mg/m <sup>3</sup> (Borate)	ACGIH

# SAFETY DATA SHEET

**NALCO® 8338**

		STEL (Inhalable fraction)	6 mg/m3 (Borate)	ACGIH
Sodium Hydroxide	1310-73-2	Ceiling	2 mg/m3	ACGIH
		Ceiling	2 mg/m3	NIOSH REL
		TWA	2 mg/m3	OSHA Z1

Engineering measures : Effective exhaust ventilation system. Maintain air concentrations below occupational exposure standards.

## Personal protective equipment

Eye protection : Safety goggles  
Face-shield

Hand protection : Wear the following personal protective equipment:  
Standard glove type.  
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing

Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash face, hands and any exposed skin thoroughly after handling. Provide suitable facilities for quick drenching or flushing of the eyes and body in case of contact or splash hazard.

## Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid  
Colour : yellow  
Odour : Organic  
Flash point : > 93.3 °C  
pH : 11.5 - 14.0, 100 %, (25 °C)  
Odour Threshold : no data available  
Melting point/freezing point : FREEZING POINT: -16.6 °C  
Initial boiling point and boiling range : no data available  
Evaporation rate : no data available  
Flammability (solid, gas) : no data available  
Upper explosion limit : no data available  
Lower explosion limit : no data available  
Vapour pressure : no data available  
Relative vapour density : no data available

## SAFETY DATA SHEET

### NALCO® 8338

Relative density	:	1.16 - 1.20, (25.0 °C),
Density	:	9.8 lb/gal
Water solubility	:	completely soluble
Solubility in other solvents	:	no data available
Partition coefficient: n-octanol/water	:	no data available
Auto-ignition temperature	:	no data available
Thermal decomposition temperature	:	no data available
Viscosity, dynamic	:	3 mPa.s (21 °C)
Viscosity, kinematic	:	no data available
Molecular weight	:	no data available
VOC	:	0 %, Calculation method

### Section: 10. STABILITY AND REACTIVITY

Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	No dangerous reaction known under conditions of normal use.
Conditions to avoid	:	None known.
Incompatible materials	:	Amines Strong acids Reducing agents
Hazardous decomposition products	:	Decomposition products may include the following materials: Carbon oxides nitrogen oxides (NOx) Sulphur oxides Oxides of phosphorus

### Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

#### Potential Health Effects

Eyes	:	Causes serious eye damage.
Skin	:	Causes severe skin burns.
Ingestion	:	Harmful if swallowed. Causes digestive tract burns.
Inhalation	:	May cause nose, throat, and lung irritation.

## SAFETY DATA SHEET

**NALCO® 8338**

Chronic Exposure : May cause damage to organs.

### Experience with human exposure

Eye contact : Redness, Pain, Corrosion

Skin contact : Redness, Pain, Corrosion

Ingestion : Corrosion, Abdominal pain

Inhalation : Respiratory irritation, Cough

### Toxicity

#### Product

Acute oral toxicity : Acute toxicity estimate: 904.52 mg/kg

Acute inhalation toxicity : no data available

Acute dermal toxicity : no data available

Skin corrosion/irritation : no data available

Serious eye damage/eye irritation : no data available

Respiratory or skin sensitization : no data available

Carcinogenicity : no data available

Reproductive effects : no data available

Germ cell mutagenicity : no data available

Teratogenicity : no data available

STOT - single exposure : no data available

STOT - repeated exposure : no data available

Aspiration toxicity : no data available

#### Components

Acute dermal toxicity : Inorganic salt  
LD50 rat: > 5,000 mg/kg

## Section: 12. ECOLOGICAL INFORMATION

### Ecotoxicity

Environmental Effects : Harmful to aquatic life.

#### Product

Toxicity to fish : LC50 *Oncorhynchus mykiss* (rainbow trout): 38 mg/l  
Exposure time: 96 hrs  
Test substance: Product

LC50 *Pimephales promelas* (fathead minnow): 303 mg/l  
Exposure time: 96 hrs

# SAFETY DATA SHEET

**NALCO® 8338**

Test substance: Product

NOEC Oncorhynchus mykiss (rainbow trout): 13 mg/l

Exposure time: 96 hrs

Test substance: Product

NOEC Pimephales promelas (fathead minnow): 125 mg/l

Exposure time: 96 hrs

Test substance: Product

Toxicity to daphnia and other aquatic invertebrates : LC50 Daphnia magna (Water flea): 250 mg/l  
Exposure time: 48 hrs

Test substance: Product

LC50 Ceriodaphnia dubia: 138 mg/l

Exposure time: 48 hrs

Test substance: Product

EC50 Daphnia magna (Water flea): 120 mg/l

Exposure time: 48 hrs

Test substance: Product

NOEC Daphnia magna (Water flea): 79 mg/l

Exposure time: 48 hrs

Test substance: Product

NOEC Ceriodaphnia dubia: 100 mg/l

Exposure time: 48 hrs

Test substance: Product

## Persistence and degradability

Greater than 95% of this product consists of inorganic substances for which a biodegradation value is not applicable.

Chemical Oxygen Demand (COD): 77,600 mg/l

Biochemical Oxygen Demand (BOD):

Incubation Period

Value

Test Descriptor

5 d

< 2 mg/l

Product

## Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air : <5%

Water : 30 - 50%

Soil : 50 - 70%

The portion in water is expected to be soluble or dispersible.

# SAFETY DATA SHEET

**NALCO® 8338**

## Bioaccumulative potential

This preparation or material is not expected to bioaccumulate.

## Other information

no data available

## Section: 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: : D002

Disposal methods : The product should not be allowed to enter drains, water courses or the soil. Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

## Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

### Land transport (DOT)

The presence of an RQ component (Reportable Quantity for U.S. DOT) in this product causes it to be regulated with an additional description of RQ for road, or as Environmentally hazardous for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

Proper shipping name : CORROSIVE LIQUID, N.O.S.  
Technical name(s) : SODIUM HYDROXIDE, SODIUM TOLYLTRIAZOLE  
UN/ID No. : UN 1760  
Transport hazard class(es) : 8  
Packing group : III  
Reportable Quantity (per package) : 508 lbs  
RQ Component : Sodium Nitrite

### Air transport (IATA)

The presence of an RQ component (Reportable Quantity for U.S. DOT) in this product causes it to be regulated with an additional description of RQ for road, or as Environmentally hazardous for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

Proper shipping name : CORROSIVE LIQUID, N.O.S.  
Technical name(s) : SODIUM HYDROXIDE, SODIUM TOLYLTRIAZOLE

# SAFETY DATA SHEET

**NALCO® 8338**

UN/ID No. : UN 1760  
Transport hazard class(es) : 8  
Packing group : III  
Reportable Quantity (per package) : 508 lbs  
RQ Component : Sodium Nitrite

## Sea transport (IMDG/IMO)

Proper shipping name : CORROSIVE LIQUID, N.O.S.  
Technical name(s) : SODIUM HYDROXIDE, SODIUM TOLYLTRIAZOLE  
UN/ID No. : UN 1760  
Transport hazard class(es) : 8  
Packing group : III

## Section: 15. REGULATORY INFORMATION

### EPCRA - Emergency Planning and Community Right-to-Know Act

#### CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Sodium Nitrite	7632-00-0	100	508

#### SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

**SARA 311/312 Hazards** : Acute Health Hazard  
Fire Hazard

**SARA 302** : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313** : The following components are subject to reporting levels established by SARA Title III, Section 313:

Sodium Nitrite	7632-00-0	10 - 30 %
Sodium Nitrate	7631-99-4	1 - 5 %

#### US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpart D):

The following components are listed: Sodium Nitrite

#### California Prop 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

#### INTERNATIONAL CHEMICAL CONTROL LAWS :

#### TOXIC SUBSTANCES CONTROL ACT (TSCA)

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

# SAFETY DATA SHEET

**NALCO® 8338**

## CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

## AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

## CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on or exempt from the Inventory of Existing Chemical Substances China (IECSC).

## JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

## KOREA

This product contains substance(s) which are not in compliance with the Toxic Chemical Control Law (TCCL) and may require additional review.

## NEW ZEALAND

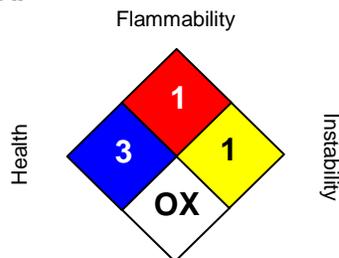
All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

## PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

## Section: 16. OTHER INFORMATION

### NFPA:



### HMIS III:

<b>HEALTH</b>	<b>3</b>
<b>FLAMMABILITY</b>	<b>1</b>
<b>PHYSICAL HAZARD</b>	<b>1</b>

0 = not significant, 1 = Slight,  
2 = Moderate, 3 = High  
4 = Extreme, \* = Chronic

Revision Date : 05/24/2016  
Version Number : 1.2  
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the SDS.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use,

## SAFETY DATA SHEET

**NALCO® 8338**

processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. For additional copies of an SDS visit [www.nalco.com](http://www.nalco.com) and request access.



SDS: 0010071  
Date Prepared: 03/08/2016

## SAFETY DATA SHEET

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### 1. IDENTIFICATION

**Product Name:** OrePrep® X-133 Frother  
**Product Description:** Mineral processing reagent  
**Synonyms:** None  
**Chemical Family:** Mixed alcohols, heavy aldehydes, esters and mixed polyglycols  
**Molecular Formula:** Mixture  
**Molecular Weight:** Mixture  
**Intended/Recommended Use:** Frother

CYTEC INDUSTRIES INC., FIVE GARRET MOUNTAIN PLAZA, WOODLAND PARK, NEW JERSEY 07424, USA  
**For Product and all Non-Emergency Information call 1-800/652-6013.** Outside the USA and Canada call 1-973/357-3193.

**EMERGENCY PHONE (24 hours/day) - For emergency only involving spill, leak, fire, exposure or accident call:**

**Asia Pacific:**

Australia - +61-3-9663-2130 or 1800-033-111 (IXOM)  
China (PRC) - +86 0532 83889090 (NRCC)  
New Guinea - +61-3-9663-2130 or 1800-033-111  
New Zealand - +61-3-9663-2130 or 0800-734-607 (IXOM)  
India, Japan, Korea, Malaysia, Thailand - +65 3158 1074 (Carechem24 Singapore)  
India (Hindi Speaking Only) - +65 3158 1198 or 000800 100 7479 (Carechem24 Singapore)

**Canada:** +1-905-356-8310 (Cytec Welland, Canada plant)

**Europe/Africa/Middle East (Carechem24 UK):**

Europe, Middle East, Africa, Israel - +44 (0) 1235 239 670  
(Arabic speaking countries) - +44 (0) 1235 239 671

**Latin America:**

Brazil - 0800 7077 022 (SUATRANS)  
Chile - +56-2-2-247-3600 (CITUC QUIMICO)  
All Others - +52-376-73 74122 (Cytec Atequiza, Mexico plant)

**USA:** +1-703-527-3887 or 1-800-424-9300 (CHEMTREC #CCN6083)

The ® indicates a Registered Trademark in the United States and the ™ indicates a trademark in the United States. The mark may also be registered, subject of an application for registration, or a trademark in other countries.

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### 2. HAZARDS IDENTIFICATION

**GHS Classification**

Flammable Liquid Hazard Category 4  
Reproductive Toxicant Category 2  
Acute Toxicity (Oral) Hazard Category 4  
Specific Target Organ Toxicity - Single Exposure Hazard Category 3  
Skin Corrosion / Irritation Hazard Category 2  
Serious Eye Damage / Eye Irritation Hazard Category 1  
Skin Sensitizer Hazard Category 1B  
Aquatic Environment Acute Hazard Category 3  
Aquatic Environment Chronic Hazard Category 3

**LABEL ELEMENTS**

**Signal Word**

Warning

**Hazard Statements**

Combustible liquid  
Suspected of damaging fertility or the unborn child  
Harmful if swallowed  
May cause respiratory irritation  
Causes skin irritation  
Causes serious eye damage  
May cause an allergic skin reaction  
Harmful to aquatic life with long lasting effects

**Precautionary Statements**

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.  
Wear protective gloves/protective clothing/eye protection/face protection.  
Obtain special instructions before use.  
Wash face, hands and any exposed skin thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
Avoid breathing dust/fume/gas/mist/vapours/spray.  
Use only outdoors or in a well-ventilated area.  
Contaminated work clothing should not be allowed out of the workplace.  
Avoid release to the environment.  
In case of fire: Use CO<sub>2</sub>, dry chemical, or foam for extinction.  
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.  
Rinse mouth.  
IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
IF ON SKIN: Wash with plenty of soap and water.  
Specific treatment (see supplemental first aid instructions on this label).  
Take off all contaminated clothing and wash it before reuse.  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
Immediately call a POISON CENTER or doctor/physician.  
Store in a well-ventilated place. Keep cool.  
Store locked up.  
Store in a well-ventilated place. Keep container tightly closed.  
Dispose of contents/container in accordance with local and national regulations.

**Hazards Not Otherwise Classified (HNOC), Other Hazards**

Use mechanical exhaust ventilation when heat-curing material.

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### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance, Mixture or Article? Mixture

**HAZARDOUS INGREDIENTS**

Component / CAS No.	%	GHS Classification	Carcinogen
Aliphatic alcohol mixture	45 - 60	Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) Aquatic Acute 3 (H402) Aquatic Chronic 3 (H412)	-
Aliphatic alcohol	10-30	Flam. Liq. 4 (H227) Acute Tox. 4 (H302) Skin Irrit. 3 (H316) Eye Irrit. 2B (H320)	-
Polyglycol ethers	10 - 20	Acute Tox. 4 (H302) Skin Irrit. 3 (H316) Eye Irrit. 2B (H320)	-
2-Ethylhexanal 123-05-7	5-10	Flam. Liq. 3 (H226) Repr. 2 (H361d) Skin Irrit. 3 (H316) Skin Sens. 1B (H317) Aquatic Acute 2 (H401)	-
Substituted acrolein	5-8	Flam. Liq. 4 (H227) Skin Irrit. 2 (H315) Eye Irrit. 2B (H320) Skin Sens. 1B (H317) Aquatic Acute 3 (H402) Aquatic Chronic 3 (H412)	-
Alkyl alcohol #2	1-3	Acute Tox. 4 (H302) Eye Dam. 1 (H318)	-
Diols	1-3	Eye Dam. 1 (H318)	-
Butanol, n- 71-36-3	1-3	Flam. Liq. 3 (H226) Acute Tox. 4 (H302) STOT SE 3 (H335) STOT SE 3 (H336) Skin Irrit. 2 (H315) Eye Dam. 1 (H318)	-
2-Ethylhexanol 104-76-7	10-20	Flam. Liq. 4 (H227) Acute Tox. 4 (H332) STOT SE 3 (H335) Skin Irrit. 2 (H315) Eye Irrit. 2A (H319)	-

The specific chemical identity and/or exact percentage of composition for one or more ingredients has been withheld as a trade secret.

Additional GHS classification or other information may be included in this section but has not been adopted by OSHA. See Section 16 for full text of H phrases.

## 4. FIRST AID MEASURES

### DESCRIPTION OF FIRST AID MEASURES

**Eye Contact:**

Rinse immediately with plenty of water for at least 15 minutes. Obtain medical attention immediately.

**Skin Contact:**

Wash immediately with plenty of water and soap. Remove contaminated clothing and shoes without delay. Obtain medical attention. Do not reuse contaminated clothing without laundering. Destroy or thoroughly clean shoes before reuse.

**Ingestion:**

If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

**Inhalation:**

Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms.

**MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED**

None known

**INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDS**

Not applicable

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**5. FIRE-FIGHTING MEASURES****Suitable Extinguishing Media:**

Use water spray, alcohol foam, carbon dioxide or dry chemical to extinguish fires. Water stream may be ineffective.

**Extinguishing Media to Avoid:**

full water jet

**Protective Equipment:**

Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing. See MSDS Section 8 (Exposure Controls/Personal Protection).

**Special Hazards:**

Keep containers cool by spraying with water if exposed to fire.

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**6. ACCIDENTAL RELEASE MEASURES****Personal precautions:**

Where exposure level is known, wear approved respirator suitable for level of exposure. Where exposure level is not known, wear approved, positive pressure, self-contained respirator. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impermeable boots.

**Methods For Cleaning Up:**

Remove sources of ignition. Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush spill area with water.

**References to other sections:**

See Sections 8 and 13 for additional information.

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**7. HANDLING AND STORAGE****HANDLING**

**Precautions:** Keep away from heat, sparks and open flame. - No smoking. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. Avoid release to the environment. Use only outdoors or in a well-ventilated area. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/clothing and eye/face protection. Avoid breathing vapors or spray mist.

**Special Handling Statements:** Containers must be bonded and grounded when pouring or transferring material. This material contains a flammable or combustible liquid and vapor. Provide good ventilation of working area (local exhaust ventilation if necessary).

## STORAGE

Areas containing this material should have fire safe practices and electrical equipment in accordance with applicable regulations and/or guidelines. Standards are primarily based on the material's flashpoint, but may also take into account properties such as miscibility with water or toxicity. All local and national regulations should be followed.

In the Americas, National Fire Protection Association (NFPA) 30: Flammable and Combustible Liquids Code, is a widely used standard. NFPA 30 establishes storage conditions for the following classes of materials: Class I Flammable Liquids, Flashpoint <37.8 °C. Class II Combustible Liquids, 37.8 °C < Flashpoint <60 °C. Class IIIa Combustible Liquids, 60 °C < Flashpoint < 93 °C. Class IIIb Combustible Liquids, Flashpoint > 93 °C. Keep away from sources of ignition - refrain from smoking. Take precautionary measures against electrostatic loading - earthing necessary during loading operations. Observe the general rules of industrial fire protection.

**Storage Temperature:** Room temperature

**Reason:** Safety.

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Engineering Measures:

Utilize a closed system process where feasible. Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure when spraying or curing at elevated temperatures.

### Respiratory Protection:

Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure. A full facepiece respirator also provides eye and face protection. Cutting, grinding or sanding of parts fabricated after curing may create respirable dust particles. Respiratory protection appropriate for this dust may be required. Refer to components listed above for potential hazardous components in the dust.

### Eye Protection:

Prevent eye and skin contact. Provide eye wash fountain and safety shower in close proximity to points of potential exposure. Wear eye/face protection such as chemical splash proof goggles or face shield.

### Skin Protection:

Prevent contamination of skin or clothing when removing protective equipment. Barrier creams may be used in conjunction with the gloves to provide additional skin protection. Wear impermeable gloves and suitable protective clothing.

### Hand Protection:

Replace gloves immediately when torn or any change in appearance (dimension, colour, flexibility etc) is noticed.

### Additional Advice:

Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. It is recommended that a shower be taken after completion of workshift especially if significant contact has occurred. Work clothing should then be laundered prior to reuse. Street clothing should be stored separately from work clothing and protective equipment. Work clothing and shoes should not be taken home.

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## Exposure Limit(s)

The below constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

### 104-76-7      2-Ethylhexanol

OSHA (PEL):

Not established

**104-76-7 2-Ethylhexanol**

ACGIH (TLV): (skin)  
50 ppm (TWA)  
Other Value: Not established

**71-36-3 Butanol, n-**

OSHA (PEL): 100 ppm (TWA)  
300 mg/m<sup>3</sup> (TWA)  
ACGIH (TLV): 20 ppm (TWA)  
Other Value: Not established

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Color:** straw to brown  
**Appearance:** liquid  
**Odor:** mixed alcohols and glycol esters  
**Boiling Point:** Not available  
**Melting Point:** <-20 °C -4 °F (freezing point)  
**Vapor Pressure:** Not available  
**Specific Gravity/Density:** 0.88 - 0.95 @ 25 °C  
**Vapor Density:** Not available  
**Percent Volatile (% by wt.):** Not available  
**pH:** Not applicable  
**Saturation In Air (% By Vol.):** Not available  
**Evaporation Rate:** Not available  
**Solubility In Water:** Partial  
**Volatile Organic Content:** Not available  
**Flash Point:** >60.6 °C 141 °F (value for solvent) Pensky-Martens Closed Cup  
**Flammability (solid, gas):** Not available  
**Flammable Limits (% By Vol):** Not available  
**Autoignition (Self) Temperature:** Not available  
**Decomposition Temperature:** Not available  
**Partition coefficient (n-octanol/water):** Not available  
**Odor Threshold:** Not available  
**Viscosity (Kinematic):** Not available

**DUST HAZARD INFORMATION**

**Particle Size (microns):** Not applicable  
**Kst (bar-m/sec):** Not applicable  
**Maximum Explosion Pressure (Pmax):** Not applicable  
**Dust Class:** Not applicable  
**Minimum Ignition Energy (MIE) (mJ):** Not applicable  
**Minimum Ignition Temperature (MIT) (°C):** Not applicable  
**Minimum Explosive Concentration (MEC) (g/m<sup>3</sup>):** Not applicable  
**Limiting Oxygen Concentration (LOC) (%):** Not applicable

**10. STABILITY AND REACTIVITY**

**Stability:** Stable  
**Conditions To Avoid:** None known  
**Polymerization:** Will not occur  
**Conditions To Avoid:** None known

<b>Materials To Avoid:</b>	Strong acids Strong oxidizers. Alkalies
<b>Hazardous Decomposition Products:</b>	Carbon dioxide Carbon monoxide (CO)

---

## 11. TOXICOLOGICAL INFORMATION

### PRODUCT TOXICITY INFORMATION

**Likely Routes of Exposure:** Oral, Eyes, Skin.

#### ACUTE TOXICITY DATA

oral	rat	Acute LD50	~990 mg/kg
dermal	rabbit	Acute LD50	>2000 mg/kg
inhalation	rat	Acute LC50 4 hr	>5 mg/l (Dust/Mist)

#### LOCAL EFFECTS ON SKIN AND EYE

Acute Irritation	skin	Irritating
Acute Irritation	eye	Causes serious damage

#### ALLERGIC SENSITIZATION

Sensitization	skin	Sensitizing
Sensitization	respiratory	No data

#### GENOTOXICITY

##### Assays for Gene Mutations

Ames Salmonella Assay	No data
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#### OTHER INFORMATION

The product toxicity information above has been estimated.

#### HAZARDOUS INGREDIENT TOXICITY DATA

Direct contact with aliphatic alcohol mixture may cause moderate to severe eye and skin irritation. Overexposure to vapors may produce irritation of the nose, throat, and upper respiratory tract and may cause central nervous system effects.

Aliphatic alcohol has an acute oral (rat) LD50 and dermal (rabbit) LD50 values of >500 mg/kg and > 2,000 mg/kg, respectively. This material may cause moderate to severe eye and mild skin irritation. Acute overexposure to alcohol compound vapor may cause irritation of the respiratory tract.

Polyglycol ethers has acute oral (rat) and estimated acute dermal (rabbit) LD50 values of >300-2000 mg/kg and >2000 mg/kg, respectively. Inhalation exposure to vapors may cause drowsiness and dizziness. Direct contact with this substance is expected to cause slight skin and moderate eye irritation. Inhalation overexposure may cause irritation of the eyes and respiratory tract.

2-Ethylhexanal has acute oral (rat) and acute dermal (rat) LD50 values of 3700 mg/kg and >16 g/kg, respectively. The acute inhalation (aerosol) LC50 (rat/4 hour) value is >6.83 mg/L. Direct contact with this material is expected to mild skin and minimal eye irritation. Based on testing from a structurally similar material, 2-ethylhexanal is expected to produce dermal sensitization. The exposure of rats to 2-ethylhexanal at concentrations of 25.5, 102.2 and 250.7 ppm for 6hr/day for 28 days produced only small effects on relative liver weight at 25.5 ppm and on the markers of hepatic peroxisome proliferation measured, this dose can be used as a No Observed Effect Level (NOEL) for peroxisome proliferation. Therefore it was concluded that 2-ethylhexanal is only a very weak peroxisome proliferator in the rat with the No Observed Adverse Effect Level (NOAEL) for overall effects/systemic toxicity established at 102.2 ppm. This substance was not mutagenic in the Ames assay or clastogenic in the in vivo Mouse Micronucleus Assay. 2-Ethylhexanal was administered by daily oral gavage to rats from day 6 to 19 of their pregnancy, at dosages up to 797.6 mg/kg bw/day. There was no obvious adverse maternal toxicity at 100.0 or 300.9 mg/kg bw/day. In contrast, at 797.6 mg/kg bw/day there was clear evidence of maternal toxicity. Embryo-fetal survival was unaffected by treatment with 2-Ethylhexanal. At 300.9 mg/kg bw/day, fetal weights were lower and there was delayed ossification. Although the relationship of these findings to treatment is uncertain, they are considered to be transient in nature, rather than representing permanent structural changes. At 797.6 mg/kg bw/day fetal and placental weights were reduced and placental abnormalities were observed in a few litters. Fetal pathology revealed visceral and skeletal abnormalities at 797.6 mg/kg bw/day. Fetal immaturity was noted universally at 797.6 mg/kg bw/day and, to a lesser extent, at 300.9 mg/kg bw/day. Based on these results, the NOAEL for both, maternal toxicity and developmental toxicity is considered to be 300.9 mg/kg bw/day.

The chemical, physical, and toxicological properties of this material have not been fully investigated. The acute oral (rat) LD50 value has been reported to be 4675 mg/kg, respectively. The 8-hr (rat - saturated vapor) LC50 value is >3.98 mg/L. Direct contact is expected to be moderately - severely irritating to skin, but only minimally irritating to eyes. This material produced dermal sensitization in guinea pigs. Substituted acrolein was non-mutagenic in the Ames Assay.

Alkyl alcohol#2 has acute oral (rat) and acute dermal (rabbit) LD50 values of 1,410 mg/kg and 3,560 mg/kg, respectively. Alkyl alcohol#2 is a severe eye and mild skin irritant.

Diols has acute oral (rat) and acute dermal (rabbit) LD50 values >2000 mg/kg, respectively. Direct contact with this material may cause mild skin irritation. Diols causes severe eye damage to eyes and would be expected to irritate other mucous membranes. In a developmental toxicity probe study, groups of 8 pregnant rats were given diols by gavage daily over gestational days 6-15 at dosages of 500, 1000, 2000 or 4000 mg/kg. Maternal toxicity (clinical signs, pathology and death) was observed at 2000 and 4000 mg/kg. Teratogenic effects occurred at these maternally toxic doses but not at lower doses. The No Observed Adverse Effect Level was established at 1000 mg/kg bw/d. In a second developmental toxicity study with fertility components, undiluted diols was applied occlusively, daily for 6 hours, over gestational days 6-15 at dosages of 1.0, 2.0 and 4.0 ml/kg; corresponding mass dosages of approximately 942, 1884 and 3768 mg/kg. Results indicate minor maternal toxicity but no effects on female reproductive performance or fertility. The NOEL is > 4.0 ml/kg bw/day or 3768 mg/kg bw/day. The lowest dose level (1.0 ml/kg; equivalent to 942 mg/kg) was found to cause no effects on development and therefore was established as the NOAEL for teratogenicity effects. Diols was not mutagenic in the Ames test, a forward gene mutation test or a sister chromatid exchange test in CHO cells.

Butanol has acute oral (rat) and dermal (rabbit) LD50 values of 0.790 g/kg and 3.4 g/kg, respectively. The inhalation LC50 (rat) value after a 4-hour exposure is 8000 ppm (24.24 mg/L). Acute overexposure to vapors of butanol may cause headache, dizziness, drowsiness, blurred vision and a burning sensation in the eyes. Overexposure to butanol vapors can produce headache and central nervous system depression. Acute ingestion of butanol has caused unconsciousness and coma. Direct contact with butanol may cause severe eye irritation and moderate skin irritation. Butanol has caused effects on the developing embryo/fetus in the presences of material toxicity.

2-Ethylhexanol (CAS# 104-76-7) has acute oral (rat) LD50 and acute dermal (rabbit) LD50 values of 2040 mg/kg and >2000 mg/kg. The 4-hour inhalation LC50 (rat) is > 0.89 but ≤ 5.3 mg/l (mixed vapor and aerosol). 2-Ethylhexanol is a moderate to severe eye and moderate skin irritant. Repeated skin exposure may cause skin dryness or cracking. Inhalation overexposure to 2-ethylhexanol may produce headache, dizziness, central nervous system depression possibly leading to unconsciousness and irritation of the eyes and respiratory tract. 2-Ethylhexanol is an aspiration hazard. Chronic overexposure to 2-ethylhexanol may cause liver damage, pulmonary edema, or renal damage with glycosuria. In a teratology study in rats 3 ml/kg applied to the skin during the most critical part of gestation produced evidence of maternal toxicity, but no evidence of injury to the offspring. In a separate study, fetal toxicity and an increased incidence of birth defects were noted when pregnant rats were administered 2 ml/kg by stomach tube during gestation. Ritter, et al (1987) reported teratological effects in rats following administration of 2-Ethylhexanol on day 12 gestation. Astill, et al (1996) found that 2-Ethylhexanol was not oncogenic in rats, and reported a weak association with hepatocellular carcinoma incidence in mice at a chronic dose of 750 mg/kg. Divencenzo, et al (1985) saw no evidence of mutagenic substances excreted in the urine of rats dosed with 2-Ethylhexanol. Agarwal, et al (1985) reported that 2-Ethylhexanol exhibited no mutagenicity in Salmonella typhimurium strains TA98, 100, 1535, 1537, 1538, and 2637, with or without S9 activation. 2-Ethylhexanol did exhibit a moderate cytotoxic effect in most cultures. 2-Ethylhexanol has caused toxic effects in the prostate and immune systems of laboratory animals.

## 12. ECOLOGICAL INFORMATION

### TOXICITY, PERSISTENCE AND DEGRADABILITY, BIOACCUMULATIVE POTENTIAL, MOBILITY IN SOIL, OTHER ADVERSE EFFECTS

**Overall Environmental Toxicity:** Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

The ecological assessment for this material is based on an evaluation of its components.

### RESULTS OF PBT AND vPvB ASSESSMENT

Not determined

### HAZARDOUS INGREDIENT TOXICITY DATA

Component / CAS No.	Toxicity to Algae	Toxicity to Fish	Toxicity to Water Flea
Aliphatic alcohol mixture	Not available	Not available	Not available
Aliphatic alcohol	Not available	Not available	Not available
Polyglycol ethers	Not available	Not available	Not available
2-Ethylhexanol 123-05-7	ErC50 = 6.9 mg/L (measured) - Green Algae (72h)	Not available	EC50 = 4.7 mg/L (measured) - Daphnia Magna (48h)
Substituted acrolein	The 72-Hr ErC50 and EbC50 values for Green Algae are 27.7 mg/L and 13.6 mg/L (nominal), respectively;	The 96-Hr LC50 for Golden Orfe 14.7 mg/L (nominal); NOEC 4.6 mg/L (nominal)	The 48-Hr EC50 for Daphnia Magna is ~20.0 mg/L (nominal);

Component / CAS No.	Toxicity to Algae	Toxicity to Fish	Toxicity to Water Flea
Alkyl alcohol #2 -	EC50 = 2.7 mg/L - Pseudokirchneriella subcapitata (96h)	LC50 3.6 - 5.1 mg/L - Lepomis macrochirus (96h) static LC50 4.78 - 8.85 mg/L - Oncorhynchus mykiss (96h) static	EC50 = 8.5 mg/L - Daphnia magna (48h) EC50 4.78 - 8.87 mg/L - Daphnia magna (48h) Static
Diols -	ErC50 >100 mg/L - Green Algae (72h)	LC50 >100 mg/L - Ictalurus punctatus (96h)	EC50 >100 mg/L - Daphnia magna (48h)
Butanol, n- 71-36-3	EC50 > 500 mg/L - Desmodesmus subspicatus (72h) EC50 > 500 mg/L - Desmodesmus subspicatus (96h)	LC50 = 1740 mg/L - Pimephales promelas (96h) flow-through LC50 = 1910000 µg/L - Pimephales promelas (96h) static LC50 100000 - 500000 µg/L - Lepomis macrochirus (96h) static LC50 1730 - 1910 mg/L - Pimephales promelas (96h) static	EC50 1897 - 2072 mg/L - Daphnia magna (48h) Static EC50 = 1983 mg/L - Daphnia magna (48h)
2-Ethylhexanol 104-76-7	EC50 = 11.5 mg/L - Desmodesmus subspicatus (72h)	LC50 27 - 29.5 mg/L - Pimephales promelas (96h) flow- through LC50 32 - 37 mg/L - Oncorhynchus mykiss (96h) static LC50 10.0 - 33.0 mg/L - Lepomis macrochirus (96h) static LC50 = 29.7 mg/L - Pimephales promelas (96h) static LC50 > 7.5 mg/L - Oncorhynchus mykiss (96h)	EC50 = 39 mg/L - Daphnia magna (48h)

### 13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristics: There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, see Section 9 of this MSDS (flash point). For Corrosivity, see Sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 3 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material if it is to be disposed. The Company encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. The Company recommends that organic materials classified as RCRA hazardous wastes be disposed of by thermal treatment or incineration at EPA approved facilities. The Company has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

### 14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

#### US DOT

Dangerous Goods? X

Proper Shipping Name: Combustible liquid, n.o.s.

Hazard Class: Combustible liquid

Packing Group: III  
 UN/ID Number: NA1993  
 Technical Name (N.O.S.): 2-Ethylhexanol, 2-Ethylhexanal

Comments: Combustible liquids are not regulated in non-bulk packagings unless the combustible liquid is a hazardous substance, a hazardous waste, or a marine pollutant.

#### TRANSPORT CANADA

Dangerous Goods? Not applicable/Not regulated

#### ICAO / IATA

Dangerous Goods? Not applicable/Not regulated

#### IMO

Dangerous Goods? Not applicable/Not regulated

## 15. REGULATORY INFORMATION

### Inventory Information

**United States (USA):** All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.

**Canada:** One or more components of this product are NOT included on the Canadian Domestic Substances List (DSL). These components are included on the Canadian Non-Domestic Substances List (NDSL).

**Australia:** One or more components of this product have NOT yet been included in the Australian Inventory of Chemical Substances (AICS) or assessed by NICNAS.

**China:** One or more components of this product are NOT included on the Chinese (IECSC) inventory.

**Japan:** One or more components of this product are NOT included on the Japanese (ENCS) inventory.

**Korea:** One or more components of this product are NOT included on the Korean (ECL) inventory.

**Philippines:** One or more components of this product are NOT included on the Philippine (PICCS) inventory.

### OTHER ENVIRONMENTAL INFORMATION

The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product.

Component / CAS No.	%	TPQ (lbs)	RQ(lbs)	S313	TSCA 12B
Butanol, n- 71-36-3	1-3	None	5000	Yes	No

### PRODUCT HAZARD CLASSIFICATION UNDER SECTION 311 OF SARA

- Acute
- Fire
- Chronic

## 16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

## 16. OTHER INFORMATION

Health: 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

Fire: 2 - Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.

Instability: 0 - Materials that in themselves are normally stable, even under fire exposure conditions.

**Reasons For Issue:** Revised Section 2  
Revised Section 7

**Date Prepared:** 03/08/2016  
**Date of last significant revision:** 03/08/2016

### Component Hazard Phrases

#### Aliphatic alcohol mixture

- H315 - Causes skin irritation.
- H319 - Causes serious eye irritation.
- H402 - Harmful to aquatic life.
- H412 - Harmful to aquatic life with long lasting effects.

#### Aliphatic alcohol

- H227 - Combustible liquid.
- H302 - Harmful if swallowed.
- H316 - Causes mild skin irritation.
- H320 - Causes eye irritation.

#### Polyglycol ethers

- H302 - Harmful if swallowed.
- H316 - Causes mild skin irritation.
- H320 - Causes eye irritation.

#### 2-Ethylhexanal

- H226 - Flammable liquid and vapor.
- H361 - Suspected of damaging fertility or the unborn child.
- H316 - Causes mild skin irritation.
- H317 - May cause an allergic skin reaction.
- H401 - Toxic to aquatic life.

#### Substituted acrolein

- H227 - Combustible liquid.
- H315 - Causes skin irritation.
- H320 - Causes eye irritation.
- H317 - May cause an allergic skin reaction.
- H412 - Harmful to aquatic life with long lasting effects.

#### Alkyl alcohol #2

- H302 - Harmful if swallowed.
- H318 - Causes serious eye damage.

#### Diols

- H318 - Causes serious eye damage.

#### Butanol, n-

- H226 - Flammable liquid and vapor.
- H302 - Harmful if swallowed.
- H315 - Causes skin irritation.
- H318 - Causes serious eye damage.
- H335 - May cause respiratory irritation.
- H336 - May cause drowsiness or dizziness.

#### 2-Ethylhexanol

H227 - Combustible liquid.  
H315 - Causes skin irritation.  
H319 - Causes serious eye irritation.  
H332 - Harmful if inhaled.  
H335 - May cause respiratory irritation.

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Prepared By: Legal & Compliance Services; E-mail: [custinfo@cytec.com](mailto:custinfo@cytec.com)

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This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.

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**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : NALFLOTE® 9837

Other means of identification : Not applicable.

Recommended use : FLOTATION REAGENT

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois 60563-1198  
USA  
TEL: (630)305-1000

Emergency telephone number : (800) 424-9300 (24 Hours) CHEMTREC

Issuing date : 06/30/2014

**SECTION 2. HAZARDS IDENTIFICATION**

**GHS Classification**

Flammable liquids : Category 3  
Serious eye damage/eye irritation : Category 1

**GHS Label element**

Hazard pictograms : 

Signal Word : Danger

Hazard Statements : Flammable liquid and vapour.  
Causes serious eye damage.

Precautionary Statements : **Prevention:**  
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ ventilating/ lighting/ equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wear protective gloves/ eye protection/ face protection.  
**Response:**  
IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician. In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

# SAFETY DATA SHEET

**NALFLOTE® 9837**

**Storage:**

Store in a well-ventilated place. Keep cool. Protect product from freezing.

**Disposal:**

Dispose of contents/ container to an approved waste disposal plant.

**Other hazards** : None known.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Concentration: (%)
C4-C16 Alcohols, Aldehydes, Esters	Proprietary	60 - 100
2-ethylhex-2-enal	645-62-5	10 - 30
Butanol	71-36-3	5 - 10

## SECTION 4. FIRST AID MEASURES

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

In case of skin contact : Wash off with soap and plenty of water. Get medical attention if symptoms occur.

If swallowed : Rinse mouth. Get medical attention if symptoms occur.

If inhaled : Remove to fresh air. Treat symptomatically. Get medical attention if symptoms occur.

Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.

Notes to physician : Treat symptomatically.

**See toxicological information (Section 11)**

## SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : High volume water jet

Specific hazards during firefighting : Fire Hazard  
Keep away from heat and sources of ignition.  
Flash back possible over considerable distance.  
Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Hazardous combustion products : Carbon oxides

Special protective equipment for firefighters : Use personal protective equipment.

# SAFETY DATA SHEET

## NALFLOTE® 9837

Specific extinguishing methods : Use water spray to cool unopened containers. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. In the event of fire and/or explosion do not breathe fumes.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Ensure adequate ventilation. Remove all sources of ignition. Keep people away from and upwind of spill/leak. Avoid inhalation, ingestion and contact with skin and eyes. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Ensure clean-up is conducted by trained personnel only. Refer to protective measures listed in sections 7 and 8.

Environmental precautions : Do not allow contact with soil, surface or ground water.

Methods and materials for containment and cleaning up : Eliminate all ignition sources if safe to do so. Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

### SECTION 7. HANDLING AND STORAGE

Advice on safe handling : Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). Keep away from fire, sparks and heated surfaces. Do not breathe dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Wash hands thoroughly after handling. Use only with adequate ventilation.

Conditions for safe storage : Keep away from heat and sources of ignition. Keep in a cool, well-ventilated place. Keep away from oxidizing agents. Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.

Suitable material : The following compatibility data is suggested based on similar product data and/or industry experience: Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

Unsuitable material : not determinednot determined

### SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### Components with workplace control parameters

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Butanol	71-36-3	TWA	20 ppm	ACGIH
		Ceiling	50 ppm 150 mg/m <sup>3</sup>	NIOSH REL
		TWA	100 ppm	OSHA Z1

## SAFETY DATA SHEET

### NALFLOTE® 9837

300 mg/m<sup>3</sup>

Engineering measures : Effective exhaust ventilation system. Maintain air concentrations below occupational exposure standards.

#### Personal protective equipment

Eye protection : Safety goggles  
Face-shield

Hand protection : Wear protective gloves.  
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Wear suitable protective clothing.

Respiratory protection : No personal respiratory protective equipment normally required.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash face, hands and any exposed skin thoroughly after handling. Provide suitable facilities for quick drenching or flushing of the eyes and body in case of contact or splash hazard.

#### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid  
Colour : Amber  
Odour : Pungent, Aldehyde  
Flash point : 47 °C  
Method: Tag closed cup

pH : no data available  
Odour Threshold : no data available  
Melting point/freezing point : FREEZING POINT: < -45.6 °C  
Initial boiling point and boiling range : 89 °C (760 mm Hg)  
Evaporation rate : no data available  
Flammability (solid, gas) : no data available  
Upper explosion limit : no data available  
Lower explosion limit : no data available  
Vapour pressure : 2.8 mm Hg (37.8 °C)  
Relative vapour density : no data available  
Relative density : 0.89 (25 °C)  
Density : no data available  
Water solubility : no data available  
Solubility in other solvents : no data available  
Partition coefficient: n-octanol/water : no data available

## SAFETY DATA SHEET

### NALFLOTE® 9837

Auto-ignition temperature	: no data available
Thermal decomposition	: Carbon oxides
Viscosity, dynamic	: 20 mPa.s (20 °C)
Viscosity, kinematic	: no data available
VOC	: no data available

#### SECTION 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: Heat, flames and sparks.
Incompatible materials	: Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.
Hazardous decomposition products	: Carbon oxides

#### SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

##### Potential Health Effects

Eyes	: Causes serious eye damage.
Skin	: May be harmful in contact with skin.
Ingestion	: Health injuries are not known or expected under normal use.
Inhalation	: Health injuries are not known or expected under normal use.
Chronic Exposure	: Health injuries are not known or expected under normal use.

##### Experience with human exposure

Eye contact	: Redness, Pain, Corrosion
Skin contact	: No symptoms known or expected.
Ingestion	: No symptoms known or expected.
Inhalation	: No symptoms known or expected.

##### Toxicity

##### Product

## SAFETY DATA SHEET

### NALFLOTE® 9837

Acute oral toxicity	: LD50 rat: > 5,000 mg/kg Test substance: Product
Acute inhalation toxicity	: no data available
Acute dermal toxicity	: LD50 rat: > 2,000 mg/kg Test substance: Product
Skin corrosion/irritation	: Species: rabbit Result: No skin irritation Method: OECD Test Guideline 404 Test substance: Product
Serious eye damage/eye irritation	: Species: rabbit Result: Causes serious eye damage. Method: OECD Test Guideline 405 Test substance: Product
Respiratory or skin sensitization	: Test Method: Buehler Test Exposure routes: Dermal Species: guinea pig Result: Does not cause skin sensitisation. Method: OECD Test Guideline 406 Test substance: Product
Carcinogenicity	: no data available
Reproductive effects	: no data available
Germ cell mutagenicity	: Not mutagenic in Ames Test.
Teratogenicity	: no data available
STOT - single exposure	: no data available
STOT - repeated exposure	: no data available
Aspiration toxicity	: no data available

### SECTION 12. ECOLOGICAL INFORMATION

#### Ecotoxicity

Environmental Effects : Harmful to aquatic life.

#### Product

Toxicity to fish : LC50 Brachydanio rerio: 68 mg/l  
Exposure time: 96 h  
Test substance: Product

Toxicity to daphnia and other aquatic invertebrates : EC50 Daphnia magna: 63.6 mg/l  
Exposure time: 48 h  
Test substance: Product

# SAFETY DATA SHEET

## NALFLOTE® 9837

Toxicity to algae	:	EC50 Green Algae (Tetrahymena pyriformis): 98 mg/l Exposure time: 72 h Test substance: Product
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: 10 mg/l Exposure time: 21 d Species: Daphnia magna Test substance: Product

### Persistence and degradability

no data available

### Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	:	10 - 30%
Water	:	30 - 50%
Soil	:	50 - 70%

### Bioaccumulative potential

no data available

### Other information

no data available

## SECTION 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste:	:	D001
Disposal methods	:	The product should not be allowed to enter drains, water courses or the soil. Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.
Disposal considerations	:	Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

## SECTION 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

### Land transport (DOT)

# SAFETY DATA SHEET

**NALFLOTE® 9837**

Proper shipping name : ALDEHYDES, N.O.S.  
Technical name(s) : Butanal, BUTYRALDEHYDE  
UN/ID No. : UN 1989  
Transport hazard class(es) : 3  
Packing group : III

## Air transport (IATA)

Proper shipping name : ALDEHYDES, N.O.S.  
Technical name(s) : Butanal, iso-Butyraldehyde  
UN/ID No. : UN 1989  
Transport hazard class(es) : 3  
Packing group : III

## Sea Transport (IMDG/IMO)

Proper shipping name : ALDEHYDES, N.O.S.  
Technical name(s) : Butanal, BUTYRALDEHYDE  
UN/ID No. : UN 1989  
Transport hazard class(es) : 3  
Packing group : III

## SECTION 15. REGULATORY INFORMATION

### EPCRA - Emergency Planning and Community Right-to-Know Act

#### CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Butanol	71-36-3	5000	73855

#### SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

**SARA 311/312 Hazards** : Fire Hazard  
Acute Health Hazard

**SARA 302** : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313** : The following components are subject to reporting levels established by SARA Title III, Section 313:  
Butanol 71-36-3 6.77 %

#### California Prop 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

#### INTERNATIONAL CHEMICAL CONTROL LAWS :

#### TOXIC SUBSTANCES CONTROL ACT (TSCA)

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

# SAFETY DATA SHEET

## NALFLOTE® 9837

### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

### EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

### JAPAN

This product contains substance(s) which are not in compliance with the Law Regulating the Manufacture and Importation Of Chemical Substances and are not listed on the Existing and New Chemical Substances list (ENCS).

### KOREA

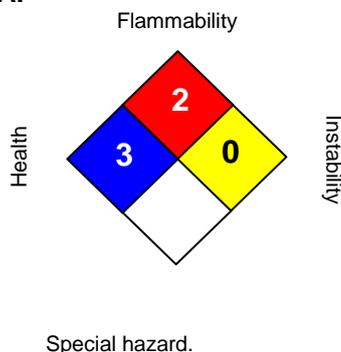
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

### PHILIPPINES

This product contains substance(s) which are not in compliance with the Republic Act 6969 (RA 6969) and may require additional review.

## SECTION 16. OTHER INFORMATION

### NFPA:



### HMIS III:

<b>HEALTH</b>	<b>3</b>
<b>FLAMMABILITY</b>	<b>2</b>
<b>PHYSICAL HAZARD</b>	<b>0</b>

0 = not significant, 1 = Slight,  
2 = Moderate, 3 = High  
4 = Extreme, \* = Chronic

Revision Date : 06/30/2014  
Version Number : 1.0  
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the SDS.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access.

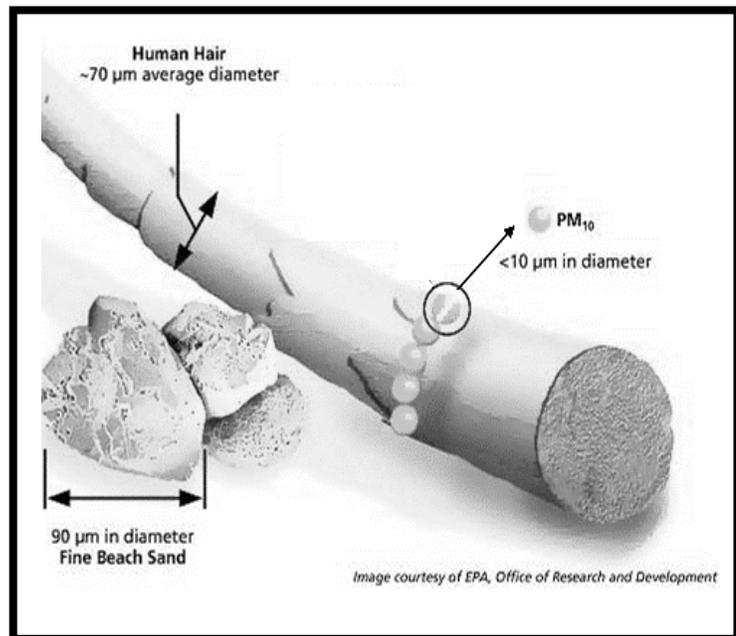
## Dust Storms & Human Health in Arizona

October 2006



### Background

Dust storms (or haboobs) are natural occurrences in Arizona. On average, people may find themselves in the middle of a dust storm a few times a year. Dust storms may cause public health concerns due to elevated levels of particulate matter (PM or small particles) in the air. PM<sub>10</sub> refers to small particles less than 10 microns in diameter (0.0004 inches, about 1/7 the width of a human hair). Breathing such particles may affect both your lungs and your heart, because they can get deep into your lungs, and some may even get into the bloodstream. Larger particles are of less concern, although they can irritate your eyes, nose, and throat.



Dust levels vary according to the wind speed and duration of a storm. The concentration of particulate matter during a dust storm varies widely. However, a ballpark figure for a moderate to severe PM<sub>10</sub> level during a dust storm is around 250 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). The current U.S. Environmental Protection Agency (EPA) compliance standard for PM<sub>10</sub> is 150  $\mu\text{g}/\text{m}^3$  averaged over 24 hours and 50  $\mu\text{g}/\text{m}^3$  averaged over a one-year period.

Breathing high levels of small particles for a short time (i.e. hours or days) can cause asthma episodes, acute bronchitis, worsen lung disease, and may also increase the chance to have respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias.

Dust storms may cause other health concerns due to the source, composition and other characteristics of the particulate matter depending on the makeup of soil and dust. For instance, dust storms in Arizona may contain background metals in soil and the microorganisms that cause valley fever. Another example would be a dust storm that occurs near a mine where the tailings can contribute to the composition of the PM.

## Comparing Dust Storms in Mining Areas to Non-mining Areas

The following two scenarios show how two communities in southern Arizona may be impacted by a dust storm with a PM<sub>10</sub> level of 260 µg/m<sup>3</sup>. One community (Community A) experiences a dust storm where PM<sub>10</sub> is composed of soils with naturally occurring levels of metals in the soil, while the other (Community B) experiences a dust storm that contains soils from a mine tailing pile (i.e. a mining waste pile). The background metals concentrations were obtained from a previous investigation (ETC 1991). The metal concentrations in mine tailings were based on Phelps Dodge's laboratory reports (Personal communication).

Other assumptions are: 1) Adults breathe in 2.5 m<sup>3</sup> of air during a 4-hour event based on an inhalation rate of 15 m<sup>3</sup>/day; 2) Adult body weight is 70 kg (~154 lbs). The table below shows the measured levels of metals in background soil and tailing pile, and their estimated levels in the air using these assumptions.

	Community A		Community B	
	Measured amount in background soil	Estimated amount in air	Measured amount in tailing pile	Estimated amount in air
	(mg/kg)	(µg/m <sup>3</sup> )	(mg/kg)	(µg/m <sup>3</sup> )
aluminum	10,654	2.770	4,550	1.183
antimony	1.7	< 0.001	7.5	0.002
arsenic	9.4	0.002	5	0.001
barium	161.3	0.042	56.5	0.015
beryllium	1.1	< 0.001	3	0.001
boron	NA*	NA	19	0.005
cadmium	0.4	< 0.001	0.885	< 0.001
chromium	17.5	0.005	4.35	0.001
cobalt	NA	NA	5.45	0.001
copper	16.6	0.004	165	0.043
lead	7.7	0.002	7.5	0.002
manganese	NA	NA	185	0.048
mercury	0.05	< 0.001	0.465	< 0.001
molybdenum	NA	NA	21	0.005
nickel	18.2	0.005	5	0.001
selenium	0.6	< 0.001	5	0.001
silver	0.5	< 0.001	3	0.001
thallium	0.7	< 0.001	5	0.001
vanadium	12	0.003	22.5	0.006
zinc	38.9	0.010	26.5	0.007

\* NA: Not Available

## Results

The results of this comparison suggest that residents from both communities would breathe relatively similar air during a dust storm. For both communities the predicted metal levels in the air are similar.

Both communities would have an EPA Air Quality Index (AQI) for PM<sub>10</sub> of 153 during a moderate to severe dust storm, which is considered unhealthy, suggesting that both communities would contain air that would be unhealthy to breathe during a dust storm. During dust storms in either community, people with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion; everyone else should reduce prolonged or heavy exertion. That is to say, the major health concern is the levels of PM<sub>10</sub> rather than the metals that may be found in the area.

## Summary

In this analysis, we compared the health impacts from dust storms in 2 communities. In one community, the dust storm was assumed to originate over naturally occurring desert soils. In the other community, the material in the dust storm was assumed to originate from a mine tailing pile. The results suggested that the air during a dust storm is unhealthy to breathe regardless of the source of the particulate matter, and that the source material in the dust did not make a significant difference in the level of health impact.

AQI (EPA 2003), based on data from local air quality monitors, tells you about the daily air quality in your area and recommends precautions you can take to protect your health.

AIR QUALITY INDEX FOR PARTICLE POLLUTION			
PM <sub>10</sub> Level* (µg/m <sup>3</sup> )	Air Quality Index	Air Quality	Health Advisory
0-54	0-50	Good	None.
55-154	51-100	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion.
155-254	101-150	Unhealthy for Sensitive Groups	People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion.
255-354	151-200	Unhealthy	People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion.
355-424	201-300	Very Unhealthy	People with heart or lung disease, older adults, and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion.
425-604	301-500	Hazardous	Everyone should avoid all physical activities outdoors; people with heart or lung disease older adults, and children should remain indoors and keep activity levels low.

\* Based on a 24-hour average

## References

The Earth Technology Corporation. (1991) Evaluation of Background Metals Concentrations in Arizona Soils.

United States Environmental Protection Agency (U.S. EPA). (2003) Air Quality Index: A Guide to Air Quality and Your Health. Available: [http://www.epa.gov/airnow//aqibroch/AQI\\_2003\\_9-3.pdf](http://www.epa.gov/airnow//aqibroch/AQI_2003_9-3.pdf) . Last access on October 13, 2006.