GW - 101

MSDS
REPORTS

YEAR(S):

1991

A-2 (Liquid)
May 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLCRADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Drilling Specialties Company for Smith Energy Services
PRODUCT NAME:	AGA-2 (Liquid); Stimulation Acid Gelling Agent
CHEMICAL NAME:	Mixture
CHEMICAL FAMILY:	Mixture
CHEMICAL FORMULA:	Mixture
CAS REG. NO.:	Mixture
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 is subject to all applicable provisions and restrictions of 40 CFR, Section 721 and 723.250.

SECTION 2 - COMPONENTS

INGREDIENTS	CAS NO.	PERCENT BY VOLUME	OSHA PEL*	ACGIH TLV*

*See Section 6, Recommended Exposure Limits

The specific chemical identity of this material is being withheld as a trade secret. It will be provided in accordance with the provisions of 29 CFR Part 1910.1200(i). In the event of a medical emergency, it will be provided to a treating physician or nurse through utilization of the Emergency Telephone Number above.

SECTION 3 - PERSONAL PROTECTION INFORMATION

VENTILATION:	Use adequate ventilation to control exposure below recommended levels.
RESPIRATORY PROTECTION:	For concentrations exceeding the recommended exposure level, use NIOSH/MSHA-approved air purifying respirator. In case of spill or leak resulting in unknown concentration, use NIOSH/MSHA-approved supplied air respirator.
EYE PROTECTION:	Use safety glasses with side shields. For splash protection, use chemical goggles and face shield.
SKIN PROTECTION:	Use gloves of rubber, neoprene or vinyl alcohol.
	NOTE: Personal protection information shown in this Section 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.

SECTION 4 - HANDLING AND STORAGE PRECAUTIONS

Avoid contact with eyes, skin or clothing. Avoid breathing vapors. Wash thoroughly after handling. Wash hands before eating, drinking or smoking. Launder contaminated clothing before reuse. Wear protective equipment and/or garments described in Section 3 if exposure conditions warrant.

Store and use in a well-ventilated area. Keep containers closed.

SECTION 5 - REACTIVITY DATA

STABILITY:	Stable
CONDITIONS TO AVOID:	Not Applicable
INCOMPATIBILITY (MATERIALS TO AVOID):	Not Established
HAZARDOUS POLYMERIZATION:	Will not Occur

CONDITIONS TO AVOID:	Not Applicable
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon Oxides and toxic gases may form when burned.

SECTION 6 - HEALTH HAZARD DATA

RECOMMENDED EXPOSURE LIMITS:	The manufacturer recommends an exposure limit of 400 ppm (total hydrocarbon).

ACUTE EFFECTS OF OVEREXPOSURE:

EYE:	May be mildly irritating.
SKIN:	May be mildly irritating.
INHALATION:	May cause headache, nausea, dizziness or unconsciousness.
INGESTION:	Slight gastrointestinal upset possible. May be aspirated into the lungs if swallowed resulting in pulmonary edema and chemical pneumonitis.
SUBCHRONIC AND CHRONIC EFFECTS OF OVEREXPOSURE:	A component has caused kidney injury in laboratory animals.
OTHER HEALTH EFFECTS:	No known applicable information.
HEALTH HAZARD CATEGORIES:	Target Organ Toxin to animal and human.

FIRST AID AND EMERGENCY PROCEDURES:

EYE:	Flush eyes with running water for at least 15 minutes. If irritation develops, seek medical attention.
SKIN:	Wash with soap and water. If irritation develops, seek medical attention.
INHALATION:	Remove from exposure. If illness or adverse symptoms develop, seek 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.

SECTION 7 - PHYSICAL DATA

APPEARANCE:	Clear to light yellow liquid
ODOR:	Odorless
BOILING POINT:	210 degrees F (99C) (Initial)
VAPOR PRESSURE:	40-50 mmHg at 100 degrees F (37.8C)
VAPOR DENSITY (AIR=1):	>1
SOLUBILITY IN WATER:	Appreciable
SPECIFIC GRAVITY (WATER=1):	1.1
PERCENT VOLATILE BY VOLUME:	>35
EVAPORATION RATE (BUTYL ACETATE=1):	<1
VISCOSITY:	Not Established

SECTION 8 - FIRE AND EXPLOSION DATA

FLASH POINT (METHOD USED):	>210 degrees F (>99C) (PMCC, ASTM D93)
FLAMMABLE LIMITS (PERCENT BY VOLUME IN AIR):	LEL: Not Established UEL: Not Established
FIRE EXTINGUISHING MEDIA:	Dry chemical, foam or carbon dioxide (CO2).
SPECIAL FIRE FIGHTING PROCEDURES:	Evacuate area of all unnecessary personnel. Shut off source, if possible. Use NIOSH/MSHA-approved self-contained breathing apparatus and other protective equipment and/or garments described in Section 3 if conditions warrant. Water fog or spray may be used to cool exposed equipment and containers.
FIRE AND EXPLOSION HAZARDS:	Carbon oxides and toxic gases may be released.

SECTION 9 - 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 3 if exposure conditions warrant. Shut off source, if possible and contain spill. Keep out of water sources and sewers. Absorb in dry, inert material (sand, clay, sawdust, etc.). Transfer to disposal containers.
WASTE DISPOSAL (ENSURE CONFORMITY WITH ALL APPLICABLE DISPOSAL REGULATIONS):	Incinerate or otherwise manage in an RCRA-permitted waste management facility.

SECTION 10 - DOT TRANSPORTATION

SHIPPING NAME:	Not Applicable
HAZARD CLASS:	Not Applicable
ID NUMBER:	Not Applicable
PACKAGING GROUP:	Not Applicable
MARKING:	Not Applicable
LABEL:	Not Applicable
PLACARD:	Not Applicable
HAZARDOUS SUBSTANCE (RQ):	Not Applicable
SHIPPING DESCRIPTION:	Not Applicable
PACKAGING REFERENCES:	Not Applicable

SECTION 11 - RCRA CLASSIFICATION - UNADULTERATED PRODUCT AS A WASTE

Not Applicable

SECTION 12 - 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 3 if exposure conditions warrant.

SECTION 13 - HAZARD CLASSIFICATION

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

Health Hazard (Section 6)

SECTION 14 - ADDITIONAL COMMENTS

SARA 313: As of June 28, 1991, 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.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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AGD-2
April 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	FMC Corporation for Smith Energy Services
CHEMICAL NAME/SYNONYMS:	AGD-2; TBP, Phosphoric Acid, Tributyl Ester
SHIPPING NAME:	Tributyl Phosphate
FORMULA:	(C4H90) 3PO
CHEMICAL FAMILY:	Phosphate Ester
PRODUCT USES:	Plasticizer and solvent for various resins, solvent for lithographic inks; uranium extraction; antifoam agent.
NFPA DESIGNATION 704:	1=Flammability (Red) 2=Health (Blue) 0=Reactivity (Yellow) -=Special Hazard
[illegible]:	4=Extreme 3=high 2=Moderate 1=Slight 0=Insignificant

SECTION 2 - PRECAUTIONARY INFORMATION

PRECAUTIONARY STATEMENT:	(Please use this statement to satisfy the in-plant labeling requirements of the OSHA Hazard Communications Standard 29 CFR 1910.1200.)
HEALTH:	Mist at room temperature and vapor at elevated temperature. May be irritating to eye, nose and throat. Liquid, mist or vapor may be irritating to skin.
PHYSICAL:	Toxic gases (oxides of phosphorus) will be released in a fire.

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SECTION 3 - INGREDIENTS

MATERIAL/COMPONENT	CAS NO.	PERCENT	CANADIAN PRODUCT ID NO.
Tributyl Phosphate	126-73-8	100%	3018

SECTION 4 - PHYSICAL DATA

MELTING/FREEZING POINT:	<-80 degrees C
BOILING POINT:	137 to 145 degrees C at 4 mmHg
VAPOR PRESSURE:	7.3 mmHg at 150 degrees C (302 deg F)
VAPOR DENSITY (AIR =1):	9.2
APPEARANCE AND STATE:	Colorless to light straw liquid
ODOR:	Normal Characteristic
SPECIFIC GRAVITY (WATER=1):	0.977 to 0.983 at 20 degrees/20 deg C
SOLUBILITY IN WATER, PERCENT BY WEIGHT:	0.1% at 25 degrees C
PERCENT VOLATILES BY VOLUME:	0
EVAPORATION RATE (BUTYL ACETATE=1):	<0.1
pH (AS IS):	Not Applicable
pH (1% SOLUTION):	Not Applicable
ODOR THRESHOLD:	Not Available
DENSITY: (GMS/mL):	0.98
COEFFICIENT (WATER/OIL DISTR.):	Not Available

SECTION 5 - FIRE, EXPLOSION AND REACTIVITY DATA

FLASH POINT:	PMCC 115 degrees C (239 deg F)
AUTOIGNITION TEMPERATURE:	770 degrees F (410 deg C)
FLAMMABLE LIMITS (AIR):	UPPER: Not Applicable LOWER: Not Applicable
EXTINGUISHING MEDIA:	Water Fog, CO2, Dry Chemical
SPECIAL FIRE FIGHTING PROCEDURES:	Full protective clothing, self-contained breathing apparatus.
DEGREE OF FIRE AND EXPLOSION HAZARD:	Slight when exposed to heat or flame.
STABILITY:	Stable
HAZARDOUS POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID:	Avoid heat and flame
MAJOR CONTAMINANTS THAT CONTRIBUTE TO INSTABILITY:	Unknown
INCOMPATIBILITY:	Strong oxidizing agents
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxides of phosphorus
SENSITIVITY TO MECHANICAL IMPACT:	None
SENSITIVITY TO STATIC DISCHARGE:	None

SECTION 6 - ROUTES OF EXPOSURE

EYE CONTACT:	Mildly irritating (Rabbits) Ref: ICD/T-76-018, Source: FMC, 1976
SKIN CONTACT:	Severely irritating (Rabbit) Ref: ICD/T-76-018 181-508, Source: FMC, 1976, 1981
SKIN ABSORPTION:	No significant hazard LD50 (Rabbits): Above 10 g/kg, Ref: ICD/T 76-018, Source: FMC, 1976
INHALATION:	Slightly hazardous LC50 (Rats): Above 20 mg/L (1-hour aerosol) 2.5 mg/m3 TWA, ACGIH 1985-6 Source: FMC, 1976
INGESTION:	Slightly hazardous LD50 (Rats): 1.2 g/kg, Ref: ICD/T 76-018, Source: FMC, 1976
EXPOSURE LIMITS:	TLV=2.5 mg/cu M TWA, Source: ACGIH, 1985-6 PEL=2.5 mg/cu M 8-hour TWA, Source: OSHA, 1989

SECTION 7 - EFFECTS OF OVEREXPOSURE

ACUTE EXPOSURE:	May be irritating to skin, eyes, and mucous membranes. Large doses (oral or I.P.) have been reported to cause dyspnea, weakness, pulmonary edema, and twitching in rats. See Emergency and First Aid Procedures and Notes to the Physician.

CHRONIC EXPOSURE:

EFFECTS CONSIDERED INCLUDE:	Sensitivities, carcinogenicity, teratogenicity, mutagenicity, synergistic products, and any medical conditions generally recognized as being aggravated by exposure.

Reduced nerve conduction velocity and electron-microscopic changes (sciatic nerve) were observed in rats orally dosed with TBP (14 days). Microscopic changes in the seminiferous tubules observed in rats repeatedly administered tributyl phosphate (14 days) were not found in subsequent longer-term studies conducted with rats at comparable dose level. In the longer term studies, urinary bladder hyperplasia and, in one study, increased liver weight were observed. There was no inhibition of acetylchol-inesterase activity. See Emergency and First Aid Procedures and Notes to the Physician.

SECTION 8 - EMERGENCY AND FIRST AID PROCEDURES

EYES: Flush thoroughly with water for at least 15 minutes, lifting the upper and lower lids occasionally. Get medical attention.

SKIN: Immediately wash affected area with soap and large amounts of water. Remove contaminated clothing while continuing water wash. Get medical attention.

INHALATION: Remove to fresh air. If breathing is difficult, have patient breathe oxygen. Seek medical attention.

INGESTION: Give 1 or 2 glasses of water and induce vomiting by touching back of throat with finger, or if available, by administering Syrup of IPECAC. **Do not induce vomiting or give anything by mouth to an unconscious person.** Obtain medical attention. Remove contaminated clothing.

DECONTAMINATION PROCEDURE: Flush contaminated area with copious (large) amounts of water and wash thoroughly.

NOTE TO PHYSICIAN: May be irritating to skin, mucous membranes and eyes. Contaminated areas should be flooded with water and any eye contact cases should receive ophthalmologic evaluation. Human system toxicity information is unavailable, but is expected to be low or non-existent. Though an organophosphate, it possesses only extremely weak anticholinesterase activity which would not require specific treatment (e.g., atropine and cholinesterase regenerators). Treatment is supportive and symptomatic after terminating exposure through washing, emesis or lavage. If inhalation exposure is severe, observation for up to 72 hours for delayed onset of severe pulmonary edema should be considered.

SECTION 9 - SPECIAL PROTECTION

VENTILATION REQUIREMENTS: Use in well-ventilated ares. Control mist and/or vapors at or below 5 mg/cu. m PEL.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:

RESPIRATORY: At or above the PEL, respiratory protection should be used that is NIOSH-approved and consistent with exposure limits.

EYES: Safety goggles or safety shield in case of splashing.

GLOVES: Rubber gloves

SPECIAL CLOTHING AND EQUIPMENT: Aprons or impervious clothing when splashing is expected.

FOOTWEAR: No special requirement.

SECTION 10 - STORAGE AND HANDLING

Please use this statement to satisfy the in plant labeling requirements of the OSHA hazard communications standard 29 CFR 1910.1200:

Wear chemical safety goggles protective clothing and gloves when splashing is expected. Wear MSHA/NIOSH full-face respirator when mist or vapor is expected. Protect from heat and flame. Store in cool ventilated area.

SECTION 11 - DISPOSAL, SPILL OR LEAK PROCEDURES

PROCEDURE FOR RELEASE OR SPILL:	Keep material out of streams and sewers. Absorb spilled materials on commercial oil absorbent sand or dirt (soil). Put the contaminated absorbent into a DOT-approved container and dispose according to the methods outlined below for waste disposal.
WASTE DISPOSAL METHOD:	An acceptable method is to burn in an incinerator in accordance with all local, state and federal environmental laws, rules, regulations, standards and other requirements. Because acceptable methods of disposal may vary by location, and because regulatory requirements may change, the appropriate regulatory agencies should be contacted prior to disposal.

SECTION 12 - TRANSPORTATION DATA

DOT PROPER SHIPPING NAME:	TBP Tributyl Phosphate
DOT CLASSIFICATION:	Not regulated
DOT LABELS:	None
DOT MARKING:	None
DOT PLACARD:	None
UN NUMBER:	None
HAZARDOUS SUBSTANCE/RQ:	Not listed
49 STCC NUMBER:	None

EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURE: As for any high-boiling organic liquids.

PRECAUTIONS TO BE TAKEN IN TRANSPORTATION: Protect against physical damage.

TYPE PACKAGES: 55 gallon drums, tank cars, tank trucks.

SECTION 13 - ADDITIONAL REGULATORY INFORMATION

Material is reported in EPA TSCA Inventory List.
Material is not listed as a carcinogen/potential carcinogen in the following:
NTP Annual report? No
IARC Group 1 or II? No
OSHA 29 CFR Part 1910 Subpart Z? No
ACGIH Appendix A? No

Contains up to 1 ppm arsenic from California's Proposition 65 List of Carcinogens.

Does product contain a toxic chemical(s) subject to SARA TITLE III Section 313 reporting? No

SARA TITLE III Section 311/312 Classification: MSDS Required; inventory reporting required.

ADDITIONAL INFORMATION:

AQUATIC TOXICITY CLASSIFICATION: NIOSH RTECS No. 79-100, moderately toxic to rainbow trout, Source: JCTB, 1979; LC50: 11.84 mg/L; LC50 (daphnia magna): 9 mg/L, Source: Monsanto, 1986

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AMS-3
June 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 804202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION AND EMERGENCY INFORMATION

MANUFACTURED BY:	EXXON Chemical Americas, for Smith Energy Services
PRODUCT:	AMS-3; Surfactant
CHEMICAL NAME:	Not Applicable: Blend
CHEMICAL FAMILY:	Surfactant
PRODUCT DESCRIPTION:	Clear Light Amber Liquid, Bland Odor

HAZARD RATING SYSTEM:
KEY:

4=Severe
3=Serious
2=Moderate
1=Slight
0=Minimal

NPCA-HMIS	NFPA 704
3	3
3	3
0	0

SECTION 2 - HAZARDOUS INGREDIENT INFORMATION

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. The product is hazardous as defined in 29 CFR 1910.1200, based on the following compositional information:

COMPONENT:	OSHA HAZARD
Methanol, Isobutanol	Flammable Liquid
Methanol, Isobutanol	Eye and Skin Irritant
Methanol, Isobutanol, Ethylene Glycol	Vapors Irritant to Eyes and Respiratory Tract
Methanol	Systemic Toxicity by Ingestion, Inhalation, Skin
Ethylene Glycol	Animal Teratogen
Methanol, Isobutanol, Ethylene Glycol	PEL/TLV

For additional information see Section 3

SECTION 3 - HEALTH INFORMATION AND PROTECTION

NATURE OF HAZARD:

EYE CONTACT:	Severely irritating. If not removed promptly, will injure eye tissue, which may result in permanent damage.
SKIN CONTACT:	Irritating. Frequent or prolonged contact may irritate and cause dermatitis. Methyl alcohol may be absorbed through the skin which can contribute to damage of the optic nerve resulting in permanent visual changes, loss of vision or total blindness.
INHALATION:	Irritating to eyes and respiratory tract in high concentrations. This product contains methyl alcohol. Vapor inhalation and/or skin absorption can cause central nervous system effects and blindness.
INGESTION:	The main hazard of methyl alcohol arises from its misuse as a drinking substitute for ethyl alcohol. As little as 15 mL (1/2 oz.) of 40% methyl alcohol has caused death. Sublethal doses of methyl alcohol may damage the optic nerve which can result in permanent visual changes, including blindness.

FIRST AID:

EYE CONTACT:	Immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.
SKIN CONTACT:	Flush with large amounts of water; use soap if available. Remove grossly contaminated clothing, including shoes, and launder before reuse. If irritation persists, seek medical attention.
INHALATION:	Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Call for prompt medical attention.
INGESTION:	If swallowed, and INDIVIDUAL IS CONSCIOUS, induce vomiting. Get prompt medical attention. DO NOT attempt to give anything by mouth to an unconscious person.

RKPLACE EXPOSURE LIMITS:

OSHA REGULATION 29CFR1910.1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:

A TWA of 200 ppm (260 mg/m3) and a STEL of 250 ppm (310 mg/m3) for Methyl Alcohol (skin).
A ceiling value of 50 ppm (125 mg/m3) for Ethylene Glycol.
A TWA of 50 ppm (150 mg/m3) of Isobutyl Alcohol.

THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:

A TWA of 200 ppm (262 $mg/m^{3)}$, and a STEL of 250 ppm (328 $mg/m^{3)}$ for Methyl Alcohol (skin).
A ceiling value of 50 ppm (127 mg/m^3) for Ethylene Glycol vapor.
A TWA of 50 ppm (152 mg/m^3) for Isobutyl Alcohol.

PRECAUTIONS:

PERSONAL PROTECTION: For open systems where contact is likely, wear chemical resistant gloves, rubber boots, a chemical jacket, chemical goggles, and a face shield. Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA-approved respirators may be necessary to prevent overexposure by inhalation.

VENTILATION: The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces. See respiratory protection recommendations. Use explosion-proof ventilation equipment.

CHRONIC EFFECTS: This product contains trace levels of polynuclear aromatic compounds (approximately 100-150 parts per billion total PNAs), some of which may be carcinogenic. These levels should represent a low to negligible carcinogenic potential.

This product contains ethylene glycol (EG). Repeated high dose exposure to ethylene glycol by ingestion has caused kidney damage, brain damage, degeneration of the liver, and changes in blood chemistry and circulating blood cells in laboratory animals. Repeated overexposure to ethylene glycol has the potential to cause similar toxic effects in humans.

Ethylene glycol has been shown to cause developmental and reproductive effects at high dose levels in laboratory animals. These findings are of uncertain significance to man.

CHRONIC TOXICITY DATA IS AVAILABLE UPON REQUEST

SECTION 4 - FIRE AND EXPLOSION HAZARD

FLASH POINT:	53 degrees F METHOD: Tag CC
FLAMMABLE LIMITS:	LEL: 0.8 UEL: 36.0
AUTOIGNITION TEMPERATURE:	Not Available
GENERAL HAZARD:	Flammable Liquid, can release vapors that form flammable mixtures at temperatures at or above the flash point. Toxic gases will form upon combustion. "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. **DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.** Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.
FIRE FIGHTING:	Use water spray to cool fire exposed surfaces and to protect personnel. Shut off "fuel" to fire. If leak or spill has not ignited, use water spray to disperse the vapors. Either allow fire to burn under controlled conditions or extinguish with alcohol-type foam or dry chemical. Try to cover liquid spills with foam. Respiratory and eye protection required for fire fighting personnel.
HAZARDOUS COMBUSTION PRODUCTS:	Smoke, Fumes, Carbon Monoxide, Carbon Dioxide, Oxides of Sulphur, Oxides of Nitrogen

SECTION 5 - SPILL CONTROL PROCEDURE

LAND SPILL:

Eliminate sources of ignition. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the National Response Center. Vapors/dust can be harmful/fatal. Warn occupants of downwind areas. Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust. Recover by pumping (use an explosion-proof or hand pump) or with a suitable absorbent. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

WATER SPILL:

Eliminate sources of ignition. Vapors/dust can be harmful/fatal. Warn occupants and shipping in downwind areas. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 6 - NOTES

NOTES:

This product may contain trace amounts of ethylene oxide (CAS No. 75-21-8), a condition which creates the potential for accumulation of ethylene oxide in the headspace of shipping and storage containers and in enclosed areas where the product is being handled or used. Ethylene oxide is considered by OSHA, IARC, and NTP as a potential carcinogen for humans. Ethylene oxide may also present reproductive, mutagenic, genotoxic, neurologic and sensitization hazards in humans. If this product is handled with adequate ventilation, the presence of these trace amounts is not expected to result in any short-or long-term hazards.

SECTION 7 - REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT PROPER SHIPPING NAME:	FLAMMABLE LIQUID, N.O.S. (contains ISOBUTANOL, METHANOL) UN 1993
DOT HAZARD CLASS:	Flammable Liquid
DOT IDENTIFICATION NUMBER:	UN 1993
NAME:	Flammable Liquids, N.O.S.
FLASH POINT:	53 degrees F METHOD: Tag CC
TSCA:	Components of this product are listed on the TSCA Inventory.
CERCLA:	If the reportable quantity of this product is accidentally spilled, the incident is subject to the provisions of the Comprehensive Response, Compensation and Liability Act (CERCLA) and must be reported to the **National Response Center by calling 800-424-8802.** The reportable spill quantity of this product is 7,267 pounds. This product contains: Methanol.
SARA TITLE III:	Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories: **Immediate Health, Delayed Health, Fire**

This product contains the following Section 313 reportable ingredients:

COMPONENT	CAS NO.	MAXIMUM PERCENT
Methyl	67-56-1	69.0
Ethylene Glycol	107-21-1	6.0

SECTION 8 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY:	0.86 at 60 DENSITY: 7.1 lbs/gal at 60
VAPOR PRESSURE, mmHg AT ^{0}F:	185 at 100 Calculated
SOLUBILITY IN WATER, WEIGHT PERCENT AT ^{0}F:	Dispersible
VISCOSITY OF LIQUID, cST AT ^{0}F:	2 at 100 Cannon-Fenske 1 at 150 Cannon-Fenske
SPECIFIC GRAVITY OF VAPOR AT 1 ATM (AIR=1):	4.55
FREEZING/MELTING POINT, ^{0}F:	-80 Pour Point
EVAPORATION RATE, n-Bu ACETATE=1:	2.0 Calculated
BOILING POINT, ^{0}F:	155 Calculated IBP
pH:	6.0

SECTION 9 - REACTIVITY DATA

STABILITY:	Stable
HAZARDOUS POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID INSTABILITY:	None
MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:	Strong Oxidizing Agents
HAZARDOUS DECOMPOSITION PRODUCTS:	None

SECTION 10 - STORAGE AND HANDLING

ELECTROSTATIC ACCUMULATION HAZARD:	Unknown, use proper grounding procedure.
STORAGE TEMPERATURE, ^{0}F:	Ambient
LOADING/UNLOADING TEMPERATURE, ^{0}F:	Ambient
STORAGE/TRANSPORT PRESSURE, mmHg:	Atmospheric
VISCOSITY AT LOADING/ UNLOADING TEMPERATURE cST:	Not available

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May 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Nalco Chemical Company for Smith Energy Services
PRODUCT:	AR-2; Acid Retarder
DESCRIPTION:	An aqueous solution of alkylsulfonate and isopropanol
NFPA 704M/HMIS RATING:	1/1=Health 3/3=Flammability 0/0=Reactivity 0 =Other
KEY:	0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 - HAZARDOUS INGREDIENTS

The manufacturer's hazard evaluation has identified the following chemical ingredient(s) as hazardous under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult Section 14 for the nature of the hazard(s).

INGREDIENT(S)	CAS NO.	APPROXIMATE PERCENT
Isopropanol	67-63-0	20-40%

SECTION 3 - PRECAUTIONARY LABEL INFORMATION

WARNING: Flammable. Do not use, pour, spill or store near heat, sparks, or open flame. May cause irritation to skin and eyes. Store in cool area. Keep container closed when not in use. Avoid contact with skin, eyes and clothing. Avoid prolonged or repeated breathing of vapors. Use with adequate ventilation. Do not take internally.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

SECTION 4 - FIRST AID INFORMATION

EYES:	Flush with water for 15 minutes. Call a physician.
SKIN:	Flush with water for 15 minutes.
NOTE TO PHYSICIAN:	No specific antidote is known. Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.
CAUTION:	If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

SECTION 5 - HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE:	Eye, skin
EYE CONTACT:	May cause irritation with prolonged contact.
SKIN CONTACT:	May cause irritation with prolonged contact.
SYMPTOMS OF EXPOSURE:	A review of available data does not identify any symptoms from exposure.
AGGRAVATION OF EXISTING CONDITIONS:	A review of available data does not identify any worsening of existing conditions.

SECTION 6 - TOXICOLOGY INFORMATION

ACUTE TOXICITY STUDIES:	No toxicity studies have been conducted on this product.

SECTION 7 - PHYSICAL AND CHEMICAL PROPERTIES

COLOR:	Brown	
FORM:	Liquid	
ODOR:	Alcohol	
DENSITY:	8.2 lbs./gal.	
SOLUBILITY IN WATER:	Completely	
SPECIFIC GRAVITY:	0.99 at 60 degrees F	
pH (NEAT):=	9.6	ASTM E-70
VISCOSITY:	13 cps at 60 degrees F	ASTM D-445
FLASH POINT:	67 Degrees F (PMCC)	ASTM D-93
PERCENT VOLATILE BY WEIGHT:	18 at 75 degrees F	ASTM D-323

NOTE: These physical properties are typical values for this product.

SECTION 8 - FIRE AND EXPLOSION INFORMATION

FLASH POINT:	67 Degrees F (PMCC)	ASTM D-93
EXTINGUISHING MEDIA:	Based on the NFPA guide, use dry chemical, alcohol foam, carbon dioxide or other extinguishing agent suitable for Class B fires. Use water to cool containers exposed to fire. For large fires, use water spray or fog, thoroughly drenching the burning material.	
UNUSUAL FIRE AND EXPLOSION HAZARD:	May evolve SOx under fire conditions.	

SECTION 9 - REACTIVITY INFORMATION

INCOMPATIBILITY: Avoid contact with strong oxidizers (e.g., chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, CO_2, SOx may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

SECTION 10 - PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION: Respiratory protection is not normally needed since the volatility and toxicity are low. If significant mists or aerosols are generated, wear a NIOSH-approved or equivalent respirator, (ANSI Z 88.2, 1980 for requirements and selection).

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a pressure-demand, self-contained breathing apparatus is recommended.

VENTILATION: General ventilation is recommended.

PROTECTIVE EQUIPMENT: Use impermeable gloves and chemical splash goggles (ANSI Z 87.1 requirements and selection of gloves, goggles, shoes, etc.) when attaching feeding equipment, or doing maintenance.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

SECTION 11 - SPILL AND DISPOSAL INFORMATION

SPILL CONTROL AND RECOVERY:

Small liquid spills: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 14.

Large liquid spills: Dike to prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 14.

For large indoor spills: Evacuate employees and ventilate area. Those responsible for control and recovery should wear the protective equipment specified in Section 10.

Keep the spill away from heat, sparks, flames and welding operations. Ventilate area and evacuate employees from exposure if the airborne concentration exceeds the TLV. Refer to Section 14.

DISPOSAL:

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under the Resources Conservation and Recovery Act (RCRA) 40 CFR 261. Hazardous Waste D001.

As a hazardous liquid waste, it must be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to a licensed industrial waste landfill (Hazardous Waste Treatment, Storage and Disposal facility). A hazardous liquid waste can also be incinerated in accordance with local, state and federal regulations.

SECTION 12 - ENVIRONMENTAL INFORMATION

If released into the environment, see CERCLA in Section 14.

SECTION 13 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME/HAZARD CODE:	FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN 1993
CONTAINS:	ISOPROPANOL

SECTION 14 - REGULATORY INFORMATION

The following regulations apply to this product:

FEDERAL REGULATIONS:

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:
Based on manufacturer's hazard evaluation, the following ingredient in this product is hazardous and the reason is shown below:

Isopropanol - Flammable

Isopropanol=TWA 400 ppm, STEL 500 ppm ACGIH/TLV
985 mg/M3, 1230 mg/M3 ACGIH/TLV

Isopropanol=TWA 400 ppm, STEL 500 ppm OSHA/PEL
980 mg/M3, 1225 mg/M3 OSHA/PEL

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 ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 and 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370):
The manufacturer's hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

XX Immediate (acute) health hazard
-- Delayed (chronic) health hazard
XX Fire hazard
-- Sudden release of pressure hazard
-- Reactive hazard

Under Section 311, submittal of MSDS(s) or a list of product names to the local emergency planning commission, state emergency response commission and local fire department is required after October 17, 1987 if you have:

- 10,000 pounds or more of a hazardous substance, or
- 500 pounds or the threshold planning quantity, whichever is less, of an extremely hazardous substance.

After October 17, 1989, MSDS(s), or a list of product names for all hazardous substances between zero (0) and 10,000 pounds, not previously reported, must be submitted.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):
This product does not contain ingredients (at a level of 1% or greater) on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA):
The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C & D:
If this product becomes a waste, it does meet the criteria of a hazardous waste as defined under RCRA 40 CFR 261 (consult Section 11).

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (formerly Section 307), 40 CFR 116 (formerly Section 311):
None of the ingredients are specifically listed.

CLEAN AIR ACT, 40 CFR 60, SECTION 111, 40 CFR 61, SECTION 112:
This product contains the following ingredient covered by the Clean Air Act:

Isopropanol - Section 111

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:
None of the chemicals on the current Proposition 65 list are known to be present in this product.

MICHIGAN CRITICAL MATERIALS:
This product does not contain ingredients listed on the Michigan Critical Materials Register.

STATE RIGHT-TO-KNOW LAWS:
Regulated in those states using the TLV for isopropanol as a criteria for listing.

SECTION 15 - ADDITIONAL INFORMATION

None

SECTION 16 - USER'S RESPONSIBILITY

This product material safety data sheet (MSDS) provides health and safety information. The product is to be used in applications consistent with manufacturer's 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 ensure safe workplace operations.

SECTION 17 - BIBLIOGRAPHY

ANNUAL REPORT ON CARCINOGENS, U.S. Department of Health and Human Services, Public Health Service, PB 33-135855, 1983.

CASARETT AND DOULL'S TOXICOLOGY, THE BASIC SCIENCE OF POISONS, Doull, J., Klaassen, C.D., and Admur, M.O., eds., Macmillian Publishing Company, Inc., N.Y., 2nd edition, 1980.

KLAASSEN, C.D., AND ADMUR, M.O., eds., Macmillian Publishing Company, Inc., N.Y., 2nd edition, 1980.

CHEMICAL HAZARDS OF THE WORKPLACE, Proctor, N.H., and Hughes, J.P., eds., J.P. Lipincott Company, N.Y., 1981.

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, Sam, N. Irving, ed., Van Nostrand Reinhold Company, N.Y., 6th edition, 1984.

IARC MONOGRAPHS ON THE EVALUATION OF THE CARCINOGENIC RISK OF CHEMICALS TO MAN, Geneva: World Health Organization, International Agency for Research on Cancer, 1972-1977.

PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, Clayton, G.D., Clayton, F.E., eds., John Wiley and Sons, N.Y., 3rd edition, Vol. 2 A-C, 1981.

REGISTRY OF TOXIC EFFECTS ON CHEMICAL SUBSTANCES, U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, 1983 supplement of 1981-1982 edition, Vol. 1-3, OH, 1984.

Title 29 Code of Federal Regulations Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS IN THE WORKROOM ENVIRONMENT WITH INTENDED CHANGES, American Conference of Governmental Industrial Hygienists, OH.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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S-4
December 1991

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	NALCO Chemical Company for Smith Energy Services
TRADE NAME:	BCS-4, Dryocide
DESCRIPTION:	A mixture of carbamates
NFPA 704M/HMIS RATING:	2/2=Health 1/1=Flammability 2/2=Reactivity 0=Other 0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 - HAZARDOUS INGREDIENTS

The manufacturer's hazard evaluation has identified the following chemical ingredient(s) as hazardous under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult Section 14 for the nature of the hazard(s).

INGREDIENT(S)	CAS NO.	APPROXIMATE PERCENT
Sodium dimethyldithiocarbamate	128-04-1	40
NABAM (disodium ethylene bisdithiocarbamate)	142-59-6	40
Ethylene thiourea	96-45-7	0-2

SECTION 3 - PRECAUTIONARY LABEL INFORMATION

WARNING: Causes eye and skin irritation. Do not get in eyes, on skin or on clothing. Wear goggles or face shield, rubber gloves and protective clothing (hats, long sleeve shirt, long pants and boots) when handling. Harmful or fatal if swallowed. Avoid contamination of food and foodstuffs.

SECTION 4 - FIRST AID INFORMATION

EYES:	Immediately flush for at least 15 minutes while holding eyelids open. Call a physician at once.
SKIN:	Wash affected skin with soap and water. Call a physician.
INGESTION:	Drink promptly a large quantity of milk, egg whites, gelatin solution or if these are not available, drink large quantities of water. Call a physician at once.
NOTE TO PHYSICIAN:	No specific antidote is known. Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.
CAUTION:	If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

SECTION 5 - HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE:	Eye, Skin
EYE CONTACT:	May cause transient irritation.
SKIN CONTACT:	May cause transient irritation with prolonged contact.
INGESTION:	Can cause nausea and vomiting.
SYMPTOMS OF EXPOSURE:	
ACUTE:	Ingestion of carbamates can produce signs and symptoms of toxicity characterized by excessive tearing, salivation, dilation of pupils and convulsions.
AGGRAVATION OF EXISTING CONDITIONS:	A review of available data does not identify any worsening of existing conditions not previously mentioned, or identified in Sections 6 or 14.

CANCER EVALUATION: The National Toxicology Program's (NTP) Annual Report on Carcinogens and The International Agency for Research on Cancer (IARC) Monographs have identified the following substance(s):

Ethylene thiourea: As a suspect cancer-causing agent based on sufficient evidence in experimental animals but inadequate human evidence. Ethylene thiourea has also been reported to be an animal teratogen.

SECTION 6 - TOXICOLOGY INFORMATION

ACUTE TOXICITY STUDIES: Acute toxicity studies have been conducted on a more concentrated form of this product (85% actives versus 80% actives). The results are shown below:

ACUTE ORAL TOXICITY (ALBINO RATS): LD_{50}=0.62 g/kg

95% CONFIDENCE LIMITS=0.42 - 0.92 g/kg

ACUTE DERMAL TOXICITY (ALBINO RABBITS): LD_{50}=Greater than 2.0 g/kg (4-hour exposure)

PRIMARY SKIN IRRITATION TEST (ALBINO RABBITS): SKIN IRRITATION INDEX DRAIZE RATING: 0.0/8.0 Non-irritating

PRIMARY EYE IRRITATION TEST (ALBINO RABBITS): EYE IRRITATION INDEX DRAIZE RATING: 16.5/110.0 Mildly irritating (1-hour exposure)

SKIN SENSITIZATION: Modified Buehler method = Skin sensitizer

OTHER TOXICITY RESULTS: Ethylene thiourea has been found to be teratogenic in rats at dosages that produce no fetal deaths or apparent maternal toxicity.

CHRONIC TOXICITY RESULTS:	Ethylene thiourea was administered in the diet of Charles River CD rats for 18 months followed by a control diet for 6 months. Dosages of 175 and 350 ppm of ethylene thiourea produced hyperplastic goiters in the majority of the experimental animals. Thyroid carcinomas were also evident in the high-dosage group animals and to a lesser extent in the rats in the low-dosage group. Carcinomas were not found in the control group animals. In addition, hyperplastic liver nodules were noted in several of the test animals. Two strains of mice that were given ethylene thiourea in the diet for 82-83 weeks displayed an increased incidence of hepatomas.

SECTION 7 - PHYSICAL AND CHEMICAL PROPERTIES

COLOR:	Yellow/green	
FORM:	Powder	
ODOR:	Sulfur	
SPECIFIC GRAVITY:	0.7	ASTM D-1298
MELTING POINT:	Approximately 120 Deg C Decomposes between 120-135 Deg C	ASTM D-2117
FLASH POINT:	Not applicable	
PERCENT VOLATILE BY WEIGHT:	3	
NOTE:	These physical properties are typical values for this product.	

SECTION 8 - FIRE AND EXPLOSION INFORMATION

FLASH POINT:	Not applicable
EXTINGUISHING MEDIA:	Product has slight flammability as supplied. Exposure to heat for prolonged duration could release flammable fumes. Use water foam to extinguish fire.

UNUSUAL FIRE AND EXPLOSION HAZARD:	Dust may be ignitable if mixed with air. Exposure to temperatures above 120 degrees C could release flammable and toxic gases. Wear self-contained breathing apparatus while extinguishing fire.

SECTION 9 - REACTIVITY INFORMATION

INCOMPATIBILITY:	Avoid contact with strong acids (e.g., sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) which can generate heat, splattering or boiling and the release of toxic fumes.
THERMAL DECOMPOSITION PRODUCTS:	In the event of combustion CO, CO_2, NO_x, SO_x, amines and carbon disulfide may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

SECTION 10 - PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION:	If it is possible to generate dust, wear a NIOSH-approved or equivalent dust respirator, (ANSI Z 88.2, 1980 for requirements and selection). For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a pressure-demand, self-contained breathing apparatus is recommended.
VENTILATION:	Use general ventilation with local exhaust ventilation to maintain dust levels to within the TLV (See Section 14).
PROTECTIVE EQUIPMENT:	Wear gloves, boots, protective clothing (hats, long sleeve shirt, long pants) and a face shield with chemical splash goggles (ANSI Z 87.1 requirements and selection of gloves, goggles, shoes, etc.). A full slicker suit is recommended if gross exposure is possible. The availability of an eye wash fountain and safety shower is recommended. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

SECTION 11 - SPILL AND DISPOSAL INFORMATION

SPILL CONTROL AND RECOVERY:

Solid spills: Sweep or vacuum up and reclaim into recovery or salvage drums for disposal. Wear the protective equipment specified in Section 10. Refer to CERCLA in Section 14.

DISPOSAL:

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under the Resources Conservation and Recovery Act (RCRA) 40 CFR 261.

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited.

Pesticide Disposal: Pesticide, spray mixture or rinse water that cannot be used according to label instructions must be disposed of according to federal or approved state procedures under Subtitle C of the Resource Conservation and Recovery Act.

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Consult federal, state or local authorities for approved alternative disposal methods.

SECTION 12 - ENVIRONMENTAL INFORMATION

ENVIRONMENTAL HAZARDS: This pesticide is toxic to fish. Do not apply (or use) in estuarine oil fields where drilling fluids (muds) are discharged in the surface water. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not discharge treated effluent into lakes, streams, ponds or public waters unless in accordance with an NPDES permit. For guidance contact your regional office of the Environmental Protection Agency.

If released into the environment, see CERCLA in Section 14.

SECTION 13 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME/HAZARD CODE: HAZARDOUS SUBSTANCE, SOLID, N.O.S.
ORM-E NA 9188

CONTAINS: ETHYLENE THIOUREA

SECTION 14 - REGULATORY INFORMATION

THE FOLLOWING REGULATIONS APPLY TO THIS PRODUCT:

FEDERAL REGULATIONS:

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:

Based on the manufacturer's hazard evaluation, the following ingredient(s) in this product is hazardous and the reason is shown below:

Ethylene thiourea: Possibility of birth defects based on tests with laboratory animals. Suspect cancer-causing agent (refer to Section 6).

Ethylene thiourea, sodium dimethyldithiocarbamate, disodium ethylene bis-dithiocarbamate = 5 mg/m^3 (respirable dust) TLV

CERCLA/SUPERFUND, 40 CFR 117, 302:

This product contains ethylene thiourea, a Reportable Quantity (RQ) substance and if 50 pounds of product are released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802). NOTE: Based on RQ of 10 and 2% in product.

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 ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

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

The manufacturer's hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

XX Immediate (acute) health hazard
XX Delayed (chronic) health hazard
__ Fire Hazard
__ Sudden release of pressure hazard
__ Reactive hazard

Under Section 311, submittal of MSDS(s) or a list of product names to the local emergency planning commission, state emergency response commission and local fire department is required after October 17, 1987 if you have:

- 10,000 pounds or more of a hazardous substance, or
- 500 pounds or the threshold planning quantity, whichever is less, of an extremely hazardous substance.

After October 17, 1989, MSDS(s), or a list of product names for all hazardous substances between zero (0) and 10,000 pounds, not previously reported, must be submitted.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):
This product contains the following ingredient(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals.

Ethylene thiourea	96-45-7	0-2

TOXIC SUBSTANCES CONTROL ACT (TSCA):

The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA):

EPA Reg. No. 31910-20-10349.
This product is registered for use as a microorganism control chemical used in drilling fluids. In all cases follow instructions on the product label.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR SUBPART C & D:

If this product becomes a waste, it does meet the criteria of a hazardous waste as defined under RCRA 40 CFR 261 (consult Section 11).

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15/formerly Section 307, 40 CFR 116/formerly Section 311:

None of the ingredients are specifically listed.

CLEAN AIR ACT, 40 CFR 60, SECTION 111, 40 CFR 61, SECTION 112:

This product does not contain ingredients covered by the Clean Air Act.

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:

This product contains ethylene thiourea, known to the State of California to cause cancer (refer to Sections 2 and 3 of the MSDS).

MICHIGAN CRITICAL MATERIALS:

This product contains the following substance(s) identified on the Michigan Critical Materials Register:

Ethylene thiourea

STATE RIGHT-TO-KNOW LAWS:

The following states identify the ingredient(s) shown below as hazardous:

Pennsylvania, New Jersey, Illinois, California, Massachusetts - Ethylene thiourea

SECTION 15 - ADDITIONAL INFORMATION

None

SECTION 16 - USER'S RESPONSIBILITY

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with the manufacturer's 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 ensure safe workplace operations.

SECTION 17 - BIBLIOGRAPHY

ANNUAL REPORT ON CARCINOGENS, U.S. Department of Health and Human Services, Public Health and Human Services, Public Health Service, PB 33-135855, 1983.

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DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, Sax, N. Irving, ed., Van Nostrand Reinhold Company, N.Y., 6th edition, 1984.

IARC MONOGRAPHS ON THE EVALUATION OF THE CARCINOGENIC RISK OF CHEMICALS TO MAN, Geneva: World Health Organization, International Agency for Research on Cancer, 1972-1977.

PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, Clayton, G.D., Clayton, F.E., eds, John Wiley and Sons, N.Y., 3rd edition, Vol. 2 A-C, 1981.

Title 29 Code of Federal Regulations Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS IN THE WORKROOM ENVIRONMENT WITH INTENDED CHANGES, American Conference of Governmental Industrial Hygienists, OH.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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BCS-7
November 1991

MATERIAL SAFETY DATA SHEET

SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

PRODUCT:	BCS-7
MANUFACTURED BY:	Petrolite Corporation for Smith Energy Services
SHIPPING NAME:	Not hazardous per DOT CFR Title 49
CHEMICAL DESCRIPTION:	2-bromo-2-nitro-1, 3-propanediol

SECTION 2 - HAZARDOUS INGREDIENTS

CAS NUMBER	MATERIAL	%	EXPOSURE LIMITS
00052-51-7	2-bromo-2-nitro-1,3-propanediol	95	Not Established

SECTION 3 - PHYSICAL DATA

SPECIFIC GRAVITY (H_2O=1.0 at 60^{0}F):	0.722
VOLATILITY:	Nil
VAPOR PRESSURE:	Nil
SOLUBILITY IN WATER:	Soluble
APPEARANCE AND ODOR:	White powder; slight characteristic odor
MISCELLANEOUS DATA:	Ph 4.0 20% in water

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	>200^{0}F
FLAMMABLE LIMITS:	Not Established
FLASH METHOD:	SFCC ASTM D-3828
EXTINGUISHING MEDIA:	Use water spray or fog, alcohol-type foam, dry chemical or CO_2.
FIRE FIGHTING PROCEDURES:	Use a self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	If product is heated above 140^{0}C, the solid decomposes liberating heat, toxic hydrogen bromide fumes, oxides of nitrogen. The product swells up into a tarry mass which burns readily.

SECTION 5 - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE

INHALATION:	Not expected to be a problem under normal conditions of use.
INHALATION LC50:	5 mg/L
SKIN AND EYE CONTACT:	Contact with skin will cause moderate to severe irritation or burns. Contact with eyes will result in severe eye irritation or burns, and if not immediately removed, may lead to permanent eye injury.
DERMAL LD50:	>1600 mg/kg
INGESTION:	May be harmful if swallowed. May cause gastrointestinal distress with nausea, vomiting and diarrhea.
ORAL LD50:	180-400 mg/kg

EMERGENCY AND FIRST AND PROCEDURES:	Wash skin thoroughly with soap and water. If rash or irritation develops, consult a physician. Launder clothing before reuse. If in eyes, irrigate with flowing water immediately and continuously for 15 minutes. Consult a physician promptly. If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe. If ingested, promptly administer large quantities of water. Consult a physician immediately.

SECTION 6 - REACTIVITY DATA

STABILITY:	Stable at normal ambient temperatures. Avoid storage at high temperatures. Decomposition occurs at melting point of 130^{0}C. Alkaline pH will liberate formaldehyde.
INCOMPATIBILITY:	Keep away from alkaline materials and strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS:	NOx, bromine and formaldehyde
HAZARDOUS POLYMERIZATION:	Will not occur.

SECTION 7 - SPILL AND LEAK PROCEDURES

IF MATERIAL IS SPILLED OR RELEASED:	Sweep up material and place in appropriate disposal container. Use sweeping compound or other cleaning aids to pick-up residues. Wash down area thoroughly with water. Use appropriate personal protective equipment as necessary.
DISPOSAL METHOD:	Secure container and take to an approved waste disposal site. Dispose of residues in accordance with applicable waste management regulations.
DECONTAMINATION PROCEDURE:	Not appropriate.

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BW-4
September 14, 1990

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Van Waters & Rogers Inc. for Smith Energy Services
CHEMICAL NAME AND SYNONYMS:	Sulfamic Acid, Aminosulfuric Acid, Aminosulfonic Acid
CAS NO.:	5329-14-6
FORMULA:	H SO3 NH_2
HAZARD RATING (MANUFACTURER):	

HAZARD RATING SCALE:

HEALTH:	3	0=minimal
FIRE:	0	1=slight
REACTIVITY:	0	2=moderate
SPECIAL:	None	3=serious
		4=severe

SECTION 2 - HAZARDOUS INGREDIENTS

Exposure Limits, MG/M3

Component	CAS No.	%	PEL	OSHA TLV	ACGIH LIMIT	OTHER	Hazard
Sulfamic Acid	5329-14-6	92.2	1		(DuPont)		Irritant
Sulfuric Acid	7664-93-9	3.5	0				Corrosive
Ammonium Bisulfate	7803-63-6	3.5	0		0		0

SECTION 3 - PHYSICAL PROPERTIES

Boiling Point, DEG F: 408 (DECOM) Vapor pressure, NM HG/20 DEG G: n/a
Melting Point, DEG F: 401 Vapor Density (air=1): n/a
Specific Gravity (water=1): 2.125 Water Solubility, %: 17.7
Appearance & Odor: White to off white crystals, odorless
Evaporation Rate: (Butyl Acetate=1): NIL

SECTION 4 - FIRST AID MEASURES

If Inhaled: Remove to fresh air. give artificial respiration if not breathing. Get medical attention.

Eye contact: Immediately flush eyes with lots of running water for 15 minutes, lifting upper and lower eyelids occasionally, get medical attention.

Skin Contact: Immediately wash skin with lots of soap and water. Remove contaminated clothing and shoes, wash before reuse. Get medical attention if irritation persists after washing.

If Swallowed: Do not induce vomiting. If conscious, give lots of water. Get immediate medical attention. Do not give anything by mouth to an unconscious or convulsing person.

SECTION 5 - HEALTH HAZARD INFORMATION

Primary Routes of Exposure: Skin or eye contact

Signs & Symptoms of Exposure:

Inhalation: Breathing dust may irritate the nose and throat and cause coughing and chest discomfort.

Eye Contact: Dust causes eye burns.

Skin Contact: Dust will irritate the skin.

Swallowed: Swallowing the dust will irritate the mouth and throat.

Chronic Effects of Exposure: No specific information available.

Medical conditions generally aggravated by exposure: None reported.

Oral: Rat LDLO = 1600 MG/KG
Dermal: Rabbit: 500 MG for 24 hrs. Produced severe irritation.
Inhalation: No data found
Carcinogenicity: This material is not considered to be a carcinogen, by the National toxicology Program, The International Agency for Research on Cancer, or the Occupational Safety and Health Administration.
Other: None

SECTION 6 - PERSONAL PROTECTION

Ventilation: Local mechanical exhaust ventilation capable of minimizing dust emissions at the point of use.

Respiratory Protection: If use conditions generate dusts, wear a NIOSH-Approved respirator appropriate for those emission levels. Appropriate respirators may be a full face piece or a half mask air-purifying cartridge respirator with particulate filters, a self-contained breathing apparatus in the pressure-demand mode, or a supplied-air respirator.

Eye Protection: Chemical goggles unless a full face piece respirator is also worn. It is generally recognized that contact lenses should not be worn when working with chemicals because contact lenses may contribute to the severity of an eye injury.

Protective Clothing: Long sleeved shirt, trousers, safety shoes, rubber gloves, and rubber apron.

Other Protective Measures: An eyewash and safety shower should be nearby and ready for use.

SECTION 7 - FIRE AND EXPLOSION

Flash Point, DEG F: None Flammable Limits in Air, %
Method Used: n/a lower: n/a Upper: n/a
Extinguishing Media: This material is not combustible. Use extinguishing media appropriate for surrounding fire.

Special Fire Fighting Procedures: Fire Fighters should wear self contained breathing apparatus and full protective clothing. Use water spray to cool nearby containers and structures exposed to fire.

Unusual Fire and Explosion Hazards: May release Sulfur Trioxide, or Ammonia if involved in a fire. Aqueous Solutions of this product are highly Acidic.

SECTION 8 - HAZARDOUS REACTIVITY

Stability: Stable
Polymerization: Will not occur.
Conditions to avoid: Excessive heat.
Materials to Avoid: Hazardous reaction in aqueous solution may occur with Chlorine, Hypochlorous Acid, Hypochlorites, Cyanides, or Sulfides.
Hazardous Decomposition Products: May release Sulfur Dioxide, Sulfur Trioxide, or Ammonia Gases.

SECTION 9 - SPILL LEAK AND DISPOSAL PROCEDURES

Action to take for spills or leaks: Wear protective equipment including rubber boots, rubber gloves, rubber apron, and a self-contained breathing apparatus in the pressure demand mode or a supplied air respirator. If the spill or leak is small a full face piece air purifying cartridge respirator equipped with particulate filters may be satisfactory. In any event always wear eye protection. For small spills, shovel into DOT-approved waste containers. keep out of sewers, storm drains, surface waters and soil.
Comply with all applicable Governmental regulations on spill reporting, and handling and disposal of waste.

Disposal Methods: Dispose of contaminated product and materials used in cleaning up spill or leaks in a manner approved for this material. Consult appropriate Federal, State and local Regulatory Agencies to ascertain proper disposal procedures.
Note: Empty containers can have residues, gases and mists and are subject to proper waste disposal, as above.

SECTION 10 - SPECIAL PRECAUTIONS

Storage & Handling Precautions: Store in a cool, dry, well ventilated place away from incompatible materials. Keep bags or fiber drums dry at all times. Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing.

Repair & Maintenance Precautions: Do not cut, grind, weld or drill on or near this container.

Other Precautions: Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full.

SECTION 11 - OTHER REGULATORY INFORMATION

Do not detach this section from the MSDS and be sure to include this section when copying the MSDS.

This Product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund
Amendments and Reauthorization Act of 1986 and 40 CFR Part 327:
Sulfuric Acid
CAS No. 7664-93-9
%. WT. 3.5

SECTION 12 - REVISION

07/89: Added other regulatory information
08/89: Changed heading and contact information

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-4
December 1991

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9399

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Van Waters & Rogers for Smith Energy Services
PRODUCT NAME:	Citric Acid Solution
CAS NO.:	Unassigned
COMMON NAMES/SYNONYMS:	Citric acid in water phylo, water buffer-chemdyn
FORMULA:	Mixture

HAZARD RATING (NFPA 704 CRITERIA):

1=Health
0=Fire
0=Reactivity
-=None

KEY:

0=Minimal
1=Slight
2=Moderate
3=Serious
4=Severe

SECTION 2 - HAZARDOUS INGREDIENTS

COMPONENT	CAS NO.	%	EXPOSURE LIMITS, PPM OSHA PEL	ACGIH TLV	OTHER LIMIT	HAZARD
Citric Acid Solution	Unassigned	>99	None	None	None	None
The solution is composed of the following:						
Citric Acid	77-92-9	1-99	None	None	None	None
Water	7732-18-5	Balance	None	None	None	None

SES MBC:bjmDecember3,1991
REV.12/27/90 to ad molecular wt.,
HMIS rating,pH,%volatile,ecological
n,autoignition temp.,other
regulatory info-all sections
file:\MSDS\CA-4

SECTION 3 - PHYSICAL PROPERTIES

BOILING POINT, DEG F:	219
VAPOR PRESSURE, mmHg/20 DEG C:	16 @ 20 Deg.C
MELTING POINT, DEG F:	Not Applicable
VAPOR DENSITY (AIR=1):	0.62
SPECIFIC GRAVITY (WATER=1):	1.24
pH:	No Data Available
WATER SOLUBILITY, %:	100
APPEARANCE AND ODOR:	Clear, Colorless Liquid; Slight Citric Odor
EVAPORATION RATE (BUTYL ACETATE=1):	1

SECTION 4 - FIRST AID MEASURES

IF INHALED:	Remove to fresh air. Give artificial respiration if not breathing. Get immediate medical attention.
IN CASE OF EYE CONTACT:	Immediately flush skin with lots of running water for 15 minutes, lifting the upper and lower eyelids occasionally. Get immediate medical attention.
IN CASE OF SKIN CONTACT:	Immediately wash skin with lots of soap and water. Remove contaminated clothing and shoes; wash before reuse. Get immediate medical attention if irritation persists after washing.
IF SWALLOWED:	Treatment not normally required.
NOTES TO PHYSICIAN:	None

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HMIS rating,pH,%volatile,ecological
info,autoignition temp.,other
regulatory info-all sections
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SECTION 5 - HEALTH HAZARD INFORMATION

PRIMARY ROUTES OF EXPOSURE:	Swallowed and skin, or eye contact.
SIGNS AND SYMPTOMS OF EXPOSURE:	
INHALATION:	None currently known
EYE CONTACT:	None currently known
SKIN CONTACT:	None currently known
SWALLOWED:	None currently known
CHRONIC EFFECTS OF EXPOSURE:	No specific information available
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:	None reported

SECTION 6 - TOXICITY DATA

OR HYDROUS CITRIC ACID:

ORAL:	Rat LD50 = 11.7 g/kg
DERMAL:	Rabbit 500 mg/24 hr (Moderate Irritation)
INHALATION:	No data found
CARCINOGENICITY:	This material is not considered to be a Carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration (OSHA).
OTHER DATA:	None

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SECTION 7 - ECOLOGICAL INFORMATION

None

SECTION 8 - PERSONAL PROTECTION

VENTILATION:	General room ventilation.
RESPIRATORY PROTECTION:	A respirator is normally not required if this product is used with adequate ventilation.
EYE PROTECTION:	Chemical goggles. It is generally recognized that contact lenses should not be worn when working with chemicals because contact lenses may contribute to the severity of an eye injury.
PROTECTIVE CLOTHING:	Long-sleeved shirt, trousers, safety shoes, and gloves.
OTHER PROTECTIVE MEASURES:	An eyewash and safety shower should be nearby and ready for use.

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REV.12/27/90 to ad molecular wt.,
HMIS rating,pH,%volatile,ecological
info,autoignition temp.,other
regulatory info-all sections
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SECTION 9 - FIRE AND EXPLOSION INFORMATION

FLASH POINT, DEG F:	None
METHOD USED:	None
FLAMMABLE LIMITS (% VOL):	
METHOD USED:	None
UEL:	Not Applicable
LEL:	Not Applicable
AUTOIGNITION TEMPERATURES, DEG. F:	Not Applicable
EXTINGUISHING MEDIA:	This material is not combustible. Use extinguishing media appropriate for surrounding fire.
SPECIAL FIRE FIGHTING PROCEDURES:	None
UNUSUAL FIRE EXPLOSION HAZARD:	None

SECTION 10 - HAZARDOUS REACTIVITY

STABILITY:	Stable
POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID:	None
MATERIAL TO AVOID:	Strong alkalis
HAZARDOUS DECOMPOSITION PRODUCTS:	None

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REV.12/27/90 to ad molecular wt.,
HMIS rating,pH,%volatile,ecological
info,autoignition temp.,other
regulatory info-all sections
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SECTION 11 - SPILL, LEAK, AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS OR LEAKS:

Wear protective equipment including rubber boots, rubber gloves, rubber apron, and self-contained breathing apparatus in the pressure demand mode or a supplied-air respirator. If the spill or leak is small, a full facepiece air-purifying cartridge respirator equipped for organic vapors may be satisfactory. In any event, always wear eye protection. For small spills or drips, mop or wipe up and dispose of in DOT-approved waste containers. For large spills contain by diking with soil or other non-combustible absorbent material and then pump into DOT-approved waste containers; or absorb with non-combustible sorbent material, place residue in DOT-approved waste containers. Keep out of sewers, storm drains, surface waters, and soil. **Comply with all applicable governmental regulations on spill reporting, and handling and disposal of waste.**

DISPOSAL METHODS:

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

NOTE:

Empty containers can have residues, gases and mists and are subject to proper waste disposal, as above.

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HMIS rating,pH,%volatile,ecological
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SECTION 12 - SPECIAL PRECAUTIONS

STORAGE AND HANDLING PRECAUTIONS:	Store in a cool, dry, well-ventilated place. Store away from all other chemicals and potential sources of contamination. Keep container tightly closed when not in use. Do not use pressure to empty container. Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing.
REPAIR AND MAINTENANCE PRECAUTIONS:	Do not cut, grind, weld, or drill on or near this container.
OTHER PRECAUTIONS:	Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full.

SECTION 13 - OTHER REGULATORY INFORMATION

SECTION 313:	None
PROPOSITION 65:	Refer to Proposition 65 (with chemicals listed).
SECTION 313 AND PROPOSITION 65:	See Section 313 (with chemicals listed) and Proposition 65 (with chemicals listed).
SECTION 313 (WITH CHEMICALS LISTED:	None
PROPOSITION 65 (WITH CHEMICALS LISTED:	None

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ATER AND TOXIC ENFORCEMENT ACT
F 1986 (PROPOSITION 65) AS
CAUSING CANCER OR REPRODUCTIVE
TOXICITY AND FOR WHICH WARNINGS
ARE NOW REQUIRED:

CHEMICALS	CAS NO.	PERCENT, WEIGHT
Arsenic Compound	7440-38-2	<3 PPM
Lead Compound	7439-92-1	<10 PPM

MASSACHUSETTS: Under Massachusetts Right-To-Know Law, hazardous substance and extraordinarily hazardous substances components present in this product which requires reporting are:

EXTRAORDINARILY HAZARDOUS SUBSTANCES

CHEMICAL	CAS NO.	CONCENTRATION (> 0.0001%)
Arsenic Compound	7440-38-2	<3 PPM

HAZARDOUS SUBSTANCES

CHEMICAL	CAS NO.	CONCENTRATION (=> 1%)
Lead Compound	7439-92-1	<10 PPM

PENNSYLVANIA: Under the Pennsylvania Right-To-Know Law, hazardous substance and special hazardous substances components present in this product which require reporting are:

SPECIAL HAZARDOUS SUBSTANCES

CHEMICAL	CAS NO.	CONCENTRATION (> 0.01%)
Arsenic Compound	7440-38-2	<3 PPM

HAZARDOUS SUBSTANCES

CHEMICAL	CAS NO.	CONCENTRATION (> 1%)
Lead Compound	7439-92-1	<10 PPM

CALIFORNIA SCAQMD:

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HMIS rating,pH,%volatile,ecological
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regulatory info-all sections
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VOC:	Not Applicable
VAPOR PRESSURE:	Not Applicable
TSCA:	The ingredients of this product are on the TSCA Inventory.

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REV.12/27/90 to ad molecular wt.,
HMIS rating,pH,%volatile,ecological
info,autoignition temp.,other
regulatory info-all sections
file:\MSDS\CA-4

CCC-3
April, 1990

MATERIAL SAFETY DATA SHEET

SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Baker Performance Chemicals Inc. for Smith Energy Services
CHEMICAL NAME:	CCC-3
CHEMICAL FAMILY:	Quaternary Amine Polymer

SECTION 2 - REGULATORY CLASSIFICATION

ENVIRONMENTAL	OCCUPATIONAL	TRANSPORTATION
RQ=None	CSHA Non-Hazardous: NA	Not Regulated: Yes
TPQ=None	OSHA Hazardous: Yes	Regulated: NA
SARA S313: Yes Ethylene Glycol-<10%	X Acute X Chronic NA Fire NA Pressure NA Reactive	ID No.: NA DOT Response No.: NA

The components of this product are listed on the TSCA Inventory.

SECTION 3 - HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENT	CAS NO.	PEL OSHA* TWA	PEL OSHA* STEL	PEL OSHA* A/L	TLV (ACGIH)* TWA	TLV (ACGIH)* STEL	MFG* REC
Ethylene Glycol (<10%)	107-21-1	50(C)			50(C)		

*ppm unless otherwise indicated; (C) denotes ceiling limit

SECTION 4 - PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY AT 60^0F (WATER=1):	1.062 - 1.070
VAPOR PRESSURE ESTIMATED (MM HG AT 68^0F):	<1
VAPOR DENSITY (AIR=1):	>1
pH: 5% OF PRODUCT:	7.0
SOLUBILITY IN WATER:	Soluble
APPEARANCE AND ODOR:	Clear pale yellow liquid with mild odor
FLASH POINT (METHOD):	>200°F (TCC)
STABILITY:	Stable
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon monoxide; oxides of nitrogen
CONDITIONS TO AVOID:	Oxidizers; heat sparks, or open flame
HAZARDOUS POLYMERIZATION:	Will not occur
FIRE CONTROL PROCEDURES:	Use foam, dry chemical, CO_2, water fog or spray. Do not enter a fire area without proper protective equipment, including NIOSH/MSHA-approved, self-contained breathing apparatus. Cool exposed containers with water spray. Avoid vapors.
FIRE HAZARDS:	No unusual fire hazards; material is not flammable and/or combustible.

SECTION 5 - HEALTH HAZARDS

EFFECTS OF OVEREXPOSURE:

INHALATION:	Inhalation of high levels of vapors or mists may cause lightheadedness, dizziness, headaches or unconsciousness.
EYE CONTACT:	Eye contact may cause irritation and redness.
SKIN CONTACT:	Prolonged or repeated contact with skin may cause irritation or contact dermatitis.
INGESTION:	May be harmful if ingested.

OTHER INFORMATION:

Ethylene glycol produces a narcotic effect on vapor overexposed individuals with symptoms of narcosis, drowsiness and possible unconsciousness. There is evidence from animal studies that chronic ingestion of large doses of ethylene glycol may cause liver and kidney damage. This chemical is mildly irritating to eyes and skin.

Ethylene Glycol Toxicity Data:

Orl - Chd - TDLo = 5500 mg/kg
Orl - Hmn - LDLo = 786 mg/kg
Inh - Hmn - TCLo = 10,000 mg/kg
Unk - Man - LDLo = 1637 mg/kg

TARGET ORGANS (29 CFR 1910.1200-APPENDIX A):

Eye Hazard
Cutaneous Hazard (Skin)
Nephrotoxin (Kidney)
Hepatotoxin (Liver)

SECTION VI - EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT:

Flush eyes immediately with large amounts of water for at least 15 minutes. Call a physician if irritation persists.

INHALATION:

Remove to fresh air. If labored breathing continues, contact a physician.

SKIN CONTACT:

Remove contaminated clothes. Wash skin thoroughly with mild soap and water. Launder clothes before reuse.

INGESTION:

DO NOT induce vomiting. If conscious, drink large amounts of water and contact a physician.

SECTION 7 - PROTECTIVE EQUIPMENT RECOMMENDATIONS

VENTILATION:

The use of mechanical ventilation is recommended whenever this product is used in a confined space, is heated above ambient temperatures, or is agitated. Where engineering controls are not feasible, assure use is in an area where there is natural air movement.

RESPIRATORY	CHEMICAL RESISTANT APPAREL	EYE/FACE
X As needed	X Gloves	X Goggles
Air Supplied (SCBA)	Clothing	Full Face Shield
X Air Purifying	Boots	
Full Face Piece		
X Half Face Piece		
X Cartridge or Canister		
Acid Gas		
X Organic Vapor		
Ammonia		

Under normal operating conditions, no excursions above the regulated (recommended) exposure levels should occur. However, if used at elevated temperatures, lower atmospheric pressure (high altitudes) or any other physical conditions that may increase the inhalation exposure, respiratory protective equipment as described above should be worn. Also, due to individual susceptibility and sensitivity, before respirators are used, a full medical evaluation should be performed per 29 CFR 1910.134 (b) (10).

A thorough review of the job task (job safety analysis) by a competent safety professional should be conducted to determine the appropriate level of protection. See 29 CFR 1910, Subpart I and 29 CFR 1910.133 for further information.

SECTION 8 - SPILL AND LEAK PROCEDURES

n appropriate protective clothing and respiratory protection prior to entering a spill/leak area. Eliminate ignition sources. Approach area upwind if possible. Shut off leak if it can be done safely. Dike and pump large spills into salvage containers. Soak up residue and small spills with absorbent clay, sand, or dirt and place in salvage containers. If RQ (reportable quantity) is exceeded, report to National Spill Response Office 1-800-424-8802. Also, in some jurisdictions, spills or leaks of any hazardous materials are reportable--consult local lead agencies for further information. Continue to observe precautions.

WASTE DISPOSAL METHOD(S):

Re-evaluation of the product may be required by the user at the time of disposal, since the product uses, transformations, mixtures and processes may change the classification to non-hazardous, or hazardous for reasons other than, or in addition to product characteristics. Dispose of all waste and/or containers in accordance with federal, state, and local regulations.

REQUIREMENTS FOR TRANSPORTATION, HANDLING AND STORAGE:

Transport, handle and store in accordance with OSHA Regulation 1910.106 and applicable DOT regulations. Avoid inhalation of vapors or mists. Do not get in eyes, on skin or on clothing. Keep container closed when not in use. Wear suitable protection for eyes and skin when handling. Use with adequate ventilation. Avoid contact with oxidizers. Store in well-ventilated area. Store in cool, dry area.

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CCC-5-W
August 1992

MATERIAL SAFETY DATA SHEET

SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	AKZO Chemicals Inc. for Smith Energy Services
CHEMICAL NAME AND SYNONYMS:	Benzylcoco Alkyldimethyl Quaternary Ammonium Chlorides
CHEMICAL FAMILY:	Quaternary Ammonium Salt
CAS NO.:	Mixture
TSCA INV NO.:	Acceptable Mixture
FORMULA:	RN $(CH_3)_2(CH_2C_6H_5)$ Cl R=C $_{8-18}$
PRODUCT CODE NO.:	ND

NFPA 704 HAZARD RATING:

3=Health
3=Fire
0=Reactivity

4=Extreme
3=High
2=Moderate
1=Slight
0=minimal
*=Chronic Health Hazard (See Section 8)

SECTION 2 - HAZARDOUS INGREDIENTS

CAS NO.	COMPONENTS	%	ACGIH TLV	OSHA PEL	CARCINOGENICITY
61789-71-7	Benzylcoco Alkyldimethyl Quaternary Ammonium Chlorides	~40	ND	ND	N/A
61788-93-0	Dimethylcocoamine	<0.1	ND	ND	N/A
67-63-0	Isopropanol - (IPA)	~60	400	400	N/A
128-73-8	SYN-O-AD 8412	1	ND	ND	N/A

SECTION 3 - SHIPPING DATA

DOT SHIPPING NAME: Flammable Liquid, Corrosive, N.O.S.
DOT HAZARD CLASSIFICATION: Flammable Liquid
IMCO CLASS: 3.3
UN NO.: UN 2924
NA NO.: NA
IATA NO.: UN 2733
CORROSIVE PER DOT: To skin

SECTION 4 - PHYSICAL PROPERTIES

INITIAL BOILING POINT: 80°C 176°F @ 760 mmHg
MELTING/FREEZING POINT: ND °C
POUR POINT: ~-21°C ~ -5°F
MOLECULAR WEIGHT: ~354
SPECIFIC GRAVITY (H_2O=1): 0.855 @ 20°C
VAPOR PRESSURE (mmhg): ~24 @ 20°C
VAPOR DENSITY (AIR=1): 2.0 (IPA)
SOLUBILITY IN WATER (% BY WEIGHT): Soluble
% VOLATILES BY WEIGHT: ~60
EVAPORATION RATE (BUTYLACETATE=1): ~1.6
APPEARANCE AND ODOR: Clear, light yellow liquid with an isopropanol odor.

SECTION 5 - FIRE AND EXPLOSION DATA

FLASH POINT: 27°C 80°F
TEST METHOD: PMCC

FLAMMABLE LIMITS IN AIR: IPA 2-12% by Volume
AUTO IGNITION TEMPERATURE: 398°C 750°F IPA
DOT EMERGENCY GUIDE NO.: 29
EXTINGUISHING MEDIA: Water fog or spray, CO_2, dry chemical, foam
SPECIAL FIRE FIGHTING PROCEDURES:
Keep fire-exposed containers cool with water spray
UNUSUAL FIRE AND EXPLOSION HAZARDS:
Volatile, flammable solvent present; respiratory protection may be required

SECTION 6 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS CONTRIBUTING TO INSTABILITY: NA

HAZARDOUS POLYMERIZATION: Will not occur

INCOMPATIBILITY; AVOID CONTACT WITH: Strong Oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS; THERMAL AND OTHER (LIST): CO, NO_x, NH_3, HCl (Possible Combustion Products)

CONDITIONS TO AVOID: Ignition sources

SECTION 7 - SPILL OR LEAK

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
Keep upwind, avoid skin contact, absorb with sand or inert material, sweep or scoop out and remove, prevent spread of spill. Toxic to fish. Do not release to public waters, etc.

WASTE DISPOSAL: Consult federal state and local authorities for proper disposal procedures.

UNDER RCRA THIS PRODUCT IS CLASSIFIED AS: Ignitable. May inhibit biological waste water treatment systems. Product RQ is based on benzyl chloride RQ=100 lbs.

UNDER CERCLA (SUPERFUND) REPORTABLE QUANTITY: RQ= 23,000 pounds

SECTION 8 - TOXICITY

ACUTE:

DERMAL (SKIN): LD50-ND - 1.66 g/kg (albino rabbit). Primary Irritation Index= 7
(24 hr. - rabbit) - severely irritating and corrosive to skin.

EYE: Draize Score - ND. Unable to score due to eye damage. 0.1 undiluted product was severely irritating and corrosive (albino rabbit).

INHALATION: LC50-ND - Active ingredient is not considered volatile at ambient temperature. TLV for isopropanol is 400 ppm.

ORAL: LD50 - 295 mg/kg (albino rats) - Administered as a 10 or 25% solution.

OTHER: Product is toxic to fish.

SECTION 9 - HEALTH HAZARD INFORMATION

EFFECTS OF EXPOSURE:

DERMAL: Prolonged skin contact may result in irritation with redness and severe swelling and blistering.

EYE: Contact may result in severe eye irritation and damage.

INHALATION: Isopropanol vapors may irritate eyes and nose and cause dizziness, headache and drowsiness.

INGESTION: May result in severe irritation of the mouth, throat and stomach.

EMERGENCY FIRST AID:

DERMAL: Remove contaminated clothing immediately. Wash skin **THOROUGHLY** with soap and water. Continue application of cold water to burn area. Get medical attention if indicated.

EYE CONTACT: Immediately flush with water for at least 15 minutes! Contact lenses should be removed if the initial flush doesn't wash them out. Get medical attention. Immediate first aid is needed to prevent eye damage.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Give oxygen if needed. Get medical attention if indicated.

INGESTION: (NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON)
Do not induce vomiting. Give plenty of water. Get medical attention. Rinse mouth.

SECTION 10 - SPECIAL PROTECTION INFORMATION

HANDS (GLOVE MATERIALS TO MINIMIZE CHEMICAL CONTACT: Neoprene, Nitrile Rubber

EYES: Chemical splash goggle or face shield is recommended when splash hazard is present.

VENTILATION REQUIREMENTS-ALWAYS MAINTAIN EXPOSURE BELOW PERMISSIBLE EXPOSURE LIMITS:
Sufficient to prevent hazardous accumulation of vapors.

RESPIRATOR TYPE-FOR REDUCING CONTAMINANT CONCENTRATION IN INHALED AIR):
Can or cartridge gas or vapor. (Organic vapor or supplied-air respirator.)

OTHER: Safety shower and/or eye wash should be available. Use of a chemical- resistant apron or suit may be necessary in high-exposure situations.

SECTION 11 - SPECIAL PRECAUTIONS

Do not store near combustibles. Wash thoroughly after handling. Do not get in eyes, on skin or clothing. Do not breathe dust, vapor, mist, gas. Keep container closed. Empty container may contain hazardous residues. Keep away from heat, sparks and open flames. Use explosion-proof equipment.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct, but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely; and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of this and end product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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CDA-1
December 1991

MATERIAL SAFETY DATA SHEET

SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9399

SECTION 1 - SUPPLIER IDENTIFICATION

MANUFACTURED BY:	N/A
PRODUCT NAME:	CDA-1; Blend
NFPA:	2=Health 3=Fire 0=Reactivity None=Special
KEY:	0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

SECTION 2 - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	CAS NO.	OSHA PEL	ACGIH TLV	OTHER
Acetyl Acetone	123-54-6	No Data		
Isopropyl Alcohol	67-63-0	400 ppm	400 ppm	

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	N/D
MELTING POINT:	N/A
SPECIFIC GRAVITY (WATER=1):	N/D
VAPOR PRESSURE:	N/D
VAPOR DENSITY (AIR=1):	>1.0
EVAPORATION RATE (BUTYL ACETATE=1):	>1
SOLUBILITY IN WATER:	Soluble
APPEARANCE AND ODOR:	Colorless Liquid, Alcohol Odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD):	>100°F
FLAMMABLE LIMITS:	LOWER: N/D UPPER: N/D
EXTINGUISHING MEDIA:	Water fog or spray, foam, dry powder, carbon dioxide (CO_2)
SPECIAL FIRE FIGHTING PROCEDURES:	Approach fire from upwind side. Avoid breathing smoke, fumes, mist, or vapors on the downwind side.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Containers may rupture from internal pressure if confined to fire area. Cool with water. Get non-essential people out of the area.

SECTION 5 - REACTIVITY INFORMATION

STABILITY:	Stable
INCOMPATIBILITY:	
MATERIALS TO AVOID:	Oxidizers or oxidizing materials
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	From fire; smoke, carbon dioxide, carbon monoxide
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 6 - HEALTH HAZARD DATA

ROUTES OF ENTRY:

INHALATION:	Irritant, narcotic (alcohol, acetyl acetone)
SKIN/EYES:	Irritant (alcohol, acetyl acetone)
INGESTION:	Irritant (alcohol, acetyl acetone)

HEALTH HAZARDS:

ACUTE:	Irritating to skin and eyes, toxic if swallowed. Contains alcohol and acetyl acetone.
CHRONIC:	Unknown

CARCINOGENICITY:

NTP:	Not listed
IARC MONOGRAPHS:	Not listed
OSHA REGULATED:	Table Z1

SIGNS AND SYMPTOMS OF EXPOSURE: Skin irritation develops slowly after contact, eye irritation develops immediately upon contact.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Breathing disorders, dermatitis

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove victim to fresh air and, if needed, immediately begin artificial respiration. Give oxygen if breathing is labored. Get emergency medical help. Contact physician immediately.

Flush eyes and skin with water. Get medical attention if symptoms develop and persist.

Ingestion: Induce vomiting if victim is conscious by giving water then stick fingers down throat. Get immediate medical attention. Never give an unconscious person anything by mouth.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

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

Small Spills: Pick up with absorbent media. Store as hazardous waste.

Large Spills: Contain with dikes, pick up with vacuum truck. Handle as hazardous waste. Notify proper local, state and federal agencies.

Waste Disposal Method: EPA-approved hazardous waste disposal site. Follow applicable local, state and federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Store in a cool place away from ignition sources.

OTHER PRECAUTIONS: Store away from oxidizers or materials bearing a yellow "DOT" label.

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION:	NIOSH-approved organic mask.
VENTILATION:	Local Exhaust: Recommended Mechanical: Recommended Special: --- Other: ---
PROTECTIVE GLOVES:	Chemical resistant gloves
EYE PROTECTION:	Chemical goggles or full face shield
OTHER PROTECTIVE EQUIPMENT:	Boots, aprons, drench showers, eye wash as needed for protection against spills and/or splashes.
WORK HYGIENIC PRACTICES:	Avoid contact with skin, eyes and clothing. After handling this product, wash hands before eating, drinking, or smoking. If contact occurs, remove contaminated clothing. If needed, take first aid action shown in Section 6. Launder contaminated clothing before reuse.

SECTION 9 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME, HAZARD CLASS:	UN/NA Number, RQ (if needed) FLAMMABLE LIQUID, NOS, (Isopropyl Alcohol) FLAMMABLE MATERIAL, UN1993

SECTION 10 - OTHER DATA

EPA HAZARDS:	1=Acute/YES 2=Chronic/YES 3=Flammability/YES 4=Sudden Release of Pressure/NO 5=Reactive/NO
CERCLA RQ:	None
HAZARDOUS WASTE NUMBER:	D001 Ignitable
SARA TITLE III:	No
CLEAN AIR ACT:	Yes
CLEAN WATER ACT:	No

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CIA-1
June 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	EXXON Chemical Americas for Smith Energy Services
PRODUCT NAME:	CIA-1; Blend
CHEMICAL NAME:	Not Applicable: Blend
CHEMICAL FAMILY:	Acetylenic Alcohol
PRODUCT DESCRIPTION:	Dark Brown Amber Liquid; Pungent Odor

HAZARD RATING SYSTEMS:	NPCA-HMIS	NFPA 704
HEALTH:	3	3
FLAMMABILITY:	3	3
REACTIVITY:	0	0

KEY:
4=Severe
3=Serious
2=Moderate
1=Slight
0=Minimal

SECTION 2 - HAZARDOUS INGREDIENTS

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. This product is hazardous as defined in 29 CFR 1910. 1200, based on the following compositional information:

COMPONENT	OSHA HAZARD
Acetylenic Alcohols: Quaternary Salt	Eye and Skin Corrosive
Acetylenic Alcohols: Methyl Alcohol via Ingestion, Skin, Inhalation	Systemic Toxicity
Methyl, Isopropyl, and Propargyl Alcohols	Flammable: PEL/TLV
Polynuclear Aromatic Hydrocarbons	Carcinogen

For additional information see Section 3

SECTION 3 - HEALTH INFORMATION AND PROTECTION

EYE CONTACT: Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT: Low order of toxicity. Corrosive; causes permanent skin damage. Methyl alcohol may be absorbed through the skin which can contribute to damage of the optic nerve resulting in permanent visual changes, loss of vision or total blindness. May cause skin sensitization, an allergic reaction which becomes evident on reexposure to this material.

INHALATION: High vapor concentrations are irritating to the eyes and the respiratory tract. May cause headaches and dizziness; are anesthetic and may have other central nervous system effects. This product contains methyl alcohol. Vapor inhalation and/or skin absorption can cause central nervous system effects and blindness. May cause liver disorder (e.g., jaundice) and/or damage. May cause kidney disorder (e.g., edema, proteinuria) and/or damage. Breathing saturated vapors for a few minutes may be fatal. Saturated vapors can be encountered in confined spaces and/or under conditions of poor ventilation.

INGESTION: Corrosive to mouth, esophagus and stomach. The main hazard of methyl alcohol arises from its misuse as a drinking substitute for ethyl alcohol. As little as 15 mL (1/2 oz.) of 40% methyl alcohol has caused death. Sublethal doses of methyl alcohol may damage the optic nerve which can result in permanent visual changes, including blindness.

FIRST AID:

EYE CONTACT: Immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.

SKIN CONTACT: Immediately flush with large amounts of water; use soap if available. Remove contaminated clothing, including shoes, after flushing has begun. Get prompt medical attention.

INHALATION: Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.

INGESTION: DO NOT induce vomiting. If individual is conscious, give milk or water to dilute stomach contents. Keep warm and quiet. Get prompt medical attention. DO NOT attempt to give anything by mouth to an unconscious person.

WORKPLACE EXPOSURE LIMITS:

OSHA REGULATION 29 CFR 1910. 1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:

A TWA of 400 ppm (980 mg/m^3) and a STEL of 500 ppm (1225 mg/m^3) for Isopropyl Alcohol.
A TWA of 1 ppm (2 mg/m^3) for Propargyl Alcohol (skin).
A TWA of 200 ppm (260 mg/m^3) and a STEL of 250 ppm (310 mg/m^3) for Methyl Alcohol (skin).

THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:

A TWA of 400 ppm (983 mg/m^3), and a STEL of 500 ppm (1230 mg/m^3) for Isopropyl Alcohol.
A TWA of 1 ppm (2.3 mg/m^3), for Propargyl Alcohol (skin).
A TWA of 200 ppm (262 mg/m^3), and a STEL of 250 ppm (328 mg/m^3) for Methyl Alcohol (skin).

EXXON RECOMMENDS THE FOLLOWING OCCUPATIONAL EXPOSURE LIMITS:

1 ppm for Ethyl Octynol (skin).

EXXON RECOMMENDS THE FOLLOWING OCCUPATIONAL EXPOSURE LIMITS:

A TWA of 100 ppm total organic vapor based on the Heavy Aromatic Naphtha (HAN) content. This component also contains a significant level of Polynuclear Aromatic Hydrocarbons (PNAs) between 0.4% and 0.5%. When aerosols are likely to be generated or when product temperatures exceed 300 degrees C, air samples should be monitored for PNAs.

PRECAUTIONS:

PERSONAL PROTECTION:

For open systems where contact is likely, were chemical resistant gloves, a chemical suit, rubber boots, and chemical safety goggles plus a face shield. Where contact may occur, were long-sleeves, chemical resistant gloves, chemical goggles, and face shield. Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA-approved respirators may be necessary to prevent overexposure by inhalation. All contact should be avoided by persons with known hypersensitivity to QUAT. SALT/ALKYL PHENOL EO

VENTILATION:

The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces. See respiratory protection recommendations. Use explosion-proof ventilation equipment.

CHRONIC EFFECTS:

This product contains significant amounts of Polynuclear Aromatic Hydrocarbons (PNAs). Certain of these PNAs have been shown to cause skin cancer in laboratory animals and may also cause cancer of the lung and other sites. In view of these findings, there may be potential risk in the absence of good personal hygiene.

Benzo(a)pyrene (BaP), some other PNAs and materials containing PNAs are listed as carcinogens or potential carcinogens in the Annual Report on Carcinogens published by the U.S. National toxicology Program (NTP).

The International Agency to Research on Cancer (IARC) has concluded that BaP and some other PNAs are probably carcinogenic to humans.

Limited studies on oils that are very active carcinogens have shown that washing the animal's skin with soap and water between applications greatly reduces tumor formation. These studies demonstrate the effectiveness of cleansing the skin after contact.

Potential risks to humans can be minimized by observing good work practices and personal hygiene procedures generally recommended for petroleum products.

This product contains Isopropyl Alcohol (IPA). In developmental studies conducted by the U.S. Chemical Manufacturers Association, unexpected acute toxicity was found when IPA was administered to pregnant rabbits by gavage. There were no unexpected toxic effects in pregnant rats exposed in the same study. In rats there were some relatively mild developmental effects at maternally toxic levels. There was no evidence of developmental toxicity in the rats at levels which did not also produce maternal toxicity. There were no indications of developmental toxicity in the rabbits at any exposure level. Preliminary findings from a multigeneration reproduction study indicate that infant and immature rats are more sensitive than their parents to the acute oral toxicity induced by high (1000 mg/kg/day) doses of Isopropanol. The effect levels for rats and rabbits were at several times the maximum exposure that levels for rats and rabbits were at several times the maximum exposure that would occur at the TLV. This observation was reported to the U.S. EPA under the provisions of Section 8(e) of TSCA.

CHRONIC TOXICITY DATA IS AVAILABLE UPON REQUEST

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	53 Deg F. METHOD: Seta CC
FLAMMABLE LIMITS:	LEL: 0.8 UEL: 36.0
AUTOIGNITION TEMPERATURE:	NOTE: Not Available

GENERAL HAZARD:	Flammable liquid can release vapors that form flammable mixtures at temperatures at or above flash point. Toxic gases will form upon combustion. "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. **DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.** Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.
FIRE FIGHTING:	Use water spray to cool fire exposed surfaces and protect personnel. Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors. Either allow fire to burn under controlled conditions or extinguish with alcohol-type foam and dry chemical. Try to cover liquid spills with foam. Respiratory and eye protection required for fire fighting personnel.
DECOMPOSITION PRODUCTS UNDER FIRE CONDITIONS:	Smoke, fumes, carbon monoxide and carbon dioxide

SECTION 5 - SPILL CONTROL PROCEDURE

LAND SPILL:	Eliminate sources of ignition. Prevent additional discharge of material if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the National Response Center. Vapors/dust can be harmful/fatal. Warn occupants of downwind areas Prevent liquid form entering sewers, watercourses, or low ares. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust. Recover by pumping (use an explosion proof or hand pump) or with a suitable absorbent. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

WATER SPILL:	Eliminate sources of ignition. Vapors/dust can be harmful/fatal. Warn occupants and shipping in downwind areas. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 6 - NOTES

NOTES:	This product may contain trace amounts of ethylene oxide (CAS No. 75-21-8), a condition which creates the potential for accumulation of ethylene oxide in the head space of shipping and storage containers and in enclosed areas where the product is being handled or used. Ethylene oxide is considered by OSHA, IARC, and NTP as potential carcinogen for humans. Ethylene oxide may also present reproductive, mutagenic, genotoxic, neurologic and sensitization hazards in humans. If this product is handled with adequate ventilation, the presence of these trace amounts is not expected to result in any short- or long-term hazards.

SECTION 7 - REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT PROPER SHIPPING NAME:	FLAMMABLE LIQUID, CORROSIVE, N.O.S., FLAMMABLE LIQUID (Contains METHANOL, PROPARGYL ALCOHOL) UN2924
DOT HAZARD CLASS:	Flammable Liquid Corrosive Liquid
DOT IDENTIFICATION NUMBER:	UN 2924
NAME:	Flammable Liquids, Corrosive, N.O.S.
FLASH POINT:	53 degrees F METHOD: Seta CC
TSCA:	Components of this product are listed on the TSCA Inventory.

CERCLA:	If the reportable quantity of this product is accidentally spilled, the incident is subjected to the provisions of the Comprehensive Response, Compensation and Liability Act (CERCLA) and must be reported to the **National Response Center by calling 1-800-424-8802.**
	The reportable spill quantity of this product is 8,862 pounds. This product contains: **Methyl Alcohol, Propargyl Alcohol**
SARA TITLE III:	Under the provisions of Title III, Section 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories: **Immediate Health, Delayed Health, Fire**

SECTION 8 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY:	0.85 at 60 DENSITY: 7.0 lbs/gal at 60
VAPOR PRESSURE, mmHg AT ^{0}F:	187 at 100 Calculated
SOLUBILITY IN WATER, WEIGHT PERCENT AT ^{0}F:	Dispersible
VISCOSITY OF LIQUID, CST AT ^{0}F:	1 at 100 Cannon-Fenske 1 at 150 Cannon-Fenske
SPECIFIC GRAVITY OF VAPOR, AT 1 ATM (AIR=1):	4.84
FREEZING/MELTING POINT, ^{0}F:	-50 Pour Point, less than
EVAPORATION RATE, n-Bu ACETATE=1:	2.0 Calculated
BOILING POINT, ^{0}F:	160 Calculated IBP

SECTION 9 - REACTIVITY DATA

STABILITY:	Stable
HAZARDOUS POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID INSTABILITY:	None
MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:	Strong Oxidizing Agents
HAZARDOUS DECOMPOSITION PRODUCTS:	None

SECTION 10 - TRANSPORT AND STORAGE

ELECTROSTATIC ACCUMULATION HAZARD:	Unknown, use proper grounding procedure
STORAGE TEMPERATURE, ^{0}F:	Ambient
LOADING/UNLOADING TEMPERATURE ^{0}F:	Ambient
STORAGE/TRANSPORT PRESSURE, mmHg:	Atmospheric
VISCOSITY AT LOADING/ UNLOADING TEMPERATURE, cST:	Not Available

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CIA-2
June 1992

MATERIAL SAFETY DATA SHEET

SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Exxon Chemical Company for Smith Energy Services
PRODUCT NAME:	CIA-2; Blend
CHEMICAL NAME:	Not Applicable: Blend
CHEMICAL FAMILY:	Acid Corrosion Inhibitor
PRODUCT DESCRIPTION:	Dark Liquid; Alcoholic Odor

HAZARD RATING SYSTEM:	NPCA-HMIS	NFPA 704
HEALTH:	4	4
FLAMMABILITY:	3	3
REACTIVITY:	0	0

KEY:
4=Severe
3=Serious
2=Moderate
1=Slight
0=Minimal

SECTION 2 - HAZARDOUS INGREDIENTS

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. This product is hazardous as defined in 29 CFR 1910.1200, based on the following compositional information:

COMPONENT	OSHA HAZARD
Isopropyl Alcohol; Methyl Alcohol	Flammable Liquid
Acetylenic Alcohols, Quaternary Salt	Eye and Skin Corrosive
Acetylenic Alcohols, Isopropyl Alcohol, Methyl Alcohol	Vapors Irritating to Eyes and Respiratory Tract
Acetylenic Alcohols, Methyl Alcohol	Toxic Systemic via Ingestion and Inhalation
Progargyl Alcohol, Formamide, Isopropyl Alcohol Methyl Alcohol, Benzyl Chloride	PEL/TLV
Benzyl Chloride	Carcinogen
Formamide	Animal Teratogen

For additional information see Section 3

SECTION 3 - HEALTH INFORMATION & PROTECTION

NATURE OF HAZARD:

EYE CONTACT:	Corrosive. Will cause eye burns and permanent tissue damage.
SKIN CONTACT:	Corrosive; causes permanent skin damage. May cause skin sensitization, an allergic reaction which becomes evident on reexposure to this material.
INHALATION:	High vapor concentrations are irritating to the eyes and the respiratory tract; may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. This product contains methyl alcohol. Vapor inhalation and/or skin absorption can cause central nervous system effects and blindness. Breathing saturated vapors for a few minutes may be fatal. Saturated vapors can be encountered in confined spaces and/or under conditions of poor ventilation.
INGESTION:	Corrosive to mouth, esophagus and stomach. The main hazard of methyl alcohol arises from its misuse as a drinking substitute for ethyl alcohol. As little as 15 mL (1/2 oz.) of 40% methyl alcohol has caused death. Sublethal doses of methyl alcohol may damage the optic nerve which can result in permanent visual changes, including blindness.

FIRST AID:

EYE CONTACT:	Immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.
SKIN CONTACT:	Immediately flush with large amounts of water; use soap if available. Remove contaminated clothing, including shoes, after flushing has begun. Get prompt medical attention.
INHALATION:	Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.
INGESTION:	DO NOT induce vomiting. If individual is conscious, give milk or water to dilute stomach contents. Keep warm and quiet. Get prompt medical attention. DO NOT attempt to give anything by mouth to an unconscious person.

ACUTE TOXICITY DATA IS AVAILABLE UPON REQUEST

WORKPLACE EXPOSURE LIMITS:

OSHA REGULATION 29 CFR 1910.1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:

A TWA of 20 ppm (30 mg/m3) and a STEL of 30 ppm (45 mg/m3) for formamide.
A TWA of 400 ppm (980 mg/m3) and a STEL of 500 ppm (1225 mg/m3) for isopropyl alcohol.
A TWA of 1 ppm (2 mg/m3) for propargyl alcohol (skin).
A TWA of 200 ppm (260 mg/m3) and a STEL of 250 ppm (310 mg/m3) for methyl alcohol (skin).

THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:

A TWA of 10 ppm (18 mg/m3) for formamide (skin).
A TWA of 400 ppm (983 mg/m3), and a STEL of 500 ppm (1230 mg/m3) for isopropyl alcohol.
A TWA of 1 ppm (2.3 mg/m3) for propargyl alcohol (skin).
A TWA of 200 ppm (262 mg/m3), and a STEL of 250 ppm (328 mg/m3) for methyl alcohol (skin).

EXXON RECOMMENDS THE FOLLOWING OCCUPATIONAL EXPOSURE LIMITS:

1 ppm for ethyl octynol (skin).

PRECAUTIONS:

PERSONAL PROTECTION: For open systems where contact is likely, wear chemical-resistant gloves, a chemical suit, rubber boots, and chemical safety goggles plus a face shield. Where contact may occur, wear long sleeves, chemical resistant gloves, chemical goggles, and a face shield. Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA-approved respirators may be necessary to prevent overexposure by inhalation. All contact should be avoided by persons with known hypersensitivity to AMINES.

VENTILATION: The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces. See respiratory protection recommendations. Use explosion-proof ventilation equipment.

CHRONIC EFFECTS:

This product contains a significant amount of formamide, which animal studies indicate can damage the embryo/fetus. Also, dermal studies in animals have shown that repeated exposure to formamide may result in blood effects.

This product contains benzyl chloride, which has been evaluated by the International Agency for Research on Cancer (IARC) and found to be possibly carcinogenic to humans.

This product contains isopropyl alcohol (IPA). In developmental studies conducted by the U.S. Chemical Manufacturers Association, unexpected acute toxicity was found when IPA was administered to pregnant rabbits by gavage. There were no unexpected toxic effects in pregnant rats exposed in the same study. In rats there were some relatively mild developmental effects at maternally toxic levels. There was no evidence of developmental toxicity in the rats at levels which did not also produce maternal toxicity. There were no indications of developmental toxicity in the rabbits at any exposure level. Preliminary findings from a multigeneration reproduction study indicate that infant and immature rats are more sensitive than their parents to the acute oral toxicity induced by high (1000 mg/kg/day) doses of isopropanol. The effect levels for rats and rabbits were at several times the maximum exposure that would occur at the TLV. This observation was reported to the U.S. EPA under the provisions of Section 8(e) of TSCA.

CHRONIC TOXICITY DATA IS AVAILABLE UPON REQUEST

SECTION 4 - FIRE & EXPLOSION HAZARD

FLASH POINT: 64 Deg F. METHOD: Seta CC

FLAMMABLE LIMITS: LEL: 0.8 UEL: 36.0

AUTOIGNITION TEMPERATURE: NOTE: Not available

GENERAL HAZARD:

Flammable liquid can release vapors that form flammable mixtures at temperatures at or above the flash point. Toxic gases will form upon combustion. "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. **DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.** Empty drums should be completely drained, prcperly bunged and promptly returned to a drum reconditioner, or properly disposed of.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel. Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors. Either allow fire to burn under controlled conditions or extinguish with alcohol-type foam and dry chemical. Try to cover liquid spills with foam. Respiratory and eye protection required for fire fighting personnel.

HAZARDOUS COMBUSTION PRODUCTS:

Smoke, Fumes, Carbon Monoxide, Carbon Dioxide, Oxides of Nitrogen

SECTION 5 - SPILL CONTROL PROCEDURE

LAND SPILL:

Eliminate sources of ignition. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the **National Response Center 1-800-424-8802.** Vapors/dust can be harmful/fatal. Warn occupants of downwind areas. Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust. Recover by pumping (use an explosion-proof or hand pump) or with a suitable absorbent. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

WATER SPILL:

Eliminate sources of ignition. Vapors/dust can be harmful/fatal. Warn occupants and shipping in downwind areas. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 6 - NOTES

NOTES: This product may contain trace amounts of ethylene oxide (CAS No. 75-21-8), a condition which creates the potential for accumulation of ethylene oxide in the head space of shipping and storage containers and in enclosed areas where the product is being handled or used. Ethylene oxide is considered by OSHA, IARC, and NTP as a potential carcinogen for humans. Ethylene oxide may also present reproductive, mutagenic, genotoxic, neurologic and sensitization hazards in humans. If this product is handled with adequate ventilation, the presence of these trace amounts is not expected to result in any short- or long-term hazards.

SECTION 7 - REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT PROPER SHIPPING NAME: Flammable Liquid, Corrosive, N.O.S., Flammable Liquid
(Contains **METHANOL, ACETYLENIC ALCOHOL**) UN 2924

DOT HAZARD CLASS: Flammable Liquid, Corrosive Liquid

DOT IDENTIFICATION NO.: UN 2924

NAME: Flammable Liquids, Corrosive N.O.S.

FLASH POINT: 64 degrees F METHOD: Tag CC

TSCA: Components of this product are listed on the TSCA Inventory.

CERCLA: If the reportable quantity of this product is accidentally spilled, the incident is subject to the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and must be reported to the **National Response Center by calling 800-424-8802.**

The reportable spill quantity of this product is 25,592 pounds. This product contains **propargyl alcohol.**

SARA TITLE III:

Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories:

Immediate Health, Delayed Health, Fire

This product contains the following Section 313 Reportable Ingredients:

COMPONENT	CAS NO.	MAXIMUM PERCENT
Methanol	67-56-1	15.0
Isopropanol	67-63-0	15.0

SECTION 8 - TYPICAL PHYSICAL & CHEMICAL PROPERTIES

SPECIFIC GRAVITY: 0.99 AT 60
DENSITY: 8.3 lbs./gal at 61

VAPOR PRESSURE, mmHg AT ^{0}F: 170 at 100 Calculated

SOLUBILITY IN WATER, WEIGHT PERCENT AT ^{0}F: Dispersible

VISCOSITY OF LIQUID, ST AT ^{0}F: 4 at 100 Cannon-Fenske
2 at 151 Cannon-Fenske

SPECIFIC GRAVITY OF VAPOR, AT 1 ATM (AIR=1): 4.05

FREEZING/MELTING POINT, ^{0}F: -80 Pour Point

EVAPORATION RATE, n-Bu ACETATE=1: 2.1 Calculated

BOILING POINT, ^{0}F: 169 Calculated IBP

SECTION 9 - REACTIVITY DATA

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID INSTABILITY: None

MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY: Strong Oxidizing Agents

HAZARDOUS DECOMPOSITION PRODUCTS:	None

SECTION 10 - STORAGE AND HANDLING

ELECTROSTATIC ACCUMULATION HAZARD:	Unknown, use proper grounding procedure
STORAGE TEMPERATURE, ^{0}F:	Ambient
LOADING/UNLOADING TEMPERATURE, ^{0}F:	Ambient
STORAGE/TRANSPORT PRESSURE, mmHg:	Atmospheric
VISCOSITY AT LOADING/ UNLOADING TEMPERATURE, cST:	Not Available

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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CIA-3
June 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Petrolite Corporation for Smith Energy Services
PRODUCT:	CIA-3
CHEMICAL DESCRIPTION:	Alkylpyridinium Quaternary, Thiourea and Oxyalkylated Alkylphenols in Isopropanol and Water
ID NUMBER:	UN1993
SHIPPING NAME:	Flammable Liquid, N.O.S.
HAZARD CLASS:	FLAMMABLE LIQUID

SECTION 2 - HAZARDOUS INGREDIENTS

CAS NUMBER	MATERIAL	PERCENT	EXPOSURE LIMITS
68909-18-2	Alkylpyridinium Quaternary	30-60%	Not Established
00062-56-6	Thiourea	10-30%	Not Established
00067-63-0	Isopropanol	5-10%	ACGIH TLV: 400 ppm TWA OSHA PEL: 400 ppm TWA ACGIH STEL: 500 ppm
09016-45-9	Oxylakylated Alkylphenol	1-5%	Not Established

SECTION 3 - PHYSICAL DATA

SPECIFIC GRAVITY (WATER=1.0 AT 60 DEG F):	1.086
VOLATILITY:	Significant
VAPOR PRESSURE:	Not Established
SOLUBILITY IN WATER:	Soluble
APPEARANCE AND ODOR:	Amber liquid; alcohol odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	96 Degrees F
FLAMMABLE LIMITS:	Not Established
FLASH METHOD:	SFCC ASTM D-3828
EXTINGUISHING MEDIA:	Use water spray or fog, alcohol-type foam, dry chemical or carbon dioxide (CO2).
FIRE FIGHTING PROCEDURES:	Use a self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode. Flammable. Cool fire-exposed containers using water spray.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Flammable liquid, vapors of which can form an ignitable mixture with air. Vapors can flow along surfaces to distant ignition sources and flash back. The product is toxic upon skin contact. When heated it emits highly irritating and noxious vapors.

SECTION 5 - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE:

INHALATION:	Exposure to elevated vapor concentrations may result in eye, nose and respiratory irritation. Prolonged contact may cause drowsiness, dizziness, and in extreme cases, narcosis. Inhalation of mists or exposure to very high vapor concentrations may cause extreme eye, nose and respiratory irritation, and may result in lung damage. Prolonged over-exposure may result in chemical pneumonitis and systemic effects.
INHALATION LC50:	>8.4 Mg/L (Rat)
SKIN AND EYE CONTACT:	Contact with skin will cause moderate to severe irritation or burns. Repeated or prolonged contact may result in absorption of toxic quantities. Contact with eyes will result in severe eye irritation or burns and, if not immediately removed, may lead to permanent eye damage.
EYE IRRITANT SCORE:	4 (0=none, 4=severe)
SKIN IRRITANT SCORE:	2 (0=none, 4=severe)
DERMAL LD50:	1-2 g/kg (Rabbit)
INGESTION:	May be harmful or fatal if swallowed. May cause headache gastrointestinal disturbances, dizziness and nausea. May result in irritation or burns of mouth and digestive tract. NOTE: Thiourea has been observed to produce anemia through bone marrow depression and may effect the thyroid. Though low in concentration, care should be taken to minimize contact with this material.
ORAL LD50:	50.1 mg/kg (Rat)

EMERGENCY AND FIRST AID PROCEDURES:	If contacted, wash skin immediately with soap and water. Remove contaminated clothing and wash before reuse. If irritation burns develop, consult a physician. If in eyes, irrigate with flowing water immediately and continuously for fifteen minutes. Consult a physician. Avoid breathing vapor or spray mist. If inhaled, remove to fresh air and administer oxygen if necessary. Get medical attention if symptoms develop or exposure was severe. If ingested, induce vomiting and get medical attention immediately. Never give anything orally to an unconscious person.

SECTION 6 - REACTIVITY DATA

STABILITY:	Stable under normal conditions of storage and use.
INCOMPATIBILITY:	Keep away from strong oxidizing agents, heat and open flames.
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxides of nitrogen and sulfur. HCl.
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 7 - SPILL AND LEAK PROCEDURES

IF MATERIAL IS SPILLED OR RELEASED:	Small spill: Absorb on paper, cloth or other material. Large spill: Dike to prevent entering any sewer or waterway. Transfer liquid to a holding container. Cover residue with dirt, or suitable chemical absorbent. Use personal protective equipment as necessary.
DISPOSAL METHOD:	Place chemical residues and contaminated absorbent materials into a suitable waste container and take to an approved hazardous waste disposal site. Dispose of all residues in accordance with applicable waste management regulations.
DECONTAMINATION PROCEDURES:	Not appropriate

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:	When concentrations exceed the exposure limits specified, use of a NIOSH-approved organic vapor cartridge respirator is recommended. Where the protection factor of the respirator may be exceeded, use of a self-contained breathing unit may be necessary.
VENTILATION:	General ventilation should be provided to maintain ambient concentrations below nuisance levels. Local ventilation of emission sources may be necessary to maintain ambient concentrations below recommended exposure limits.
PROTECTIVE CLOTHING:	Chemical-resistant gloves and chemical goggles, face shield and synthetic apron or coveralls should be used to prevent contact with eyes, skin or clothing.

SECTION 9 - SPECIAL PRECAUTIONS

Flammable liquid. Avoid heat, sparks and open flames. Avoid breathing of vapor and contact with eyes, skin or clothing. Keep container closed when not in use. Hazardous product residue may remain in emptied container. Do not reuse empty containers without commercial cleaning or reconditioning. **NOTE:** Thiourea has been identified as a suspect cancer agent by the National Toxicology Program and/or by the International Agency for Research on Cancer (IARC).

SECTION 10 - SARA TITLE III, SECTION 313

This notification is incorporated into the Material Safety Data Sheet (MSDS) for the product first named above. When physically attached to the MSDS, this notification must not be detached from the MSDS. Any copying and redistribution of the MSDS to which this notification is attached must include copying and redistribution of this notification.

This product contains a toxic 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 372, as follows:

CHEMICAL	CAS NO.	WEIGHT PERCENT
Thiourea	000062-56-6	14.5%

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December 1991

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT INFORMATION

MANUFACTURED BY:	Blended for Smith Energy Services
PRODUCT NAME:	CX-1, Blend
NFPA:	1=Health 3=Fire 0=Reactivity - Special
KEY:	4=Severe 3=Serious 2=Moderate 1=Slight 0=Minimal

SECTION 2 - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	CAS NO.	OSHA PEL	ACGIH	TLV	OTHER
Isopropyl Alcohol	67-63-0	400 ppm	400 ppm		
Isopropoxy Ethoxy Titanium BIS (2,4-Pentanedionate)---------	NO DATA				

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	N/D
MELTING POINT:	N/A
SPECIFIC GRAVITY (H2O=1):	0.8 - 1.0
VAPOR PRESSURE:	N/D
VAPOR DENSITY (AIR=1):	>1.0
EVAPORATION RATE (BuAc=1):	>1.0
SOLUBILITY IN WATER:	Dispersible
APPEARANCE AND ODOR:	Light Orange-Yellow Liquid, Alcohol Odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD):	Approximately 54°F
FLAMMABLE LIMITS:	Lower: N/D Upper: N/D
EXTINGUISHING MEDIA:	Dry Powder, Carbon Dioxide, "Alcohol" Foam; use water to cool containers. **DANGER! ALCOHOL MAY BURN WITH AN INVISIBLE FLAME.**
SPECIAL FIRE FIGHTING PROCEDURES:	Approach fire from upwind side. Avoid breathing smoke, fumes, mist, or vapors on the downwind side.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Containers may rupture from internal pressure if confined to fire area. Cool with water. Get non-essential people out of the area.

SECTION 5 - REACTIVITY INFORMATION

STABILITY:	Product is Stable
INCOMPATIBILITY/MATERIALS TO AVOID:	Strong Acids
HAZARDOUS DECOMPOSITION OR BY PRODUCTS:	From fire; smoke, carbon dioxide, carbon monoxide
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 6 - HEALTH HAZARD DATA

ROUTES OF ENTRY:

INHALATION:	Irritant, Narcotic
SKIN/EYES:	Irritant
INGESTION:	Irritant

HEALTH HAZARDS:

UTE:	Inhalation of vapors may be narcotic or anesthetic. Ingestion of liquid will cause gastrointestinal distress, irritation, and possibly nausea. liquid or vapors may be irritating to skin and eyes.
CHRONIC:	Unknown
CARCINOGENICITY:	
LISTED IN NTP:	No
IARC MONOGRAPHS:	No
OSHA REGULATED:	Table Z1
SIGNS AND SYMPTOMS OF EXPOSURE:	Skin irritation develops slowly after contact, eye irritation develops immediately upon contact
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:	Unknown

EMERGENCY AND FIRST AID PROCEDURES:

EYES:	Flush with water for 15 minutes. Remove contaminated clothing. Call a physician.
SKIN:	Flush with water for 15 minutes. Remove contaminated clothing and don't reuse. Call a physican.
INHALATION:	Remove victim to fresh air and, if needed, immediately begin artificial respiration. Give oxygen if breathing is labored. Get emergency medical help. Contact physician immediately.
INGESTION:	Induce vomiting if victim is conscious by giving water then stick fingers down throat. Get medical attention. **Never give unconscious person anything by mouth.**

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

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

SMALL SPILLS:	Pick up with absorbent media. Store as hazardous waste.
LARGE SPILLS:	Contain with dikes, pick up with vacuum truck. Handle as hazardous waste. Notify proper local, state and federal agencies.
WASTE DISPOSAL METHOD:	EPA approved hazardous waste disposal site. Follow applicable local, state and federal regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:	Store in a cool place away from ignition sources.
OTHER PRECAUTIONS:	Store away from acids.

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION:	NIOSH-approved mask suitable for isopropyl alcohol
VENTILATION:	
LOCAL EXHAUST:	Recommended
SPECIAL:	---
MECHANICAL:	Recommended
OTHER:	---
PROTECTIVE GLOVES:	Chemical resistant gloves suitable for isopropyl alcohol
EYE PROTECTION:	Chemical goggles or full face shield
OTHER PROTECTIVE EQUIPMENT:	Boots, aprons, drench showers, eye wash as needed for protection against spills and/or splashes
WORK HYGIENIC PRACTICES:	Avoid contact with skin, eyes and clothing. After handling this product, wash hands before eating, drinking, or smoking. If contact occurs, remove contaminated clothing. If needed, take first aid action shown in Section 6. Launder contaminated clothing before reuse.

SECTION 9 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME, HAZARD CLASS:	UN/NA Number, RQ (if needed)
	FLAMMABLE LIQUID, NOS., (ISOPROPYL ALCOHOL) FLAMMABLE LIQUID, UN1993

SECTION 10 - OTHER DATA

EPA HAZARDS:	1=Acute/Yes 2=Chronic/Yes 3=Flammability/Yes 4=Sudden Release of Pressure/No 5=Reactive/No
CERCLA RQ:	No
HAZARDOUS WASTE NUMBER:	D001 Ignitable
SARA TITLE III:	Yes
CLEAN AIR ACT:	No
CLEAN WATER ACT:	No

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CX-6
January 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9399

SECTION 1 - SUPPLIER IDENTIFICATION

MANUFACTURED BY:	N/A
PRODUCT NAME:	CX-6; Blend
NFPA:	1=Health 3=Fire 0=Reactivity -=Special
KEY:	4=Severe 3=Serious 2=Moderate 1=Slight 0=Minimal

SECTION 2 - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	CAS NO.	OSHA PEL	ACGIH TLV	OTHER
Isopropyl Alcohol	67-63-0	400 ppm	400 ppm	
Triethanolamine Titanium Chelate----------	No Data			

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	Approximately 180-185^{0}F
MELTING POINT:	N/A
SPECIFIC GRAVITY (WATER=1):	N/D
VAPOR PRESSURE:	N/D
VAPOR DENSITY (AIR=1):	>1.0
EVAPORATION RATE (BUTYL ACETATE=1):	>1
SOLUBILITY IN WATER:	Dispersible
APPEARANCE AND ODOR:	Pale Yellow-Greenish Liquid, Alcohol Odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD):	Approximately 50-60^{0}F
FLAMMABLE LIMITS:	LOWER: N/D UPPER: N/D
EXTINGUISHING MEDIA:	Dry powder, carbon dioxide (CO_2), "alcohol" foam, use water to cool containers. DANGER! Alcohol may burn with an invisible flame.
SPECIAL FIRE FIGHTING PROCEDURES:	Approach fire from upwind side. Avoid breathing smoke, fumes, mist, or vapors on the downwind side.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Containers may rupture from internal pressure if confined to fire area. Cool with water. Get non-essential people out of the area.

SECTION 5 - REACTIVITY INFORMATION

STABILITY:

PRODUCT IS:	Stable

INCOMPATIBILITY:

MATERIALS TO AVOID:	Strong Acids
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	From fire; smoke, carbon dioxide, carbon monoxide, oxides of nitrogen
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 6 - HEALTH HAZARD DATA

ROUTES OF ENTRY:

INHALATION:	Irritant, narcotic
SKIN/EYES:	Irritant

INGESTION:	Irritant
HEALTH HAZARDS:	
UTE:	Inhalation of vapors may be narcotic or anesthetic. Ingestion of liquid will cause gastrointestinal distress, irritation, and possibly nausea. Liquid or vapors may be irritating to skin and eyes.
CHRONIC:	Unknown
CARCINOGENICITY:	
NTP:	Not listed
IARC MONOGRAPHS:	Not listed
OSHA REGULATED:	Table Z1
SIGNS AND SYMPTOMS OF EXPOSURE:	Skin irritation develops slowly after contact, eye irritation develops immediately upon contact.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:	Unknown
EMERGENCY AND FIRST AID PROCEDURES:	**Inhalation:** Remove victim to fresh air and, if needed, immediately begin artificial respiration. Give oxygen if breathing is labored. Get emergency medical help. Contact physician immediately.
	Ingestion: Induce vomiting if victim is conscious by giving water then stick fingers down throat. Get immediate medical attention. Never give an unconscious person anything by mouth.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:	**Small Spills:** Pick up with absorbent media. Store as hazardous waste.
	Large Spills: Contain with dikes, pick up with vacuum truck. Handle as hazardous waste. Notify proper local, state and federal agencies.
	Waste Disposal Method: EPA-approved hazardous waste disposal site. Follow applicable local, state and federal regulations.

CERCLA RQ:	No
HAZARDOUS WASTE NUMBER:	D001 Ignitable
SARA TITLE III:	Yes
CLEAN AIR ACT:	No
CLEAN WATER ACT:	No

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-13
February 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT INFORMATION

MANUFACTURED BY:	Chemical Blending Services Inc., for Smith Energy Services
PRODUCT:	CX-13
CHEMICAL NAME:	Boron Solution
CHEMICAL FORMULA:	Proprietary
CONTAINER:	55 Gallon Drum

SECTION 2 - TOXICITY HAZARDOUS

PRINCIPAL HAZARDOUS COMPONENT(S)	PERCENT	TLV (UNITS)
Sodium Borate Decahydrate CAS RN: 130394 NIOSH NO.: VZ 2275000	10-30%	Air: 5mg/M^3

TOXICITY DATA: THR: High Scu; MOD human oral; MOD oral. Borax ingestion of 5 to 10 gm. by children can cause severe vomiting, diarrhea, shock, death.

Glutaraldehyde	<1%	Air: 0.2 ppm

TOXICITY DATA: THR: A severe skin and eye irritant in humans and rabbits. MOD oral, inhalation and skin. Laboratory studies have shown that glutaraldehyde is not a teratogenic, and several studies have shown the material not to be a mutagen.

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SECTION 3 - PHYSICAL DATA

FREEZING POINT:	15 degrees F
BOILING POINT:	Not Available
VAPOR PRESSURE (mmHg):	Not Available
VAPOR DENSITY (AIR=1):	Not Available
SOLUBILITY IN WATER:	Complete
pH:	6.5 to 7.5
SPECIFIC GRAVITY (WATER=1):	1.13 at 25 degrees C
PERCENT, VOLATILE BY VOLUME:	Not Available
EVAPORATION RATE:	Not Available
APPEARANCE AND ODOR:	Clear, pale straw to amber liquid, odorless

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	>200 degrees F
EXTINGUISHING MEDIA:	Water, carbon dioxide
SPECIAL FIRE FIGHTING PROCEDURES:	NIOSH-approved SCBA
UNUSUAL FIRE/EXPLOSION HAZARDS:	Low when exposed to heat or flame or strong oxidizer. Can react violently with acetic anhydride.

SECTION 5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE:	Not available for blend. See Section 2 for hazards of principle components.
EFFECTS OF OVEREXPOSURE:	Eye irritation, mucous membrane irritation, respiratory irritation, dry skin, weariness, general weakness, abdominal pain if ingested, followed by vomiting and diarrhea.
EMERGENCY AND FIRST AID PROCEDURES:	CAUTION! May cause irritation. Harmful if swallowed or absorbed through damaged skin. If swallowed, do not induce vomiting. Do not give anything to drink. Obtain medical advice with urgency. If skin is contaminated, wash thoroughly with soap and water. Remove any contaminated clothing. If irritation persists, see a physician. If inhaled, remove to fresh air. If breathing is difficult, administer oxygen. If symptoms persist, call a physician. If splashed in eyes, immediately flush with clean water for at least 15 minutes. Consult an ophthalmologist if irritation persists.
	RESTRICTIVE MEDICAL CONDITIONS: Kidney, liver diseases and nerve disorders may be aggravated by exposure to this material.

SECTION 6 - REACTIVITY DATA

STABILITY:	Stable
CONDITIONS TO AVOID:	Mixing with incompatible materials and heat.
INCOMPATIBILITY:	Acetic anhydride, heat.
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon monoxide (CO) and carbon dioxide (CO_2)
HAZARDOUS POLYMERIZATION:	Will not occur.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:	Contain with absorbant. Dispose of contaminated absorbant in a safe manner, according to local, state, and federal regulations.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:	None required
VENTILATION:	Adequate
PROTECTIVE GLOVES:	Rubber or neoprene
EYE PROTECTION:	Safety glasses, goggles
OTHER PROTECTIVE EQUIPMENT:	As needed to avoid skin contact.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:	Store away from anhydrides and heat.
OTHER PRECAUTIONS:	Wear easily washable clothing. Change daily. Wash contaminated clothing before reuse.

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June 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	N/A
PRODUCT NAME:	CX-14; Blend
NFPA:	2=Health 2=Fire 0=Reactivity 0=Special
KEY:	0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	CAS NO.	OSHA PEL	ACGIH TLV	OTHER
Sodium Zirconium Lactate	10377-98-7		5 mg/M3/8-Hours	as zirconium
Triethanolamine	K102-71-6	NO DATA AVAILABLE		
Triethanolamine Titanium Chelate	CAS NOT AVAILABLE		NO DATA AVAILABLE	
Isopropyl Alcohol	67-63-0	400 ppm	400 ppm	

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	Not Determined
MELTING POINT:	Not Applicable
SPECIFIC GRAVITY (WATER=1):	1 to 1.5
VAPOR PRESSURE:	Not Determined
VAPOR DENSITY (AIR=1):	Greater than 1.0
EVAPORATION RATE (BuAc=1):	Greater than 1
SOLUBILITY IN WATER:	Miscible
APPEARANCE AND ODOR:	Pale yellow to greenish solution; slight ammoniacal and/or alcohol odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD):	Less than 200 Degrees F
FLAMMABLE LIMITS:	LOWER: Not Determined UPPER: Not Determined
EXTINGUISHING MEDIA:	Water fog or spray, foam, dry powder, carbon dioxide (CO2)
SPECIAL FIRE FIGHTING PROCEDURES:	Approach fire from upwind side. Avoid breathing smoke, fumes, mist or vapors on the downwind side.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Containers may rupture from internal pressure if confined to fire area. Cool with water. Get non-essential people out of the area.

SECTION 5 - REACTIVITY INFORMATION

STABILITY:	Stable
INCOMPATIBILITY:	Materials to avoid: Strong acids, oxidizers or oxidizing materials.
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	From fire; smoke, carbon dioxide, carbon monoxide, oxides of nitrogen
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 6 - HEALTH HAZARD DATA

ROUTES OF ENTRY:	**Inhalation:** Irritant, narcotic **Skin/Eyes:** Irritant **Ingestion:** Irritant

HEALTH HAZARDS:

ACUTE:	Inhalation of vapors may be narcotic or anesthetic. Ingestion of liquid will cause gastrointestinal distress, irritation and possibly nausea. Liquid or vapors may be irritating to skin and eyes.
CHRONIC:	kidney and liver damage possible from triethanolamine.
CARCINOGENICITY:	Not listed in NTP or IARC Monographs. OSHA regulated, Table Z1.
SIGNS AND SYMPTOMS OF EXPOSURE:	Skin irritation develops slowly after contact, eye irritation develops immediately upon contact.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:	Kidney, liver disorders.

ERGENCY AND FIRST AID PROCEDURES:

INHALATION:	Remove victim to fresh air and, if needed, immediately begin artificial respiration. Give oxygen if breathing is labored. Get emergency medical help. Contact physician immediately.
INGESTION:	Induce vomiting if victim is conscious by giving water then stick fingers down throat. Get medical attention. Never give unconscious person anything by mouth.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:	**Small Spills:** Pick up with absorbent media. Store as hazardous waste. **Large Spills:** Contain with dikes, pick up with vacuum truck. Handle as hazardous waste. Notify proper local, state, and federal agencies.
WASTE DISPOSAL METHOD:	EPA-approved hazardous waste disposal site. Follow applicable local, state and federal regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:	Store in a cool place away from ignition sources.
OTHER PRECAUTIONS:	Store away from acids. Store away from alkaline materials. Store away from oxidizers or materials bearing a yellow "DOT" label.

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION:	Chemical cartridge respirator when appropriate for exposure.
VENTILATION:	Local Exhaust: Recommended Mechanical: Recommended Special: --- Other: ---
PROTECTIVE GLOVES:	Chemical resistant gauntlet-type gloves.
EYE PROTECTION:	Chemical goggles or full face shield.
OTHER PROTECTIVE EQUIPMENT:	Boots, aprons, drench showers, eyewash as needed for protection against spills and/or splashes.
WORK HYGIENIC PRACTICES:	Avoid contact with skin, eyes and clothing. After handling this product, wash hands before eating, drinking or smoking. If contact occurs, remove contaminated clothing. If needed, take first aid action shown in Section 6.
	Launder contaminated clothing before reuse.

SECTION 9 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME/
HAZARD CLASS:

UN/NA Number, Reportable Quantity (RO), (if needed)

In a container holding <u>less</u> than 110 gallons:
ENTER ON SHIPPING PAPER:

CHEMICALS, N.O.S. (OR ENTER CX-14)

If in a container holding **<u>more</u>** than 110 gallons:
ENTER ON SHIPPING PAPER:

COMBUSTIBLE LIQUID, N.O.S., COMBUSTIBLE MATERIAL, NA 1993

SECTION - 10 OTHER DATA

EPA HAZARDS:	1-Acute/Yes 2-Chronic/Yes 3-Flammability/Yes 4-Sudden Release of Pressure/No 5-Reactive/No
CERCLA REPORTABLE QUANTITY (RQ):	No
HAZARDOUS WASTE NUMBER:	No
SARA TITLE III	Yes (ISOPROPYL ALCOHOL)
CLEAN AIR ACT:	No
CLEAN WATER ACT:	No

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June 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	N/A
PRODUCT NAME:	CX-15; Blend
NFPA:	2=Health 3=Fire 0=Reactivity 0=Special
KEY:	0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	CAS NO.	OSHA PEL	ACGIH TLV	OTHER
Isopropyl Alcohol	67-63-0	400 ppm	400 ppm	
Triethanolamine	NO DATA	NO DATA AVAILABLE		
Sodium Zirconium Lactate	NO DATA	NO DATA AVAILABLE		

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	Not Determined
MELTING POINT:	Not Determined
SPECIFIC GRAVITY (WATER=1):	Not Determined
VAPOR PRESSURE:	Not Determined
VAPOR DENSITY (AIR=1):	Greater than 1.0
EVAPORATION RATE (BuAc=1):	Greater than 1.0
SOLUBILITY IN WATER:	Miscible
APPEARANCE AND ODOR:	Pale yellow to greenish solution; slight ammoniacal and/or alcohol odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD):	Less than 100 Degrees F
FLAMMABLE LIMITS:	LOWER: Not Determined UPPER: Not Determined
EXTINGUISHING MEDIA:	Water fog or spray, foam, dry powder, carbon dioxide (CO2)
SPECIAL FIRE FIGHTING PROCEDURES:	Approach fire from upwind side. Avoid breathing smoke, fumes, mist or vapors on the downwind side.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Containers may rupture from internal pressure if confined to fire area. Cool with water. Get non-essential people out of the area.

SECTION 5 - REACTIVITY INFORMATION

STABILITY:	Stable
INCOMPATIBILITY:	Materials to avoid: Strong acids, oxidizers or oxidizing materials.
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	From fire; smoke, carbon dioxide, carbon monoxide, oxides of nitrogen
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 6 - HEALTH HAZARD DATA

ROUTES OF ENTRY:

Inhalation: Irritant, narcotic
Skin/Eyes: Irritant
Ingestion: Irritant

HEALTH HAZARDS:

ACUTE:	Inhalation of vapors may be narcotic or anesthetic. Ingestion of liquid will cause gastrointestinal distress, irritation and possibly nausea. Liquid or vapors may be irritating to skin and eyes.
CHRONIC:	kidney and liver damage possible.
CARCINOGENICITY:	Not listed in NTP or IARC Monographs. OSHA regulated, Table Z1.
SIGNS AND SYMPTOMS OF EXPOSURE:	Skin irritation develops slowly after contact, eye irritation develops immediately upon contact.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:	Kidney and liver disorders.

ERGENCY AND FIRST AID PROCEDURES:

INHALATION:	Remove victim to fresh air and, if needed, immediately begin artificial respiration. Give oxygen if breathing is labored. Get emergency medical help. Contact physician immediately.
INGESTION:	Induce vomiting if victim is conscious by giving water then stick fingers down throat. Get medical attention. Never give unconscious person anything by mouth.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:	**Small Spills:** Pick up with absorbent media. Store as hazardous waste. **Large Spills:** Contain with dikes, pick up with vacuum truck. Handle as hazardous waste. Notify proper local, state, and federal agencies.
WASTE DISPOSAL METHOD:	EPA-approved hazardous waste disposal site. Follow applicable local, state and federal regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:	Store in a cool place away from ignition sources.
OTHER PRECAUTIONS:	Store away from acids. Store away from alkaline materials. Store away from oxidizers or materials bearing a yellow "DOT" label.

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION:	Chemical cartridge respirator when appropriate for exposure.
VENTILATION:	Local Exhaust: Recommended Mechanical: Recommended Special: --- Other: ---
PROTECTIVE GLOVES:	Chemical resistant gauntlet-type gloves.
EYE PROTECTION:	Chemical goggles or full face shield.
OTHER PROTECTIVE EQUIPMENT:	Boots, aprons, drench showers, eyewash as needed for protection against spills and/or splashes.
WORK HYGIENIC PRACTICES:	Avoid contact with skin, eyes and clothing. After handling this product, wash hands before eating, drinking or smoking. If contact occurs, remove contaminated clothing. If needed, take first aid action shown in Section 6.
	Launder contaminated clothing before reuse.

SECTION 9 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME/ HAZARD CLASS:	UN/NA Number, Reportable Quantity (RQ), (if needed)
	FLAMMABLE LIQUID, N.O.S., FLAMMABLE MATERIAL, UN 1993

SECTION - 10 OTHER DATA

EPA HAZARDS:	1-Acute/Yes 2-Chronic/Yes 3-Flammability/Yes 4-Sudden Release of Pressure/No 5-Reactive/No
CERCLA REPORTABLE QUANTITY (RQ):	No
HAZARDOUS WASTE NUMBER:	D001 Ignitable
SARA TITLE III	Yes (ISOPROPYL ALCOHOL)
CLEAN AIR ACT:	No
CLEAN WATER ACT:	No

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CX-91
January 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9399

SECTION 1 - SUPPLIER IDENTIFICATION

MANUFACTURED BY:	N/A
PRODUCT NAME:	CX-91; Blend
NFPA:	1=Health 3=Fire 0=Reactivity -=Special

SECTION 2 - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	CAS NO.	OSHA PEL	ACGIH TLV	OTHER
Isopropyl Alcohol	67-63-0	400 ppm	400 ppm	

Isopropoxy Ethoxy Titanium Bis (2,4-Pentanedionate)---No Data

Triethanolamine Titanium Chelate (No Data)----No Data Available

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	Approximately 180-200°F
MELTING POINT:	N/A
SPECIFIC GRAVITY (WATER=1):	N/D
VAPOR PRESSURE:	N/D
VAPOR DENSITY (AIR=1):	>1.0
EVAPORATION RATE (BUTYL ACETATE=1):	>1
SOLUBILITY IN WATER:	Dispersible
APPEARANCE AND ODOR:	Pale Orange-Yellow Liquid, Alcohol Odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD):	Approximately 54°F
FLAMMABLE LIMITS:	LOWER: N/D UPPER: N/D
EXTINGUISHING MEDIA:	Dry powder, carbon dioxide (CO_2), "Alcohol" foam; use water to cool containers. **DANGER!** Alcohol may burn with an invisible flame.
SPECIAL FIRE FIGHTING PROCEDURES:	Approach fire from upwind side. Avoid breathing smoke, fumes, mist, or vapors on the downwind side.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Containers may rupture from internal pressure if confined to fire area. Cool with water. Get non-essential people out of the area.

SECTION 5 - REACTIVITY INFORMATION

STABILITY:

PRODUCT IS:	Stable

INCOMPATIBILITY:

MATERIALS TO AVOID:	Waters and strong acids
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	From fire; smoke, carbon dioxide, carbon monoxide, oxides of nitrogen
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 6 - HEALTH HAZARD DATA

ROUTES OF ENTRY:

INHALATION:	Irritant, narcotic
SKIN/EYES:	Irritant
INGESTION:	Irritant

HEALTH HAZARDS:

ACUTE:	Inhalation of vapors may be narcotic or anesthetic. Ingestion of liquid will cause gastrointestinal distress, irritation and possibly nausea. Liquid or vapors may be irritating to skin and eyes.
CHRONIC:	Unknown

CARCINOGENICITY:

NTP:	Not listed
IARC MONOGRAPHS:	Not listed
OSHA REGULATED:	Table Z1
SIGNS AND SYMPTOMS OF EXPOSURE:	Skin irritation develops slowly after contact, eye irritation develops immediately upon contact.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:	Unknown
EMERGENCY AND FIRST AID PROCEDURES:	**Inhalation:** Remove victim to fresh air and, if needed, immediately begin artificial respiration. Give oxygen if breathing is labored. Get emergency medical help. Contact physician immediately.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:	**Small Spills:** Pick up with absorbent media. Store as hazardous waste. **Large Spills:** Contain with dikes, pick up with vacuum truck. Handle as hazardous waste. Notify proper local, state and federal agencies. **Waste Disposal Method:** EPA-approved hazardous waste disposal site. Follow applicable local, state and federal regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:	Store in a cool place away from ignition sources.
OTHER PRECAUTIONS:	Store away from acids.

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION:	NIOSH-approved mask suitable for isopropyl alcohol.
VENTILATION:	**Local Exhaust:** Recommended **Mechanical:** Recommended **Special:** --- **Other:** ---
PROTECTIVE GLOVES:	Chemical resistant gloves suitable for isopropyl alcohol
EYE PROTECTION:	Chemical goggles or full face shield
OTHER PROTECTIVE EQUIPMENT:	Boots, aprons, drench showers, eye wash as needed for protection against spills and/or splashes.
WORK HYGIENIC PRACTICES:	Avoid contact with skin, eyes and clothing. After handling this product, wash hands before eating, drinking, or smoking. If contact occurs, remove contaminated clothing. If needed, take first aid action shown in Section 6. Launder contaminated clothing before reuse.

SECTION 9 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME, HAZARD CLASS:	UN/NA Number, RQ (if needed) FLAMMABLE LIQUID, NOS, FLAMMABLE MATERIAL, UN1993

SECTION 10 - OTHER DATA

EPA HAZARDS:	1=Acute/YES 2=Chronic/YES 3=Flammability/YES 4=Sudden Release of Pressure/NO 5=Reactive/NO
CERCLA RQ:	No
HAZARDOUS WASTE NUMBER:	D001 Ignitable
SARA TITLE III:	Yes
CLEAN AIR ACT:	No
CLEAN WATER ACT:	No

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S-4
June 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	EXXON Chemical Americas for Smith Energy Services
PRODUCT NAME:	EPS-4
CHEMICAL NAME:	Not Applicable; Blend
CHEMICAL FAMILY:	Blend
PRODUCT APPEARANCE:	Clear Light Amber Liquid; Hydrocarbon Odor

HAZARD RATING SYSTEMS:

	NPCA-HMIS	NFPA 704
HEALTH:	2	2
FLAMMABILITY:	3	3
REACTIVITY:	0	0

KEY:
4=Severe
3=Serious
2=Moderate
1=Slight
0=Minimal

SECTION 2 - HAZARDOUS INGREDIENT INFORMATION

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. This product is hazardous as defined in 29 CFR 1910.1200, based on the following compositional information:

COMPONENT	OSHA HAZARD
Methyl & Isopropyl Alcohols; Xylene; Toluene	Flammable Liquid
Oxyalkylated Alcohols; Organic Polymer	Eye and Skin Irritant
Methyl Alcohol	Toxic-Systemic
Methyl & Isopropyl Alcohols; Xylene; Toluene	PEL/TLV
Polynuclear Aromatic Hydrocarbons	Carcinogen

SECTION 3 - HEALTH INFORMATION AND PROTECTION

NATURE OF HAZARD:

EYE CONTACT:	Irritating, and will injure eye tissue if not removed promptly.
SKIN CONTACT:	Methyl alcohol may be absorbed through the skin which can contribute to damage of the optic nerve resulting in permanent visual changes, loss of vision or total blindness. Irritating. May cause skin sensitization, an allergic reaction which becomes evident on reexposure to this material.
INHALATION:	High vapor concentrations are irritating to the eyes and the respiratory tract; may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. This product contains methyl alcohol. Vapor inhalation and/or skin absorption can cause central nervous system effects and blindness.
INGESTION:	The main hazard of methyl alcohol arises from its misuse as a drinking substitute for ethyl alcohol. As little as 15 ml (1/2 oz.) of 40% methyl alcohol has caused death. Sublethal doses of methyl alcohol may damage the optic nerve which can result in permanent visual changes, including blindness.

FIRST AID:

EYE CONTACT:	Immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.
SKIN CONTACT:	Flush with large amounts of water; use soap if available. Remove grossly contaminated clothing, including shoes, and launder before reuse. If irritation persists, seek medical attention.
INHALATION:	Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.

GESTION: If swallowed, and INDIVIDUAL IS CONSCIOUS, induce vomiting. Get prompt medical attention. DO NOT attempt to give anything by mouth to an unconscious person.

WORKPLACE EXPOSURE LIMITS:

OSHA REGULATION 29CFR1910.1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:

A TWA of 100 ppm (435 mg/m^3) and a STEL of 150 ppm (655 mg/m^3) for Xylenes.
A TWA of 200 ppm (260 mg/m^3) and a STEL of 250 ppm (310 mg/m^3) for Methyl Alcohol (skin).
A TWA of 100 ppm (375 mg/m^3) and a STEL of 150 ppm (560 mg/m^3) for Toluene.
A TWA of 400 ppm (980 mg/m^3) and a STEL of 500 ppm (1225 mg/m^3) for Isopropyl Alcohol.

THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:

A TWA of 100 ppm (434 mg/m^3), and a STEL of 150 ppm (651 mg/m^3) for Xylene.
A TWA of 200 ppm (262 mg/m^3), and a STEL of 250 ppm (328 mg/m^3) for Methyl Alcohol (skin).
A TWA of 100 ppm (377 mg/m^3), and a STEL of 150 ppm (565 mg/m^3) for Toluene.
A TWA of 400 ppm (983 mg/m^3), and a STEL of 500 ppm (1230 mg/m^3) for Isopropyl Alcohol.

THE FOLLOWING OCCUPATIONAL EXPOSURE LIMITS ARE RECOMMENDED:

A TWA of 100 ppm total organic vapor based on Heavy Aromatic Naphtha (HAN) content. This component also contains a significant level of Polynuclear Aromatic Hydrocarbons (PNAs) between 0.4% and 0.5%. When aerosols are likely to be generated or when product temperatures exceed 300 degrees C, air samples should be monitored for PNAs.

PRECAUTIONS:

PERSONAL PROTECTION:

For open systems where contact is likely, wear chemical resistant gloves, rubber boots, a chemical jacket, chemical goggles, and a face shield. Where contact may occur, wear long sleeves, chemical resistant gloves, and a face shield. Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate. NIOSH/MSHA-approved respirators may be necessary to prevent overexposure by inhalation. All contact should be avoided by persons with known hypersensitivity to PHENOL/FORMALDEHYDE RESINS.

NTILATION:

The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces. See Respiratory Protection recommendations. Use explosion-proof ventilation equipment.

CHRONIC EFFECTS:

This product contains significant amounts of Polynuclear Aromatic Hydrocarbons (PNAs). Certain of these PNAs have been shown to cause skin cancer in laboratory animals and may also cause cancer of the lung and other sites. In view of these findings, there may be potential risk of skin cancer in humans from prolonged and repeated skin contact with this product in the absence of good personal hygiene.

Benzo(a)pyrene(BaP), some other PNAs and materials containing PNAs are listed as carcinogens or potential carcinogens in the Annual Report on Carcinogens published by the U.S. National Toxicology Program (NTP).

The International Agency for Research on Cancer (IARC) has concluded that BaP and some other PNAs are probably carcinogenic to humans.

Limited studies on oils that are very active carcinogens have shown that washing the animal's skin with soap and water between applications greatly reduces tumor formation. These studies demonstrate the effectiveness of cleansing the skin ter contact.

Potential risks to humans can be minimized by observing good work practices and personal hygiene procedures generally recommended for petroleum products.

This product contains Isopropyl Alcohol (IPA). In developmental studies conducted by the U.S. Chemical Manufacturers Association, unexpected acute toxicity was found when IPA was administered to pregnant rabbits by gavage. There were no unexpected toxic effects in pregnant rats exposed in the same study. In rats there were some relatively mild developmental effects at maternally toxic levels. There was no evidence of developmental toxicity in the rats at levels which did not also produce maternal toxicity. There were no indications of developmental toxicity in the rabbits at any exposure level. Preliminary findings from a multigeneration reproduction study indicate that infant and immature rats are more sensitive than their parents to the acute oral toxicity induced by high (1000 mg/kg/day) doses of isopropanol. The effect levels for rats and rabbits were at several times the maximum exposure that would occur at the TLV. This observation was reported to the U.S. EPA under the provisions of Section 8(e) of TSCA.

CHRONIC TOXICITY DATA IS AVAILABLE UPON REQUEST.

SECTION 4 - FIRE AND EXPLOSION HAZARD

FLASH POINT: 48 Deg F. METHOD: Seta CC

FLAMMABLE LIMITS: LEL: 0.8 UEL: 36.0

AUTOIGNITION TEMPERATURE: Not Available

GENERAL HAZARD:

Flammable Liquid; can release vapors that form flammable mixtures at temperatures at or above the flash point. Toxic gases will form upon combustion. "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. **DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.** Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel. Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors. Either allow fire to burn under controlled conditions or extinguish with alcohol-type foam and dry chemical. Try to cover liquid spills with foam. Respiratory and eye protection required for fire fighting personnel.

HAZARDOUS COMBUSTION PRODUCTS:

Smoke, Fumes, Carbon Monoxide, Carbon Dioxide

SECTION 5 - SPILL CONTROL PROCEDURE

LAND SPILL:

Eliminate sources of ignition. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the National Response Center. Vapors/dust can be harmful/fatal. Warn occupants of downwind areas. Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust. Recover by pumping (use an explosion-proof or hand pump) or with a suitable absorbent. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

TER SPILL:

Eliminate sources of ignition. Vapors/dust can be harmful/fatal. Warn occupants and shipping in downwind areas. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 6 - NOTES

This product may contain trace amounts of ethylene oxide (CAS No. 75-21-8), a condition which creates the potential for accumulation of ethylene oxide in the head space of shipping and storage containers and in enclosed areas where the product is being handled or used. Ethylene oxide is considered by OSHA, IARC, and NTP as a potential carcinogen for humans. Ethylene oxide may also present reproductive, mutagenic, genotoxic, neurologic and sensitization hazards in humans. If this product is handled with adequate ventilation, the presence of these trace amounts is not expected to result in any short- or long-term hazards.

SECTION 7 - REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

T PROPER SHIPPING NAME:	FLAMMABLE LIQUID, N.O.S. (Contains METHYL ALCOHOL, TOLUENE) UN1993
DOT HAZARD CLASS:	Flammable Liquid, N.O.S.
DOT IDENTIFICATION NUMBER:	UN 1993
NAME:	Flammable Liquids, N.O.S.
FLASH POINT:	48 degrees F. METHOD: Seta CC
TSCA:	Components of this product are listed on the TSCA Inventory.
CERCLA:	If the reportable quantity of this product is accidentally spilled, the incident is subject to the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and must be reported to the National Response Center by calling **(800) 424-8802.** The reportable spill quantity of this product is 13,193 pounds. This product contains: Methyl Alcohol, Xylene, Toluene.

SARA TITLE III: Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories:
Immediate Health, Delayed Health, Fire

This product contains the following Section 313 Reportable Ingredients:

COMPONENT	CAS NO.	MAXIMUM %
Methyl Alcohol	67-56-1	40.0
Xylene	1330-20-7	5.0
Toluene	108-88-3	5.0

SECTION 8 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY: 0.89 at 60
DENSITY: 7.4 lbs./gal. at 60

VAPOR PRESSURE, mmHg at ^{0}F: 177 at 100 Calculated

SOLUBILITY IN WATER, WEIGHT PERCENT AT ^{0}F: Dispersible

VISCOSITY OF LIQUID, cST AT ^{0}F: 7 at 100 Cannon-Fenske
4 at 150 Cannon-Fenske

SPECIFIC GRAVITY OF VAPOR, AT 1 ATM (AIR=1): 4.39

FREEZING/MELTING POINT, ^{0}F: -5 Pour Point

EVAPORATION RATE, n-Bu ACETATE=1: 2.0 Calculated

BOILING POINT, ^{0}F: 163 Calculated IBP

SECTION 9 - REACTIVITY DATA

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID INSTABILITY: None

TERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:	Strong Oxidizing Agents
HAZARDOUS DECOMPOSITION PRODUCTS:	None

SECTION 10 - STORAGE AND HANDLING

ELECTROSTATIC ACCUMULATION HAZARD:	Unknown, use proper grounding procedure
STORAGE TEMPERATURE, ^{0}F:	Ambient
LOADING/UNLOADING TEMPERATURE, ^{0}F:	Ambient
STORAGE/TRANSPORT PRESSURE, mmHg:	Atmospheric
VISCOSITY AT LOADING/UNLOADING TEMPERATURE, cST:	Not Available

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S-9
January 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	NALCO Chemical Company for Smith Energy Services
PRODUCT NAME:	EPS-9
DESCRIPTION:	A blend of an alkylphenol/formaldehyde resin and oxyalkylates in a hydrocarbon solvent
NFPA 704M/HMIS RATING:	1/1=Health 2/2=Flammability 0/0=Reactivity 0=Other
KEY:	0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 - HAZARDOUS INGREDIENTS

The manufacturer's hazard evaluation has identified the following chemical ingredient(s) as hazardous under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult Section 14 for the nature of the hazard(s).

INGREDIENTS(S)	CAS NO.	APPROXIMATE PERCENT
Ethoxylated nonylphenol	9016-45-9	1-5
Heavy aromatic naphtha	64742-94-5	70-100
Naphthalene	91-20-3	5-10

SECTION 3 - PRECAUTIONARY LABEL INFORMATION

WARNING: Causes irritation to skin and eyes. Combustible. Prolonged inhalation of vapor may be harmful. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield when handling. Avoid prolonged or repeated breathing of vapor. Use with adequate ventilation. Do not take internally. Keep away from heat and open flame. Keep container closed when not in use.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

SECTION 4 - FIRST AID INFORMATION

EYES: Immediately flush with water for at least 15 minutes while holding eyelids open. Call a physician at once.

SKIN: Wash thoroughly with soap and rinse with water. Call a physician.

INGESTION: **Do not induce vomiting.** Give water. Call a physician.

INHALATION: Remove to fresh air. Treat symptoms. Call a physician.

NOTE TO PHYSICIAN: No specific antidote is known. Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

SECTION 5 - HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE: Eye, Skin, Inhalation

EYE CONTACT: Can cause moderate irritation.

SKIN CONTACT: Can cause moderate irritation.

INHALATION: Prolonged inhalation of vapor may be harmful.

SYMPTOMS OF EXPOSURE:

Acute: Inhalation of high concentrations of heavy aromatic naphtha can cause nausea, dizziness, vomiting, stupor or unconsciousness.

Chronic: Prolonged skin contact of heavy aromatic naphtha can cause dry skin and defatting resulting in irritation and dermatitis.

AGGRAVATION OF EXISTING CONDITIONS:

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

SECTION 6 - TOXICOLOGY INFORMATION

ACUTE TOXICITY STUDIES: Acute toxicity studies have not been conducted on this product, but toxicity studies of the ingredient(s) in Section 2 have been reviewed. The results are shown below:

ACUTE ORAL TOXICITY (ALBINO RATS):
Ethoxylated nonylphenol LD50=3,000 mg/kg

ACUTE DERMAL TOXICITY (ALBINO RABBITS):
Ethoxylated nonylphenol LD50=Greater than 3,000 mg/kg

PRIMARY SKIN IRRITATION TEST (ALBINO RABBITS):
SKIN IRRITATION INDEX DRAIZE RATING:
2.4/8.0 Ethoxylated nonylphenol

PRIMARY EYE IRRITATION TEST (ALBINO RABBITS):
EYE IRRITATION INDEX DRAIZE RATING:
35.5/110.0 Ethoxylated nonylphenol

SECTION 7 - PHYSICAL AND CHEMICAL PROPERTIES

COLOR:	Yellow
FORM:	Liquid
ODOR:	Hydrocarbon
DENSITY:	7.6 lbs./gal.
SOLUBILITY IN WATER:	Dispersible
SPECIFIC GRAVITY:	0.91 at 60 degrees F

(AT 20%):	11	ASTM E-70
POUR POINT:	Less than -60 degrees F	ASTM D-97
VISCOSITY:	5.4 cps/45 SUS at 60 deg F	ASTM D-445
FLASH POINT:	145 degrees F (TCC)	ASTM D-56
VAPOR PRESSURE:	0 mmHg at 100 degrees F	ASTM D-323
PERCENT VOLATILE BY WEIGHT:	1 at 75 degrees F	
NOTE:	These physical properties are typical values for this product.	

SECTION 8 - FIRE AND EXPLOSION INFORMATION

FLASH POINT:	145 degrees F (TCC)	ASTM D-56
EXTINGUISHING MEDIA:	Based on the NFPA guide, use dry chemical, alcohol foam, carbon dioxide or other extinguishing agent suitable for Class B fires. Use water to cool containers exposed to fire. For large fires, use water spray or fog, thoroughly drenching the burning material.	

SECTION 9 - REACTIVITY INFORMATION

INCOMPATIBILITY:	Avoid contact with strong oxidizers (e.g., chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.
THERMAL DECOMPOSITION PRODUCTS:	In the event of combustion carbon monoxide (CO), carbon dioxide (CO_2) may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

SECTION - 10 PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION: Respiratory protection is not normally needed since the volatility and toxicity are low. If significant vapors, mists or aerosols are generated, wear a NIOSH-approved or equivalent respirator, (ANSI Z 88.2, 1980, for requirements and selection).

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a pressure-demand, self-contained breathing apparatus is recommended.

VENTILATION: General ventilation is recommended. Additionally, local exhaust ventilation is recommended where vapors, mists or aerosols may be released.

PROTECTIVE EQUIPMENT: Use impermeable gloves and chemical splash goggles (ANSI Z 87.1 requirements and selection of gloves, goggles, shoes, etc.) when attaching feeding equipment or doing maintenance.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

SECTION 11 - SPILL AND DISPOSAL INFORMATION

SPILL CONTROL AND RECOVERY:

SMALL LIQUID SPILLS: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 14.

LARGE LIQUID SPILLS: Dike to prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 14.

DISPOSAL: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, (i.e., D001 through D017) nor is it listed under Subpart D.

As a non-hazardous solid waste, it should be solidified before disposal to a sanitary landfill. Can be incinerated in accordance with local, state and federal regulations.

SECTION 12 - ENVIRONMENTAL INFORMATION

AQUATIC DATA:

Based upon a similar product.

96-hour static acute LC50 to Bluegill Sunfish=Greater than 100 ppm, less than 1,000 ppm.

96-hour static acute LC50 to Rainbow Trout=135 ppm.

If released into the environment, see CERCLA in Section 14.

SECTION 13 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME/HAZARD CODE:

Combustible Liquid, N.O.S.
Combustible Liquid NA 1993

CONTAINS:

Aromatic Hydrocarbons, Naphthalene

SECTION 14 - REGULATORY INFORMATION

THE FOLLOWING REGULATIONS APPLY TO THIS PRODUCT:

FEDERAL REGULATIONS: OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:

Based on the manufacturer's hazard evaluation, the following ingredients in this product are hazardous and the reasons are shown below:

Ethoxylated nonylphenol: Moderate Eye Irritant
Heavy aromatic naphtha: Skin Irritant
Naphthalene: Irritant

Naphthalene=TWA 10 ppm, STEL 15 ppm ACGIH/TLV
50 mg/m^3, 75 mg/m^3 ACGIH/TLV

Naphthalene=PEL 10 ppm, 50 mg/m^3 OSHA/TLV

Heavy aromatic naphtha=100 ppm TLV
Manufacturer's recommendation

CERCLA/SUPERFUND, 40 CFR 117, 302: This product contains naphthalene, a Reportable Quantity (RQ) substance and if 1,000 pounds of product are released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. 1-800-424-8802.

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 ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

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

The manufacturer's hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

XX Immediate (acute) Health Hazard
-- Delayed (chronic) Health Hazard
XX Fire Hazard
-- Sudden Release of Pressure Hazard
-- Reactive Hazard

Under Section 311, submittal of MSDS(s) or a list of product names to the local emergency commission, state emergency response commission and local fire department is required after October 17, 1987 if you have:

- 10,000 pounds or more of a hazardous substance, or
- 500 pounds or the threshold planning quantity, whichever is less, of an extremely hazardous substance.

After October 17, 1989, MSDS(s), or a list of product names for all hazardous substances between zero (0) and 10,000 pounds, not previously reported, must be submitted.

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

This product contains the following ingredient(s), (with CAS number and percent range) which appear(s) on the List of Toxic Chemicals:

Naphthalene 91-20-3 5-10

TOXIC SUBSTANCES CONTROL ACT (TSCA):

The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C&D:

If this product becomes a waste, it does not meet the criteria of a hazardous waste.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (FORMERLY SECTION 307), 40 CFR 116 (FORMERLY SECTION 311): This product contains the following ingredients(s) covered by the Clean Water Act:

Naphthalene - Section 307, 311

CLEAN AIR ACT, 40 CFR 60, SECTION 111, 40 CFR 61, SECTION 112: This product does not contain ingredients covered by the Clean Air Act.

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65: This product complies with the MSDS and labeling requirements of the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).

MICHIGAN CRITICAL MATERIALS: This product does not contain ingredients listed on the Michigan Critical Materials Register.

STATE RIGHT-TO-KNOW LAWS: Regulated in those states using the TLV for naphthalene as a criteria for listing.

INTERNATIONAL REGULATIONS: This is a WHMIS-controlled product under The House of Commons of Canada Bill C-70. The product contains the following substance(s), from the Ingredient Disclosure List or has been evaluated based on its toxicological properties, to contain the following hazardous ingredient(s):

CHEMICAL NAME	CAS NO.	PERCENT CONCENTRATION RANGE
Ethoxylated nonylphenol	9016-45-9	1-5
Heavy aromatic naphtha	64742-94-5	70-100
Naphthalene	91-20-3	5-10

SECTION 15 - ADDITIONAL INFORMATION

NONE

SECTION 16 - USER'S RESPONSIBILITY

This product Material Safety Data Sheet (MSDS) provides health and safety information. The product is to be used in applications consistent with manufacturer's 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 ensure safe workplace operations.

SECTION 17 - BIBLIOGRAPHY

ANNUAL REPORT ON CARCINOGENS, U.S. Department of Health and Human Services, Public Health Service, PB 33-135855, 1983.

CASARETT AND DOULL'S TOXICOLOGY, THE BASIC SCIENCE OF POISONS, Doull, J., Klaassen, C.D., and Admur, M.O., editors, Macmillian Publishing Company, Inc., N.Y., 2nd edition, 1980.

CHEMICAL HAZARDS OF THE WORKPLACE, Proctor, N.H., and Hughes, J.P., editors, J.P. Lipincott Company, N.Y., 1981.

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, Sax, N. Irving, editor, Van Nostrand Reinhold Company, N.Y., 6th edition, 1984.

IARC MONOGRAPHS ON THE EVALUATION OF THE CARCINOGENIC RISK OF CHEMICALS TO MAN, Geneva: World Health Organization, International Agency for Research on Cancer, 1972-1977.

PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, Clayton, G.D., Clayton, F.E., editors, John Wiley and Sons, N.Y., 3rd edition, Vol. 2 A-C, 1981.

REGISTRY OF TOXIC EFFECTS ON CHEMICAL SUBSTANCES, U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, 1983 supplement of 1981-1982 edition, Vol. 1-3, OH, 1984.

Title 29 Code of Federal Regulations Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupation Safety and Health Administration (OSHA).

RESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS IN THE WORKROOM ENVIRONMENT WITH INTENDED CHANGES, American Conference of Governmental Industrial Hygienists, OH.

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FAA-2 ("Winter"/All-Year)
February 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Chemron Corporation for Smith Energy Services
PRODUCT:	FAA-2 (All-Year)
HMIS CODES:	1=Health 1=Fire 0=Reactivity C=Personal Protection
KEY:	0=Minimal 1=Slight Hazard 2=Moderate Hazard 3=Serious Hazard 4=Severe Hazard C=Safety Goggles, Gloves, Synthetic Apron

SECTION 2 - HAZARDOUS INGREDIENTS/SARA III INFORMATION

	OCCUPATIONAL EXPOSURE LIMITS				VAPOR PRESSURE	WEIGHT
CAS NO.	OSHA PEL	ACGIH	TLV	OTHER	mmHg AT TEMP	PERCENT

*** No reportable quantities of hazardous ingredients are present ***
*** No toxic chemical(s) subject to the reporting requirements of Section 313 of Title III and of 40 CFR 372 are present ***

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	212^{0}F
VAPOR DENSITY:	Lighter than Air
COATING V.O.C.:	N/A
SOLUBILITY IN WATER:	100%
APPEARANCE AND ODOR:	Pale Yellow Liquid, Mild Odor
SPECIFIC GRAVITY (H2O=1):	1.0
EVAPORATION RATE:	N/A

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	N/A METHOD USED: --
FLAMMABLE LIMITS: IN AIR BY VOLUME:	LOWER: N/A UPPER: N/A
EXTINGUISHING MEDIA:	Foam, Carbon Dioxide, Dry Chemical, Water Fog
SPECIAL FIRE FIGHTING PROCEDURES:	As with most chemical fires, it is advised that firemen be supplied with self-contained breathing devices equipped with full face piece.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	None

SECTION 5 - REACTIVITY DATA

STABILITY:	Stable
CONDITIONS TO AVOID:	None
INCOMPATIBILITY (MATERIALS TO AVOID):	None currently known
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	May produce hazardous fumes or hazardous decomposition products.
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 6 - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE:	No health effects are known from inhalation of this product. Inhalation of mists or sprays may result in non-specific irritation of the upper respiratory tract.
SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE:	Contact with skin could produce mild irritation. Mild to moderate irritation may result with eye contact.
SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE:	None currently known.
INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE:	Ingestion may cause irritation to the membranes of the mouth, throat and gastrointestinal tract. Nausea, vomiting, cramps and diarrhea may occur.
HEALTH HAZARDS (ACUTE AND CHRONIC):	No chronic effects, either systemic or local are known.
CARCINOGENICITY:	NTP: No; IARC MONOGRAPHS: No; OSHA REGULATED: No
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:	None currently known

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION:	Remove to fresh air. If symptoms of respiratory discomfort persist, obtain medical attention.
SKIN/EYES:	Remove contaminated clothing and flush skin with water. Wash with soap and water until material has been removed. Hold lids apart; immediately flush with large amounts of water for 15 minutes. Do not attempt to neutralize with chemical agents. Get medical help.
INGESTION:	Give large amounts of warm water or put finger down throat to induce vomiting. Vomiting should be encouraged until vomitus is clear. Milk, eggs or olive oil may be given for soothing effect. Get medical help.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:	Wear suitable protective equipment. **Small Spills:** Absorb liquid with absorbent material. **Large Spills:** Stop spill at source. Dike area of spill to prevent spreading. Pump liquids into waste containers. Remaining liquids can be absorbed.
WASTE DISPOSAL METHOD:	Incinerate or landfill where permitted under appropriate federal, state and local regulations. Questions concerning disposal should be directed to Smith Energy Services.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:	Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Soiled clothing should be removed and laundered before reuse. Store below 120 degrees F. Keep container closed.
OTHER PRECAUTIONS:	---

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION:	Self-contained breathing apparatus in high concentrations. Normally not required.
VENTILATION:	General (mechanical) room ventilation is expected to be satisfactory.
PROTECTIVE GLOVES:	Butyl or neoprene rubber.
EYE PROTECTION:	Monogoggles.
OTHER PROTECTIVE CLOTHING OR EQUIPMENT:	Synthetic apron, eye wash station.
WORK/HYGIENIC PRACTICES:	---

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HCl-O (O=Bagged)
February 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURER:	Various Suppliers for Smith Energy Services
CHEMICAL NAME/SYNONYMS:	Hydrochloric Acid, Hydrogen Chloride, Aqueous Solution, Chlorohydric Acid
CHEMICAL FORMULA:	HCl
CHEMICAL FAMILY:	Inorganic Acids
MOLECULAR WEIGHT:	36.46
TRADE NAME:	Muriatic Acid, 20 degree and 22 degree Baume, Technical, Industrial and Commercial Grade
SYNONYMS:	Hydrochloric Acid
DOT IDENTIFICATION:	UN 1789

SARA INFORMATION:
HAZARDS:
Fire=No
Pressure=No
Reactivity=No
Acute=Yes
Chronic=Yes

PHYSICAL DATA:
Mixture=Yes
Pure=No
Liquid=Yes
Gas=No

HAZARD RATING:

HMIS	NFPA
3=Health	3=Health
0=Flammability	0=Flammability
0=Reactivity	0=Reactivity
0=Special Protection	

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

SECTION 2 - PRODUCTION AND COMPONENT DATA

COMPONENT(S) CHEMICAL NAME: *Hydrogen Chloride
CAS REGISTRY NO.: 7647-01-0
PERCENT (APPROXIMATE): 35
ACGIH TLV-TWA: 5 ppm Ceiling

*Denotes chemical subject to reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372.

SECTION 3 - PHYSICAL DATA

APPEARANCE AND ODOR:	Clear, colorless liquid with pungent, irritating odor.
BOILING POINT:	150 deg F to 230 deg F (65.6 deg C to 110.0 deg C)
VAPOR PRESSURE mmhg:	78 mmHg at 20 deg C
EVAPORATION RATE (Butyl Acetate=1):	<1.00
SPECIFIC GRAVITY:	20 deg Be: 1.1600 at 15.6/15.6 deg C
	22 deg Be: 1.1789 at 15.6/ 15.6 deg C
VAPOR DENSITY IN AIR (AIR=1):	1.27
PERCENT VOLATILE, BY VOLUME:	35
SOLUBILITY IN WATER:	Complete

SECTION 4 - REACTIVITY DATA

STABILITY:	Stable
INCOMPATIBILITY (MATERIALS TO AVOID):	Bases, metals, mercuric sulfate, perchloric acid, carbides of calcium, cesium, rubidium, acetylides of cesium and rubidium, phosphides of calcium and uranium and lithium silicide.
HAZARDOUS DECOMPOSITION PRODUCTS:	None (Refer to Conditions to Avoid)
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS TO AVOID:	Contact with strong bases can cause violent reaction generating large amounts of heat. Reactions with metals can release flammable hydrogen gas. Refer to Section 8.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	METHOD USED: None
EXTINGUISHING AGENTS:	N/A
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Fire fighters should wear self-contained positive-pressure breathing apparatus and avoid skin contact. Refer to Reactivity Data in Section 4.
FLAMMABLE LIMITS IN AIR:	None

SECTION 6 - TOXICITY AND FIRST AID

EXPOSURE LIMITS:	When exposure to this product and other chemicals is concurrent, the exposure limit must be defined in the workplace.
ACGIH:	5 ppm Ceiling
OSHA:	5 ppm Ceiling
IDLH:	100 ppm
	Effects described in this Section are believed not to occur if exposures are maintained at or below appropriate TLVs. Because of the wide variation in individual susceptibility, these exposure limits may not be applicable to all persons and those with medical conditions listed below.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:	Asthma, bronchitis, emphysema and other lung conditions and chronic nose, sinus or throat conditions. Exposure may aggravate existing skin and/or eye conditions contact.
ACUTE TOXICITY:	Primary route(s) of exposure: Inhalation, Skin Absorption
INHALATION:	Hydrogen chloride gas, mist and vapor can cause irritation of respiratory tract, with burning choking, coughing, headaches and rapid heartbeat. Levels of 10 to 35 ppm can cause irritation of throat and 50-100 ppm is nearly unbearable for one hour. Inflammation, destruction of nasal passages and breathing difficulties can occur with higher concentrations and may be delayed in onset. 1000 to 2000 ppm can be fatal.
SKIN:	Liquid hydrogen chloride or concentrated vapors can rapidly cause burning of skin. Repeated or prolonged contact with dilute solutions, and concentrated vapors, can cause irritation and dermatitis.
EYES:	Liquid or concentrated vapors can cause eye irritation, severe burns and permanent damage including blindness.

GESTION: Can cause severe burns of mouth, esophagus and stomach. Nausea, pain and vomiting frequently occur. Depending upon amount swallowed, holes in the intestinal tract, kidney inflammation, shock and death can occur.

FIRST AID:

INHALATION: Move person to fresh air. If breathing stops, administer artificial respiration. Get medical attention immediately.

SKIN: Remove contaminated clothing and wash skin thoroughly for a minimum of 15 minutes with large quantities of water (preferably a safety shower). Get medical attention immediately.

EYES: Wash eyes immediately with large amounts of water (preferably eye wash fountain), lifting the upper and lower eyelid and rotating eyeball. Continue washing for a minimum of 15 minutes. Get medical attention immediately.

INGESTION: If conscious, give large quantities of water. Do not induce vomiting. Get medical attention immediately.

CHRONIC TOXICITY: Exposure of 100 ppm for 6 hours a day for 50 days caused only slight unrest and irritation to the eyes and nose of rabbits, guinea pigs and pigeons. The hemoglobin content of blood was also slightly diminished. Monkeys receiving twenty exposures of 33 ppm for 6 hours did not display any adverse effects. Higher exposures (unspecified) have caused weight loss which paralleled the severity of exposure. Baboons exposed to 500, 5000, or 10,000 ppm for 15 minutes did not have significant alterations in any pulmonary function parameters 3 days or 3 months after exposure. In humans, long term overexposures have been associated with erosion of the teeth.

CARCINOGENICITY:	No standard carcinogenicity studies for hydrogen chloride were identified. Two studies on rats were conducted to determine if hydrogen chloride increased the formation of nasal tumors or increased the carcinogenic potential of formaldehyde. In both studies the rats were exposed to 10 ppm hydrogen chloride, 6 hours per day, 5 days a week. One study lasted 84 weeks while the other lasted the animals' lifetime. Hydrogen chloride did not cause an increase in nasal tumors and did not increase the carcinogenicity of formaldehyde. Hydrogen chloride is not listed on the IARC, NTP, OSHA carcinogen lists.
REPRODUCTIVE TOXICITY:	No studies were identified relative to hydrogen chloride and reproductive toxicity.

SECTION 7 - PERSONAL PROTECTION AND CONTROLS

RESPIRATORY PROTECTION:	Where vapor concentration exceeds or is likely to exceed 5 ppm, a NIOSH/MSHA-approved full face respirator with acid gas canister is acceptable. A NIOSH/MSHA approved self-contained breathing apparatus with full face piece is required for air concentrations above 100 ppm and for spills and/or emergencies. Follow any applicable respirator use, standards and regulations.
VENTILATION:	As necessary to maintain air concentration below 5 ppm, at all times.
SKIN PROTECTION:	Wear neoprene or PVC rain suit, boots, and gloves.
EYE PROTECTION:	Wear chemical goggles which are splash-proof and face shield.
HYGIENE:	Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any protective clothing, or shoes which become contaminated with hydrochloric acid should be removed immediately, and thoroughly laundered before wearing again.

OTHER CONTROL MEASURES:	Safety showers and eyewash station must be available in immediate area. To determine the exposure level(s), monitoring should be performed regularly.
NOTE:	Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations.

SECTION 8 - STORAGE AND HANDLING PRECAUTIONS

Follow protective controls set forth in Section 7 when handling this product.

Store in closed properly labeled, rubber-lined steel, acid-resistant plastic, or glass containers. Do not store near strong alkalies or reactive materials.

Do not remove or deface label or tag.

Hydrogen chloride can react with cyanide, forming lethal concentrations of hydrocyanic acid. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276.

SARA TITLE III HAZARD CATEGORY: Immediate Health

SECTION 9 - SPILL, LEAK, AND DISPOSAL PRACTICES

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

Evacuate immediate area where concentrated fumes are present. Cleanup personnel must were proper protective equipment (see Section 7). Completely contain spilled acid with dikes, etc., and prevent run-off into ground and surface waters or into sewers. Neutralization with soda ash or dilute caustic soda. Neutralization products, both liquid and solid, must be recovered for proper disposal. Reportable Quantity (RQ) is 5000 lbs. Notify **National Response Center 1-800-424-8802** of uncontrolled spills in excess of RQ.

WASTE DISPOSAL METHOD:	Recovered solids or liquid may be sent to a licensed reclaimer or disposed of in a permitted waste management facility. Consult federal, state, or local disposal authorities for procedures.

SECTION 10 - TRANSPORTATION

DOT HAZARD CLASSIFICATION:	Corrosive
PROPER SHIPPING NAME:	Muriatic Acid Solution
ID NUMBER:	UN 1789
PLACARD REQUIRED:	Corrosive
LABEL REQUIRED:	Corrosive. Label as required by OSHA Hazard Communication Standard, and applicable state and local regulations.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct, but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of this end product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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-FRS
June 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	EXXON Chemical Americas for Smith Energy Services
PRODUCT NAME:	MC-FRS
CHEMICAL NAME:	Not Applicable: Blend
CHEMICAL FAMILY:	Amphoteric Surfactant
PRODUCT DESCRIPTION:	Clear Yellow Liquid; Mild Odor
CAS NO:	61789-39-7

HAZARD RATING SYSTEMS:	NPCA-HMIS	NFPA 704
HEALTH:	1	1
FLAMMABILITY:	1	1
REACTIVITY:	0	0

KEY:
4=Severe
3=Serious
2=Moderate
1=Slight
0=Minimal

SECTION 2 - HAZARDOUS INGREDIENT INFORMATION

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. This product is hazardous as defined in 29 CFR 1910.1200, based on the following compositional information:

COMPONENT	OSHA HAZARD
Glycerine	TLV

For additional information see Section 3

SECTION 3 - HEALTH INFORMATION AND PROTECTION

NATURE OF HAZARD:

EYE CONTACT:	Slightly irritating but does not injure eye tissue.
SKIN CONTACT:	Low order of toxicity. Frequent or prolonged contact may irritate and cause dermatitis. May cause skin sensitization, an allergic reaction which becomes evident on reexposure to this material.
INHALATION:	Irritating to eyes and respiratory tract in high concentrations.
INGESTION:	Low order of toxicity.

FIRST AID:

EYE CONTACT:	Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.
SKIN CONTACT:	Flush with large amounts of water; use soap if available. Remove grossly contaminated clothing, including shoes, and launder before reuse. If irritation persists, seek medical attention.
INHALATION:	Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.
INGESTION:	First aid is normally not required.

WORKPLACE EXPOSURE LIMITS:

OSHA REGULATION 29 CFR 1910.1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:

A TWA of 10 mg/M3 (total dust) and 5 mg/M3 (respirable fraction) for glycerin (mist).

THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:

A TWA of 10 mg/M3 (total mist) for glycerin.

PRECAUTIONS:

PERSONAL PROTECTION:	For open systems where contact is likely, wear chemical resistant gloves, a chemical suit, rubber boots, a chemical jacket, and a face shield. Where contact may occur, wear long sleeves, chemical resistant gloves, and a face shield. Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA-approved respirators may be necessary to prevent overexposure by inhalation. All contact should be avoided by persons with known hypersensitivity to **MODIFIED AMINE.**
VENTILATION:	The use of mechanical dilution ventilation is recommended whenever this product is used in a confined space, is heated above ambient temperatures, or is agitated.

SECTION 4 - FIRE AND EXPLOSION HAZARD

FLASH POINT:	>210 Degrees F. METHOD: Tag/CC
FLAMMABLE LIMITS:	Not Available
AUTOIGNITION TEMPERATURE:	Not Available
GENERAL HAZARD:	Low Hazard, liquid can burn upon heating to temperatures at or above the flash point. "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.
FIRE FIGHTING:	Use water spray to cool fire exposed surfaces and to protect personnel. Isolate "fuel" supply from fire. Use alcohol-type foam, dry chemical or water spray to extinguish fire. Avoid spraying water directly into storage containers due to danger of boilover.

HAZARDOUS COMBUSTION PRODUCTS: No Unusual

SECTION 5 - SPILL CONTROL PROCEDURE

LAND SPILL: Eliminate sources of ignition. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the National Response Center.

Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Recover by pumping or with a suitable absorbent. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

WATER SPILL: Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 6 - NOTES

None

SECTION 7 - REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT PROPER SHIPPING NAME: Not DOT Regulated; No DOT Labels Required
DOT HAZARD CLASS: Not DOT Regulated
DOT IDENTIFICATION NUMBER: Not Available

TSCA: This product is listed on the TSCA Inventory as a UVCB (Unknown, Variable Composition or Biological) Chemical at CAS Registry Number 61789-39-7.

CERCLA: If this product is accidentally spilled, it is not subject to any special reporting under the requirements of the Comprehensive Environmental

Response, Compensation, and Liability Act (CERCLA). We recommend you contact local authorities to determine if there may be other local reporting requirements.

SARA TITLE III: Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories:

Delayed Health

This product does not contain Section 313 Reportable Ingredients.

SECTION 8 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY:	1.06 at 68 DENSITY: 8.8 lbs./gal. at 60
VAPOR PRESSURE, mmHg at ^{0}F:	55 at 68 Calculated
SOLUBILITY IN WATER, WEIGHT PERCENT AT ^{0}F:	Soluble
VISCOSITY OF LIQUID, CST AT ^{0}F:	15 at 68 Cannon-Fenske 8 at 68 Cannon-Fenske
SPECIFIC GRAVITY OF VAPOR, AT 1 ATM (AIR=1):	1.00
FREEZING/MELTING POINT, ^{0}F:	5 Pour Point
EVAPORATION RATE, n-Bu ACETATE=1:	1.5
BOILING POINT, ^{0}F:	212 Calculated IBP
pH:	5.4

SECTION 9 - REACTIVITY DATA

STABILITY:	Stable
HAZARDOUS POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID INSTABILITY:	Not Applicable
MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:	Strong oxidizing agents and strong acids
HAZARDOUS DECOMPOSITION PRODUCTS:	None

SECTION 10 - STORAGE AND HANDLING

ELECTROSTATIC ACCUMULATION HAZARD:	Unknown, use proper grounding procedure
STORAGE TEMPERATURE, ^{0}F:	Ambient to 120 degrees F
LOADING/UNLOADING TEMPERATURE ^{0}F:	80 to 120
STORAGE/TRANSPORT PRESSURE, mmHg:	Atmospheric
VISCOSITY AT LOADING/UNLOADING TEMPERATURE, cST:	50-150 cST

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R-1
February 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Calgon Corporation Subsidiary of Merck and Company, Inc., for Smith Energy Services
CHEMICAL NAME/SYNONYMS:	OFR-1; Oil Soluble Polymer
FORMULA:	Multi-component Liquid

SECTION 2 - HAZARDOUS INGREDIENTS

PRINCIPAL HAZARDOUS COMPONENT(S)	CAS NO.	PERCENT	ORAL LD50	DERMAL LD50	TLV (UNITS)
Kerosene	8008-20-6	77	28 gm/kg	Unknown	500 ppm
Isopropanol	67-63-0	10	5840 mg/kg	13 gm/kg	400 ppm
Ethylene Glycol	107-21-1	4	8540 mg/kg	19,530 mg/kg	50 ppm

SECTION 3 - PHYSICAL DATA

BOILING POINT (DEG. F.):	175 to 180
VAPOR PRESSURE (mmHg):	28.4
VAPOR DENSITY (AIR=1):	Unknown
SOLUBILITY IN WATER:	Slight
APPEARANCE AND ODOR:	Water white to yellow solution
SPECIFIC GRAVITY (WATER=1):	0.81
PERCENT VOLATILE BY VOLUME (PERCENT):	95
pH:	N/A

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED):	<78 degrees F TCC
FLAMMABLE LIMITS:	Not Available LEL: -- UEL: --
EXTINGUISHING MEDIA:	Water spray, foam, dry chemical or carbon dioxide
SPECIAL FIRE FIGHTING PROCEDURES:	Exercise caution when fighting any chemical fire. Respiratory protection is essential.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	None

SECTION 5 - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE:	Causes irritation. Harmful if swallowed or inhaled.
EMERGENCY AND FIRST AID PROCEDURES:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. flush skin with water. If swallowed, do **NOT INDUCE VOMITING.** Give large quantities of water. Call a physician. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

SECTION 6 - REACTIVITY DATA

STABILITY:	Stable
CONDITIONS TO AVOID:	Heat, sparks and open flame
INCOMPATIBILITY (MATERIALS TO AVOID):	Strong oxidizers such as liquid chlorine and oxygen
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxides of nitrogen
HAZARDOUS POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID:	Unknown

SECTION 7 - SPILL OR LEAK PROCEDURES

REPORTABLE QUANTITIES (RQ) IN LBS. OF EPA HAZARDOUS SUBSTANCES IN PRODUCT:	N/A
NOTIFY EPA OF PRODUCT SPILLS EQUAL TO OR EXCEEDING ___LBS:	~~N/A~~ 26000 Lbs
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:	Dispose of in accordance with local, state and federal regulations. Dike area to contain as much spilled material as possible. Remove any remaining material by absorbing on vermiculite or other suitable absorbing material and place in a sealed metal container for disposal.
WASTE DISPOSAL METHOD:	Incinerate in accordance with local, state and federal regulations.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:	A NIOSH-approved respirator for organic vapors is recommended if the air standard for petroleum distillates, isopropanol and ethylene glycol are exceeded.
VENTILATION:	
LOCAL EXHAUST:	Recommended
MECHANICAL (GENERAL):	Recommended
SPECIAL:	None
OTHER:	None
PROTECTIVE GLOVES:	Solvent resistent rubber
EYE PROTECTION:	Safety glasses or eye goggles
OTHER PROTECTIVE EQUIPMENT:	Not required

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:	Avoid contact with eyes, skin and clothing. Keep container closed. Wash thoroughly after handling.
OTHER PRECAUTIONS:	Use only in well-ventilated areas that will maintain air levels below limits established by federal, state and local regulations.

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A-2
January 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	NALCO Chemical Company for Smith Energy Services
PRODUCT:	OGA-2; Activator
DESCRIPTION:	An aqueous solution of sodium aluminate
NFPA 704M/HMIS RATING:	3/3=Health 0/3=Flammability 0/3=Reactivity 0=Other
KEY:	0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 - HAZARDOUS INGREDIENTS

The manufacturer's evaluation has identified the following chemical ingredient(s) as hazardous under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult Section 14 for the nature of the hazard(s).

INGREDIENT(S)	CAS NO.	APPROXIMATE PERCENT
Sodium Hydroxide	1310-73-2	1-10
Sodium Aluminate	1302-42-7	20-40

SECTION 3 - PRECAUTIONARY LABEL INFORMATION

WARNING: Contains caustic. Causes burns to skin and eyes. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield when handling. Do not take internally.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

SECTION 4 - FIRST AID INFORMATION

EYES:	Immediately flush for at least 15 minutes while holding eyelids open. Call a physician at once.
SKIN:	Immediately flush with water for at least 15 minutes. For a large splash, flood body under a shower. Call a physician at once.
INGESTION:	Do not induce vomiting. Give water. Call a physician at once.
INHALATION:	Remove to fresh air. Treat symptoms. Call a physician.
NOTE TO PHYSICIAN:	No specific antidote is known. Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.
CAUTION:	If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.
NOTE TO PHYSICIAN:	Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed.

SECTION 5 - HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE:	Eye, Skin
EYE CONTACT:	Corrosive to the eyes with possible permanent damage depending on the length of exposure and on the first aid action given.
SKIN CONTACT:	Corrosive to the skin, possibly resulting in third degree burns depending on the length of exposure and on the first aid action given.
INGESTION:	Can be harmful.
SYMPTOMS OF EXPOSURE:	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.

SECTION 6 - TOXICOLOGY INFORMATION

ACUTE TOXICITY STUDIES:	Acute toxicity studies have not been conducted on this product, but toxicity studies of the ingredient(s) in Section 2 have been reviewed. The results are shown below:
ACUTE ORAL TOXICITY (ALBINO RATS):	LD(LO)=500 mg/kg

SECTION 7 - PHYSICAL AND CHEMICAL PROPERTIES

COLOR:	Cloudy White	
FORM:	Liquid	
ODOR:	None	
DENSITY:	12.2 to 12.7 lbs./gal.	
SOLUBILITY IN WATER:	Completely	
SPECIFIC GRAVITY:	146 to 1.52 at 77 degrees F	ASTM D-1298
pH (NEAT):	14	ASTM E-70
VISCOSITY:	280 cps at 40 degrees F	ASTM D-2983
POUR POINT:	-40 degrees F	ASTM D-97
FLASH POINT:	None	
NOTE:	These physical properties are typical values for this product.	

SECTION 8 - FIRE AND EXPLOSION INFORMATION

FLASH POINT:	None
EXTINGUISHING MEDIA:	Not Applicable
UNUSUAL FIRE AND EXPLOSION HAZARD:	Contact with reactive metals (e.g., aluminum) may result in the generation of flammable hydrogen gas.

SECTION 9 - REACTIVITY INFORMATION

INCOMPATIBILITY:	Avoid contact with strong acids (e.g., sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) which can generate heat, splattering or boiling and the release of toxic fumes.
FEEDING EQUIPMENT:	Avoid aluminum and brass; product will corrode these.
THERMAL DECOMPOSITION PRODUCTS:	Not Applicable

SECTION 10 - PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION:	Respiratory protection is not normally needed since the volatility and toxicity are low. If significant vapors, mists or aerosols are generated, wear a NIOSH-approved or equivalent respirator. For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a pressure-demand, self-contained breathing apparatus is recommended.
VENTILATION:	General ventilation is recommended.
PROTECTIVE EQUIPMENT:	Wear gloves, boots, apron and a face shield with chemical splash goggles. A full slicker suit is recommended if gross exposure is possible. The availability of an eye wash fountain and safety shower is recommended. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

SECTION 11 - SPILL AND DISPOSAL INFORMATION

SPILL CONTROL AND RECOVERY:

Small Liquid Spills: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 14.

Large Liquid Spills: Dike to prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 14.

DISPOSAL:

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under the Resources Conservation and Recovery Act (RCRA) 40 CFR 261. Hazardous Waste D002.

As a hazardous liquid waste, it must be solidified before disposal in a landfill (Hazardous Waste Treatment, Storage and Disposal facility). A hazardous liquid waste can also be incinerated in accordance with local, state and federal regulations.

SECTION 12 - ENVIRONMENTAL INFORMATION

CHEMICAL OXYGEN DEMAND (COD): 1,420 mg/L

BIOCHEMICAL OXYGEN DEMAND (5-DAY BOD): 921 mg/L

TOTAL ORGANIC CARBON (TOC): 924 mg/L

AQUATIC DATA: 96-hour static acute LC50 to Rainbow Trout=172 mg/L
96-hour no observed effect concentration is less than 100 mg/L based on no mortality or abnormal effects.

TOXICITY RATING:	Moderately toxic 96-hour static acute LC50 to Fathead Minnow=530 mg/L 96-hour no observed effect concentration is 400 mg/L based on no mortality or abnormal effects.
TOXICITY RATING:	Slightly toxic 48-hour static acute LC50 to Daphnia magna=64 mg/L 48-hour no observed effect concentration is 40 mg/L based on no mortality or abnormal effects.
TOXICITY RATING:	Moderately toxic

If released into the environment, see CERCLA in Section 14.

SECTION 13 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME/ HAZARD CODE:	SODIUM ALUMINATE SOLUTION CORROSIVE MATERIAL UN 1819
CONTAINS:	SODIUM HYDROXIDE

SECTION 14 - REGULATORY INFORMATION

The following regulations apply to this product:

FEDERAL REGULATIONS:

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:

Based on the manufacturer's hazard evaluation, the following ingredient(s) in this product is hazardous and the reason is shown below:

Sodium hydroxide: Corrosivity

Sodium hydroxide: Ceiling 2 mg/m^3 ACGIH/TLV
Sodium aluminate: (Soluble salt, as Al)=TWA 2 mg/m^3 ACGIH/TLV

Sodium hydroxide=Ceiling 2 mg/m^3 OSHA/PEL
Sodium aluminate: (Soluble salt, as Al)=TWA 2 mg/m^3 OSHA/PEL

RCLA, 40 CFR 117, 302: This product contains **sodium hydroxide**, a Reportable Quantity (RQ) substance and if 27,000 pounds of product are released, it requires notification to the **NATIONAL RESPONSE CENTER, WASHINGTON, D.C. 1-800-424-8802.**

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 ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312-MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS (40 CFR 370): The manufacturer's hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

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

SECTION 313-LIST OF TOXIC CHEMICALS (40 CFR 372): This product does NOT contain ingredients (at a level of 1% or greater) on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA): The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR SUBPART C & D: Consult Section 11 for RCRA classification.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (formerly Section 307), 40 CFR 116 (formerly Section 311): This product contains the following ingredient(s) covered by the Clean Water Act:

Sodium Hydroxide - Section 311

CLEAN AIR ACT, 40 CFR 60, SECTION 111, 40 CFR 61, SECTION 112: This product does not contain ingredients covered by the Clean Air Act.

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65: None of the chemicals on the current Proposition 65 list are known to be present in this product.

MICHIGAN CRITICAL MATERIALS: This product does not contain ingredients listed on the Michigan Critical Materials Register.

STATE RIGHT-TO-KNOW LAWS: The following ingredient(s) are disclosed for compliance with State Right-To-Know Laws:

Sodium aluminate	1302-42-7
Sodium hydroxide	1310-73-2
Water	7732-18-5

INTERNATIONAL REGULATIONS: This is a WHMIS controlled product under The House of Commons of Canada Bill C-79 (Class E). The product contains the following substance(s), from the Ingredient Disclosure List or has been evaluated based on its toxicological properties, to contain the following hazardous ingredient(s):

CHEMICAL NAME	CAS NO.	PERCENT CONCENTRATION RANGE
Sodium hydroxide	1310-73-2	1-5
Sodium aluminate	1302-42-7	20-40

SECTION 15 - ADDITIONAL INFORMATION

None

SECTION 16 - USER'S RESPONSIBILITY

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with manufacturer's 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 ensure safe workplace operations.

SECTION 17 - BIBLIOGRAPHY

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PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, Clayton, G.D., Clayton, F.E., eds., John Wiley and Sons, N.Y., 3rd edition, Vol. 2 A-C, 1981.

REGISTRY OF TOXIC EFFECTS ON CHEMICAL SUBSTANCES, U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, 1983 supplement cf 1981-1982 edition, Vol. 1-3, OH, 1984.

Title 29 Code of Federal Regulations Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS IN THE WORKROOM ENVIRONMENT WITH INTENDED CHANGES, American Conference of Governmental Industrial Hygienists, OH.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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A-5
February 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Petrolite Corporation for Smith Energy Services
PRODUCT:	OGA-5
TRADE NAME:	Not Applicable
SHIPPING NAME:	Combustible Liquid, N.O.S. (Methanol) (In Bulk DOT)
HAZARD CLASS:	Combustible Liquid
LABEL:	014 000 097
IDENTIFICATION NUMBER:	NA 1993
CHEMICAL DESCRIPTION:	Phosphate Esters in Methanol

SECTION 2 - HAZARDOUS INGREDIENTS

CAS NUMBER	MATERIAL	PERCENT	EXPOSURE LIMITS
00067-56-1	Methanol		ACGIH TLV: 200 ppm TWA OSHA PEL: 200 ppm TWA ACGIH STEL: 250 ppm

Specific chemical identity of unlisted ingredients is being withheld for confidential business purposes.

SECTION 3 - PHYSICAL DATA

SPECIFIC GRAVITY (WATER=1.0 AT 60 DEG. F):	1.119
VOLATILITY:	Appreciable
VAPOR PRESSURE:	Not Established
SOLUBILITY IN WATER:	Soluble
APPEARANCE AND ODOR:	Amber Liquid; Alcohol Odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	170 degrees F
FLAMMABLE LIMITS:	Not Established
FLASH METHOD:	SFCC ASTM D-3828
EXTINGUISHING MEDIA:	Use water spray or fog, alcohol-type foam, dry chemical or carbon dioxide (CO_2).
FIRE FIGHTING PROCEDURES:	Use a self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode. Combustible. Keep fire-exposed containers cool using water spray.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	At elevated temperatures, vapors can form an ignitable mixture with air. Vapors can flow along surfaces to distant ignition sources and flash back.

SECTION 5 - HEALTH INFORMATION DATA

EFFECTS OF OVEREXPOSURE:

INHALATION:	Prolonged exposure may cause mild irritation of mucous membranes, headache and tiredness. At elevated concentrations, symptoms may include nausea, shortness of breath and a sense of drunkenness. In extreme cases, visual disturbances and ocular damage may occur. Inhalation of mists, aerosols or very high vapor concentrations will produce intense eye, nose and respiratory irritation and may result in lung damage. Prolonged exposure may result in chemical pneumonitis and, in extreme cases, pulmonary edema.
SKIN AND EYE CONTACT:	Contact with skin will cause moderate to severe irritation or burns. Contact with eyes will result in severe eye irritation or burns, and if not immediately removed, may lead to permanent eye injury.
INGESTION:	Causes severe irritation or burns to the mouth and gastrointestinal tract. In extreme cases may cause kidney and liver damage. Ingestion of methanol may result in a feeling of intoxication and can cause visual disturbances and, in extreme cases, ocular damage.

EMERGENCY AND FIRST AID PROCEDURES:	If contacted, wash skin immediately with soap and water. Remove contaminated clothing and wash before reuse. If irritation or burns develop, consult a physician. If in eyes, irrigate with flowing water immediately and continuously for 15 minutes. Consult a physician. If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe. If ingested, **DO NOT INDUCE VOMITING.** If conscious, drink promptly large quantities of water. Call a physician immediately.
NOTE TO PHYSICIAN:	Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock and convulsion may be necessary.

SECTION 6 - REACTIVITY DATA

STABILITY:	Stable under normal conditions of storage and use.
INCOMPATIBILITY:	Keep away from strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxides of phosphorus
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 7 - SPILL AND LEAK PROCEDURES

IF MATERIAL IS SPILLED OR RELEASED:	**Small spill:** Absorb on paper, cloth or other material. **Large spill:** Dike to prevent entering any sewer or waterway. Transfer liquid to a holding container. Cover residue with dirt, or suitable chemical adsorbent. use personal protective equipment as necessary.
DISPOSAL METHOD:	Place chemical residues and contaminated adsorbent materials into a suitable waste container and take to an approved hazardous waste disposal site. Dispose of all residues in accordance with applicable waste management regulations.
DECONTAMINATION PROCEDURES:	Not appropriate.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: When concentrations exceed the exposure limits specified, use of a NIOSH-approved supplied-air respirator is recommended. Where the protection factor of the respirator may be exceeded, use of a self-contained breathing unit may be necessary.

VENTILATION: General ventilation should be provided to maintain ambient concentrations below nuisance levels. Local ventilation of emission sources may be necessary to maintain ambient concentrations below recommended exposure limits.

PROTECTIVE CLOTHING: Chemical-resistant gloves and chemical goggles, face shield and synthetic apron or coveralls should be used to prevent contact with eyes, skin or clothing.

SECTION 9 - SPECIAL PRECAUTIONS

Avoid heat, sparks and open flames. Avoid breathing of vapors and contact with eyes, skin or clothing. Keep container closed when not in use. Hazardous product residue may remain in emptied container. Do not reuse empty container without commercial cleaning or reconditioning.

SECTION 10 - SARA TITLE III, SECTION 313

This notification is incorporated into the Material Safety Data Sheet (MSDS) for the product first named above. When physically attached to the MSDS, this notification must not be detached from the MSDS. Any copying and redistribution of the MSDS to which this notification is attached must include copying and redistribution of this notification.

This product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR 372, as follows:

CHEMICAL	CAS NUMBER	WEIGHT PERCENT
Glycol Ethers	Not Applicable	24.6%
METHANOL	000067-56-1	13.5%

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SES:MBC:bjmFebruary17,1992
file:\MSDS\OGA-5

P[redacted]-1
June 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	EXXON Chemical Americas for Smith Energy Services
PRODUCT:	PDC-1
CHEMICAL NAME:	Not Applicable; Blend - Clear
CHEMICAL FAMILY:	Surfactant
PRODUCT APPEARANCE:	Clear Blue Liquid; Aromatic Odor
NPCA-HMIS/NFPA 704:	3=Health 2=Flammability 0=Reactivity
KEY:	4=Severe 3=Serious 2=Moderate 1=Slight 0=Minimal

SECTION 2 - HAZARDOUS INGREDIENT INFORMATION

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. This product is hazardous as defined in 29 CFR 1910.1200, based on the following compositional information:

COMPONENT	OSHA HAZARD
Oxyalkylated Alcohol	Eye Corrosive
Oxyalkylated Alcohol, 2-Butoxyethanol	Skin Irritant
Aromatic Naphtha, Naphthalenes	Combustible
2-Butoxyethanol	PEL/TLV

For additional information see Section 3.

SECTION 3 - HEALTH INFORMATION AND PROTECTION

NATURE OF HAZARD:

EYE CONTACT:	Corrosive. Will cause eye burns and permanent tissue damage.
SKIN CONTACT:	Irritating. May be absorbed through skin to produce hemolytic anemia and kidney damage evidenced by paleness and possibly red coloration of the urine. May cause skin sensitization, an allergic reaction which becomes evident on reexposure to this material.
INHALATION:	High vapor concentrations are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Vapors and/or aerosols which may be formed at elevated temperatures may cause systemic effects.
INGESTION:	Low order of toxicity.

FIRST AID:

EYE CONTACT:	Immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.
SKIN CONTACT:	Immediately flush with large amounts of water; use soap if available. Remove contaminated clothing, including shoes, after flushing has begun. Get prompt medical attention.
INHALATION:	Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. keep at rest. Call for prompt medical attention.
INGESTION:	If swallowed, and INDIVIDUAL IS CONSCIOUS, induce vomiting. Get prompt medical attention. DO NOT attempt to give anything by mouth to an unconscious person.

ACUTE TOXICITY DATA IS AVAILABLE UPON REQUEST

WORKPLACE EXPOSURE LIMITS:

OSHA REGULATION 29 CFR 1910.1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:

A TWA of 25 ppm (120 mg/m3) for 2-butoxyethanol (ethylene glycol monobutyl ether) (skin).
A TWA of 10 ppm (50 mg/m3) and a STEL of 15 ppm (75 mg/m3) for naphthalene.

THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:

A TWA of 25 ppm (121 mg/m3) for 2-butoxyethanol (ethylene glycol monobutyl ether) (skin).
A TWA of 10 ppm (52 mg/m3) and a STEL of 15 ppm (79 mg/m3) for naphthalene.

EXXON RECOMMENDS THE FOLLOWING OCCUPATIONAL EXPOSURE LIMITS:

100 ppm total hydrocarbon based on composition.

PRECAUTIONS:

PERSONAL PROTECTION: For open systems where contact is likely, wear chemical resistant gloves, a chemical suit, rubber boots, and chemical safety goggles plus a face shield. Where contact may occur, wear long sleeves, chemical resistant gloves, chemical goggles and a face shield. Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA-approved respirators may be necessary to prevent overexposure by inhalation. All contact should be avoided by persons with known hypersensitivity to ALKYL PHENOL SURFACTANT.

VENTILATION: The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces. See respiratory protection recommendations.

CHRONIC EFFECTS: Overexposure by inhalation and/or dermal contact may result in damage to the blood and kidneys.

CHRONIC TOXICITY DATA IS AVAILABLE UPON REQUEST

SECTION 4 - FIRE AND EXPLOSION HAZARD

FLASH POINT:	144 degrees F METHOD: Seta CC
FLAMMABLE LIMITS:	LEL: 0.8 UEL: 10.6
AUTOIGNITION TEMPERATURE:	NOTE: Not Available
GENERAL HAZARD:	Combustible Liquid; can form combustible mixtures at temperatures at or above the flash point. Toxic gases will form upon combustion. "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. **DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.** Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.
FIRE FIGHTING:	Use water spray to cool fire exposed surfaces and to protect personnel. Isolate "fuel" supply from fire. Respiratory and eye protection required for fire fighting personnel. Avoid spraying water directly into storage containers due to danger of boilover.
DECOMPOSITION PRODUCTS UNDER FIRE CONDITIONS:	Smoke, fumes, carbon monoxide, carbon dioxide

SECTION 5 - SPILL CONTROL PROCEDURE

LAND SPILL:

Eliminate sources of ignition. Prevent additional discharge of material if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the **National Response Center 1-800-424-8802.** Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust. Recover by pumping (use an explosion-proof or hand pump) or with a suitable absorbent. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

WATER SPILL:

Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 6 - NOTES

NOTES:

This product may contain trace amounts of ethylene oxide (CAS No. 75-21-8), a condition which creates the potential for accumulation of ethylene oxide in the head space of shipping and storage containers and in enclosed areas where the product is being handled or used. Ethylene oxide is considered by OSHA, IARC and NTP as a potential carcinogen for humans. Ethylene oxide may also present reproductive, mutagenic, genotoxic, neurologic and sensitization hazards in humans. If this product is handled with adequate ventilation, the presence of these trace amounts is not expected to result in any short- or long-term hazards.

SECTION 7 - REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT PROPER SHIPPING NAME:	In containers <110 gallons: No DOT Labels Required For containers > 110 gallons: COMBUSTIBLE LIQUID, N.O.S. CONTAINS HEAVY AROMATIC NAPHTHA, BUTOXYETHANOL) NA1993
DOT HAZARD CLASS:	COMBUSTIBLE LIQUID, N.O.S.
DOT ID NUMBER:	NA1993
FLASH POINT:	144 degrees F METHOD: Seta CC
TSCA:	Components of this product are listed on the TSCA Inventory.
CERCLA:	If the reportable quantity (RQ) of this product is accidentally spilled, the incident is subject to the provisions of the Comprehensive Emergency Response, Compensation and Liability Act (CERCLA) and must be reported to the **National Response Center 1-800-424-8802.** The reportable spill quantity of this product is 1,266 pounds. This product contains: **Naphthalene.**
SARA TITLE III:	Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories: **Delayed Health, Fire** This product contains the following Section 313 Reportable Ingredients:

COMPONENT	CAS NO.	MAXIMUM PERCENT
Naphthalene	90-20-3	8.0%
2-Butoxy Ethanol	111-76-2	9.0%

SECTION 8 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY:	0.92 at 60 DENSITY: 7.6 lbs./gal. at 61
VAPOR PRESSURE, mmHg AT ^{0}F:	0 at 100 Calculated
SOLUBILITY IN WATER, WEIGHT PERCENT AT ^{0}F:	Dispersible
VISCOSITY OF LIQUID, CST AT ^{0}F:	2 at 100 Cannon-Fenske 1 at 151 Cannon-Fenske
SPECIFIC GRAVITY OF VAPOR, AT 1 ATM (AIR =1)	4.70
FREEZING/MELTING POINT, ^{0}F:	-30 Pour Point
EVAPORATION RATE, nBu Acetate=1:	1.0 Less than; Calculated
BOILING POINT, ^{0}F:	360 Calculated

SECTION 9 - REACTIVITY DATA

STABILITY:	Stable
HAZARDOUS POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID INSTABILITY:	None
MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:	Strong Oxidizing Agents
HAZARDOUS DECOMPOSITION PRODUCTS:	None

SECTION 10 - STORAGE AND HANDLING

ELECTROSTATIC ACCUMULATION HAZARD:	Unknown, use proper grounding procedure
STORAGE TEMPERATURE, ^{0}F:	Ambient
LOADING/UNLOADING TEMPERATURE, ^{0}F:	Ambient
STORAGE/TRANSPORT PRESSURE, mmHg:	Atmospheric
VISCOSITY AT LOADING/ UNLOADING TEMPERATURE, cST:	Not available

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L-1
March 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	NALCO Chemical Company for Smith Energy Services
PRODUCT NAME:	PFL-1; Inhibitor
DESCRIPTION:	An aqueous solution of ammonium bisulfite, alkanolphosphate ester, and a quaternary alkoxy alkamine and isopropanol
NFPA 704M/HMIS RATING:	2/2=Health 3/3=Flammability 0/0=Reactivity 0 =Other 0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 - HAZARDOUS INGREDIENTS

The manufacturer's hazard evaluation has identified the following chemical ingredient(s) as hazardous under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult Section 14 for the nature of the hazard(s).

INGREDIENT(S)	CAS NO.	APPROXIMATE PERCENT
Isopropanol	67-63-0	10-20%

SECTION 3 - PRECAUTIONARY LABEL INFORMATION

WARNING: Flammable. Causes skin and eye irritation. Do not use, store, spill or pour near heat, sparks, or open flame. Keep container closed when not in use. Do not get in eyes, on skin or on clothing. Wear goggles and face shield when handling. Avoid prolonged or repeated breathing of vapors. Use with adequate ventilation. Do not take internally. **Empty containers may contain residual product. Do not reuse container unless properly reconditioned.**

SECTION 4 - FIRST AID INFORMATION

EYES:	Flush with water for 15 minutes. Call a physician.
SKIN:	Flush with water for 15 minutes.
INGESTION:	Induce vomiting. Give water. Call a physician.
INHALATION:	Remove to fresh air. Treat symptoms. Call a physician.
NOTE TO PHYSICIAN:	Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.
CAUTION:	If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

SECTION 5 - HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE:	Eye, Skin
EYE CONTACT:	Can cause moderate irritation.
SKIN CONTACT:	Can cause moderate irritation.
INGESTION:	A review of available data does not identify any symptoms from exposure.
SYMPTOMS OF EXPOSURE:	A review of available data does not identify and symptoms from exposure.
AGGRAVATION OF EXISTING CONDITIONS:	A review of available data does not identify any worsening of existing conditions.

SECTION 6 - TOXICOLOGY INFORMATION

ACUTE TOXICITY STUDIES: No toxicity studies have been conducted on this product.

SECTION 7 - PHYSICAL AND CHEMICAL PROPERTIES

COLOR:	Clear Red	
FORM:	Liquid	
ODOR:	Pungent	
SOLUBILITY IN WATER:	Completely	
SPECIFIC GRAVITY:	1.15-1.18 at 60 degrees F	
pH (NEAT):	4.2-4.8	ASTM E-70
VISCOSITY:	29 cps/26 cts/121 SUS at 60 degrees F	ASTM D-445
POUR POINT:	Less than -15 degrees F	ASTM D-97
FLASH POINT:	74 degrees F (PMCC)	ASTM D-93
VAPOR PRESSURE:	89 mmHg at 100 degrees F	ASTM D-323
PERCENT VOLATILE BY WEIGHT:	8 at 75 degrees F	
NOTE:	These physical properties are typical values for this product.	

SECTION 8 - FIRE AND EXPLOSION INFORMATION

FLASH POINT:	74 degrees F (PMCC)	ASTM D-93
EXTINGUISHING MEDIA:	Based on the NFPA guide, use dry chemical, foam, carbon dioxide or other extinguishing agent suitable for Class B fires. Use water to cool containers exposed to fire. For large fires, use water spray or fog, thoroughly drenching the burning material.	

SECTION 9 - REACTIVITY INFORMATION

INCOMPATIBILITY: Avoid contact with strong oxidizers (e.g., chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, CO_2, NO_x, SO_x may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

SECTION - 10 PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION: Respiratory protection not normally needed. If significant mists or aerosols are generated, wear a NIOSH-approved or equivalent respirator.

For **large spills**, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a pressure-demand, self-contained breathing apparatus is recommended.

VENTILATION: General ventilation is recommended.

PROTECTIVE EQUIPMENT: Use impermeable gloves and chemical splash goggles when attaching feeding equipment, doing maintenance or handling product. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, natural rubber, vitron and butyl (compatibility studies have not been performed).

The availability of an eye wash fountain and safety shower is recommended.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

SECTION 11 - SPILL AND DISPOSAL INFORMATION

SPILL CONTROL AND RECOVERY:

SMALL LIQUID SPILLS: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 14.

LARGE LIQUID SPILLS: Dike to prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 14.

DISPOSAL: If this product becomes a waste, it meets the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Hazardous Waste D001.

As a hazardous liquid waste, it must be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no liquid remains before disposal to a licensed industrial waste landfill (Hazardous Waste Treatment, Storage and Disposal facility). A hazardous liquid waste can also be incinerated in accordance with local, state and federal regulations.

Empty product containers containing no more than one inch of product, no more than 3% by weight of containers up to 110 gallons, or no more than 0.3% by weight of containers greater than 110 gallons are not hazardous, 261.7.

SECTION 12 - ENVIRONMENTAL INFORMATION

If released into the environment, see CERCLA in Section 14.

SECTION 13 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME/HAZARD CODE: FLAMMABLE LIQUID, N.O.S.
FLAMMABLE LIQUID UN 1993

CONTAINS: ISCPROPANOL, AMMONIUM BISULFITE

SECTION 14 - REGULATORY INFORMATION

THE FOLLOWING REGULATIONS APPLY TO THIS PRODUCT:

FEDERAL REGULATIONS: OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:

Based on the manufacturer's hazard evaluation, the following ingredient in this product is hazardous and the reason is shown below:

Iscpropanol - Flammable

Isopropanol=TWA 400 ppm, STEL 500 ppm ACGIH/TLV
983 mg/M^3, 1230 mg/M^3 ACGIH/TLV

Isopropanol=TWA 400 ppm, STEL 500 ppm OSHA/PEL
980 mg/M^3, 1225 mg/M^3 OSHA/PEL

CERCLA/SUPERFUND, 40 CFR 117, 302: This product contains ammonium bisulfite, a Reportable Quantity (RQ) substance and if 19,000 pounds of product are released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. 1-800-424-8802.

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 ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS (40 CFR 370): The manufacturer's hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

XX Immediate (acute) health hazard
-- Delayed (chronic) health hazard
XX Fire hazard
-- Sudden release of pressure hazard
-- Reactive hazard

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):	This product does not contain ingredients (at a level of 1% or greater) on the List of Toxic Chemicals.
TOXIC SUBSTANCES CONTROL ACT (TSCA):	The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C&D:	Consult Section 11 for RCRA classification.
FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (FORMERLY SECTION 307), 40 CFR 116 (FORMERLY SECTION 311):	This product contains the following ingredients covered by the Clean Water Act: Ammonium bisulfite - Section 111 Sodium phosphate, tribasic - Section 111
CLEAN AIR ACT, 40 CFR 60, SECTION 111, 40 CFR 61, SECTION 112:	This product contains the following ingredients covered by the Clean Air Act: Isopropanol - Section 111

<u>STATE REGULATIONS</u>:

CALIFORNIA PROPOSITION 65:	This product does not contain any chemicals which require warning under Proposition 65.
MICHIGAN CRITICAL MATERIALS:	This product does not contain ingredients listed on the Michigan Critical Materials Register.
STATE-RIGHT-TO KNOW LAWS:	The following state(s) identify the ingredient(s) shown below as hazardous: NEW JERSEY, ILLINOIS, CALIFORNIA: Ammonium bisulfite NEW JERSEY: Sodium phosphate, tribasic

Regulated in those states using the TLV for isopropanol as a criteria for listing.

SECTION 15 - ADDITIONAL INFORMATION

NONE

SECTION 16 - USER'S RESPONSIBILITY

This product Material Safety Data Sheet (MSDS) provides health and safety information. The product is to be used in applications consistent with the manufacturer's 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 ensure safe workplace operations.

SECTION 17 - BIBLIOGRAPHY

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Title 29 Code of Federal Regulations Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupation Safety and Health Administration (OSHA).

RESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS IN THE WORKROOM ENVIRONMENT WITH INTENDED CHANGES, American Conference of Governmental Industrial Hygienists, OH.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct, but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of this end product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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M-18
April 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	Van Waters & Rogers Inc. for Smith Energy Services
PRODUCT:	RM-18; Boric Acid Gran
COMMON NAME/SYNONYMS:	Boracic Acid, Orthoboric Acid
FORMULA:	H3 B O3
CAS NUMBER:	10043-35-3
HAZARD RATING/NFPA 704:	2=Health 0=Fire 0=Reactivity -=Special
HAZARD RATING SCALE:	4=Severe 3=Serious 2=Moderate 1=Slight 0=Minimal

SECTION 2 - HAZARDOUS INGREDIENTS

		EXPOSURE LIMITS, MG/M3			
		OSHA	ACGIH	OTHER	
COMPONENT	PERCENT	PEL	TLV	LIMIT	HAZARD
Boric Acid	Min 90	15 (B203)	10 (B203)	None	None

SBS MBC:bjmApril22,1992
file:\MSDS\RM-18

SECTION 3 - PHYSICAL DATA

BOILING POINT, DEG F:	572
VAPOR PRESSURE mmHg/20 DEG C:	15
MELTING POINT, DEG F:	340
SPECIFIC GRAVITY (WATER=1):	1.43
VAPOR DENSITY (AIR=1):	Not Applicable
WATER SOLUBILITY, PERCENT:	1-10
EVAPORATION RATE (BUTYL ACETATE=1):	<1
APPEARANCE AND ODOR:	White solid, odorless

SECTION 4 - FIRST AID MEASURES

IF INHALED:	Remove to fresh air. Give artificial respiration if not breathing. Get immediate medical attention.
EYE CONTACT:	Immediately flush eyes with lots of running water for 15 minutes, lifting the upper and lower eyelids occasionally. Get immediate medical attention.
SKIN CONTACT:	Immediately wash skin with lots of soap and water. Remove contaminated clothing and shoes; wash before reuse. Get medical attention if irritation persists after washing.
IF SWALLOWED:	If conscious, immediately induce vomiting by giving two glasses of water and sticking a finger down the throat. Get immediate medical attention. Do not give anything by mouth to an unconscious or convulsing person.

SECTION 5 - HEALTH HAZARD INFORMATION

PRIMARY ROUTES OF EXPOSURE:	Skin or eye contact, inhalation.
SIGNS/SYMPTOMS OF EXPOSURE:	
INHALATION:	Breathing dust may irritate the nose and throat and cause coughing and chest discomfort.
EYE CONTACT:	Dusts may irritate the eyes.
SKIN CONTACT:	Dusts may irritate the skin. Harmful quantities may be absorbed through broken skin but unlikely through intact skin. Prolonged skin contact may cause skin sensitization.
SWALLOWED:	Swallowing the dusts or solids may cause nausea and vomiting. Swallowing large quantities may be fatal.
CHRONIC EFFECTS OF EXPOSURE:	May cause central nervous system stimulation and erythematous flush or macular skin rash.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:	None reported.

SECTION 6 - TOXICITY DATA

ORAL:	Woman LDLO=200 mg/kg; rat LD50=2660 mg/kg
DERMAL:	Infant LDLO=1200 mg/kg
INHALATION:	No data found
CARCINOGENICITY:	This material is not considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration.
OTHER DATA:	None

SECTION 7 - PERSONAL PROTECTION

VENTILATION:	Local mechanical exhaust ventilation capable of maintaining dust emissions at the point of use below the PEL.
RESPIRATORY PROTECTION:	If use conditions generate dusts, wear a NIOSH-approved respirator appropriate for those emission levels. Appropriate respirators may be a full face piece or a half mask air-purifying cartridge respirator with particulate filters, a self-contained breathing apparatus in the pressure demand mode, or a supplied-air respirator. Absence of adequate environmental controls at the point of use.
EYE PROTECTION:	Chemical goggles unless a full face piece respirator is also worn. It is generally recognized that contact lenses should not be worn when working with chemicals because contact lenses may contribute to the severity of an eye injury.
PROTECTIVE CLOTHING:	Long-sleeved shirt,trousers,safety shoes, gloves.
OTHER PROTECTIVE MEASURES:	An eyewash and safety shower should be nearby and ready for use.

SECTION 8 - FIRE AND EXPLOSION INFORMATION

FLASH POINT, DEG F: METHOD USED:	None Not Applicable
FLAMMABLE LIMITS IN AIR, PERCENT:	Lower: N/A Upper: N/A
EXTINGUISHING MEDIA:	This material is not combustible. Use extinguishing media appropriate for surrounding fire.
SPECIAL FIRE FIGHTING PROCEDURES:	Fire fighters should wear self-contained breathing apparatus and full protective clothing. Use water spray to cool nearby containers and structures exposed to fire.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	None

SECTION 9 - HAZARDOUS REACTIVITY

STABILITY:	Stable
POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID:	None
MATERIALS TO AVOID:	Keep water, potassium and moist air out of the container.
HAZARDOUS DECOMPOSITION PRODUCTS:	None

SECTION 10 - SPILL, LEAK AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS OR LEAKS:

Wear protective equipment including rubber boots, rubber gloves, rubber apron, and a full face piece or a half mask air-purifying cartridge respirator with particulate filters. Wear chemical goggles if a half mask is worn. For small spills, sweep up and dispose of in DOT-approved waste containers. For large spills, shovel into DOT-approved waste containers. Keep out of sewers, storm drains, surface waters, and soil. Comply with all applicable governmental regulations on spill reporting, and handling and disposal of waste.

DISPOSAL METHODS:

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

NOTE: Empty containers can have residues, gases and mists and are subject to proper waste disposal, as above.

SECTION 11 - SPECIAL PRECAUTIONS

STORAGE AND HANDLING PRECAUTIONS: Store in a cool, dry, well-ventilated place away from incompatible material. Keep bags or fiber drums dry at all times. Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing.

REPAIR AND MAINTENANCE PRECAUTIONS: None

OTHER PRECAUTIONS: Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full.

This product contains the following chemical(s) considered by the State of California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as causing cancer or reproductive toxicity and for which warnings are now required:

CHEMICAL	CAS NUMBER
Arsenic	7440-38-2

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct, but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of this end product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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SAA-2
January 1992

MATERIAL SAFETY DATA SHEET

SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9399

SECTION 1 - SUPPLIER IDENTIFICATION

MANUFACTURED BY:	Chemical Blending Inc. for Smith Energy Services
PRODUCT NAME:	SAA-2; Blend
NFPA:	2=Health 3=Fire 0=Reactivity None=Special
KEY:	0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

SECTION 2 - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	CAS NO.	OSHA PEL	ACGIH TLV	OTHER
Isopropyl Alcohol	67-63-0	400 ppm	400 ppm	
Nonylphenol Ethoxylate		No Data		

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	N/D
MELTING POINT:	N/A
SPECIFIC GRAVITY (WATER=1):	N/D
VAPOR PRESSURE:	N/D
VAPOR DENSITY (AIR=1):	>1.0
EVAPORATION RATE (BUTYL ACETATE=1):	>1
SOLUBILITY IN WATER:	Soluble
APPEARANCE AND ODOR:	Colorless to Straw-Colored Liquid, Alcohol Odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD):	Below 100^0F
FLAMMABLE LIMITS:	LOWER: N/D UPPER: N/D
EXTINGUISHING MEDIA:	Dry powder, carbon dioxide (CO_2), "alcohol" foam, use water to cool containers. **DANGER! ALCOHOL MAY BURN WITH AN INVISIBLE FLAME!**
SPECIAL FIRE FIGHTING PROCEDURES:	Approach fire from upwind side. Avoid breathing smoke, fumes, mist, or vapors on the downwind side.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Containers may rupture from internal pressure if confined to fire area. Cool with water. Get non-essential people out of the area.

SECTION 5 - REACTIVITY INFORMATION

STABILITY:	Stable
INCOMPATIBILITY:	
MATERIALS TO AVOID:	Oxidizers or oxidizing materials
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	From fire; smoke, carbon dioxide, carbon monoxide
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 6 - HEALTH HAZARD DATA

ROUTES OF ENTRY:

INHALATION:	Irritant
SKIN/EYES:	Irritant
INGESTION:	Irritant

HEALTH HAZARDS:

ACUTE:	Inhalation of vapors may be narcotic or anesthetic. Ingestion of liquid will cause gastrointestinal distress, irritation, and possibly nausea. Liquid or vapors may be irritating to skin and eyes.

CHRONIC: Unknown

CARCINOGENICITY:

NTP: Not listed
IARC MONOGRAPHS: Not listed
OSHA REGULATED: Table Z1

SIGNS AND SYMPTOMS OF EXPOSURE: Skin irritation develops slowly after contact, eye irritation develops immediately upon contact.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Unknown

EMERGENCY AND FIRST AID PROCEDURES: **Inhalation:** Remove victim to fresh air and, if needed, immediately begin artificial respiration. Give oxygen if breathing is labored. Get emergency medical help. Contact physician immediately.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: **Small Spills:** Pick up with absorbent media. Store as hazardous waste.

Large Spills: Contain with dikes, pick up with vacuum truck. Handle as hazardous waste. Notify proper local, state and federal agencies.

Waste Disposal Method: EPA-approved hazardous waste disposal site. Follow applicable local, state and federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Store in a cool place away from ignition sources.

OTHER PRECAUTIONS: Store away from oxidizers or materials bearing a yellow "DOT" label.

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION:	NIOSH-approved mask suitable for isopropyl alcohol.
VENTILATION:	**Local Exhaust:** Recommended **Mechanical:** Recommended **Special:** --- **Other:** ---
PROTECTIVE GLOVES:	Chemical resistant gloves suitable for isopropyl alcohol
EYE PROTECTION:	Chemical goggles or full face shield
OTHER PROTECTIVE EQUIPMENT:	Boots, aprons, drench showers, eye wash as needed for protection against spills and/or splashes.
WORK HYGIENIC PRACTICES:	Avoid contact with skin, eyes and clothing. After handling this product, wash hands before eating, drinking, or smoking. If contact occurs, remove contaminated clothing. If needed, take first aid action shown in Section 6. Launder contaminated clothing before reuse.

SECTION 9 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME, HAZARD CLASS:	UN/NA Number, RQ (if needed) FLAMMABLE LIQUID, NOS, (Isopropyl Alcohol) FLAMMABLE MATERIAL, UN1993

SECTION 10 - OTHER DATA

EPA HAZARDS:	1=Acute/YES 2=Chronic/YES 3=Flammability/YES 4=Sudden Release of Pressure/NO 5=Reactive/NO
CERCLA RQ:	None
HAZARDOUS WASTE NUMBER:	D001 Ignitable
SARA TITLE III:	Yes
CLEAN AIR ACT:	No
CLEAN WATER ACT:	No

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A-3
June 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	EXXON Chemical Americas for Smith Energy Services
PRODUCT:	SAA-3; Blend
CHEMICAL NAME:	Not Applicable; Blend
CHEMICAL FAMILY:	Surfactant
PRODUCT DESCRIPTION:	Clear Amber Liquid; Aromatic Odor

HAZARD RATING SYSTEM:	NPCA/HMIS	NFPA 704
Health=	3	3
Flammability=	2	2
Reactivity=	0	0

Y:
4=Severe
3=Serious
2=Moderate
1=Slight
0=Minimal

SECTION 2 - HAZARDOUS INGREDIENTS

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. This product is hazardous as defined in 29 CFR 1910.1200, based on the following compositional information:

COMPONENT	OSHA HAZARD
Organic Ester	Eye Corrosive
2-Butoxyethanol	Skin Irritant
Aromatic Naphtha	Combustible Liquid
Isopropyl Alcohol; 2-Butoxyethanol;	
Naphthalene	PEL/TLV
Polynuclear Aromatic Hydrocarbons	Carcinogen

For additional information, see Section 3.

SECTION 3 - HEALTH INFORMATION AND PROTECTION

NATURE OF HAZARD:

EYE CONTACT:	Corrosive. Will cause eye burns and permanent tissue damage.
SKIN CONTACT:	Irritating. May be absorbed through skin to produce hemolytic anemia and kidney damage evidenced by paleness and possibly red coloration of the urine.
INHALATION:	High vapor concentrations are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Vapors and/or aerosols which may be formed at elevated temperatures may cause systemic effects.
INGESTION:	Irritating to mouth, throat and stomach. May cause gastric tract disorder and/or damage.

FIRST AID:

EYE CONTACT:	Immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.
SKIN CONTACT:	Immediately flush with large amounts of water; use soap if available. Remove contaminated clothing, including shoes, after flushing has begun. Get prompt medical attention.
INHALATION:	Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.
INGESTION:	If swallowed, and INDIVIDUAL IS CONSCIOUS, induce vomiting. Get prompt medical attention. DO NOT attempt to give anything by mouth to an unconscious person.

RKPLACE EXPOSURE LIMITS:

OSHA REGULATION 29 CFR 1910.1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:

A TWA of 400 ppm (980 mg/m3) and a STEL of 500 ppm (1225 mg/m3) for Isopropyl Alcohol.
A TWA of 25 ppm (120 mg/m3) for 2-Butoxyethanol (Ethylene Glycol Monobutyl Ether) (skin).
A TWA of 10 ppm (50 mg/m3) and a STEL of 15 ppm (75 mg/m3) for Naphthalene.

THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:

A TWA of 400 ppm (980 mg/m3), and a STEL of 500 ppm (1230 mg/m3) for Isopropyl Alcohol.
A TWA of 25 ppm (121 mg/m3) for 2-Butoxyethanol (Ethylene Glycol Monobutyl Ether) (skin).
A TWA of 10 ppm (50 mg/m3), and a STEL of 15 ppm (79 mg/m3) for Naphthalene.

MANUFACTURER RECOMMENDS THE FOLLOWING OCCUPATIONAL EXPOSURE LIMITS:

A TWA of 100 ppm total organic vapor based on the Heavy Aromatic Naphtha (HAN) content. This component also contains a significant level of Polynuclear Aromatic Hydrocarbons (PNAs) between 0.4% and 0.5%. When aerosols are likely to be generated or when product temperatures exceed 300 degrees C., air samples should monitored for PNAs.

PRECAUTIONS:

PERSONAL PROTECTION: For open systems where contact is likely, wear chemical resistant gloves, a chemical suit, rubber boots, and chemical safety goggles plus a face shield. Where contact may occur, wear long sleeves, chemical resistant gloves, chemical goggles, and a face shield. Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA-approved respirators may be necessary to prevent overexposure by inhalation.

VENTILATION: The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces. See respiratory protection recommendations.

RONIC EFFECTS:

Overexposure by inhalation and/or dermal contact may result in damage to the blood and kidneys.
This product contains significant amounts of Polynuclear Arcmatic Hydrocarbons (PNAs). Certain of these PNAs have been shown to cause skin cancer in laboratory animals and may also cause cancer of the lung and other sites. In view of these findings, there may be potential risk of skin cancer in humans from prolonged and repeated skin contact with this product in the absence of good personal hygiene.

Benzo(a)pyrene (BaP), some other PNAs and materials containing PNAs are listed as carcinogens or potential carcinogens in the Annual Report on Carcinogens published by the U.S. National Toxicology Program (NTP).

The International Agency for Research on Cancer (IARC) has concluded that BaP and some other PNAs are probably carcinogenic to humans.

Limited studies on oils that are very active carcinogens have shown that washing the animal's skin with soap and water between applications greatly reduces tumor formation. These studies demonstrate the effectiveness of cleansing the skin after contact.
Potential risks to humans can be minimized by observing good work practices and personal hygiene procedures generally recommended for petroleum products.

This product contains Isopropyl Alcohol (IPA). In developmental studies conducted by the U.S. Chemical Manufacturers Association, unexpected acute toxicity was found when IPA was administered to pregnant rabbits by gavage. There were no unexpected toxic effects in pregnant rats exposed in the same study. In rats there were some relatively mild developmental effects at maternally toxic levels. There was no evidence of developmental toxicity in the rats at levels which did not also produce maternal toxicity. There were no indications of developmental toxicity in the rabbits at any exposure level. Preliminary findings from a multigeneration reproduction study indicate that infant and immature rats are more sensitive than their parents to the acute oral toxicity induced by high (1000 mg/kg/day) does of isopropanol. The effect levels for rats and rabbits were at several times the maximum exposure that would occur at the TLV. This observation was reported to the U.S. EPA under the provisions of Section 8 (e) of TSCA.

CHRONIC TOXICITY DATA IS AVAILABLE UPON REQUEST

SECTION 4 - FIRE AND EXPLOSION HAZARD

FLASH POINT:	115 Deg F. METHOD: Seta CC
FLAMMABLE LIMITS:	LEL: 0.8 UEL: 12.0
AUTOIGNITION TEMPERATURE:	NOTE: Not Available
GENERAL HAZARD:	Combustible Liquid, can form combustible mixtures at temperatures at or above the flash point. Toxic gases will form upon combustion. "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.
FIRE FIGHTING:	Use water spray to cool fire exposed surfaces and to protect personnel. Isolate "fuel" supply from fire. Use alcohol type foam, dry chemical or water spray to extinguish fire. Respiratory and eye protection required for fire fighting personnel.
DECOMPOSITION PRODUCTS UNDER FIRE CONDITIONS:	Smoke, Fumes, Carbon Monoxide, Carbon Dioxide, Sulfur Oxides

SECTION 5 - SPILL CONTROL PROCEDURE

LAND SPILL: Eliminate sources of ignition. Prevent additional discharge of material if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the National Response Center.

Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust. Recover by pumping (use an explosion proof or hand pump) or with a suitable absorbent. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

WATER SPILL: Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 6 - NOTES

None

SECTION 7 - REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT PROPER SHIPPING NAME: Not DOT Regulated, No DOT Labels Required

DOT HAZARD CLASS: Not DOT Regulated

DOT ID NUMBER: Not Available

TSCA: Components of this product are listed on the TSCA Inventory.

CERCLA: If this product is accidentally spilled, it is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Manufacturer recommends you contact local authorities to determine if there may be other local reporting requirements.

SARA TITLE III: Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories: **Immediate Health, Delayed Health, Fire**

This product contains the following Section 313 Reportable Ingredients:

COMPONENT	CAS NO.	MAXIMUM PERCENT
Naphthalene	91-20-3	1.0
Ethylene Glycol Monobutyl Ether	111-76-2	30.0

SECTION 8 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY: 0.96 at 60

DENSITY: 8.0 lbs./gal. at 60

VAPOR PRESSURE, mmHg AT DEG F: 5 at 100 Calculated

SOLUBILITY IN WATER, WEIGHT PERCENT AT DEG F: Dispersible

VISCOSITY OF LIQUID, cST AT DEG F: Not available

SPECIFIC GRAVITY OF VAPOR, AT 1 ATM (AIR=1): 2.00

FREEZING/MELTING POINT, DEG F: Not Available

EVAPORATION RATE, n-Bu Acetate=1: 2.3 Calculated

BOILING POINT, DEG F: 180 Calculated

SECTION 9 - REACTIVITY DATA

STABILITY:	Stable
HAZARDOUS POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID INSTABILITY:	None
MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:	Strong Oxidizing Agents
HAZARDOUS DECOMPOSITION PRODUCTS:	None

SECTION 10 - STORAGE AND HANDLING

ELECTROSTATIC ACCUMULATION HAZARD:	Unknown, use proper grounding procedure
STORAGE TEMPERATURE, DEG F:	Ambient
LOADING/UNLOADING TEMPERATURE:	Ambient
STORAGE/TRANSPORT PRESSURE, mmHg:	Atmospheric
VISCOSITY AT LOADING/UNLOADING TEMPERATURE, cST:	Not Available

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SSS-2
April 1992

MATERIAL SAFETY DATA SHEET
SMITH ENERGY SERVICES
999 18TH STREET, SUITE 3100, DENVER, COLORADO 80202-2431
(303) 297-0750
EMERGENCY TELEPHONE NUMBER/24-HOUR CHEMTREC: 1-800-424-9300

SECTION 1 - PRODUCT IDENTIFICATION

MANUFACTURED BY:	EXXON Chemical Americas for Smith Energy Services
PRODUCT:	SSS-2
CHEMICAL NAME:	Not Applicable; Blend
CHEMICAL FAMILY:	Blend
PRODUCT APPEARANCE:	Light Amber liquid; Aromatic Odor

NPCA-HMIS/NFPA 704 HAZARD CODE:

2=Health
3=Flammability
0=Reactivity

KEY:

4=Severe
3=Serious
2=Moderate
1=Slight
0=Minimal

SECTION 2 - HAZARDOUS INGREDIENT INFORMATION

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. This product is hazardous as defined in 29 CFR 1910.1200, based on the following compositional information:

COMPONENT	OSHA HAZARD
Methyl Alcohol	Flammable
2-Butoxyethanol; Aromatic Hydrocarbons; Surfactant	Eye Irritant
Methyl Alcohol	Toxic
Methyl Alcohol; Xylene; 2-Butoxyethanol	PEL/TLV

For additional information see Section 3.

SECTION 3 - HEALTH INFORMATION AND PROTECTION

NATURE OF HAZARD:

EYE CONTACT:	Irritating, and may injure eye tissue if not removed promptly.
SKIN CONTACT:	Low order of toxicity. Frequent or prolonged contact may irritate and cause dermatitis. Methyl alcohol may be absorbed through the skin which can contribute to damage of the optic nerve resulting in permanent visual changes, loss of vision or total blindness. May cause skin sensitization, an allergic reaction which becomes evident on reexposure to this material.
INHALATION:	High vapor concentrations are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. This product contains methyl alcohol. Vapor inhalation/and or skin absorption can cause central nervous system effects and blindness. Vapors and/or aerosols which may be formed at elevated temperatures may be irritating to eyes and respiratory tract.
INGESTION:	The main hazard of methyl alcohol arises from its misuse as a drinking substitute for ethyl alcohol. As little as 15 mL (1/2 oz.) of 40% methyl alcohol has caused death. Sublethal doses of methyl alcohol may damage the optic nerve which can result in permanent visual changes, including blindness.

FIRST AID:

EYE CONTACT:	Immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.
SKIN CONTACT:	Flush with large amounts of water; use soap if available. Remove grossly contaminated clothing, including shoes, and launder before reuse. If irritation persists, seek medical attention.

INHALATION: Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. keep at rest. Call for prompt medical attention.

INGESTION: If swallowed, and INDIVIDUAL IS CONSCIOUS, induce vomiting. Get prompt medical attention. DO NOT attempt to give anything by mouth to an unconscious person.

WORKPLACE EXPOSURE LIMITS:

OSHA REGULATION 29 CFR 1910.1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:

A TWA of 25 ppm (120 mg/m3) for 2-butoxyethanol (ethylene glycol monobutyl ether) (skin).
A TWA of 200 ppm (260 mg/m3) and a STEL of 250 ppm (310 mg/m3) for methyl alcohol (skin).
A TWA of 100 ppm (435 mg/m3) and a STEL of 150 ppm (655 mg/m3) for xylenes.

THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:

A TWA of 25 ppm (121 mg/m3) for 2-butoxyethanol (ethylene glycol monobutyl ether) (skin).
A TWA of 200 ppm (262 mg/m3) and a STEL of 250 ppm (328 mg/m3) for methyl alcohol (skin).
A TWA of 100 ppm (434 mg/m3) and a STEL of 150 ppm (651 mg/m3 for xylene.

EXXON RECOMMENDS THE FOLLOWING OCCUPATIONAL EXPOSURE LIMITS:

100 ppm total organic vapor based on Heavy Aromatic Naphtha (HAN).

PRECAUTIONS:

PERSONAL PROTECTION: For open systems where contact is likely, wear chemical resistant gloves, a chemical suit, rubber boots, and chemical goggles and a face shield. Where contact may occur, wear long sleeves, chemical resistant and a face shield. Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA-approved respirators may be necessary to prevent overexposure by inhalation. All contact should be avoided by persons with known hypersensitivity to PHENOL/FORMALDEHYDE RESIN.

VENTILATION:	The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces. See respiratory protection recommendations. Use explosion-proof ventilation equipment.

SECTION 4 - FIRE AND EXPLOSION HAZARD

FLASH POINT:	61 Degrees F. METHOD: Seta CC
FLAMMABLE LIMITS:	LEL: 0.8 UEL: 36.0
AUTOIGNITION TEMPERATURE:	NOTE: Not Available
GENERAL HAZARD:	Flammable Liquid; can release vapors that form flammable mixtures at temperatures at or above the flash point. Toxic gases will form upon combustion. "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.
FIRE FIGHTING:	Use water spray to cool fire exposed surfaces and to protect personnel. Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors. Either allow fire to burn under controlled conditions or extinguish with alcohol-type foam and dry chemical. Try to cover liquid spills with foam. Respiratory and eye protection required for fire fighting personnel.
HAZARDOUS COMPOSITION PRODUCTS:	Smoke, fumes, carbon monoxide, carbon dioxide, nitrogen oxides

SECTION 5 - SPILL CONTROL PROCEDURE

LAND SPILL:	Eliminate sources of ignition. Prevent additional discharge of material if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the **National Response Center 1-800-424-8802.** Vapors/dust can be harmful/fatal. Warn occupants of downwind areas. Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust. Recover by pumping (use an explosion-proof or hand pump) or with a suitable absorbent. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.
WATER SPILL:	Eliminate sources of ignition. Vapors/dust can be harmful/fatal. Warn occupants and shipping in downwind areas. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 6 - NOTES

NOTES:	None.

SECTION 7 - REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT PROPER SHIPPING NAME:	FLAMMABLE LIQUID, N.O.S. (Contains: METHYL ALCOHOL, ETHYLENE GLYCOL MONOBUTYL ETHER) UN 1993
DOT HAZARD CLASS:	Flammable Liquid
DOT IDENTIFICATION NO.:	UN 1993
NAME:	Flammable Liquids, N.O.S.

TSCA: Components of this product are listed on the TSCA Inventory.

CERCLA: If the reportable quantity (RQ) of this product is accidentally spilled, the incident is subject to the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and must be reported to the **National Response Center 1-800-424-8802.** The reportable spill quantity of this product is 14,286 pounds. This product contains: **Methyl Alcohol, Xylene.**

SARA TITLE III: Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories:
Immediate Health, Delayed Health, Fire
This product contains the following Section 313 Reportable Ingredients:

COMPONENT	CAS NO.	MAXIMUM PERCENT
Methyl Alcohol	67-56-1	35.0%
Xylene	1330-20-7	5.0%
Ethylene Glycol Monobutyl Ether	111-76-2	15.5%

SECTION 8 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY: 0.93 at 60
DENSITY: 7.8 lbs./gal. at 60

VAPOR PRESSURE, mmHg AT DEG F: 135 at 100 Calculated

SOLUBILITY IN WATER, WEIGHT PERCENT AT DEG F: Soluble

VISCOSITY OF LIQUID, CST AT DEG F: Not Available

SPECIFIC GRAVITY OF VAPOR, AT 1 ATM (AIR =1) 3.74

FREEZING/MELTING POINT, DEG F: -50 Pour Point

EVAPORATION RATE, n-Bu Acetate=1: 1.8 Calculated

BOILING POINT, DEG F:	187 Calculated IBP

SECTION 9 - REACTIVITY DATA

STABILITY:	Stable
HAZARDOUS POLYMERIZATION:	Will not occur
CONDITIONS TO AVOID INSTABILITY:	None
MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:	Strong Oxidizing Agents
HAZARDOUS DECOMPOSITION PRODUCTS:	None

SECTION 10 - STORAGE AND HANDLING

ELECTROSTATIC ACCUMULATION HAZARD:	Unknown, use proper grounding procedure
STORAGE TEMPERATURE, DEG F:	Ambient
LOADING/UNLOADING TEMPERATURE, DEG F:	Ambient
STORAGE/TRANSPORT PRESSURE, mmHg:	Atmospheric
VISCOSITY AT LOADING/ UNLOADING TEMPERATURE, CST:	Not available

his material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate the use of this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

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