Section 1: IDENTIFICATION

Product Name:	Equilibrium Catalysts (Spent Fluid Cracking Catalyst)
Synonyms:	Not available.
Product Use:	Recyclable Waste-Cement Manufacture. Re-use at other refineries.
Restrictions on Use:	Not available.
Manufacturer/Supplier:	Husky Oil Operations Ltd. PO Box 6525 Station 'D' Calgary, Alberta T2P 3G7
Phone Number:	403-298-6111
Emergency Phone:	403-262-2111
Date of Preparation of SDS:	March 1, 2015

Section 2: HAZARD(S) IDENTIFICATION

GHS INFORMATION

Classification: Not hazardous according to OSHA criteria (29 CFR 1910.1200).

LABEL ELEMENTS

Hazard Pictogram(s): None.

Signal Word: None.

Hazard Statements: Not applicable.

Precautionary Statements

Prevention: Not applicable.

Response: Not applicable.

Storage: Not applicable.

Disposal: Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients with Unknown Toxicity: None.

This material is not considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200).

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient(s)	Common name / Synonyms	CAS No.	% wt./wt.
Kaolin	Not available.	1332-58-7	60 - 80
Aluminum oxide (Al2O3)	Aluminum oxide	1344-28-1	30 - 45
Silica	Silicon dioxide	7631-86-9	30 - 45
Magnesium oxide (MgO)	Magnesium oxide	1309-48-4	5 - 9
Phosphorus	Not available.	7723-14-0	1 - 4
Rare Earth Oxides	Not available.	(Various)	1 - 3
Iron sulfide (FeS)	Ferrous sulfide	1317-37-9	0.1 - 1
Vanadium sulfide	Not available.	11130-24-8	0.05 - 0.08
Nickel oxide (NiO)	Nickel oxide	1313-99-1	0.01 - 0.03
Copper	Not available.	7440-50-8	0.002 - 0.009

Section 4: FIRST-AID MEASURES

Inhalation:

If inhaled: Call a poison center or doctor if you feel unwell.

Acute and delayed symptoms and effects: May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. Inhalation of Magnesium oxide can cause metal fume fever, a 24- to 48-hour flu-like illness characterized by chills, fever, aching muscles, dryness in the mouth and throat and headache. Inhalation of dusts containing Vanadium may result in respiratory irritation, skin paleness, greenish-black tongue, chest pain, cough, dyspnea, palpitation, and lung changes. This material contains Nickel which is considered toxic and may be harmful if inhaled; may produce lung damage. Lung damage may be evidenced by shortness of breath, especially on exertion, and may be accompanied by chronic cough. This product contains trace quantities of unrefined oils, excessive exposure may result in respiratory irritation, headache, dizziness, loss of appetite, weakness, loss of coordination and unconsciousness.

Eye Contact:

If in eyes: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a poison center or doctor if you feel unwell.

Acute and delayed symptoms and effects: May cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Skin Contact:

If on skin: Wash with plenty of soap and water. Call a poison center or doctor if you feel unwell. Dry-clean contaminated clothing before reuse. Inform individuals responsible for cleaning of potential hazards associated with handling contaminated clothing. Destroy contaminated non-resistant footwear.

Acute and delayed symptoms and effects: May cause skin irritation. Signs/symptoms may include localized redness, swelling, and itching. Nickel is a contact allergen and sensitizer.

Ingestion: If swallowed: Call a poison center or doctor if you feel unwell. If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration. Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

Acute and delayed symptoms and effects: May cause gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show the label or SDS where possible).

Note to Physicians: Symptoms may not appear immediately.

Section 5: FIRE-FIGHTING MEASURES

FLAMMABILITY AND EXPLOSION INFORMATION
Not flammable or combustible by OSHA/WHMIS criteria. Finely powdered iron sulfide is pyrophoric and will ignite spontaneously in air.

Sensitivity to Mechanical Impact: This material is not sensitive to mechanical impact.
Sensitivity to Static Discharge: This material is not sensitive to static discharge.

MEANS OF EXTINCTION
Suitable Extinguishing Media: Small Fire: Dry chemical, CO_2, water spray or regular foam.

Large Fire: Water spray, fog or regular foam. Move containers from fire area if you can do it without risk.

Unsuitable Extinguishing Media: Not available.

Products of Combustion: Oxides of sulphur. Oxides of phosphorus. Oxides of nickel. Oxides of vanadium. Oxides of iron. Oxides of silicon. Aluminum oxide. Oxides of copper.

Protection of Firefighters: Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may cause pollution. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6: ACCIDENTAL RELEASE MEASURES

Emergency Procedures: Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering.

Personal Precautions: Do not touch or walk through spilled material. Use personal protection recommended in Section 8.

Environmental Precautions: Keep out of drains, sewers, ditches, and waterways.

Methods for Containment: Do not flush to sewer or allow to enter waterways.

Methods for Clean-Up: Sweep up and shovel into suitable containers for disposal.

Other Information: See Section 13 for disposal considerations.

Section 7: HANDLING AND STORAGE

Handling:
Do not swallow. Do not breathe dusts. Do not get in eyes, or on skin. See Section 8 for information on Personal Protective Equipment.

Storage:
Store away from incompatible materials. See Section 10 for information on Incompatible Materials. Keep out of the reach of children.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines
Component

Kaolin [CAS No. 1332-58-7]

ACGIH: 2 mg/m³ (TWA); A4; The value is for particulate matter containing no asbestos and < 1% crystalline silica; Respirable fraction (1990)

OSHA: 15 mg/m³ (Total dust) (TWA), 5 mg/m³ (Respirable fraction) (TWA); 10 mg/m³ (Total dust) (TWA) [Vacated];

Aluminum oxide [CAS No. 1344-28-1]

ACGIH: 1 mg/m³ (TWA); A4; Respirable fraction (2007); For Aluminum metal and Insoluble compounds

OSHA: No PEL established.

Silicon dioxide [CAS No. 7631-86-9]

ACGIH: 0.025 mg/m³ (TWA); A2; Respirable fraction (2009)

OSHA: 30 / (%SiO2 + 2) mg/m³ Quartz (Total dust) (TWA), 10 / (%SiO2 + 2) mg/m³ Quartz (Respirable) & 250 / (%SiO2 + 5) mppcf Quartz (Respirable) (TWA); See Table Z3.
0.1 mg/m³ (As respirable quartz) (TWA) [Vacated];

Magnesium oxide [CAS No. 1309-48-4]

ACGIH: 10 mg/m³ (TWA); A4; Inhalable fraction (2000)

OSHA: 15 mg/m³ (Total particulate, fume) (TWA);
10 mg/m³ (Total dust) (TWA) [Vacated];

Phosphorus [CAS No. 7723-14-0]

ACGIH: No TLV established.

OSHA: 0.1 mg/m³ (TWA);

Rare Earth Oxides [CAS No. (Various)]

ACGIH: 10 mg/m³ (TWA) (Inhalable.); 3 mg/m³ (TWA) (Respirable.); For Particles (Insoluble or Poorly Soluble) Not Otherwise Specified

OSHA: 15 mg/m³ (Total dust) (TWA), 5 mg/m³ (Respirable fraction) (TWA); For Particulates Not Otherwise Regulated (PNOR).

Ferrous sulfide [CAS No. 1317-37-9]

ACGIH: 10 mg/m³ (TWA) (Inhalable.); 3 mg/m³ (TWA) (Respirable.); For Particles (Insoluble or Poorly Soluble) Not Otherwise Specified

OSHA: 15 mg/m³ (Total dust) (TWA), 5 mg/m³ (Respirable fraction) (TWA); For Particulates Not Otherwise Regulated (PNOR).

Vanadium sulfide [CAS No. 11130-24-8]

ACGIH: 0.05 mg/m³ (TWA); A3; Inhalable fraction (2008)
OSHA: 0.5 mg/m³ (Respirable dust, as V2O5) (C); For Vanadium (V2O5) dust, respirable.
0.05 mg/m³ (TWA) [Vacated]; For Vanadium (V2O5) dust, respirable.

Nickel oxide [CAS No. 1313-99-1]

ACGIH: 0.2 mg/m³ (TWA); A1; Inhalable fraction (1996); For Nickel, as Ni, Insoluble inorganic compounds (NOS)
OSHA: 1 mg/m³ (as Ni) (TWA); For Nickel.
0.1 mg/m³ (TWA) [Vacated]; For Nickel.

Copper [CAS No. 7440-50-8]

ACGIH: 0.2 mg/m³ (TWA); (1990); For Fune, as Cu
OSHA: 0.1 mg/m³ Fume (as Cu) (TWA), 1 mg/m³ Dusts and mists (as Cu) (TWA);

PEL: Permissible Exposure Limit
TLV: Threshold Limit Value
TWA: Time-Weighted Average
STEL: Short-Term Exposure Limit
C: Ceiling

Engineering Controls: Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapour, gas, etc.) below recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye/Face Protection: Wear safety glasses. Indirect vented, dust-tight goggles are required if dust is generated when handling this product. Use equipment for eye protection that meets the standards referenced by CSA Standard CAN/CSA-Z94.3-92 and OSHA regulations in 29 CFR 1910.133 for Personal Protective Equipment.

Hand Protection: Wear protective gloves. Consult manufacturer specifications for further information.

Skin and Body Protection: Wear protective clothing.

Respiratory Protection: If engineering controls and ventilation are not sufficient to control exposure to below the allowable limits then an appropriate NIOSH/MSHA approved air-purifying respirator that meets the requirements of CSA Standard CAN/CSA-Z94.4-11, with particulate filter, or self-contained breathing apparatus must be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.

General Hygiene Considerations: Handle according to established industrial hygiene and safety practices. Consult a competent industrial hygienist to determine hazard potential and/or the PPE manufacturers to ensure adequate protection.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Solid powder, white, light grey, dark gray or black.
Colour:	White, light grey, dark gray or black.
Odour:	Odourless.
Odour Threshold:	Not available.
Physical State:	Solid.
pH:	Not available.
Melting Point / Freezing Point:	2072 °C (3761.6 °F) (Al_2O_3)
Initial Boiling Point:	Not available.
Boiling Range:	Not available.
Flash Point:	Not available.
Evaporation Rate:	Not available.
Flammability (solid, gas):	See Section 5.
Lower Flammability Limit:	Not available.
Upper Flammability Limit:	Not available.
Vapor Pressure:	Not available.
Vapor Density:	Not available.
Relative Density:	0.9 (Water = 1)
Solubilities:	Insoluble in water.
Partition Coefficient: n-Octanol/Water:	Not available.
Auto-ignition Temperature:	Not available.
Decomposition Temperature:	Not available.
Viscosity:	Not available.
Percent Volatile, wt. %:	Not available.
VOC content, wt. %:	Not available.
Density:	0.7 to 1.1 g/cm^3
Coefficient of Water/Oil Distribution:	Not available.

Section 10: STABILITY AND REACTIVITY

Reactivity: Contact with incompatible materials. Sources of ignition. Exposure to heat.

Chemical Stability: Stable under normal storage conditions.

Possibility of Hazardous Reactions: None known.

Conditions to Avoid: Contact with incompatible materials. Sources of ignition. Exposure to heat.

Incompatible Materials: Acids. Strong oxidizers. Halogens. Chlorine trifluoride. Ethylene oxide.

Hazardous Decomposition Products: The nickel in this product is chemically bound and will not produce nickel carbonyl. The phosphorous contained in this product is chemically bound and will not be released as highly reactive phosphorous pentoxide.

Section 11: TOXICOLOGICAL INFORMATION

EFFECTS OF ACUTE EXPOSURE

Product Toxicity

Oral: Not available.

Dermal: Not available.

Inhalation: Not available.

Component Toxicity

Component	CAS No.	LD_{50} oral	LD_{50} dermal	LC_{50}
Kaolin	1332-58-7	Not available.	Not available.	Not available.
Aluminum oxide	1344-28-1	Not available.	Not available.	Not available.
Silicon dioxide	7631-86-9	> 5000 mg/kg (rat)	Not available.	> 2190 mg/m³ (rat); 4H
Magnesium oxide	1309-48-4	Not available.	Not available.	Not available.
Phosphorus	7723-14-0	3.03 mg/kg (rat)	Not available.	Not available.
Rare Earth Oxides	(Various)	Not available.	Not available.	Not available.
Ferrous sulfide	1317-37-9	Not available.	Not available.	Not available.
Vanadium sulfide	11130-24-8	Not available.	Not available.	Not available.
Nickel oxide	1313-99-1	5000 mg/kg (rat)	Not available.	Not available.
Copper	7440-50-8	Not available.	Not available.	Not available.

Likely Routes of Exposure: Eye contact. Skin contact. Inhalation. Ingestion.

Target Organs: Skin. Eyes. Gastrointestinal tract. Respiratory system. Lungs. Blood. Liver. Kidneys. Central nervous system. Teeth.

Symptoms (including delayed and immediate effects)

Inhalation: May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. Inhalation of Magnesium oxide can cause metal fume fever, a 24- to 48-hour flu-like illness characterized by chills, fever, aching muscles, dryness in the mouth and throat and headache. Inhalation of dusts containing Vanadium may result in respiratory irritation, skin paleness, greenish-black tongue, chest pain, cough, dyspnea, palpitation, and lung changes. This material contains Nickel which is considered toxic and may be harmful if inhaled; may produce lung damage. Lung damage may be evidenced by shortness of breath, especially on exertion, and may be accompanied by chronic cough. This product contains trace quantities of unrefined oils, excessive exposure may result in respiratory irritation, headache, dizziness, loss of appetite, weakness, loss of coordination and unconsciousness.

Eye: May cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Skin: May cause skin irritation. Signs/symptoms may include localized redness, swelling, and itching. Nickel is a contact allergen and sensitizer.

Ingestion: May cause gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Skin Sensitization: Repeated or prolonged contact with Copper dust may cause skin sensitization.

Respiratory Sensitization: Not available.

Medical Conditions Aggravated By Exposure: Asthma. Emphysema.

EFFECTS OF CHRONIC EXPOSURE (from short and long-term exposure)

Target Organs: Skin. Eyes. Gastrointestinal tract. Respiratory system. Lungs. Blood. Liver. Kidneys. Central nervous system. Teeth.

Chronic Effects: Prolonged or repeated contact may dry skin and cause irritation. Chronic inhalation of Kaolin may cause a mild type of pneumoconiosis called Kaolinosis, characterized by positive x-ray findings and mild reductions in pulmonary function. Pure Kaolin is not fibrogenic and does not induce debilitating silicosis. However, if it is contaminated with crystalline silica it may produce severe lung effects, including emphysema and pulmonary fibrosis due to the contaminating silica. Overexposure to Nickel can cause sensitization, dermatitis, allergic asthma and pneumonitis.

Carcinogenicity: Product is not classified as a carcinogen. See Component Carcinogenicity table below for information on individual components. Repeated or excessive exposure to high concentrations of Nickel dust may cause lung or nasal cancer.

Component Carcinogenicity

Component	ACGIH	IARC	NTP	OSHA	Prop 65
Kaolin	A4	Not listed.	Not listed.	Not listed.	Not listed.
Aluminum oxide	A4	Not listed.	Not listed.	Not listed.	Not listed.
Silicon dioxide	A2	Group 3	List 1	OSHA Carcinogen.	Listed.
Magnesium oxide	A4	Not listed.	Not listed.	Not listed.	Not listed.
Vanadium sulfide	A3	Not listed.	Not listed.	Not listed.	Not listed.
Nickel oxide	A1	Not listed.	Not listed.	OSHA Carcinogen.	Listed.

Mutagenicity: Not available.

Reproductive Effects: Not available.

Developmental Effects

Teratogenicity: Not available.

Embryotoxicity: Not available.

Toxicologically Synergistic Materials: Not available.

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: Not available.

Persistence / Degradability: Not available.

Bioaccumulation / Accumulation: Not available.

Mobility in Environment: Not available.

Other Adverse Effects: Not available.

Section 13: DISPOSAL CONSIDERATIONS

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

Section 14: TRANSPORT INFORMATION

U.S. Department of Transportation (DOT)

Proper Shipping Name: Not regulated.

Class: Not applicable.

UN Number: Not applicable.

Packing Group: Not applicable.

Label Code: Not applicable.

Canada Transportation of Dangerous Goods (TDG)

Proper Shipping Name: Not regulated.

Class: Not applicable.

UN Number: Not applicable.

Packing Group: Not applicable.

Label Code: Not applicable.

Section 15: REGULATORY INFORMATION

Chemical Inventories

US (TSCA)
The components of this product are in compliance with the chemical notification requirements of TSCA.

Canada (DSL)
The components of this product are in compliance with the chemical notification requirements of the NSN Regulations under CEPA, 1999.

Federal Regulations

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

WHMIS Classification: Not a controlled product.

Hazard Symbols: None.

United States
This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SARA Title III

Component	Section 302 (EHS) TPQ (lbs.)	Section 304 EHS RQ (lbs.)	CERCLA RQ (lbs.)	Section 313	RCRA CODE	CAA 112(r) TQ (lbs.)
Aluminum oxide	Not listed.	Not listed.	Not listed.	313	Not listed.	Not listed.
Phosphorus	100	1	1	313	Not listed.	Not listed.
Vanadium sulfide	Not listed.	Not listed.	Not listed.	313	Not listed.	Not listed.
Copper	Not listed.	Not listed.	5000	313	Not listed.	Not listed.

State Regulations
Massachusetts
US Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Component	CAS No.	RTK List
Kaolin	1332-58-7	Listed.
Aluminum oxide	1344-28-1	Listed.
Silicon dioxide	7631-86-9	Listed.
Magnesium oxide	1309-48-4	Listed.
Phosphorus	7723-14-0	E
Ferrous sulfide	1317-37-9	Listed.
Vanadium sulfide	11130-24-8	Listed.
Nickel oxide	1313-99-1	E
Copper	7440-50-8	Listed.

Note: E = Extraordinarily Hazardous Substance

New Jersey

US New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Component	CAS No.	RTK List
Kaolin	1332-58-7	Listed.
Aluminum oxide	1344-28-1	Listed.
Silicon dioxide	7631-86-9	SHHS
Magnesium oxide	1309-48-4	Listed.
Phosphorus	7723-14-0	SHHS
Vanadium sulfide	11130-24-8	Listed.
Nickel oxide	1313-99-1	SHHS
Copper	7440-50-8	Listed.

Note: SHHS = Special Health Hazard Substance

Pennsylvania

US Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Component	CAS No.	RTK List
Kaolin	1332-58-7	Listed.
Aluminum oxide	1344-28-1	E
Silicon dioxide	7631-86-9	Listed.
Magnesium oxide	1309-48-4	Listed.
Phosphorus	7723-14-0	E
Ferrous sulfide	1317-37-9	Listed.
Vanadium sulfide	11130-24-8	E
Nickel oxide	1313-99-1	ES
Copper	7440-50-8	Listed.

Note: E = Environmental Hazard; S = Special Hazardous Substance

California

California Prop 65: WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Component	Type of Toxicity
Silicon dioxide	cancer
Nickel oxide	cancer

Section 16: OTHER INFORMATION

Disclaimer:

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for their own particular use.

Date of Preparation of SDS: March 1, 2015

SDS Expiry Date (Canada): February 28, 2018

Version: 1.0

GHS SDS Prepared by: **Deerfoot Consulting Inc.**

Phone: (403) 720-3700