HALLIBURTON

SAFETY DATA SHEET

Product Trade Name: **BE-6™ Bactericide**

Revision Date: 05-Jun-2015 **Revision Number:** 27

1. Identification

1.1. Product Identifier

Product Trade Name: BE-6™ Bactericide
Synonyms: None
Chemical Family: Not applicable
Internal ID Code HM000124

1.2 Recommended use and restrictions on use

Application: Microbiocide
Uses Advised Against No information available

1.3 Manufacturer's Name and Contact Details

Manufacturer/Supplier Halliburton Energy Services, Inc.
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By Chemical Stewardship
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

1.4. Emergency telephone number

Emergency Telephone Number (281) 575-5000

2. Hazard(s) Identification

2.1 Classification in accordance with paragraph (d) of §1910.1200

Acute Oral Toxicity	Category 4 - H302
Acute Toxicity - Dermal	Category 4 - H312
Skin Corrosion / Irritation	Category 1 - H314
Serious Eye Damage / Eye Irritation	Category 1 - H318
Specific Target Organ Toxicity - (Single Exposure)	Category 3 - H335
Acute Aquatic Toxicity	Category 1 - H400
Chronic Aquatic Toxicity	Category 2 - H411
Flammable solids.	Category 2 - H228

2.2. Label Elements

Hazard Pictograms

Signal Word Danger

Hazard Statements

H228 - Flammable solid
H302 - Harmful if swallowed
H312 - Harmful in contact with skin
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage
H335 - May cause respiratory irritation
H400 - Very toxic to aquatic life
H411 - Toxic to aquatic life with long lasting effects

Precautionary Statements

Prevention

P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P240 - Ground/Bond container and receiving equipment
P241 - Use explosion-proof electrical/ventilating/lighting/equipment
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
P264 - Wash face, hands and any exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P273 - Avoid release to the environment
P280 - Wear protective gloves/eye protection/face protection

Response

P301+ P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P330 - Rinse mouth
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P312 - Call a POISON CENTER or doctor/physician if you feel unwell
P362 - Take off contaminated clothing and wash before reuse
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P363 - Wash contaminated clothing before reuse
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P310 - Immediately call a POISON CENTER or doctor/physician
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P370 + P378 - In case of fire: Use water spray for extinction
P391 - Collect spillage

Storage	P403 + P233 - Store in a well-ventilated place. Keep container tightly closed P405 - Store locked up
Disposal	P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

Contains

Substances	**CAS Number**
2-Bromo-2-nitro-1,3-propanediol	52-51-7

2.3 Hazards not otherwise classified

None known

3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - US
2-Bromo-2-nitro-1,3-propanediol	52-51-7	60 - 100%	Acute Tox. 4 (H302) Acute Tox. 4 (H312) Skin Irrit. 1 (H314) Eye Irrit. 1 (H318) STOT SE 3 (H335) Aquatic Acute 1 (H400) Aquatic Chronic 2 (H411) Flam. Sol. 2 (H228)

The exact percentage (concentration) of the composition has been withheld as proprietary.

4. First-Aid Measures

4.1. Description of first aid measures

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Eyes	Immediately flush eyes with large amounts of water for at least 30 minutes. Seek prompt medical attention.
Skin	In case of contact, immediately flush skin with plenty of soap and water for at least 30 minutes and remove contaminated clothing, shoes and leather goods immediately. Get medical attention immediately.
Ingestion	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

4.2 Most important symptoms/effects, acute and delayed

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. May cause respiratory irritation. Harmful if swallowed. Harmful in contact with skin.

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

Notes to Physician Treat symptomatically.

5. Fire-fighting measures

5.1. Extinguishing media

Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons

None known.

5.2 Specific hazards arising from the substance or mixture

Special Exposure Hazards

Decomposition in fire may produce toxic gases.

5.3 Special protective equipment and precautions for fire-fighters

Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment.

See Section 8 for additional information

6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

6.3. Methods and material for containment and cleaning up

Scoop up and remove. Flush area with water.

7. Handling and storage

7.1. Precautions for Safe Handling

Handling Precautions

Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Wash hands after use. Launder contaminated clothing before reuse.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Information

Store away from oxidizers. Store in a cool, dry location. Store in a well ventilated area. Store locked up. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Store at temperatures below 104 F (40 C) and 140 F (60 C) for short periods. Product has a shelf life of 48 months.

8. Exposure Controls/Personal Protection

8.1 Occupational Exposure Limits

Substances	CAS Number	OSHA PEL-TWA	ACGIH TLV-TWA
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Not applicable	Not applicable

8.2 Appropriate engineering controls

Engineering Controls Use in a well ventilated area.

8.3 Individual protection measures, such as personal protective equipment

Personal Protective Equipment If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

Respiratory Protection	If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Organic vapor respirator with a dust/mist filter. (A2P2/P3)
Hand Protection	Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): Nitrile gloves. (>= 0.4 mm thickness) This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced. Manufacturer's directions for use should be observed because of great diversity of types.
Skin Protection	Normal work coveralls.
Eye Protection	Dust proof goggles.
Other Precautions	Eyewash fountains and safety showers must be easily accessible. Rubber boots

9. Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Physical State:	Solid Powder	**Color:**	White
Odor:	Characteristic	**Odor Threshold:**	No information available

Property Remarks/ - Method	Values
pH:	5 - 7
Freezing Point/Range	130 °C / 266 °F
Melting Point/Range	No data available
Boiling Point/Range	> 130 °C / > 266 °F
Flash Point	> 93 °C / 199 °F PMCC
Flammability (solid, gas)	No data available
upper flammability limit	No data available
lower flammability limit	No data available
Evaporation rate	No data available
Vapor Pressure	0.0005 @ 20 C (mmHg)
Vapor Density	> 1 (air = 1)
Specific Gravity	1.1
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	0.18
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

9.2. Other information

VOC Content (%)	No data available

10. Stability and Reactivity

10.1. Reactivity
Not expected to be reactive.

10.2. Chemical Stability
Stable

10.3. Possibility of Hazardous Reactions
Will Not Occur

10.4. Conditions to Avoid
Keep away from heat, sparks and flame.

10.5. Incompatible Materials
Strong oxidizers. Contact with alkalis. Contact with metals. Amines.

10.6. Hazardous Decomposition Products
Oxides of nitrogen. Bromine. Hydrogen bromide. Carbon monoxide and carbon dioxide. Formaldehyde.

11. Toxicological Information

11.1 Information on likely routes of exposure
Principle Route of Exposure Eye or skin contact, inhalation.

11.2 Symptoms related to the physical, chemical and toxicological characteristics
Acute Toxicity

Inhalation May cause respiratory irritation.

Eye Contact Causes severe eye irritation which may damage tissue.

Skin Contact Causes severe skin irritation with tissue destruction. May cause skin burns on prolonged contact. May cause skin defatting with prolonged exposure.

Ingestion Causes burns of the mouth, throat and stomach. May be harmful if swallowed.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

11.3 Toxicity data

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
2-Bromo-2-nitro-1,3-propanediol	52-51-7	305 mg/kg (Rat) 307 mg/kg (Rat)	1600 mg/kg (Rat)	> 0.588 mg/L (Rat) 4h > 5 mg/L (Rat) 4h

Substances	CAS Number	Skin corrosion/irritation
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Causes severe skin irritation with tissue destruction. (Rabbit)

Substances	CAS Number	Eye damage/irritation
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Causes severe eye irritation which may damage tissue. (Rabbit)

Substances	CAS Number	Skin Sensitization
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Patch test on human volunteers did not demonstrate sensitization properties Did not cause sensitization on laboratory animals (guinea pig)

Substances	CAS Number	Respiratory Sensitization
2-Bromo-2-nitro-1,3-propanediol	52-51-7	No information available

Substances	CAS Number	Mutagenic Effects
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Some in vitro tests have shown mutagenic effects. In vivo tests did not show mutagenic effects.

Substances	CAS Number	Carcinogenic Effects
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Did not show carcinogenic effects in animal experiments

Substances	CAS Number	Reproductive toxicity
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.

Substances	CAS Number	STOT - single exposure
2-Bromo-2-nitro-1,3-propanediol	52-51-7	May cause respiratory irritation.

Substances	CAS Number	STOT - repeated exposure
2-Bromo-2-nitro-1,3-propanediol	52-51-7	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	Aspiration hazard
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Not applicable

12. Ecological Information

12.1. Toxicity

Ecotoxicity Effects

Product Ecotoxicity Data

No data available

Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
2-Bromo-2-nitro-1,3-propanediol	52-51-7	EC50 (72h) 0.25 mg/L (Skeletonema costatum) EC50 (72h) 0.37 mg/L (Pseudokirchnerella subcapitata) EC50 (72h) 0.89 mg/L (Chlorella vulgaris)	LC50 (96h) 58 mg/l (Pimephales promelas) LC50 (96h) 35.7 mg/L (Lepomis macrochirus) LC50 (96h) 41.2 mg/L (Oncorhynchus mykiss) LC50 (96h) 57.6 mg/L (Cyprinodon variegatus) NOEC (49d) 21.5 mg/L (Oncorhynchus mykiss) LC50 (49d) 39.1 mg/L (Oncorhynchus mykiss)	EC20 (150m) 2 mg/L (Activated Sludge, Respiration Inhibition) EC50 (150m) 43 mg/L (Activated sludge)	EC50 (48h) 1.4 mg/L (Daphnia magna) EC50 (48h) 3.5 mg/L (Acartia tonsa) NOEC (21d) 0.27 mg/L (Daphnia magna) EC50 (21d) 0.27-0.88 mg/L (Daphnia magna)

12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Readily biodegradable (70% @ 28d)

12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
2-Bromo-2-nitro-1,3-propanediol	52-51-7	0.22

12.4. Mobility in soil

Substances	CAS Number	Mobility
2-Bromo-2-nitro-1,3-propanediol	52-51-7	KOC = > 4

12.5 Other adverse effects

No information available

13. Disposal Considerations

13.1. Waste treatment methods

Disposal Method Disposal should be made in accordance with federal, state, and local regulations. Incineration recommended in approved incinerator according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.

Contaminated Packaging Follow all applicable national or local regulations.

14. Transport Information

US DOT

UN Number: UN3241
UN Proper Shipping Name: 2-Bromo-2-Nitropropane-1,3-Diol
Transport Hazard Class(es): 4.1
Packing Group: III
Environmental Hazards: Marine Pollutant
NAERG: NAERG 133

US DOT Bulk

DOT (Bulk) Not applicable

Canadian TDG

UN Number: UN3241
UN Proper Shipping Name: 2-Bromo-2-Nitropropane-1,3-Diol
Transport Hazard Class(es): 4.1
Packing Group: III
Environmental Hazards: Marine Pollutant

IMDG/IMO

UN Number: UN3241
UN Proper Shipping Name: 2-Bromo-2-Nitropropane-1,3-Diol
Transport Hazard Class(es): 4.1
Packing Group: III
Environmental Hazards: Marine Pollutant
EMS: EmS F-J, S-G

IATA/ICAO

UN Number: UN3241
UN Proper Shipping Name: 2-Bromo-2-Nitropropane-1,3-Diol
Transport Hazard Class(es): 4.1
Packing Group: III
Environmental Hazards: Marine Pollutant

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable
Special Precautions for User: None

15. Regulatory Information

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Fire Hazard Reactive Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of: Ignitability D001
Federal Insecticide, Fungicide and Rodenticide Act:	Label in accordance with Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requirements.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

FIFRA Information

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

Signal Word	DANGER CORROSIVE
Hazard Statements	Causes irreversible eye damage or skin burns. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. This pesticide is toxic to fish and wildlife.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory or are exempt.

16. Other information

Preparation Information

Prepared By	Chemical Stewardship Telephone: 1-580-251-4335 e-mail: fdunexchem@halliburton.com
Revision Date:	05-Jun-2015
Reason for Revision	SDS sections updated: 2

Additional information
For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

Key or legend to abbreviations and acronyms
bw – body weight
CAS – Chemical Abstracts Service
EC50 – Effective Concentration 50%
ErC50 – Effective Concentration growth rate 50%
LC50 – Lethal Concentration 50%
LD50 – Lethal Dose 50%
LL50 – Lethal Loading 50%
mg/kg – milligram/kilogram
mg/L – milligram/liter
NIOSH – National Institute for Occupational Safety and Health
NTP – National Toxicology Program
OEL – Occupational Exposure Limit
PEL – Permissible Exposure Limit
ppm – parts per million
STEL – Short Term Exposure Limit
TWA – Time-Weighted Average
UN – United Nations
h - hour
mg/m^3 - milligram/cubic meter
mm - millimeter
mmHg - millimeter mercury
w/w - weight/weight
d - day

Key literature references and sources for data
www.ChemADVISOR.com/
NZ CCID
OSHA

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End of Safety Data Sheet