



June 13, 2016

Ms. Beverly McKeone  
NSR Permitting Program Manager  
West Virginia Department of Environmental Protection  
Division of Air Quality  
601 57<sup>th</sup> Street SE  
Charleston, WV 25304

**Subject: TRANSFLO Terminal Services, Inc., Fairmont, West Virginia  
Permit Determination Request, WV DEP Permit R13-2962**

Dear Ms. McKeone:

TRANSFLO Terminal Services, Inc. (TRANSFLO) operates the above referenced material transloading facility located in Fairmont, West Virginia. TRANSFLO also operates a material transloading operation in Clarksburg, West Virginia. These two facilities are located approximately 20 miles apart. Due to current business conditions (i.e., somewhat reduced operating volumes), TRANSFLO is consolidating the two operations to the Fairmont facility. That is, the operations at Clarksburg will be moved to the Fairmont facility.

This consolidation was discussed with Mr. Steven Pursley of the West Virginia Department of Air Quality (WV DEP) on June 7, 2016. Based on these discussions, we believe that this consolidation does not require a permit as explained following in this letter. This letter, the enclosed Permit Determination Request form (Attachment 1), and supporting information are provided to allow the DEP to review the pertinent information and issue a permit determination.

This letter is organized in the following manner:

- Historical Operations / Permit Status
  - Fairmont
  - Clarksburg
- Consolidated Operations

#### **Historical Operations / Permit Status**

The historical operations and air permit status for the Fairmont and Clarksburg facilities are discussed in this section. Of particular note, the Fairmont permit and the Clarksburg exemptions were obtained during a time of substantial oil exploration and drilling in the region. The anticipated frac sand throughput was based on projections during the peak of the petroleum fracking activity. The current frac sand transfer rates are considerably less than was originally anticipated.

*Fairmont*

The Fairmont facility originally operated as an exempt facility (WV DEP Permit Determination Number PD12-048, May 7, 2012) for the transfer of solid materials between railcars and trucks. This permit determination was issued based on frac sand being the primary material being transloaded. This permit determination was for the direct transfer process, that is, without intermediate on-site storage.

Plans for intermediate on-site frac sand storage were developed after this initial permit determination. Based on potential increases in emissions at the site due to the on-site storage in addition to the direct material transfer, Construction Permit Number 049-00149 was issued on November 9, 2012. This permit provides for three operations as separate emission units (EUs):

- EU 01 – Direct Transfer of Frac Sand;
- EU 02 – Frac Sand Transfer with Storage; and,
- EU 03 – Direct Transfer of Cement.

A recent 12-month rolling material throughput and emission report for the Fairmont facility is included in Attachment 2. As shown in this report, and summarized following, the facility operates with a substantial margin of compliance with these emission limits:

- EU 01 – Direct Transfer of Frac Sand;
  - Throughput limit = 920,000 tons per year (tpy);
  - Actual throughput = 33,672 tpy; and,
  - Actual as percent of limit = 4%.
- EU 02 – Frac Sand Transfer with Storage;
  - Throughput limit = 690,000 tpy;
  - Actual throughput = 182,259 tpy; and,
  - Actual as percent of limit = 26%.
- EU 03 – Direct Transfer of Cement;
  - Throughput limit = 57,500 tpy;
  - Actual throughput = 0 tpy; and,
  - Actual as percent of limit = 0%.

*Clarksburg*

The Clarksburg facility (WV DEP Plant ID Number 033-00206) similarly transferred solid materials, and historically also transloaded liquid materials. A permit determination form was provided to the DEP in 1999 for the operations at this site. This permit determination form was submitted with the company name of Bulk Intermodal Distributions Services, Inc. (BIDS), which is TRANSFLO's prior name.

An updated permit determination form was submitted to the DEP in May 2012 for the transfer of frac sand and ammonium nitrate at this site. The WV DEP determined that no permit was required for the transfer of these materials (WV DEP Permit Determination Number PD12-056, June 4, 2012).

A subsequent permit determination form was submitted to the DEP in August 2013 primarily for the increased transfer volumes of frac sand at the facility. The WV DEP determined that no permit was required for the increased transfer volume of frac sand (WV DEP Permit Determination Number PD13-052, September 23, 2013).

A recent 12-month rolling material throughput and emission report for the Clarksburg facility is included in Attachment 2. As shown in this report, and summarized following, the facility operates with a substantial margin of compliance with the annual permitting thresholds of 10 tpy for particulate matter (PM) and particulate matter with aerodynamic diameter of 10 micrometers or less (PM<sub>10</sub>) for a regulated pollutant:

- Frac Sand;
  - PM emissions = 0.11 tpy; and,
  - PM<sub>10</sub> emissions = 0.01 tpy;
- Ammonium nitrate;
  - PM emissions = 0.05 tpy; and,
  - PM<sub>10</sub> emissions = 0.02 tpy.

### Consolidated Operations

Two materials were transferred in the prior 12 months at Clarksburg; frac sand and ammonium nitrate. Approximately 700 railcars (70,244 tons) of frac sand were transloaded directly between railcars and trucks, without intermediate storage. Hence, this frac sand business will be added to EU 01 at the Fairmont facility. The anticipated frac sand volume for the combined operations at the Fairmont facility is 104,000 tpy, which is approximately 11 percent of the 920,000 tpy permit limit. Hence, there is ample capacity at the Fairmont facility to allow for these combined operations.

The Fairmont facility permit does not include an emission unit that provides for the transfer of ammonium nitrate. However, the anticipated actual and potential emissions from ammonium nitrate transfer operations (listed following) are considerably less than the permitting thresholds of six pounds per hour and 10 tpy for regulated pollutants (i.e., PM and PM<sub>10</sub>).

- Actual PM emissions;
  - 0.78 pounds per hour (lbs/hr); and,
  - 0.05 tpy;
- Actual PM<sub>10</sub> emissions;
  - 0.40 lbs/hr; and,
  - 0.02 tpy;
- Potential PM emissions;
  - 0.78 lbs/hr; and,
  - 0.13 tpy;
- Potential PM<sub>10</sub> emissions;
  - 0.40 lbs/hr; and,
  - 0.072 tpy.

The potential emissions are estimated as 2.8 times the recent actual emissions. This 2.8 factor is the ratio of continuous operation (24 hours per day, 7 days per week) to the typical facility

operating schedule (10 hours per day, 6 days per week). This approach for estimating potential emissions is found to work quite well for TRANSFLO's system wide operations. Based on experience, this value conservatively accounts for (i.e., overestimates) typical increases in transfer volumes that occur from changes in market conditions. Other changes that would substantially increase material volume, such as securing a new customer for an existing material, would undergo internal review by TRANSFLO's Health, Safety, Environmental, and Quality (HSE&Q) staff. Thus, it is believed that the 2.8 ratio of potential to actual emissions is appropriate for the ammonium nitrate transfer operations.

Based on the estimated actual and potential emissions from the transfer of ammonium nitrate, we believe these operations to qualify for a permit exemption. This exemption was discussed with Mr. Steven Pursley of the DEP on June 7, 2016.

### Closing

Should you have any questions as you review this Permit Determination Request, please contact me by telephone at (904) 494-4200, or by e-mail at [haitinc@gmail.com](mailto:haitinc@gmail.com). Ms. Becky Heilman, TRANSFLO Manager; HSE&Q may also be reached by telephone at (904) 359-1337 or by e-mail at [bheilman@transflo.net](mailto:bheilman@transflo.net).

Sincerely,



Mitchell J. Hait, Ph.D., P.E.  
President

### Attachments:

1. Permit Determination Form
  - a. Area Map
  - b. Process Flow Diagram
  - c. Process Description
  - d. MSDS
    - i. Frac Sand
    - ii. Ammonium Nitrate
  - e. Emission Estimates
2. Recent 12-Month Rolling Total Database Reports
  - a. Fairmont
  - b. Clarksburg

**Attachment 1:**  
**Permit Determination Form**



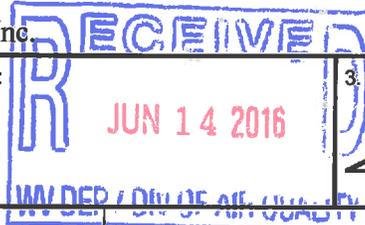
WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
DIVISION OF AIR QUALITY  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304  
Phone: (304) 926-0475  
www.dep.wv.gov/daq

**PERMIT DETERMINATION FORM  
(PDF)**

FOR AGENCY USE ONLY: PLANT I.D. # \_\_\_\_\_  
PDF # \_\_\_\_\_ PERMIT WRITER \_\_\_\_\_

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE):

TRANSFLO Terminal Services, Inc.



2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):

TRANSFLO Fairmont Facility

3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE:

**488110**

4A. MAILING ADDRESS:

500 Water Street, J-975, Jacksonville, FL, 32202-4423

4B. PHYSICAL ADDRESS:

900 Washington Street, Fairmont, WV 26554

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A): I-79 North to Exit 136 to Co Rd 21/2/Stoney Road, 0.4 miles turn left on Fairmont Gateway Connector NW Virginia 273 N, 0.8 miles straight through traffic circle, 0.2 miles continue on Jefferson Street, 0.3 miles turn right on Washington Street, 0.7 miles to TRANSFLO on right.

5B. NEAREST ROAD:

Jefferson and Washington

5C. NEAREST CITY OR TOWN:

Fairmont

5D. COUNTY:

Marion

5E. UTM NORTHING (KM):

4371.04810

5F. UTM EASTING (KM):

574.73299

5G. UTM ZONE:

17

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:

Becky Heilman

6B. TITLE:

Manager, HSE&Q

6C. TELEPHONE:

(904) 359-1337

6D. FAX:

(904) 245-2228

6E. E-MAIL:

bheilman@transflo.net

7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY):

**049 - 00149**

7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19 AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED WITH THIS PROCESS (FOR AN EXISTING FACILITY ONLY):

**R13-2962**

7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST: **No**

8A. TYPE OF EMISSION SOURCE (CHECK ONE):

- NEW SOURCE     ADMINISTRATIVE UPDATE  
 MODIFICATION     OTHER (PLEASE EXPLAIN IN 11B)

8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE APPLICANT'S CONSENT TO UPDATE THE EXISTING PERMIT WITH THE INFORMATION CONTAINED HEREIN?

- YES     NO    Not Applicable

9. IS DEMOLITION OR PHYSICAL RENOVATION AT AN EXISTING FACILITY INVOLVED?     YES     NO

10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE:

06 / 07 / 2016 .

10B. DATE OF ANTICIPATED START-UP:

06 / 07 / 2016 .

11A. PLEASE PROVIDE A DETAILED PROCESS FLOW DIAGRAM SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS ATTACHMENT B.

11B. PLEASE PROVIDE A DETAILED PROCESS DESCRIPTION AS ATTACHMENT C.

12. PLEASE PROVIDE MATERIAL SAFETY DATA SHEETS (MSDS) FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS ATTACHMENT D. FOR CHEMICAL PROCESSES, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.

**13A. REGULATED AIR POLLUTANT EMISSIONS:**

⇒ **FOR A NEW FACILITY**, PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.

⇒ **FOR AN EXISTING FACILITY**, PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.

*PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.*

POLLUTANT	HOURLY PTE (LB/HR)	YEARLY PTE (TON/YR) (HOURLY PTE MULTIPLIED BY 8760 HR/YR) DIVIDED BY 2000 LB/TON
PM	0.784	0.13
PM <sub>10</sub>	0.398	0.07
VOCs	n/a	n/a
CO	n/a	n/a
NO <sub>x</sub>	n/a	n/a
SO <sub>2</sub>	n/a	n/a
Pb	n/a	n/a
HAPs (AGGREGATE AMOUNT)	n/a	n/a
TAPs (INDIVIDUALLY)*	n/a	n/a
OTHER (INDIVIDUALLY)*	n/a	n/a

\* ATTACH ADDITIONAL PAGES AS NEEDED

**13B. PLEASE PROVIDE ALL SUPPORTING CALCULATIONS AS ATTACHMENT E.**

*CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112[b] OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).*

**14. CERTIFICATION OF DATA**

I, JAN M. BARNES (TYPE NAME) ATTEST THAT ALL THE REPRESENTATIONS CONTAINED IN THIS APPLICATION, OR APPENDED HERETO, ARE TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE BASED ON INFORMATION AND BELIEF AFTER REASONABLE INQUIRY, AND THAT I AM A **RESPONSIBLE OFFICIAL**\*\* (PRESIDENT, VICE PRESIDENT, SECRETARY OR TREASURER, GENERAL PARTNER OR SOLE PROPRIETOR) OF THE APPLICANT.

SIGNATURE OF RESPONSIBLE OFFICIAL: \_\_\_\_\_

*Jan Barnes*

TITLE: DIRECTOR, HSE & Q

DATE: 06/13/2016

\*\* THE DEFINITION OF THE PHRASE 'RESPONSIBLE OFFICIAL' CAN BE FOUND AT 45CSR13, SECTION 2.23.

**NOTE: PLEASE CHECK ENCLOSED ATTACHMENTS:**

ATTACHMENT A    ATTACHMENT B    ATTACHMENT C    ATTACHMENT D    ATTACHMENT E

*RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.*

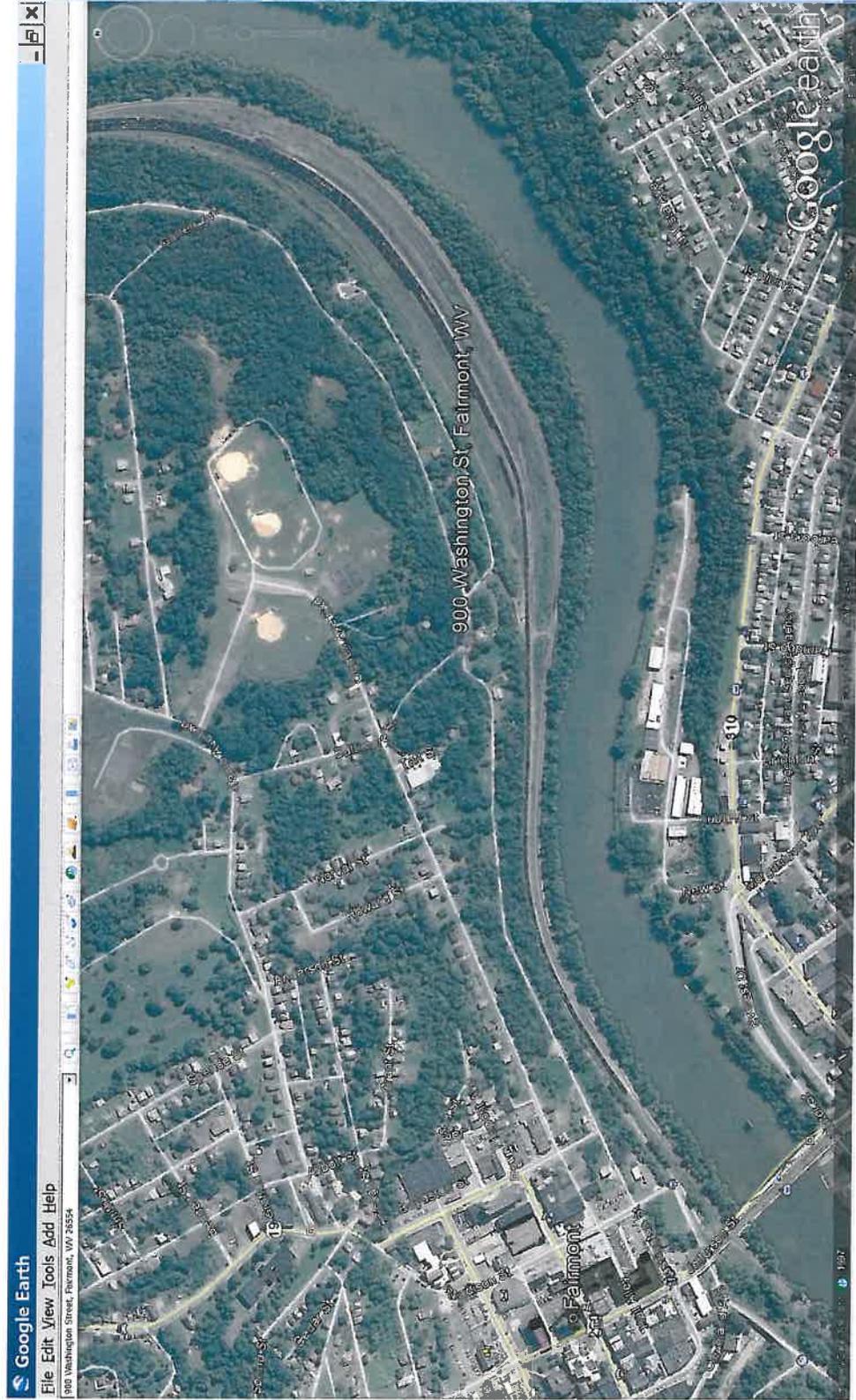
THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE:

[www.dep.wv.gov/daq](http://www.dep.wv.gov/daq)

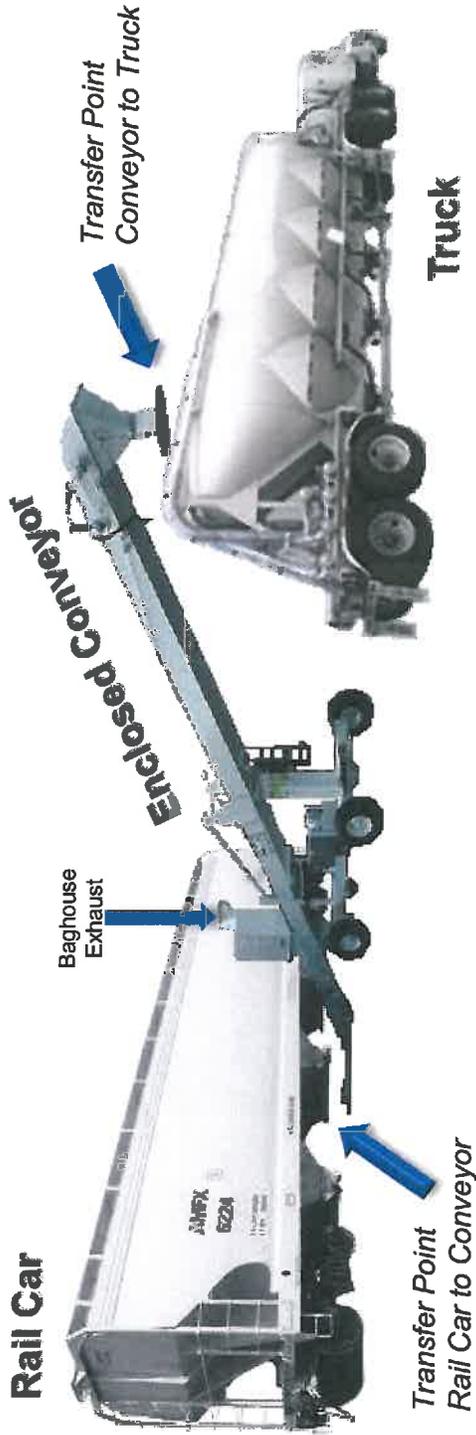
**Attachment 1a:**

**Area Map**

# TRANSFLO Fairmont, West Virginia Area Map



**Attachment 1b:**  
**Process Flow Diagram**



Mitchell J. Hait, Ph.D., P.E., Inc.  
 904/494-4200 (office)  
 904/392-5771 (cellular)  
 Haitinc@gmail.com

TITLE: **Process Flow Diagram 5: Conveyor Solid Transfer – Railcar to Truck**

DATE: **12/26/2012**

REV: **---1---**

CLIENT: **TRANSFLO Terminal Services, Inc.**

**Attachment 1c:**  
**Process Description**

**Please see cover letter for process description.**

**Attachment 1d:**

**MSDS**

# U. S. SILICA COMPANY

## MSDS - MATERIAL SAFETY DATA SHEET

### SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

#### Product Names/Trade Names:

Silica Sand sold under various names: ASTM TESTING SANDS • GLASS SAND • FLINT SILICA • DM-SERIES • F-SERIES • FOUNDRY SANDS • FJ-SERIES • FP-SERIES • H-SERIES • L-SERIES • N-SERIES • NJ-SERIES • OK-SERIES • P-SERIES • T-SERIES • HYDRAULIC FRACING SANDS • MIN-U-SIL® Ground Silica • MYSTIC WHITE® • #1 DRY • #1 SPECIAL • PENN SAND® • Q-ROK® • SIL-CO-SIL® Ground Silica • SUPERSIL® • MASON SAND • GS-SERIES • PER-SPEC

Synonyms/Common Names: Sand, Silica Sand, Quartz, Crystalline Silica, Flint, Ground Silica.

Manufacturer's Name: U. S. Silica Company  
P. O. Box 187  
Berkeley Springs, WV 25411

Emergency Telephone Number: 304-258-2500 (8:30 am to 5:00 pm eastern)  
304-258-8295 (fax)

Date Prepared: February 10, 2005

### SECTION 2 - HAZARD IDENTIFICATION

#### EMERGENCY OVERVIEW:

The U. S. Silica Company material is a white or tan sand, or ground sand. It is not flammable, combustible or explosive. It does not cause burns or severe skin or eye irritation. A single exposure will not result in serious adverse health effects. Crystalline silica (quartz) is not known to be an environmental hazard.

Crystalline silica (quartz) is incompatible with hydrofluoric acid, fluorine, chlorine trifluoride or oxygen difluoride.

#### OSHA REGULATORY STATUS

This material is considered hazardous under the OSHA Hazard Communications Standard (29 CFR 1910.1200).

#### POTENTIAL HEALTH EFFECTS:

##### Inhalation:

- a. Silicosis Respirable crystalline silica (quartz) can cause silicosis, a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death.
- b. Lung Cancer Crystalline silica (quartz) inhaled from occupational sources is classified as carcinogenic to humans.
- c. Tuberculosis Silicosis increases the risk of tuberculosis.
- d. Autoimmune and Chronic Kidney Diseases Some studies show excess numbers of cases of scleroderma, connective tissue disorders, lupus, rheumatoid arthritis, chronic kidney diseases and end-stage kidney disease in workers exposed to respirable crystalline silica.
- e. Non-Malignant Respiratory Diseases (other than silicosis) Some studies show an increased incidence in chronic bronchitis and emphysema in workers exposed to respirable crystalline silica.

Eye Contact: Crystalline silica (quartz) may cause abrasion of the cornea.

Skin Contact: Not applicable.

Ingestion: Not applicable.

**Chronic Effects:** The adverse health effects -- silicosis, lung cancer, autoimmune and chronic kidney diseases, tuberculosis, and non-malignant respiratory diseases-- are chronic effects.

**Signs and Symptoms of Exposure:** Generally, there are no signs or symptoms of exposure to crystalline silica (quartz).

**Medical Conditions Generally Aggravated by Exposure:** The condition of individuals with lung disease (e.g., bronchitis, emphysema, chronic obstructive pulmonary disease) can be aggravated by exposure.

See Section 11, Toxicological Information, for additional detail on potential adverse health effects.

### SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

**Ingredients:**

	Chemical Formula	Typical %, By Weight	CAS #
Crystalline Silica (quartz)	SiO <sub>2</sub>	99.0 - 99.9	14808-60-7
Aluminum Oxide	Al <sub>2</sub> O <sub>3</sub>	< .8	1344-28-1
Iron Oxide	Fe <sub>2</sub> O <sub>3</sub>	< .1	1309-37-1
Titanium Oxide	TiO <sub>2</sub>	< .1	13463-67-7

### SECTION 4 - FIRST AID MEASURES

**Inhalation:** No specific first-aid is necessary since the adverse health effects associated with exposure to crystalline silica (quartz) result from chronic exposures. If there is a gross inhalation of crystalline silica (quartz), remove the person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

**Eye Contact:** Wash immediately with water. If irritation persists, seek medical attention.

**Skin Contact:** Not applicable.

**Ingestion:** Not applicable.

### SECTION 5 - FIRE FIGHTING MEASURES

Crystalline silica (quartz) is not flammable, combustible or explosive.

### SECTION 6 - ACCIDENTAL RELEASE MEASURES

**Spills:** Use dustless methods (vacuum) and place into closable container for disposal, or flush with water. Do not dry sweep. Wear protective equipment specified below.

**Waste Disposal Method:** See Section 13.

### SECTION 7 - HANDLING AND STORAGE

**Precautions During Handling and Use:** Do not breathe dust. Use adequate ventilation and dust collection. Keep airborne dust concentrations below permissible exposure limit ("PEL"). Do not rely on your sight to determine if dust is in the air. Respirable crystalline silica dust may be in the air without a visible dust cloud.

If crystalline silica dust cannot be kept below permissible limits, wear a respirator approved for silica dust when using, handling, storing or disposing of this product or bag. See Section 8 for further information on respirators. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, clean, and fit test respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing that has become dusty.

The OSHA Hazard Communication Standard, 29 CFR Sections 1910.1200, 1915.1200, 1917.28, 1918.90, 1926.59 and 1928.21, and state and local worker or community "right-to-know" laws and regulations should be strictly followed.

## Do not use U. S. Silica Company materials for sandblasting.

**Precautions During Storage:** Avoid breakage of bagged material or spills of bulk material. Use dustless methods (vacuum) and place into closable container for disposal, or flush with water. Do not dry sweep. See control measures in Section 8.

The OSHA Hazard Communication Standard, 29 CFR Sections 1910.1200, 1915.1200, 1917.28, 1918.90, 1926.59 and 1928.21, and state and local worker or community "right-to-know" laws and regulations should be strictly followed. **WARN YOUR EMPLOYEES (AND YOUR CUSTOMERS IN CASE OF RESALE) BY POSTING AND OTHER MEANS OF THE HAZARDS AND THE REQUIRED OSHA PRECAUTIONS. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT THE OSHA PRECAUTIONS.**

For additional precautions, see American Society for Testing and Materials (ASTM) standard practice E 1132-99a, "Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica."

### SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

**Local Exhaust Ventilation:** Use sufficient local exhaust ventilation to reduce the level of respirable crystalline silica to below the OSHA PEL. See ACGIH "Industrial Ventilation, A Manual of Recommended Practice" (latest edition).

#### Respiratory Protection:

If it is not possible to reduce airborne exposure levels to below the OSHA PEL with ventilation, use the table below to assist you in selecting respirators that will reduce personal exposures to below the OSHA PEL. This table is part of the NIOSH Respirator Selection Logic, 2004, Chapter III, Table 1, "Particulate Respirators". The full document can be found at [www.cdc.gov/niosh/npptl/topics/respirators](http://www.cdc.gov/niosh/npptl/topics/respirators); the user of this MSDS is directed to that site for information concerning respirator selection and use.

The assigned protection factor (APF) is the minimum anticipated level of protection provided by each type of respirator worn in accordance with an adequate respiratory protection program. For example, an APF of 10 means that the respirator should reduce the airborne concentration of a particulate by a factor of 10, so that if the workplace concentration of a particulate was 150 ug/m<sup>3</sup>, then a respirator with an APF of 10 should reduce the concentration of particulate to 15 ug/m<sup>3</sup>.

Assigned protection factor <sup>1</sup>	Type of Respirator (Use only NIOSH-certified respirators)
10	Any air-purifying elastomeric half-mask respirator equipped with appropriate type of particulate filter. <sup>2</sup> Appropriate filtering facepiece respirator. <sup>2,3</sup> Any air-purifying full facepiece respirator equipped with appropriate type of particulate filter. <sup>2</sup> Any negative pressure (demand) supplied-air respirator equipped with a half-mask.
25	Any powered air-purifying respirator equipped with a hood or helmet and a high efficiency (HEPA) filter. Any continuous flow supplied-air respirator equipped with a hood or helmet.
50	Any air-purifying full facepiece respirator equipped with N-100, R-100, or P-100 filter(s). Any powered air-purifying respirator equipped with a tight-fitting facepiece (half or full facepiece) and a high-efficiency filter. Any negative pressure (demand) supplied-air respirator equipped with a full facepiece. Any continuous flow supplied-air respirator equipped with a tight-fitting facepiece (half or full facepiece). Any negative pressure (demand) self-contained respirator equipped with a full facepiece.
1,000	Any pressure-demand supplied-air respirator equipped with a half-mask.

1. The protection offered by a given respirator is contingent upon (1) the respirator user adhering to complete program requirements (such as the ones required by OSHA in 29CFR1910.134), (2) the use of NIOSH-certified respirators in their approved configuration, and (3) individual fit testing to rule out those respirators that cannot achieve a good fit on individual workers.

2. Appropriate means that the filter medium will provide protection against the particulate in question.

3. An APF of 10 can only be achieved if the respirator is qualitatively or quantitatively fit tested on individual workers.

**Exposure Guidelines:**

Component	CAS No.	Percentage (by wt.)	OSHA PEL		ACGIH TLV		NIOSH REL		Unit
			TWA	STEL	TWA	STEL	TWA	STEL	
Crystalline Silica (quartz)	14808-60-7	99.0-99.9	$\frac{10}{\% \text{ SiO}_2 + 2}$	None	.05	None	.05	None	mg/m <sup>3</sup>

If crystalline silica (quartz) is heated to more than 870°C, it can change to a form of crystalline silica known as trydimite; if crystalline silica (quartz) is heated to more than 1470°C, it can change to a form of crystalline silica known as cristobalite. The OSHA PEL for crystalline silica as trydimite or cristobalite is one-half of the OSHA PEL for crystalline silica (quartz).

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b>	White or tan sand; granular, crushed, or ground.		
<b>Boiling Point:</b>	4046°F/2230°C	<b>Odor:</b>	None
<b>Vapor Pressure (mm Hg.):</b>	None	<b>Specific Gravity (Water = 1):</b>	2.65
<b>Vapor Density (Air = 1):</b>	None	<b>Melting Point:</b>	2930°F/1610°C
<b>Solubility in Water:</b>	Insoluble in water	<b>Evaporation Rate (Butyl Acetate = 1):</b>	None

**SECTION 10 - STABILITY AND REACTIVITY**

**Stability:** Crystalline silica (quartz) is stable.

**Incompatibility (Materials to Avoid):** Contact with powerful oxidizing agents, such as fluorine, chlorine trifluoride and oxygen difluoride, may cause fires.

**Hazardous Decomposition or Byproducts:** Silica will dissolve in hydrofluoric acid and produce a corrosive gas - silicon tetrafluoride.

**Hazardous Polymerization:** Will not occur.

**SECTION 11 - TOXICOLOGICAL INFORMATION**

The method of exposure to crystalline silica that can lead to the adverse health effects described below is inhalation.

**A. SILICOSIS**

The major concern is silicosis, caused by the inhalation and retention of respirable crystalline silica dust. Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute.

Chronic or Ordinary Silicosis (often referred to as Simple Silicosis) is the most common form of silicosis, and can occur after many years of exposure to relatively low levels of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis.

Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function or disability.

Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath, wheezing, cough and sputum production. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pulmonale).

Accelerated Silicosis can occur with exposure to high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of initial exposure. Progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that lung lesions appear earlier and progression is more rapid.

Acute Silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis is fatal.

## **B. CANCER**

IARC - The International Agency for Research on Cancer ("IARC") concluded that there was "*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources", and that there is "*sufficient evidence* in experimental animals for the carcinogenicity of quartz and cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans (Group 1)*." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 68, "Silica, Some Silicates..." (1997).

NTP - The National Toxicology Program, in its Ninth Annual Report on Carcinogens, classified "silica, crystalline (respirable)" as a known human carcinogen.

OSHA - Crystalline silica (quartz) is not regulated by the U. S. Occupational Safety and Health Administration as a carcinogen.

## **C. AUTOIMMUNE DISEASES**

Several studies have reported excess cases of several autoimmune disorders, -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis -- among silica-exposed workers. For a review of the subject, the following may be consulted: "Occupational Exposure to Crystalline Silica and Autoimmune Disease", Environmental Health Perspectives, Volume 107, Supplement 5, pp. 793-802 (1999); "Occupational Scleroderma", Current Opinion in Rheumatology, Volume 11, pp. 490-494 (1999).

## **D. TUBERCULOSIS**

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to persons with tuberculosis. The following may be consulted for further information: Occupational Lung Disorders, Third Edition, Chapter 12, entitled "Silicosis and Related Diseases", Parkes, W. Raymond (1994); "Risk of pulmonary tuberculosis relative to silicosis and exposure to silica dust in South African gold miners," Occup Environ Med., Volume 55, pp.496-502 (1998).

## **E. KIDNEY DISEASE**

Several studies have reported excess cases of kidney diseases, including end stage renal disease, among silica-exposed workers. For additional information on the subject, the following may be consulted: "Kidney Disease and Silicosis", Nephron, Volume 85, pp. 14-19 (2000).

## **F. NON-MALIGNANT RESPIRATORY DISEASES**

The reader is referred to Section 3.5 of the NIOSH Special Hazard Review cited below, for information concerning the association between exposure to crystalline silica and chronic bronchitis, emphysema and small airways disease. There are studies that disclose an association between dusts found in various mining occupations and non-malignant respiratory diseases, particularly among smokers. It is unclear whether the observed associations exist only with underlying silicosis, only among smokers, or result from exposure to mineral dusts generally (independent of the presence or absence of crystalline silica, or the level of crystalline silica in the dust).

### Sources of information:

The *NIOSH Hazard Review - Occupational Effects of Occupational Exposure to Respirable Crystalline Silica* published in April 2002 summarizes and discusses the medical and epidemiological literature on the health risks and diseases associated with occupational exposures to respirable crystalline silica. The *NIOSH Hazard Review* should be consulted for additional information, and citations to published studies on health risks and diseases associated with occupational exposure to respirable crystalline silica. The *NIOSH Hazard Review* is available from NIOSH - Publications Dissemination, 4676 Columbia Parkway, Cincinnati, OH 45226, or by calling 1-800-35-NIOSH (1-800-356-4676), or through the NIOSH web site, [www.cdc.gov/niosh/topics/silica](http://www.cdc.gov/niosh/topics/silica), then click on the link "NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica".

## **SECTION 12 - ECOLOGICAL INFORMATION**

Crystalline silica (quartz) is not known to be ecotoxic; i.e., there are no data that suggests that crystalline silica (quartz) is toxic to birds, fish, invertebrates, microorganisms or plants.

## SECTION 13 - DISPOSAL CONSIDERATIONS

**General:** The packaging and material may be landfilled; however, material should be covered to minimize generation of airborne dust.

**RCRA:** Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

The above applies to materials as sold by U. S. Silica Company. The material may be contaminated during use, and it is the responsibility of the user to assess the appropriate disposal of the used material.

## SECTION 14 - TRANSPORT INFORMATION

Crystalline silica (quartz) is not a hazardous material for purposes of transportation under the U. S. Department of Transportation Table of Hazardous Materials, 49 CFR §172.101.

## SECTION 15 - REGULATORY INFORMATION

### UNITED STATES (FEDERAL AND STATE)

**TSCA No.:** Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14808-60-7.

**RCRA:** Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

**CERCLA:** Crystalline silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.

**Emergency Planning and Community Right to Know Act (SARA Title III):** Crystalline silica (quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

**Clean Air Act:** Crystalline silica (quartz) mined and processed by U.S. Silica Company is not processed with or does not contain any Class I or Class II ozone depleting substances.

**FDA:** Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300(b)(3)(xxvi).

**NTP:** Respirable crystalline silica, primarily quartz dusts occurring in industrial and occupational settings, is classified as Known to be a Human Carcinogen.

**OSHA Carcinogen:** Crystalline silica (quartz) is not listed.

**California Proposition 65:** Crystalline silica (airborne particles of respirable size) is classified as a substance known to the State of California to be a carcinogen.

**California Inhalation Reference Exposure Level (REL):** California established a chronic REL of 3 ug for silica (crystalline, respirable). A chronic REL is an airborne level of a substance at or below which no adverse health effects are anticipated in individuals indefinitely exposed to the substance at that level.

**Massachusetts Toxic Use Reduction Act:** Silica, crystalline (respirable size, <10 microns) is "toxic" for purposes of the Massachusetts Toxic Use Reduction Act.

**Pennsylvania Worker and Community Right to Know Act:** Quartz is a hazardous substance under the Act, but it is not a special hazardous substance or an environmental hazardous substance.

### CANADA

**Domestic Substances List:** U. S. Silica Company products, as naturally occurring substances, are on the Canadian DSL.

**WHMIS Classification:** D2A

**OTHER**

EINECS No.: 238-878-4

EEC Label (Risk/Safety Phrases): R 48/20, R 40/20, S22, S38

IARC: Crystalline silica (quartz) is classified in IARC Group 1.

National, state, provincial or local emergency planning, community right-to-know or other laws, regulations or ordinances may be applicable—consult applicable national, state, provincial or local laws.

**SECTION 16 - OTHER INFORMATION**

**Hazardous Material Information System (HMIS):**

Health	*
Flammability	0
Reactivity	0
Protective Equipment	E

\* For further information on health effects, see Sections 2 and 11 of this MSDS.

**National Fire Protection Association (NFPA):**

Health	0
Flammability	0
Reactivity	0

**Web Sites with Information about Effects of Crystalline Silica Exposure:**

The U. S. Silica web site will provide updated links to OSHA and NIOSH web sites addressing crystalline silica issues. [www.u-s-silica.com](http://www.u-s-silica.com), click in "Information", then click on "Health & Safety".

**U. S. SILICA COMPANY DISCLAIMER**

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects that may be caused by purchase, resale, use or exposure to our silica. Customers-users of silica must comply with all applicable health and safety laws, regulations, and orders, including the OSHA Hazard Communication Standard.



## Material Safety Data Sheet

Orica Canada Inc.  
Maple Street  
Brownsburg, PQ  
For MSDS Requests: 450-533-4201

Orica USA Inc.  
33101 E. Quincy Avenue  
Watkins, CO 80137  
For MSDS Requests: 303-268-5000

EMERGENCY CONTACTS  
FOR EMERGENCIES INVOLVING CHEMICAL SPILL OR RELEASE, CALL THE ORICA CANADA  
TRANSPORTATION  
EMERGENCY RESPONSE SYSTEM AT 1-877-561-3636, or CHEMTREC AT 1-800-424-9300

## SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: **Ammonium Nitrate Prills**

Product Use: Fertilizer, manufacture of explosives.

MSDS Number: 40002  
Date Issued: 14-May-2004

## SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENT(S)	% (w/w)	ACGIH TWA	CAS NO.
Ammonium Nitrate	99-100	Not Listed	6484-52-2

## SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview: Irritating to eyes, respiratory system and skin. May cause methemoglobinemia. Read the entire MSDS for a more thorough evaluation of the hazards.

## SECTION 4 - FIRST AID MEASURES

**General:** If you feel unwell seek medical advice immediately (show the product label where possible).  
**Inhalation:** Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.

**Skin Contact:** Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, obtain medical advice.

**Eye Contact:** Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing and obtain medical attention.

**Ingestion:** If victim is alert and not convulsing, rinse mouth out and give 200-300 mL (1 cup) of water to dilute material. DO NOT induce vomiting. If spontaneous vomiting occurs, have victim lean forward with head positioned to avoid breathing in or vomiting, rinse mouth and administer more water. Obtain medical attention IMMEDIATELY.

**Note to Physicians:** Symptomatic. Administer oxygen if there are signs of cyanosis. If clinical condition deteriorates, administer 10 cc Methylene Blue intravenously. It is unlikely for this to be required with methemoglobin level of less than 40%.

## SECTION 5 - FIRE-FIGHTING MEASURES

**Flash Point:** This product does not flash.

**Flammable Limits (Lower):** Not applicable.

**Flammable Limits (Upper):** Not applicable.

**Auto Ignition Temperature:** Not applicable.

**Decomposition Temperature:** 170-200°C (338-500°F)

**Sensitivity to Mechanical Impact:** Not applicable.

**Sensitivity to Static Discharge:** Not expected to be sensitive to static discharge.

**Hazardous Reactions:** See 'Fire and Explosion Hazards'.

**Fire and Explosion Hazards:** Attempts to smother a fire involving this product will be ineffective as it is its own oxygen source.

Smothering could lead to decomposition and explosions. This product is more sensitive if contaminated with organics or oxidizable material or if heated while confined. Unless the mass of product on fire is flooded with water, re-ignition is possible.

**Extinguishing Media:** Use water only, in as much volume as possible in order to cool the burning mass quickly. Chemical extinguishers are useless for this type of fire.

**Fire Fighting Procedures:** Large quantities of water should be used to cool containers, and cool and dilute the burning material. A water spray can also be used to knock down fumes.

**Fire Fighting Protective Equipment:** Use self-contained breathing apparatus and special protective clothing.

**NOTE:** Also see "Section 10- Stability and Reactivity"

#### SECTION 6 - ACCIDENTAL RELEASE MEASURES

**Spills, Leaks, or Releases:** Collect product for disposal. Sweep up immediately to eliminate slipping hazard. Do not allow to enter sewers or watercourses. Notify applicable government authority.

**Deactivating Chemicals:** Not required.

#### SECTION 7 - HANDLING AND STORAGE

**Handling:** Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Use only with adequate ventilation and avoid breathing dusts. Locate safety shower and eyewash station close to chemical handling area. Product is mildly corrosive to concrete and steel structures. Stainless steels and aluminum are adequate. Avoid materials made of copper and bronzes in storage and handling equipment.

**Storage Requirements:** Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed.

**Storage Temperature:** Ideal storage temperature is 10-27°C (50-80°F). Do not expose sealed containers to temperatures above 40°C (104°F).

#### SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

##### PREVENTIVE MEASURES:

Recommendations listed in this section indicate the type of equipment which will provide protection against over-exposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

**Engineering Controls:** General ventilation is recommended. Recommendations listed in this section indicate the type of equipment which will provide protection against over exposure to this product.

##### PERSONAL PROTECTIVE EQUIPMENT:

**Eye Protection:** Use chemical safety goggles when there is potential for eye contact.

**Skin Protection:** Gloves and protective clothing made from cotton should be impervious under normal conditions of use.

**Respiratory Protection:** A NIOSH/MSHA-approved dust respirator, if concentrations in air are unknown or in excess of established exposure guidelines.

##### EXPOSURE GUIDELINES:

###### PRODUCT:

Ammonium Nitrate Prills:

Orca Guideline 5 mg/m3 internal TWA

###### HAZARDOUS INGREDIENT(S):

Ammonium Nitrate:

Orca Guideline 5 mg/m3 internal TWA

#### SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

**Alternate Name(s):** AN

**Chemical Name:** Nitric Acid Ammonium Salt

**Chemical Family:** Nitrate.

**Molecular Formula:** NH4NO3

**Appearance:** Free-flowing, hygroscopic, grey-white colored prills.

**Odor:** Odorless.

**pH:** 5.0 - 6.0 (0.1M solution in water)

**Vapor Pressure (mm Hg at 20°C):** 0

**Vapor Density (Air=1):** Not applicable.

**Boiling Point:** 210°C (410°F)  
**Melting Point:** 160 to 165°C (320 to 329°F)  
**Freezing Point:** 160 to 165°C (320 to 329°F)  
**Solubility (Water):** 79% @ 25°C (77°F)  
**Solubility (Other):** Soluble in alcohols, acetone. Insoluble in ether.  
**Specific Gravity:** 1.725  
**Evaporation Rate:** Not applicable  
**% Volatile by Volume:** 0 %  
**% Volatile Organic Compounds:** 0 %  
**Molecular Weight:** 80.06  
**Additional Properties:** Total Nitrogen: 34-34.5%

#### SECTION 10 - STABILITY AND REACTIVITY

**Hazardous Decomposition Products:** Toxic gases and vapours (oxides of nitrogen) will be released by thermal decomposition (about 210°C). At higher temperatures, decomposition may be explosive, especially if confined.

**Chemical Stability:** Stable at room temperature.

**Conditions to Avoid:** High temperatures, sparks, open flames and all other sources of ignition. Keep away from combustible material. Protect from light.

**Incompatibility with other Substances:** Avoid oxidizable materials, metal powder, bronze & other copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, compressive liquids, chlorates, sulphur, sodium nitrite, charcoal, coke and other finely divided combustibles. Reducing agents.

**Hazardous Polymerization:** Will not occur.

#### SECTION 11 - TOXICOLOGICAL INFORMATION

**Summary:** May cause irritation. May cause methemoglobinemia.

##### TOXICOLOGICAL DATA:

###### PRODUCT:

None established for product.

###### INGREDIENTS:

Ammonium Nitrate:

Oral LD50 (rat) = 2217 mg/kg

Dermal LD50 (rabbit) = 3000 mg/kg

###### POTENTIAL HEALTH EFFECTS:

**Inhalation:** High concentrations of product are irritating to the respiratory tract.

**Skin Contact:** Repeated and/or prolonged contact may cause dermatitis.

**Eye Contact:** Moderately irritant causing moderate initial pain.

**Ingestion:** Highly unlikely under normal industrial use. Ingestion may cause irritation of the gastrointestinal tract.

**Subchronic Effects:** Ingestion may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by navy blue lips, tongue and mucous membranes, with skin colour being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and possibly, shock.

**Chronic Effects:** None known.

**Carcinogenicity:** The ingredient(s) of this product is (are) NOT classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), NOT regulated as carcinogens by OSHA (Occupational Safety and Health Administration), and NOT listed as carcinogens by NTP (National Toxicology Program).

**Mutagenicity:** There is no evidence of mutagenic potential.

**Reproductive Effects:** No information is available and no adverse reproductive effects are anticipated.

**Teratogenicity and Fetotoxicity:** No information is available and no adverse teratogenic/embryotoxic effects are anticipated.

**Synergistic Materials:** None known.

#### SECTION 12 - ECOLOGICAL INFORMATION

**Ecotoxicological Information:** Harmful to aquatic life at low concentrations. Toxic to aquatic life.

**Environmental Effects:** Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

Dispose of waste material at an approved landfill site in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.

**SECTION 14 - TRANSPORT INFORMATION**

Proper Shipping Name: Ammonium Nitrate or Ammonium Nitrate fertilizers  
 Class/Division: 5.1  
 Product Identification Number (PIN): UN1942 or 2067, respectively  
 Packing Group: III  
 Transportation Emergency Telephone Number: 1-800-424-9300 (USA) or 1-877-561-3636 (CAN)

**SECTION 16 - REGULATORY INFORMATION**

**CANADIAN CLASSIFICATION:**

This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR. Controlled Products Regulations (CPR) Classification: C: Oxidizer, D-2B: Toxic.  
 CEPA / Canadian Domestic Substances List (DSL): The substance(s) in this product is/are on the Canadian Domestic Substances List (CEPA DSL).

IARC Classification: None of the components of this product are listed on IARC.

**USA CLASSIFICATION:**

OSHA Classification:

Physical: Oxidizer.

Health: Irritant.

Target Organ: Eye, Skin, Respiratory tract, Blood/hematopoietic system.

SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements: 100% Ammonium Nitrate (5484-52-2)

Ozone Protection and 40 CFR 42: This product does not contain nor is it manufactured with ozone depleting substances.

Other Regulations/Legislation which apply to this product: Florida, New Jersey Special Health Hazard Substance List, New Jersey RTK Environmental Hazardous Substance, Rhode Island Hazardous Substance List, Massachusetts Right-to-Know, Pennsylvania Right-to-Know, New Jersey Right-to-Know.

**SECTION 16 - OTHER INFORMATION**

**REFERENCES:**

RTECS-Registry of Toxic Effects of Chemical Substances, CCINFO Online, Canadian Centre for Occupational Health and Safety, National Institute for Occupational Safety and Health, U.S. Dept. of Health & Human Services, Cincinnati. Supplier's Material Safety Data Sheets.  
 "CHEMINFO", through "CCINFO Online", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada. Sax, N. Irving, Dangerous Properties of Industrial Materials, 7th ed., Van Nostrand Reinhold Co., New York, 1989.  
 Threshold Limit Values and Biological Exposure Indices for 2001, American Conference of Governmental Industrial Hygienists, Cincinnati, 1997.  
 Winchok, Martha, Ed., The Merck Index, 11th ed., Merck and Co., Inc., Rahway, New Jersey, 1989.

Prepared by: Safety, Health and Environment (343) 288-6000

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Orica will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

**Attachment 1e:**  
**Emission Estimates**



Subject: Emission Estimates - TRANSFLO TERMINAL SERVICES, INC.		
Table 1 - Ammonium Nitrate Transfer Emissions	Made by: MJH	Date: June 2016
Ref: AP-42 Chapter 13.2.4; RBT Guarantee Number 08AS0201		

**PURPOSE:** Estimate actual and potential emissions for ammonium nitrate transfer operations. The current operations in Clarksburg, WV (exempt facility) are being consolidated with the Fairmont, WV operations.

**Specific Location** Fairmont, West Virginia  
**Information: DEP Plant I.D. No.** 049-00149

**BACKGROUND:** Each solids transloading operation consists of four potential emission points:

- Baghouse exhaust emissions
- Drop point from railcar to conveyor (Transfer Point 1)
- Drop point from conveyor to covered truck (Transfer Point 2)
- Drop point from conveyor return to collection bin (Transfer Point 3)



Photograph Showing the Baghouse and Transfer Point 1 (Railcar to Conveyor) and Transfer Point 2 (Conveyor to Covered Truck)



Photograph showing Transfer Point 3 (Conveyor Return to Collection Bin)

<b><u>GIVEN:</u></b>	50	tons material transloaded/hr
	15	lbs material/hour from conveyor return (similar TRANSFLO facility staff interview)
	90%	control efficiency of the fugitive emissions from transfer points 1 and 2 - based on engineering judgment and observation
	0.0100	gr/dscf - baghouse emission rate (conservative value based on manufacturer guarantee)
	1.43E-06	lb/dscf - baghouse emission rate (conservative value based on manufacturer guarantee)
	600	cfm (airflow for Model UMA 100)

**ESTIMATES:**

It is conservatively assumed all emissions from the baghouse are PM<sub>10</sub>.

Hence PM<sub>10</sub> and Particulate emissions are equivalent

**Step 1 - Estimate the emissions from the baghouse using the UMA 100 (Emission Point 0002)**

$$600 \text{ cfm} \times 60 \text{ min/hr} \times (\text{above } \#) \text{ lb/dscf} = 0.05 \text{ lbs PM or PM}_{10} / \text{hr from UMA 100}$$

**Step 2 - Estimate the emissions from the transfer points**

There are three distinct drop points: 1 - Rail Car to Conveyor, 2 - Conveyor to Truck, and 3 - Conveyor return to collection bin. The control efficiency of transfer point 1 is estimated to be at 90% since the air velocity was measured at 120 feet per minute into the conveyor. The measurement was made during a site visit on March 5, 2008 at the Jacksonville terminal, and used a TSI VelociCalc Model 8347 wind velocity meter. The control efficiency of transfer point 2 is estimated to be 90% (conservative estimate) since a foam seal is used at the transfer point. Visual observations were performed at the Jacksonville facility during a site visit on March 5, 2008. A 0% control is used at transfer point 3 as no controls are currently used.

Using AP-42 Chapter 13.2.4, Equation 1, the emission factor for each transfer point is estimated. The emissions are inversely proportional to moisture content. Drier materials are "dustier" and have greater emission rates than wetter materials.

Sample calculation for one material follows, similar calculations are used for other materials with different moisture contents

Equation 1 (the "drop equation") is used to estimate the emissions per drop point

$$E = k(0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}$$

where:

k, particle size multiplier =	0.74	(for PM, AP-42 Chapter 13.2.4)
k, particle size multiplier =	0.35	(for PM <sub>10</sub> , AP-42 Chapter 13.2.4)
k, particle size multiplier =	0.053	(for PM <sub>2.5</sub> , AP-42 Chapter 13.2.4)
U, mean wind speed (mph) =	9.08	( <a href="http://wfb.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html">http://wfb.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html</a> ) Windspeed for Pittsburgh, PA used (nearest large city w/ avail data)
M, material moisture content =	0.3%	Typical product specifications

Ammonium Nitrate Emission Factor (E) = **0.07323** lbs PM / ton material transferred (intermediate value for drop eqn)

Ammonium Nitrate Emission Factor (E) = **0.03464** lbs PM<sub>10</sub> / ton material transferred (intermediate value for drop eqn)

**Transfer Point 1 (Rail Car to Conveyor) - Emission Point 00003**

	Controlled	Uncontrolled	
ton/hr x Drop Eqn. Emission Factor x (1-CE) =	0.366	3.662	lbs PM / hr
	0.173	1.732	lbs PM <sub>10</sub> / hr

**Transfer Point 2 (Conveyor to Covered Truck) - Emission Point 00004**

	Controlled	Uncontrolled	
ton/hr x Drop Eqn. Emission Factor x (1-CE) =	0.366	3.662	lbs PM / hr
	0.173	1.732	lbs PM <sub>10</sub> / hr

**Transfer Point 3 (Conveyor Return to Collection Bin) - Emission Point 00005**

	Uncontrolled	
15 lbs/hr x 1 ton/2,000 lbs x Emission factor =	0.00055	lbs PM / hr
	0.00026	lbs PM / hr

Total Emission Rates

Transfer Point 1 + Transfer Point 2 + Transfer Point 3 +Baghouse =

PM Emissions	Controlled	Uncontrolled	
Emissions =	<b>0.784</b>	7.375	lbs PM / hr
tons / hour =	50	50	for 24 inch conveyor
Emission Rate =	0.0157	0.1475	lbs PM / ton material transferred
Per railcar =	1.57	14.75	lbs PM / 100 ton railcar
Annual emissions	94.12		lbs PM
Annual emissions	0.05		tons PM
Potential emissions	263.53		lbs pm /year
Potential emissions	<b>0.13</b>		tons PM / year

PM <sub>10</sub> Emissions			
Emissions =	<b>0.398</b>	3.515	lbs PM <sub>10</sub> / hr
tons / hour =	50	50	for 24 inch conveyor
Emission Rate =	0.0080	0.0703	lbs PM <sub>10</sub> / ton material transferred
Per railcar =	0.80	7.03	lbs PM / 100 ton railcar
Annual emissions	47.77		lbs PM
Annual emissions	0.02		tons PM
Potential emissions	133.75		lbs pm /year
Potential emissions	<b>0.07</b>		tons PM / year

Annual Throughput	5,941 tons / year
Annual Railcars	60 rc/year
PTE : Actual	2.8 dimensionless
(24 hrs / day * 7 days / week) : (10 hrs / day * 6 days / week)	
Potential RC / Year	168 rc / year

Clarksburg, 6/2015 -  
5/2016  
Rounded, 100 tons / RC

**Attachment 2:**  
**Recent 12-Month Rolling Total Database Reports**

## **Fairmont Facility**

**TRANSFLO Terminal - FAIRMONT, WV**

For Dates between 5/1/2015 to 4/30/2016

R13-2962  
WV DEP

Expiration Date:

**Rolling 12-Month Total Transfer/Emission Estimates (Bulk Solids - Direct Transfer)**

Product Name	STCC	CAS Number	Moisture Content (%)	Total Transfers (tons/mo)	PM Emission Factor (lbs/ton)	PM Emissions (tons/mo)	PM10 Emission Factor (lbs/ton)	PM10 Emissions (tons/mo)	PM2.5 Emission Factor (lbs/ton)	PM2.5 Emitted (tons/mo)
Sand	1441310		1.00%	33,672	0.000623	0.010489	0.000435	0.007324	0.000369	0.006213
EU01 Direct Transfer Rolling 12-Month Total				<b>Limit = 250'000</b>	33,672	<b>Limit = 0'08</b>	<b>Limit = 0'08</b>	0.007324	<b>Limit = 0'02</b>	0.006213

**Rolling Total Transfer/Emission Estimates (Bulk Solids - Intermediate Storage)**

Product Name	STCC	CAS Number	Moisture Content (%)	Total Transfers (tons/mo)	PM Emission Factor (lbs/ton)	PM Emissions (tons/mo)	PM10 Emission Factor (lbs/ton)	PM10 Emissions (tons/mo)	PM2.5 Emission Factor (lbs/ton)	PM2.5 Emitted (tons/mo)
Sand	1441310		1.00%	182,259	0.016870	1.537357	0.006800	0.619681	0.006610	0.602367
EU02 Intermediate Storage Rolling Total				182,259	1.537357	<b>Limit = 2'85</b>	<b>Limit = 0'32</b>	0.619681	<b>Limit = 3'38</b>	0.602367

## **Clarksburg Facility**

**TRANSFLO Terminal - CLARKSBURG\*\***,

For Dates between 6/1/2015 to 5/31/2016

**Rolling Total Transfer/Emission Estimates (Bulk Solids)**

Product Name	STCC	Transfer Equipment	Moisture Content (%)	PM Emission Factor (lbs/ton)	Total Transfers (tons/12 mo)	PM Emitted (lbs/12 mo)	PM Emitted (tons/12 mo)	PM 10 Emission Factor (lbs/ton)	PM 10 Emitted (tons/12 mo)
Ammonium Nitrate	4918311	Dry Conveyor	0.30%	0.0157	5,941	93.19	0.0466	0.008	0.0236
Sand	1441310	Dry Conveyor	1.00%	0.0030	70,244	211.13	0.1056	0.0003	0.0105
<b>Rolling 12 Month Total</b>					<b>76,185</b>	<b>304.32</b>	<b>0.1522</b>		<b>0.0341</b>