United States Steel Corporation

BOP Classifier Sludge

Safety Data Sheet (SDS)

USS IHS Number: 25692

Locations: ET, Gary, Lake Erie

Original: 12/16/2010 **Revision: 9/27/2020**

Section 1 – Identification

1(a) Product Identifier used on Label: BOP Classifier Sludge

1(b) Other Means of Identification: Q-BOP Classifier Sludge

1(c) Recommended use of the chemical and restrictions on use: None

1(d) Name, Address, and Telephone Number:

United States Steel Corporation
600 Grant Street, Room 1662
Pittsburgh, PA 15219-2800

Phone number: (412) 433-6840 (8:00 am to 5:00 pm)
FAX: (412) 433-5019

1(e) Emergency Phone Number: 1-800-262-8200 (CHEMTREC)

Section 2 – Hazard(s) Identification

2(a) Classification of the Chemical: BOP Classifier Sludge is considered a hazardous material according to the criteria specified in REACH [REGULATION (EC) No 1907/2006] and CLP [REGULATION (EC) No 1272/2008] and OSHA 29 CFR 1910.1200 Hazard Communication Standard. The categories of Health Hazards as defined in "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3" United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

2(b) Signal Word, Hazard Statement(s), Symbols and Precautionary Statement(s):

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)
	Carcinogenicity - 1A Single Target Organ Toxicity (STOT) Single Exposure - 1 STOT Repeated Exposure - 1	**DANGER**	May cause cancer. Causes mechanical irritation to skin and lung irritation. Causes damage to lungs, autoimmune system and kidneys through prolonged or repeated exposure. Causes severe skin burns and serious eye damage. Harmful if swallowed.
	Eye Irritation - 1 Skin Irritation - 1A		
	Acute Toxicity-Oral - 4		

Precautionary Statement(s):

Prevention	Response	Storage/Disposal
Do not breathe dusts. Wear protective gloves / protective clothing / eye protection / face protection. Wash thoroughly after handling. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product.	If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor/physician. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. If swallowed: Rinse mouth. Do **NOT** induce vomiting. Call a poison center or doctor/physician if you feel unwell. Store locked up.	Dispose of contents in accordance with federal, state and local regulations.

2(c) Hazards not Otherwise Classified: None Known

2(d) Unknown Acute Toxicity Statement (Mixture): None Known

Section 3 – Composition/Information on Ingredients

3(a-c) Chemical Name, Common Name (Synonyms), CAS Number and Other Identifiers, and Concentration:

Chemical Name	CAS Number	EC Number	% weight
Iron and Iron Oxides	7439-89-6 1345-25-1 1309-37-1	231-096-4 215-721-8 215-168-2	42-97
Calcium Oxide	1305-78-8	215-138-9	5-28
Silica, Fused	60676-86-0	262-373-8	2-10
Manganese Oxide	1344-43-0	215-695-8	0.9-3
Magnesium Oxide	1309-48-4	215-171-9	0.6-8
Aluminum Oxide	1344-28-1	215-691-6	0.3-2
Crystalline Silica (as Quartz)	14808-60-7	238-878-4	0-4
Sodium Oxide	1313-59-3	215-208-9	0-2
Zinc Oxide	1314-13-2	215-222-5	0-1.1

EC- European Community
CAS- Chemical Abstract Service

Section 4 – First-aid Measures

4(a) Description of Necessary Measures: If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor/physician.

- **Inhalation:** Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor/physician.
- **Eye Contact:** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
- **Skin Contact:** If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
- **Ingestion:** If swallowed: Rinse mouth. Do **NOT** induce vomiting. Call a poison center or doctor/physician if you feel unwell.

4(b) Most Important Symptoms/Effects, Acute and Delayed (Chronic):

Acute effects:

- **Inhalation:** Excessive exposure to high concentrations of dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract.
- **Eye:** Particles of iron or iron compounds may become imbedded in the eye. Excessive exposure to high concentrations of dust may cause irritation to the eyes.
- **Skin:** Skin contact with dusts may cause irritation or sensitization, possibly leading to dermatitis. Skin contact with metallic dusts may cause physical abrasion.
- **Ingestion:** Ingestion of dust may cause nausea and/or vomiting.

Chronic Effects:

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any airborne particulate matter exposure. Persons with pre-existing skin disorders may be more susceptible to dermatitis.

4(c) Immediate Medical Attention and Special Treatment: Treat symptomatically.

Section 5 – Fire-fighting Measures

5(a) Suitable (and Unsuitable) Extinguishing Media: Steam, water fog, CO_2, foam, dry chemicals or sand. Small fires – Foam, CO2, Dry Chemical, Water Spray. Large Fires – Water Spray, fog or foam.

5(b) Specific Hazards Arising from the Chemical: Incompatibility (materials to avoid) heat, and flames. When burned, toxic smoke and vapor may be emitted including, oxides of carbon, metal oxides and other toxic vapors.

5(c) Special Protective Equipment and Precautions for Fire-fighters: Self-contained NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used.

Section 6 - Accidental Release Measures

6(a) Personal Precautions, Protective Equipment and Emergency Procedures: For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Personnel should be protected against contact with eyes and skin. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Section 6 - Accidental Release Measures (continued)

6(b) Methods and Materials for Containment and Clean Up: Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

Section 7 - Handling and Storage

7(a) Precautions for Safe Handling: Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Do not breathe dusts. Wear protective gloves / protective clothing / eye protection / face protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid direct contact on skin, eyes or on clothing. Emergency safety showers and eye wash stations should be present.

7(b) Conditions for Safe Storage, including any Incompatibilities: Whenever feasible, store locked up.

Section 8 - Exposure Controls / Personal Protection

8(a) Occupational Exposure Limits (OELs): The following exposure limits are offered as reference, for an experience industrial hygienist to review.

Ingredients	OSHA PEL [1]	ACGIH TLV [2]	NIOSH REL [3]	IDLH [4]
Iron and Iron Oxides	10 mg/m³ (iron oxide fume)	5.0 mg/m³ (iron oxide, respirable fraction [5])	5.0 mg/m³ (iron oxide dust and fume)	2,500 mg/m^3 (as Fe)
Calcium Oxide	5.0 mg/m³ (as calcium oxide)	2.0 mg/m³ (as calcium oxide)	2.0 mg/m³ (as calcium oxide)	25 mg/m³ (as calcium oxide)
Silica, Fused	80 mg/m^3 / % SiO_2 (as SiO_2)	NE	NE	NE
Manganese Oxide	"C" 5.0 mg/m³ (as fume & inorganic compounds, as Mn)	0.02 mg/m³ (as fume & inorganic compounds, as Mn, respirable fraction) 0.1 mg/m³ (as fume & inorganic compounds, as Mn, inhalable fraction[6])	1.0 mg/m³ (as fume & inorganic compounds, as Mn) "STEL" 3.0 mg/m³ (as fume & inorganic compounds, as Mn)	500 mg/m^3 (as Mn)
Magnesium Oxide	15 mg/m³ (as magnesium oxide fume, total particulate)	10 mg/m³ (as magnesium oxide, inhalable fraction[7])	NE	750 mg/m³ (as magnesium oxide fume)
Aluminum Oxide	15 mg/m³ (as aluminum oxide, metal & insoluble compounds, total dust) 5.0 mg/m³ (as aluminum oxide, metal & insoluble compounds, respirable fraction)	1.0 mg/m³ (as metal & insoluble compounds, respirable fraction)	10 mg/m³ (as metal & insoluble compounds, total dust) 5.0 mg/m³ (as metal & insoluble compounds, respirable fraction)	NE
Crystalline Silica (as Quartz)	0.05 mg/m^3 "AL" 0.025 mg/m^3	0.025 mg/m^3 (as respirable fraction)	0.05 mg/m³ (as respirable dust), Ca	50 mg/m³ (as quartz, Tripoli) 25 mg/m³ (as cristobalite, tridymite), Ca
Sodium Oxide	NE	NE	NE	NE
Zinc Oxide	15 mg/m³ (total dust) 5.0 mg/m³ (respirable fraction and fume)	2.0 mg/m^3 (respirable fraction) "STEL" 10 mg/m^3 (respirable fraction)	5.0 mg/m³ (respirable fraction, dust only & fume) "C" 15 mg/m^3 (respirable fraction, dust only & fume)	500 mg/m^3

NE - None Established

1. OSHA PELs (Permissible Exposure Limits) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday. An Action level (AL) is used by OSHA and NIOSH to express a health or physical hazard. They indicate the level of a harmful or toxic substance/activity, which requires medical surveillance, increased industrial hygiene monitoring, or biological monitoring. Action Levels are generally set at one half of the PEL but the actual level may vary from standard to standard. The intent is to identify a level at which the vast majority of randomly sampled exposures will be below the PEL.
2. Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes. DSEN – May cause dermal sensitization. This notation is used to indicate the potential for dermal sensitization resulting from the interaction of an absorbed agent and ultraviolet light (i.e. photosensitization). RSEN – May cause respiratory sensitization.
3. The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL)- Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
4. The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994. Ca is designated as carcinogen.
5. Respirable fraction. The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in ACGIH 2020 TLVs ® and BEIs ® Appendix D, paragraph C.
6. Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH 2020 TLVs ® and BEIs ® (Biological Exposure Indices) Appendix D, paragraph A.

Section 8 - Exposure Controls / Personal Protection (continued)

8(b) Appropriate Engineering Controls: Local exhaust ventilation should be used to control the emission of air contaminants. General dilution ventilation may assist with the reduction of air contaminant concentrations. Emergency eye wash stations and deluge safety showers should be available in the work area.

8(c) Individual Protection Measures:

- **Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 10 times the exposure limit. Full-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 50 times the exposure limit. Protection by air-purifying negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self-contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

  Warning! Air-purifying respirators both negative-pressure and powered-air do not protect workers in oxygen-deficient atmospheres.
- **Eyes**: Wear eye protection/face protection. A face shield should be used when appropriate to prevent contact with splashed materials. Chemical goggles, face shields or glasses should be worn to prevent eye contact. Contact lenses should not be worn where industrial exposure to this material is likely.
- **Skin**: Persons handling this product should wear appropriate clothing to prevent skin contact. Take off contaminated clothing and wash before reuse. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves.
- **Other protective equipment**: An eyewash fountain and deluge shower should be readily available in the work area.

Section 9 - Physical and Chemical Properties

9(a) Appearance (physical state, color, etc.): Solid, Reddish brown moist precipitate

9(b) Odor: NA

9(c) Odor Threshold: NA

9(d) pH: 11.5

9(e) Melting Point/Freezing Point: NA

9(f) Initial Boiling Point and Boiling Range: NA

9(g) Flash Point: NA

9(h) Evaporation Rate: NA

9(i) Flammability (solid, gas): Not flammable

9(j) Upper/Lower Flammability or Explosive Limits: NA

9(k) Vapor Pressure: NA

9(l) Vapor Density (Air = 1): NA

9(m) Relative Density: NA

9(n) Solubility(ies): Not appreciable

9(o) Partition Coefficient n-octanol/water: NA

9(p) Auto-ignition Temperature: ND

9(q) Decomposition Temperature: ND

9(r) Viscosity: ND

NA - Not Applicable

ND - Not Determined for product as a whole

Section 10 - Stability and Reactivity

10(a) Reactivity: Not Determined (ND)

10(b) Chemical Stability: **BOP Classifier Sludge** is stable under normal storage and handling conditions.

10(c) Possibility of Hazardous Reaction: None Known

10(d) Conditions to Avoid: Calcium oxide will react with water to form calcium hydroxide.

10(e) Incompatible Materials: Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.

10(f) Hazardous Decomposition Products: Oxides of carbon, metal oxides and toxic vapors may be releases at elevated temperatures.

Section 11 - Toxicological Information

11(a-e) Information on Toxicological Effects: The following toxicity data has been determined for **BOP Classifier Sludge** by using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of OSHA and the EU CPL:

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
Acute Toxicity Hazard (covers Categories 1-4)	4	4[a]		**Warning**	Harmful if swallowed.
Skin Irritation (covers Categories 1A, 1B, 1C, and 2)	1B	1A[b]		**Danger**	Causes severe skin burns and eye damage.

Section 11 - Toxicological Information

11(a-e) Information on Toxicological Effects (continued):

Hazard Classification	Hazard Category		Hazard Category	Signal Word	Hazard Statement
	EU	OSHA			
Eye Damage/Irritation (covers Categories 1, 2A and 2B)	1	1[c]		**Danger**	Causes serious eye damage.
Germ Cell Mutagenicity (covers Categories 1A, 1B and 2)	2	NR *	NA	**NA**	NA
Carcinogenicity (covers Categories 1A, 1B and 2)	NR	1A [g]		**Danger**	May cause cancer.
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3)	2	1[i]		**Danger**	Causes mechanical irritation to skin and lung irritation.
STOT Following Repeated Exposure (covers Categories 1 and 2)	1	1 [j]		**Danger**	Causes damage to lungs, autoimmune system and kidneys through prolonged or repeated exposure.

* NR Not Rated - Available data does not meet criteria for classification.

The Toxicological data listed below are presented regardless to classification criteria. Individual hazard classification categories where the toxicological information has met or exceeded a classification criteria threshold are listed above.

a. No LC_{50} or LD_{50} has been established for **BOP Classifier Sludge**. The following data has been determined for the components:

- **Iron Oxide:** LD_{50}= >10,000 mg/kg (Oral/ Rat)
- **Iron:** Rat LD_{50} =1060 mg/kg (IUCLID) (oral)
- **Silica:** Rat LD_{50} = 500 mg/kg (Oral/ Rat)
- **Zinc Oxide:** Rat LD_{50} >5000 mg/kg (oral)

b. No Skin (Dermal) Irritation data available for **BOP Classifier Sludge** as a mixture. The following Skin (Dermal) Irritation data has been determined for the components:

- **Iron Oxide:** Moderately irritating.
- **Magnesium Dioxide:** Severe skin irritant in human (HSDB).
- **Sodium Oxide:** Severe skin irritant.

c. No Eye Irritation data available for **BOP Classifier Sludge** as a mixture. The following Eye Irritation information was found for the components:

- **Iron Oxide:** Severely irritating; may cause burns. Human Corrosive (IUCLID).
- **Iron:** Irritating when administered as Iron metal. Rabbit Draize - irritating (IUCLID).
- **Calcium Oxide:** Rabbit Irritating (REACH).
- **Magnesium dioxide**: Severe eye irritant in human (HSDB).
- **Silicon Dioxide:** Crystalline silica may cause abrasion of the cornea**.**
- **Sodium Oxide:** Severe eye irritant.

d. No Skin (Dermal)/Respiratory Sensitization data available **for BOP Classifier Sludge** as a mixture or its individual components.

e. No Aspiration Hazard data available for **BOP Classifier Sludge** as a mixture or its individual components.

f. No Germ Cell Mutagenicity data available for **BOP Classifier Sludge** as a mixture. The following Germ Cell Mutagenicity information was found for the components:

- **Iron Oxide:** Both positive and negative data.

g. Carcinogenicity: IARC, NTP, and OSHA do not list **BOP Classifier Sludge** as carcinogens. The following Carcinogenicity information was found for the components:

- **Iron Oxide (Fe_2O_3):** IARC-3, unclassifiable as to carcinogenicity in humans; ACGIH TLV-A4, not classifiable as a human carcinogen
- **Silica, amorphous, fused:** IARC-3, unclassifiable as to carcinogenicity in humans.
- **Manganese (inorganic compounds, as Mn)**: ACGIH TLV-A4, not classifiable as a human carcinogen; EPA-D, not classifiable as to human carcinogenicity (CBD, cannot be determined).
- **Manganese (fume, as Mn)**: EPA-D, not classifiable as to human carcinogenicity (CBD, cannot be determined).
- **Magnesium (oxide)**: ACGIH TLV-A4, not classifiable as a human carcinogen
- **Aluminum (metal and insoluble compounds):** IARC-1 (production), carcinogen to humans; ACGIH TLV-A4, not classifiable as a human carcinogen.
- **Silica, crystalline (as quartz):** IARC-1 (silica, crystalline), carcinogen to humans; ACGIH TLV-A2 (silica, crystalline), suspected human carcinogen; NTP–K, known to be a carcinogen; NIOSH–Ca, potential occupational carcinogen; OSHA-Ca, carcinogen.
- **Zinc (compounds, oxide, as Zn):** EPA-II, inadequate information to assess carcinogenic potential & EPA-D not classifiable as to human carcinogenicity & EPA-I, data are inadequate for assessment of human carcinogenic potential.

h. No Toxic Reproduction data available for **BOP Classifier Sludge** as a mixture or its individual components.

Section 11 - Toxicological Information (continued)

11(a-e) Information on Toxicological Effects (continued):

i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **BOP Classifier Sludge** as a mixture. The following STOT following a Single Exposure data was found for the components:

- **Iron Oxide:** May cause lung irritation.
- **Iron:** Irritating to Respiratory tract.
- **Calcium Oxide**: Can cause respiratory tract irritation, skin and eye irritation.
- **Silicon Dioxide:** Single exposure to very high airborne levels may cause lung irritation in exposed humans.

Sodium Oxide: Sodium oxide is highly reactive with water to form caustic sodium hydroxide.

j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available **for BOP Classifier Sludge** as a whole. The following STOT following Repeated Exposure data was found for the components:

- **Iron Oxide:** Some pulmonary and lung effects reported.
- **Silicon Dioxide:** Repeated exposure to crystalline silica causes silicosis and kidney damage as well as increased incidence of autoimmune disorders in humans.

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2020, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS).

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s):

Acute Effects by Component:

- **IRON (and Iron Oxide):** Iron is harmful if swallowed, causes skin irritation, and causes eye irritation. Contact with iron oxide has been reported to cause skin irritation and serious eye damage.
- **CALCIUM OXIDE:** Calcium oxide is an eye and skin irritant.
- **AMORPHOUS SILICA (SILICON DIOXIDE):** Not Reported/ Not Classified
- **MANGANESE OXIDE:** Manganese oxide is harmful if swallowed.
- **MAGNESIUM OXIDE:** Not Reported/ Not Classified.
- **ALUMINUM OXIDE:** Inhalation may cause cough.
- **CRYSTALINE SILICA (Silicon Dioxide):** Causes irritation and inflammation of the respiratory tract. May cause abrasion of the cornea. Inhalation may cause cough. A single exposure to very high airborne levels may cause lung irritation in exposed humans.
- **SODIUM OXIDE:** Corrosive to skin, eyes and respiratory tract. Serious local effects can result from all routes of administration. Highest possible categories listed for skin and eye irritation and for single dose target organ toxicity were selected based on the material's high reactivity to water to form the caustic compound Sodium Hydroxide.
- **ZINC OXIDE:** Not Reported/ Not Classified

Delayed (chronic) Effects by Component:

- **IRON (and Iron Oxide):** Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the development of a benign lung disease, called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of ferric oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Iron oxide is listed as a Group 3 (not classifiable) carcinogen by the International Agency for Research on Cancer (IARC).
- **CALCIUM OXIDE:** Depending on the concentration and duration of exposure, repeated or prolonged inhalation may cause inflammation of the respiratory passages, ulcers of the mucous membranes, and possible perforation of the nasal septum. Repeated or prolonged skin contact may cause dermatitis.
- **AMORPHOUS SILICA (SILICON DIOXIDE):** Silicon dusts are a low health risk by inhalation and should be treated as a nuisance dust. Eye contact with pure material can cause particulate irritation. Skin contact with silicon dusts may cause physical abrasion.
- **MANGANESE OXIDE:** Neurobehavioral alterations in worker populations exposed to Manganese oxide include speed and coordination of motor function are especially impaired.
- **MAGNESIUM OXIDE:** Irritation of eyes, nose, and throat. Symptoms may include dryness of nose and mouth, cough, feeling of weakness, tightness of chest, muscular pain, chills, fever, headache, nausea, and vomiting.
- **ALUMINUM OXIDE:** Considered to be an inert or nuisance dust.
- **SILICA (Crystalline Quartz):** Inhalation of quartz is classified by IARC as a probable human carcinogen. Chronic exposure can cause silicosis, a form of lung scarring that can cause shortness of breath, reduced lung function, and in severe cases, death. Repeated exposure may cause kidney damage as well as increased incidence of autoimmune disorder.
- **SODIUM OXIDE:** Sodium oxide may be damaging to mucosal membranes of the respiratory tract. Sodium oxide may cause irritation and potentially pulmonary edema.
- **ZINC OXIDE:** Zinc oxide dusts are a low health risk by inhalation and should be treated as a nuisance dust.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial): No data available for the product, **BOP Classifier Sludge** as a whole. However, individual components of the product have been found to be toxic to the environment. Dusts may migrate into soil and groundwater and be ingested by wildlife as follows:

- **Iron Oxide**: LC_{50}: >1000 mg/L; Fish
- **Zinc Oxide:** EU RAR lists as Category 1 Very toxic to aquatic life with long lasting effects.
- **Calcium Oxide:** LC_{50}: 159 mg/L; invertebrates

12(b) Persistence & Degradability: No Data Available

12(c) Bioaccumulative Potential: No Data Available

12(d) Mobility (in soil): No Data Available

12(e) Other Adverse Effects: None Known

Additional Information:

Hazard Category: Category 1 **Signal Word:** Warning

Hazard Symbol: 

Hazard Statement: Very Toxic to aquatic life with long lasting effects.

Section 13 - Disposal Considerations

Disposal: Dispose of contents/container in accordance with local/regional/international regulations.

Container Cleaning and Disposal: Follow applicable federal, state and local regulations. Observe safe handling precautions. European Waste Catalogue 10-02-13 (sludges and filter cakes from gas treatment containing dangerous substances) or 10-02-14 (sludges and filter cakes from gas treatment other than those mentioned in 10-02-13).

Please note this information is for BOP Classifier Sludge in its original form. Any alterations can void this information.

Section 14 - Transport Information

14 (a-g) Transportation Information:

US Department of Transportation (DOT) under 49 CFR 172.101 does not regulate **BOP Classifier Sludge** as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

Shipping Name: NOT DOT Regulated **Shipping Symbols:** NA **Hazard Class:** NA **UN No.:** NA **Packing Group:** NA **DOT/ IMO Label:** NA **Special Provisions (172.102):** NA	**Packaging Authorizations:** **a) Exceptions:** NA **b) Non-bulk:** NA **c) Bulk:** NA	**Quantity Limitations:** **a) Passenger Aircraft or Rail:** NA **b) Cargo Aircraft Only:** NA **Vessel Stowage Location:** NA **DOT reportable quantities**: NA

International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR) does not regulate **BOP Classifier Sludge** as a hazardous material.

Shipping Name: NOT Regulated **Classification Code:** NA **UN No.:** NA **Packing Group:** NA **ADR Label:** NA **Special Provisions:** NA **Limited Quantities:** NA	**Packaging:** **a) Packing Instructions:** NA **b) Special Packing Provisions:** NA **c) Mixed Packing Provisions:** NA	**Portable Tanks & Bulk Containers:** **a) Instructions:** NA **b) Special Provisions:** NA

International Air Transport Association (IATA) does not regulate **BOP Classifier Sludge** as a hazardous material.

Shipping Name: NOT Regulated **Class/Division:** NA **Hazard Label (s):** NA **UN No.:** NA **Packing Group:** NA **Excepted Quantities (EQ):** NA	**Passenger & Cargo Aircraft** **Limited Quantity (EQ)**		**Cargo Aircraft Only:** **Pkg Inst:** NA **Max Net Qty/Pkg:** NA	**Special Provisions:** NA **ERG Code:** NA
	Pkg Inst: NA **Max Net Qty/Pkg:** NA	**Pkg Inst:** NA **Max Net Qty/Pkg:** NA		

Pkg Inst – Packing Instructions Max Net Qty/Pkg – Maximum Net Quantity per Package ERG – Emergency Response Drill Code

BOP Classifier Sludge does not have a **Transport Dangerous Goods (TDG)** classification.

Section 15 - Regulatory Information

Regulatory Information: *The following listing of regulations relating to a U. S. Steel product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.* This product and/or its constituents are subject to the following regulations:

SARA Potential Hazard Categories: Immediate Acute Health Hazard, Delayed Chronic Health Hazard

Section 313 Supplier Notification: The product, **BOP Classifier Sludge** contains the following toxic 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:

CAS #	Chemical Name	Percent by Weight
7439-96-5	Manganese Oxide (Mn compounds)	3 max
1314-13-2	Zinc Oxide (Zn Compounds)	1.1 max

State Regulations: The product, **BOP Classifier Sludge** as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

California Prop. 65:

This product can expose you to crystalline silica (airborne particles of respirable size only)., which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Other Regulations:

WHMIS Classification (Canadian): The product, **BOP Classifier Sludge** is not listed as a whole. However individual components are listed.

Ingredients	WHMIS Classification
Iron	Combustible dusts - Category 1 (may form combustible dust concentrations in air)
Calcium Oxide	Skin corrosion/irritation - Category 1; Serious eye damage/eye irritation - Category 1; Health hazards not otherwise classified (corrosion) - Category 1
Manganese	Reproductive toxicity - Category 2; Specific target organ toxicity - repeated exposure - Category 1; Combustible dusts*
Silica Quartz	Carcinogenicity - Category 1A; Specific target organ toxicity - repeated exposure - Category 1
Sodium Oxide	Skin corrosion/irritation - Category 1; Serious eye damage/eye irritation - Category 1; Specific target organ toxicity - single exposure (respiratory tract irritation) - Category 3 - Respiratory tract irritation Physical hazards not otherwise classified (exclamation mark) - Category 1

* This product could belong to the hazard class "Combustible dust", based on various factors related to the combustibility and explosiveness of its dust, including composition, shape and size of the particles

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

Section 16 - Other Information

Prepared By: United States Steel Corporation

Revision History:

08/31/2020 – Update to sections 2, 8, 11, 15
06/26/2017 – Update WHMIS
04/14/15- Revision
04/07/2014 - Update to OSHA HAZCOM 2012

Expiration Date: 09/27/2023
08/21/10 – Update of content and format to comply with GHS
03/1999 - Original

Additional Information:

Hazardous Material Identification System (HMIS) Classification

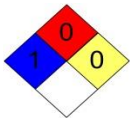
Health Hazard	1
Fire Hazard	0
Physical Hazard	0

HEALTH= **1**, * Denotes possible chronic hazard if airborne dusts or fumes are generated Irritation or minor reversible injury possible.

FIRE= **0**, Materials that will not burn.

PHYSICAL HAZARDS = **0**, Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

National Fire Protection Association (NFPA)



HEALTH = **1**, Exposure could cause irritation but only minor residual injury even if no treatment is given.

FIRE = **0,** Materials that will not burn.

INSTABILITY = **0**, Normally stable, even under fire exposure conditions, and are not reactive with water.

ABBREVIATIONS/ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	**NIF**	No Information Found
BEIs	Biological Exposure Indices	**NIOSH**	National Institute for Occupational Safety and Health
CAS	Chemical Abstracts Service	**NTP**	National Toxicology Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	**ORC**	Organization Resources Counselors
CFR	Code of Federal Regulations	**OSHA**	Occupational Safety and Health Administration
CNS	Central Nervous System	**PEL**	Permissible Exposure Limit
GI, GIT	Gastro-Intestinal, Gastro-Intestinal Tract	**PNOR**	Particulate Not Otherwise Regulated

HMIS	Hazardous Materials Identification System		**PNOC**	Particulate Not Otherwise Classified

Section 16 - Other Information (continued)

ABBREVIATIONS/ACRONYMS (continued):

IARC	International Agency for Research on Cancer		**PPE**	Personal Protective Equipment
LC50	Median Lethal Concentration		**ppm**	parts per million
LD50	Median Lethal Dose		**RCRA**	Resource Conservation and Recovery Act
LD_{Lo}	Lowest Dose to have killed animals or humans		**RTECS**	Registry of Toxic Effects of Chemical Substances
LEL	Lower Explosive Limit		**SARA**	Superfund Amendment and Reauthorization Act
$\mu g/m^3$	microgram per cubic meter of air		**SCBA**	Self-contained Breathing Apparatus
mg/m^3	milligram per cubic meter of air		**STEL**	Short-term Exposure Limit
mppcf	million particles per cubic foot		**TLV**	Threshold Limit Value
SDS	Safety Data Sheet		**TWA**	Time-weighted Average
MSHA	Mine Safety and Health Administration		**UEL**	Upper Explosive Limit
NFPA	National Fire Protection Association			

Disclaimer: This information is taken from sources or based upon data believed to be reliable. However, United States Steel Corporation makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.