November 18, 2024

Washington Department of Ecology
Eastern Regional Office
4601 N. Monroe
Spokane, WA 99205-1295

Re: **Request to Amend Two Rivers Terminal, LLC Approval Order No. 17AQ-E049 to Install and Operate a Bag-to-Bulk Process**

Dear Washington Department of Ecology (WDOE):

This request is submitted on behalf of Two Rivers Terminal, LLC (TRT) located at 3300C N. Glade Rd., Pasco, WA 99301 to install a new dry material handling process described as the Bag-to-Bulk Process. In addition to this request, the Technical Support Document includes some updates to the existing equipment inventory permitted by Approval Order No. 17AQ-E049. The updates to the existing equipment inventory do not impact the emission limits established by the current Approval Order. Rather, this information is provided so that the equipment listed in the Approval Order is consistent with the equipment that is in operation at the facility.

Concerning the new and updated process equipment, please find attached WDOE Form ECY 070-410 (Notice of Construction) and attached Technical Support Document that were prepared in support of this request.

> The increased emissions from the new process are *de minimis* with PM10 emissions estimated at 1.38 lb/yr and PM2.5 emissions estimated at 0.53 lb/yr.

TRT requests that WDOE perform the SEPA analysis as none of the work required in this request for Approval Order amendment requires the approval of Franklin County, WA.

The information provided in the attached enclosures is true and accurate to the best of my knowledge. Please let me know if you have any questions.

Sincerely,
RME Safety and Environmental, LLC

David A. Weeks, P.E., CIH
Senior Engineer
daweeks2003@gmail.com
(509) 412-2558

Enclosures (1)
1. Notice of Construction Application

ENCLOSURE 1

CONTENTS:

- Notice of Construction Application, and
- Technical Support Document

Notice of Construction Application

A notice of construction permit is required before installing a new source of air pollution or modifying an existing source of air pollution. This application applies to facilities in Ecology's jurisdiction. Submit this application for review of your project. For general information about completing the application, refer to Ecology Forms ECY 070-410a-g, "Instructions for Ecology's Notice of Construction Application."

Ecology offers up to two hours of free pre-application assistance. We encourage you to schedule a pre-application meeting with the contact person specified for the location of your proposal, below. If you use up your two hours of free pre-application assistance, we will continue to assist you after you submit Part 1 of the application and the application fee. You may schedule a meeting with us at any point in the process.

Upon completion of the application, please enclose a check for the initial fee and mail to:

Department of Ecology
Cashiering Unit
P.O. Box 47611
Olympia, WA 98504-7611

For Fiscal Office Use Only:
001-NSR-216-0299-000404

Check the box for the location of your proposal. For assistance, call the contact listed below:		
	Ecology Permitting Office	**Contact**
☐ **CRO**	**Chelan, Douglas, Kittitas, Klickitat, or Okanogan County** Ecology Central Regional Office – Air Quality Program	Lynnette Haller (509) 457-7126 lynnette.haller@ecy.wa.gov
☒ **ERO**	**Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Stevens, Walla Walla or Whitman County** Ecology Eastern Regional Office – Air Quality Program	Karin Baldwin (509) 329-3452 karin.baldwin@ecy.wa.govmailto:gregory.flibbert@ecy.wa.gov
☐ **NWRO**	**San Juan County** Ecology Northwest Regional Office – Air Quality Program	David Adler (425) 649-7267 david.adler@ecy.wa.gov
☐ **IND**	**For actions taken at Kraft and Sulfite Paper Mills and Aluminum Smelters** Ecology Industrial Section – Waste 2 Resources Program Permit manager: _____	James DeMay (360) 407-6868 james.demay@ecy.wa.gov
☐ **NWP**	**For actions taken on the US Department of Energy Hanford Reservation** Ecology Nuclear Waste Program	Lilyann Murphy (509) 372-7951 lilyann.murphy@ecy.wa.gov

Check the box below for the fee that applies to your application.

DEPARTMENT OF ECOLOGY
State of Washington

Notice of Construction Application

New project or equipment:

☐	**$1,500: Basic project** initial fee covers up to 16 hours of review.
☐	**$10,000: Complex project** initial fee covers up to 106 hours of review.

Change to an existing permit or equipment:

☐	**$200: Administrative or simple change** initial fee covers up to 3 hours of review Ecology may determine your change is complex during completeness review of your application. If your project is complex, you must pay the additional $675 before we will continue working on your application.
☒	**$875: Complex change** initial fee covers up to 10 hours of review
☐	**$350** flat fee: **Replace or alter control technology equipment under WAC 173-400-114** Ecology will contact you if we determine your change belongs in another fee category. You must pay the fee associated with that category before we will continue working on your application.

Read each statement, then check the box next to it to acknowledge that you agree.	
☒	The initial fee you submitted may not cover the cost of processing your application. Ecology will track the number of hours spent on your project. If the number of hours Ecology spends exceeds the hours included in your initial fee, Ecology will bill you $95 per hour for the extra time.
☒	You must include all information requested by this application. Ecology may not process your application if it does not include all the information requested.
☒	Submittal of this application allows Ecology staff to visit and inspect your facility.

Notice of Construction Application
Part 1: General Information

I. Project, Facility, and Company Information

1. Project Name Bag to Bulk Process Addition
2. Facility Name Two Rivers Terminal LLC
3. Facility Street Address 3300C North Glade Road, Pasco, WA 93301
4. Facility Legal Description • Latitude: 46.320433° Longitude: -119.12243° • Section 25, Township 10 North, Range 29 East
5. Company Legal Name (if different from Facility Name)
6. Company Mailing Address (street, city, state, zip) P.O. Box 2327, Pasco, WA 93301

II. Contact Information and Certification

1. Facility Contact Name (who will be onsite) Steve Peot	
2. Facility Contact Mailing Address (if different than Company Mailing Address) P.O. Box 2327, Pasco, WA 93301	
3. Facility Contact Phone Number (509) 547-7776	4. Facility Contact E-mail steve@tworiversterminal.com
5. Billing Contact Name (who should receive billing information) Nate Eicher	
6. Billing Contact Mailing Address (if different than Company Mailing Address)	
7. Billing Contact Phone Number (509) 547-7776	8. Billing Contact E-mail nateo@tworiversterminal.com
9. Consultant Name (optional – if 3rd party hired to complete application elements) David Weeks, PE, CIH	
10. Consultant Organization/Company RME Safety and Environmental, LLC	
11. Consultant Mailing Address (street, city, state, zip) 747 Rio Vista Loop, Richland, WA 99352	
12. Consultant Phone Number 509-412-2558	13.Consultant E-mail daweeks2003@gmail.com
14. Responsible Official Name and Title (who is responsible for project policy or decision-making) Steve Peot, General Manager	
16. Responsible Official Phone 509-547-7776	17. Responsible Official E-mail steve@tworiversterminal.com
18. Responsible Official Certification and Signature I certify that the information on this application is accurate and complete. Signature Steve Peot Date 11/6/24	

Part 2: Technical Information

Notice of Construction Application

The Technical Information may be sent with this application form to the Cashiering Unit, or may be sent directly to the Ecology regional office with jurisdiction along with a copy of this application form.

For all sections, check the box next to each item as you complete it.

III. Project Description

Please attach the following to your application.

☒ Written narrative describing your proposed project.
☒ Projected construction start and completion dates.
☒ Operating schedule and production rates.
☒ List of all major process equipment with manufacturer and maximum rated capacity.
☒ Process flow diagram with all emission points identified.
☒ Plan view site map.

☐ Manufacturer specification sheets for major process equipment components.
☒ Manufacturer specification sheets for pollution control equipment.
☐ Fuel specifications, including type, consumption (per hour & per year) and percent sulfur.

See the attached Technical Support Document (TSD) for these details.

IV. State Environmental Policy Act (SEPA) Compliance

Check the appropriate box below.

☐ SEPA review is complete:
Include a copy of the final SEPA checklist and SEPA determination (e.g., DNS, MDNS, EIS) with your application.

☒ SEPA review has not been conducted:

☐ If review will be conducted by another agency, list the agency. You must provide a copy of the final SEPA checklist and SEPA determination before Ecology will issue your permit.
Agency Reviewing SEPA:

_____

☒ If the review will be conducted by Ecology, fill out a SEPA checklist and submit it with your application. You can find a SEPA checklist online at https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-document-templates

Please see Attachment F to the TSD.

Notice of Construction Application

V. Emissions Estimations of Criteria Pollutants

Does your project generate criteria air pollutant emissions? ☒ Yes ☐ No

If yes, please provide the following information regarding your criteria emissions in your application.

☒ The names of the criteria air pollutants emitted (i.e., NO_x, SO_2, CO, $PM_{2.5}$, PM_{10}, TSP, VOC, and Pb)

PM10 and PM2.5

☒ Potential emissions of criteria air pollutants in tons per hour, tons per day, and tons per year (include calculations)

See attached Technical Support Document (TSD).

☐ If there will be any fugitive criteria pollutant emissions, clearly identify the pollutant and quantity

VI. Emissions Estimations of Toxic Air Pollutants

Does your project generate toxic air pollutant emissions? ☒ Yes ☐ No

If yes, please provide the following information regarding your toxic air pollutant emissions in your application.

☒ The names of the toxic air pollutants emitted (specified in WAC 173-460-150[1])

Silica, Boron, Uranium, and Asbestos, (in order of percent in material processed), all emissions are less than *de minimis* or SQER emission rates. See Attached TSD for details.

☒ Potential emissions of toxic air pollutants in pounds per hour, pounds per day, and pounds per year (include calculations)

See prior statement.

☐ If there will be any fugitive toxic air pollutant emissions, clearly identify the pollutant and quantity

VII. Emission Standard Compliance

☒ Provide a list of all applicable new source performance standards, national emission standards for hazardous air pollutants, national emission standards for hazardous air pollutants for source categories, and emission standards adopted under Chapter 70.94 RCW.

Does your project comply with all applicable standards identified? ☒ Yes ☐ No

There are no regulatory standards for this process other than general WDOE rules and requirements.

VIII. Best Available Control Technology

[1] http://apps.leg.wa.gov/WAC/default.aspx?cite=173-460-150

☒ Provide a complete evaluation of Best Available Control Technology (BACT) for your proposal.

PM emissions are *de minimis*. Silica emission comply with TBACT. See attached TSD.

IX. Ambient Air Impacts Analyses

Please provide the following:

☐ Ambient air impacts analyses for Criteria Air Pollutants (including fugitive emissions)

Not necessary. Criteria Air Pollutant Emissions are *de minimis*.

☐ Ambient air impacts analyses for Toxic Air Pollutants (including fugitive emissions)

Not necessary. TAP emissions are *de minimis* or less than SQER after application of TBACT.

Overall: Increased emissions are *de minimis* because the increase in PM10 and PM2.5 emission quantities is in the range of < 2 lbs of PM, PM10, and PM2.5 per year or less. No ambient air quality analysis is required. Please see attached TSD.

☐ Discharge point data for each point included in air impacts analyses (include only if modeling is required)

- ☐ Exhaust height
- ☐ Exhaust inside dimensions (ex. diameter or length and width)
- ☐ Exhaust gas velocity or volumetric flow rate
- ☐ Exhaust gas exit temperature
- ☐ The volumetric flow rate
- ☐ Description of the discharges (i.e., vertically or horizontally) and whether there are any obstructions (ex., raincap)
- ☐ Identification of the emission unit(s) discharging from the point
- ☐ The distance from the stack to the nearest property line
- ☐ Emission unit building height, width, and length
- ☐ Height of tallest building on-site or in the vicinity and the nearest distance of that building to the exhaust
- ☐ Whether the facility is in an urban or rural location

Does your project cause or contribute to a violation of any ambient air quality standard or acceptable source impact level? ☐ Yes ☒ No

From this new dry process at TRT's Pasco Facility:

Increased PM Emissions are *de minimis*: PM = 9 lb/yr; PM10 = 1.38 lb/yr; PM2.5 = 0.53 lb/yr.

TAP Emissions are *de minimis* except for Silica.

TAP Silica emissions are less than the SQER after application of TBACT.

Please see attached TSD.

TECHNICAL ANALYSIS IN SUPPORT OF NEW SOURCE REVIEW FOR A NEW BAG-TO-BULK DRY MATERIAL TRANSFER PROCESS

Prepared in Connection With:

New Source Permit Application
Two Rivers Terminal, LLC
3300C North Glade Road
Pasco, WA 99301

Prepared for:

Mr. Steve Peot
Two Rivers Terminal, LLC
P.O. Box 2327
Pasco, WA 93301

Prepared by:

David A. Weeks, PE
RME Safety and Environmental, LLC
(972) 272-0386
daweeks@rmese.com

November 2024

LIST OF REVISIONS

1. None. This is an initial submittal.

TABLE OF CONTENTS

LIST OF CHARTS

LIST OF APPENDICES

1.0 INTRODUCTION

Two Rivers Terminal, LLC. (TRT) is an agricultural fertilizer blending and distribution facility. The facility plans to install a new process at its Pasco location in addition to the processes that are currently in operation. The primary purpose of the new process is to transfer materials in bulk bags into trucks for transport to the Hanford Reservation for use as raw glass forming chemicals (i.e. GFCs) in the Hanford waste vitrification treatment plan project.

In addition to this request, TRT is including updates to its existing equipment inventory. The updates to the existing equipment inventory do not impact the emission limits established by the current Approval Order. Rather, this information is provided so that the equipment listed in the Approval Order is consistent with the equipment that is in operation at the facility today.

TRT is not requesting a change in of the Approval Order limits other than PM10 and PM2.5 from the addition of the bag-to-bulk process. The current Approval Order is numbered 17AQ-E049 and was signed on December 13, 2017.

The general location of the new or relocated process equipment is shown in Figure 1. The SDS's for the new substances that will be handled are provided in Appendix E. This technical background document discusses the basis for emissions estimates and provides an analysis of emissions with respect to the Department of Ecology regulations. It is TRT's intent to receive a permit to construct and operate the process described in this technical support document.

The facility is located outside of Pasco, Washington with the approximate geographic coordinates of the new bag-to-bulk process are as follows:

- Latitude: 46.320433° Longitude: -119.12243°
- Section 25, Township 10 North, Range 29 East

Operations are expected to occur year-round for the new process. Two types of materials will be processed based on tested particle size distributions (PSDs): 1) materials similar to sand (the preponderance of materials that will be handled), and 2) materials similar to pulverized mineral powders (a much lower quantity as compared to materials similar to sand). The daily 24-hr maximum emission rates for the new process are based on 24-hr/day operations. The proposed limit for the materials that are similar to sand is 10,000 ton/yr and the limit for the materials that are more like pulverized mineral is proposed to be 2,000 tons/yr.

1.1 General Process Description

1.1.1 Existing Processes in Current Approval Order

The current approval order addresses the following processes and equipment, which are also are summarized in Table 1 (Appendix A) along with the new proposed equipment, and equipment inventory updates.

One Wet Chemical Batch Reactor Plant with the Following Equipment:

1. 1-1000 ft^3 Calcium Oxide receiving and storage silo.
2. 1-1000 ft^3 Magnesium Oxide receiving and storage silo
3. 2- Nitric Acid Storage Tanks - 9,000 gallon capacity each
4. 1- Sulfuric Acid Storage Tank – 8,000 gallon capacity
5. 1 – Nitrate Product Reactor 5,000 gallon capacity
6. 1 – Sulfate Product Reactor 5,000 gallon capacity
7. 1 – Nitrate Products Heat Exchanger, 1,200 ft^2
8. 1- Sulfate Products Heat Exchanger, 510 ft^2
9. 2 – Filter Presses (one for each reactor product stream)
10. 2 – Calcium Nitrate Product Storage Tanks, 1 – 16,000 gallon, 1 – 20,000 gallon
11. 2 – Magnesium Sulfate Product Storage Tanks, 20,000 gallons each
12. 1 – Cooling Tower – 19,000 ft^3/min air flow capacity.
13. 2 – Dry Material Augurs, Enclosed, 1 – Calcium Oxide, 1 – Magnesium Oxide
14. 2 – Boilers, Parker Boiler Co., 3.36 mmBtu/hr input Capacity each, Natural Gas Fired Only
15. 1-24,000 gallon batch mixing tank
16. 1-2,500 gallon batch mixing tank
17. 1-hopper and associated elevator

One Dry Material Handling Plant with the Following Equipment:

1. 1-Unload Pad trenched for the below-grade conveyor
2. 1-Drag Chain Conveyor
3. 1-Dry Building with the following:
   - 3.1. Bucket elevator
   - 3.2. Distributing conveyor
   - 3.3. Feed Material Hopper
   - 3.4. Blending Tower with:
     - 3.4.1. 2-Batch Tanks
     - 3.4.2. 1-Drum Mixer
   - 3.5. Load-out Chute and Pad

Additional Process Equipment with increased emissions:

1. 2-Storage Silos with Bin Vent Filters, 60 Ton Each
2. 3-5,000 gallon Digester
3. 1-5,000 gallon Finishing Vessel
4. 1-50 T/hr Screw Auger

The emissions from the currently permitted processes are summarized in Table 2 (Appendix A.)

1.1.2 New Process Equipment

The additional process equipment requested to be permitted by this application that will increase site-wide emissions of particulate matter in a *de minimis* nature includes the following.

Chart 1: Summary of Additional Process Equipment

Item NO.	Number of Equip. Items	Equipment Description
NEW EQUIPMENT		
BAG TO BULK PROCESS		
1.A	1	Silica Silo (5,851 ft3; 484 T Silica)
1.B	1	Silica Silo (4,383 ft3; 362 T Silica)
2.	2	Bin Vent Filters (1 for each Silica Silo, WhirlAirFilter, Model 230-56)
3.	1	Transfer Auger System (1,500 cfh; 124 T/hr Silica at rated capacity of silo discharge)
4.	NA	Mobile Bins (Multiple for each type of material)
5.	1	Fabic Filter (Donaldson-Torit Model DF02-8)
6.	2	Bag Unloading Stations
7.	2	35 TPH Enclosed Conveyors
8.	2	Telescoping Downspouts with Fabric Filters (Vortex VFS-25V1-A-A-A4)

The equipment inventory including both existing and new equipment is contained in Table 1 of Appendix A. A process flow diagram for the new process is provided in Figures 2 – 4 of Appendix B.

Dry materials will arrive in 1-Ton Supersacks and be stored in the GFC Bag Storage and Bag-to-Bulk Building (the "GFC Building.") Silica will also arrive in a pneumatic tanker truck and be transferred by compressed air from a truck-mounted air compressor to the new silica storage silos located outside the GFC Building. The fugitive emissions that occur as a result of the displaced air from the storage silos will be treated by WhirlAirFilter® brand fabric filters (also known as a "Bin Vents Filters.") Silica in the storage silos will be transferred by an enclosed auger (with the drop from silo to auger also enclosed) to a station located inside the GFC Building where it will be transferred to a Supersack. The fugitive emissions from this silo to mobile bin transfer process that occurs inside the building will be collected and routed to a Donaldson-Torit fabric filter also located inside the GFC Building.

GFC materials arriving by Supersack, and silica that has been transferred to Supersacks, will then be funneled into a mobile metal bin (i.e. transient metal container on wheels) located inside the GFC Building. Fugitive emissions from the Supersack to mobile bin transfer process will be collected and routed to the Donaldson-Torit fabric filter in order to treat the air displaced from the mobile bins. The mobile bins of dry material will next be placed at an unload station located inside the GFC Building and will be unloaded into an enclosed conveyor. The drop between the mobile metal bin and the conveyor is totally enclosed and there are no fugitive emissions from this dry material drop, which also occurs inside a building.

The enclosed conveyor transfers the material from inside the GFC Building to a truck located outside the building. The material is transferred from the end of the conveyor to the truck with an enclosed telescoping downspout equipped with a Vortex® cartridge filter to treat the air displaced from the truck. The overall current emissions for the site are summarized in Table 2 (Appendix A), and the site emissions including the new process are summarized in Table 3 (Appendix A) along with the delta increase in emissions, which is very minor (on the order of pounds per year).

1.1.3 Equipment Inventory Updates

In addition to the new Bag-to-Bulk equipment, the equipment inventory was updated to address minor changes to the existing equipment addressed by the current Approval Order. These changes are minor and do not affect the process rates or emissions rates described in prior Approval Order applications.

Chart 2: Summary of Updates to Existing Equipment Inventory

Item NO.	Number of Equip. Items	Equipment Description
EXISTING EQUIPMENT		
Wet Chemical Batch Reactor Plant		
1.	1	1000 ft3 Calcium Oxide receiving and storage silo
2.	1	Magnesium Oxide Solid Handling Eductor ~~1000 ft3 Magnesium Oxide receiving and storage silo~~
3.	2	Nitric Acid Storage Tanks - 9,000 gallons each
4.	1	Sulfuric Acid Storage Tank - 11,000 gallons ~~8,000 gallons~~
5.	1	Nitrate Products Reactor - 5,000 gallons
6.	1	Sulfate Products Reactor - 5,000 gallons
~~7.~~	~~1~~	~~Nitrate Products Heat Exchanger, 1,200 ft2~~
8.	1	Sulfate Products Heat Exchanger, 291 ft2 ~~510 ft2~~
9.	3 ~~2~~	Filter Presses, 1-nitrate reactor stream, 1-sulfate reactor stream, 1-liquid fertilizer stream ~~(one for each reactor stream)~~
10.	9 ~~2~~	Calcium Nitrate Product Storage Tanks, 1-7,500-gallon, 1-10,000-gallon, 2-11,000-gallon, 1-12,000-gallon, 2-14,000-gallon, 1-15,000-gallon, 1-22,000-gallon ~~1-16,000 gallon, 1-20,000 gallon~~
11.	2	Magnesium Sulfate Product Storage Tanks, 20,000 gallons each
12.	1	Cooling Tower - 19,000 ft3/min air flow capacity
13.	1 ~~2~~	Dry Material Auger~~s~~, Enclosed, 1-Calcium Oxide~~, 1-Magnesium Oxide~~
14.	2	Boilers, Parker Boiler Co., 3.36 mmBTU/hr input capacity each, Natural Gas Fired Only
15.	1	12,000-gallon ~~24,000 gallon~~ batch mixing tank
16.	2 ~~1~~	Batch mixing tanks, 1-3,000-gallon, 1-6,200-gallon ~~2,500 gallon batch mixing tank~~
17.	~~1~~	Dry Material Conveyance equipment including: ~~hopper and associated elevator~~
17.1	2	Hoppers
17.2	2	Conveyor Belts , Enclosed
17.3	1	Auger, Enclosed
Dry Material Handling Plant		
1.	1	Unload Pad trenched for the below-grade conveyor
2.	1	Drag Chain Conveyor
3.	1	Dry Building with the following:

3.1		Bucket elevator
3.2		Distributing conveyor
3.3		Feed Material Hopper
3.4		Blending Tower with:
3.4.1		2-Batch Tanks
3.4.2		1-Drum Mixer
3.5		Load-out Chute and Pad
4.	1	10 - 12 TPH Dry Fertilizer Portable Conveyor
5.	1	Dry Fertilizer Portable Hopper with load-out conveyor
6.	2	Solid Handling Eductors (used to add dry fertilizer to the mixers in Industrial Tank Farm 2)
Limestone/Dolomite Process (Never Fully Constructed or Placed Into Operation)		
1.	2	Storage Silos with Bin Vent Filters - 60 Ton Each
2.	3	Digesters - 5,000 gallons each
3.	1	Finishing Vessel - 5,000 gallons each
4.	1	Screw Auger - 50 T/hr
KOH Blending Process		
1.	1	Cooling Tower - 15,487 ft3/min air flow capacity
		Note: Other equipment in this process is part of the Wet Chemical Batch Reactor Plant described above.
Fertilizer Solutionizing Process		
1.	3	Mixers (closed top) - 5,000 gallons each
2.	3	Fertilizer Solution Storage Tanks - 6,000 gallons each
3.	3	Eductors (Used to add dry fertilizer to the Mixers)
4.	2	Packaging Lines

The minor update to the dry fertilizer process identifies equipment that has always been present but was not identified in prior application updates because the dry fertilizer process limit is based on a total throughput of dry fertilizer through the process. The total quantity of fertilizer will move through multiple equipment configurations but the total quantity will not move through every equipment configuration.

1.1.4 Existing Production Permit Limits

The current Approval Order contains the following production limits, which TRT is not requesting to be changed.

Chart 3: Summary of Existing Production Limits

LIMIT	VALUE (T/YR)
Calcium and Magnesium Nitrate Combined	11,233
Magnesium Sulfate	9,308
Zinc Nitrate	290
Dry Fertilizer (as Received)	175,000
Natural Gas Use	320,000 Therms

1.1.5 Summary of Potential Emissions from Bag-to-Bulk Process

The operation of the new process at the facility has the potential to emit one or more pollutants regulated by the Washington Department of Ecology pursuant to WAC 173-400 and WAC 173-460. A summary of the emissions from the new process is provided in Table 3 (Appendix A), and detailed emission calculations are provided in Appendix C. (Appendix B are the supporting figures that describe process as a picture.) The potential emissions from the new processes include:

- PM10 and PM2.5 emissions from the silica silo storage load-in, and load-out of material to Supersacks inside the GFC Building.
- PM10 and PM2.5 emissions from the Supersack to mobile bin load-in step of the process.
- PM10 and PM2.5 emissions from the truck loadout step of the process.
    - (There are no fugitive emissions from the mobile bin load-in to the load-out conveyor because this part of the process is totally enclosed.)

Washington toxic air pollutant emissions from the new process include:

- Silica emissions from the process (which are below the SQER).
- Uranium emissions from the process (which are below De minimis Criterion).
- Asbestos emissions from the process (which are below De minimis Criterion).

Tables 2 and 3 (Appendix A) summarize the total particulate emissions from the existing and new processes. The new equipment will result in a very minor increase in particulate emissions as follows:

- PM: Emissions increase by 9 pounds per year
- PM10: Emissions increase by 1.28 pounds per year
- PM2.5: Emissions increase by 0.58 pounds per year

The characteristics of the new process materials is examined in Appendix C1. The emission estimates are described in Appendix C2 and are based on a throughput limit for the new Bag-to-Bulk process of 10,000 T/yr of bulk material similar to sand, and 2,000 T/yr of material similar to a pulverized mineral.

2.0 EMISSION CALCULATIONS & MODELING

2.1 Particulate Emissions

The emissions of particulate PM, PM10, and PM2.5 were estimated using emission factors from AP-42. Emission factors from Chapter 11.19.1 (Sand and Gravel Processing) were used for materials similar to sand, and factors from Chapter 11.19.2 (Crushed Stone Processing and Pulverized Mineral Processing) were used for the materials more similar to pulverized minerals (specifically those factors published for pulverized mineral processing.) Materials were grouped into the two categories based on their raw material particle size distributions (PSDs). Materials similar to sand generally displayed raw material PSDs with PM10 percentages in the range of 0 – 40%, and PM2.5 in the range of 0 – 13.3%. Materials similar to pulverized minerals generally displayed a raw material PSDs with PM10 percentages in the range of 76 – 96%, and a PM2.5 range of 42 – 50%. Internet research was used to investigate the PSD for materials where no specific project test data were available. A summary of the material characteristics of the new materials to be handled in the new process is provided in Appendix C1. The actual emission calculations for PM, PM10, and PM2.5 are summarized in Appendix C2.

The particulate emission calculations assume that only one conveyor is operated at any single time. This assumption is appropriate for two reasons. First, there is room to load only one truck at a time. Second, the material buyer (the DOE Hanford Reservation) has strict limits on cross-contamination---so one conveyor will be cleaned while the other is operating.

2.1.1 Materials Like Sand

AP-42 Table 11.19.1-1 reports a PM emission factor for "Sand handling, transfer, and storage with wet scrubber" of 0.0013 lb/ton. The factor is based reference 9 from the AP-42 background report.

4.2.4 Reference 9

This report documents measurements of filterable PM emissions from the handling, transfer, and storage of foundry sand. The exhaust stream sampled included emissions from conveyor belts and an elevator that transfers sand from a sand dryer to storage silos. Emissions generated within the silos also were included in the exhaust stream. The emissions from the sources are controlled with a wet scrubber. Production rates were provided on the basis of the rate of sand exiting the dryer. The test was conducted in March 1990 to demonstrate compliance with State regulations.

As shown above, the emission factors consider emissions from conveyor belts, a bucket elevator, and loading silos. Thus, the emission factor for each individual component is the factor value divided by at least 3. The factor for each individual process is thus 4.33E-4 lb/ton. However, the factor is based on emissions from a wet scrubber. EPA reports that wet scrubbers demonstrate a control efficiency of 70 – 99% for particles with a size of 1 micron and greater. Assuming a control efficiency of 99%, the uncontrolled PM emission factor is 4.33E-2 lb/ton.

However, an emission factor was not reported for PM10 or PM2.5. Reference 9 above reports that the emission factor was developed from a test on foundry sand. The Federal Highway Administration reports that the grain size distribution of spent foundry sand is very uniform, with approximately 85 to

95 percent of the material between 0.6 mm and 0.15 mm (600 to 1,500 microns). Five to 12 percent of foundry sand can be expected to be smaller than 0.075 mm (75 microns.) (https://www.fhwa.dot.gov/publications/research/infrastructure/structures/97148/fs1.cfm).

The above data can be used to estimate the uncontrolled PM10 emission factor as 0.12 * 4.33E-2 lb/ton, or 5.2E-3 lb/ton.

The PM2.5 emission factor was estimated by consulting a study published in the Journal of the Air and Waste Management Association (AWMA) entitled "PM4 Crystalline Silica Emission Factors and Ambient Concentrations at Aggregate-Producing Sources in California," (published online 24 January 2012). The article describes the results of particulate sampling (PM10 and PM4) at 3 sand and gravel plants. The sources tested included screening, crushing, and conveyor transfer points. Two of the plants used a wet water spray for emission controls and the third used a wet spray with a fabric filter. Only the data from the two plants with water sprays were considered.

The reported PM10 and PM4 emission factors for the two plants are summarized below.

Chart 4: Reported Emission Factors with Water Spray

Plant	PM10 Emission Factor (lb/ton)	PM4 Emission Factor (lb/ton)
Barstow (Conveyor Transfer Pt.)	5.75E-4	3.52E-4
Vernalis (Conveyor Transfer Pt.)	1.09E-3	4.57E-4
AVG	8.325E-4	4.045E-4

Assuming the PM4 emission factor is a conservative estimate of PM2.5, the ratio of PM2.5 to PM10 is 0.4859. Applying this ratio to the previously estimated PM10 emission factor from AP-42 results in a PM2.5 emission factor of 2.53E-3 lb/ton (5.2E-3 lb/ton * 0.4859).

An evaluation was also made on the above EPA AP-42 derived emission factors against other Air and Waste Management Association (AWMA) reported emission factors for the purpose of determining how conservative the estimated AP-42 emission factors are. The water spray control efficiency was assumed to be equal to 50% based on the control efficiency for spray towers reported by EPA (as high 90% for particles greater than 5 microns, 60 to 80% for particles of 3 to 5 microns, and 50% for particles less than 3 microns.) A removal efficiency of 50% was selected because the water sprays at the sand and gravel plants were not actual spray towers but water sprayed on the operating equipment.

Chart 5: Evaluation of Uncontrolled Emission Factors Derived from AP-42 Against those Reported by AWMA Data

Plant	PM10 Emission Factor (lb/ton)	PM2.5 Emission Factor (lb/ton)
AWMA Study - Barstow (Conveyor Transfer Pt.)	1.15E-3	7.04E-4
AWMA Study - Vernalis (Conveyor Transfer Pt.)	2.18E-3	9.14E-4
AP42 Derived Emission Factors	5.20E-3	2.53E-3

The above comparison shows that the AP-42 derived PM10 and PM2.5 emission factors are conservative as compared to the factors derived from the AWMA study. The AP-42 derived emission factors were used in the emission calculations described in Appendix C.

2.1.2 Materials Like Pulverized Minerals

AP-42 Table 11.19.2-4 reports a PM, PM10, and PM2.5 emission factor for "Product Storage with Fabric Filter Control." Such a process would be similar to loading a mobile bin or a truck because the particulate laden air displaced from loading the AP-42 storage silo would be similar to the displacement of air from loading a mobile bin or a truck. The uncontrolled emission factors can thus be calculated assuming a control efficiency of 99.5% as follows:

- PM: 0.0099 lb/ton x 1/(1 – 0.995) = 1.98 lb/ton PM
- PM10: 0.0016 lb/ton x 1/(1-0.995) = 0.32 lb/ton PM10
- PM2.5: 0.0006 lb/ton x 1/(1-0.995) = 0.12 lb/ton PM2.5

2.1.3 Control Efficiency

The filter media that will be used to surround the structural framework of the bags or cartridges of the silica silo WhirlAirFilter Bin Vents, the Donaldson-Torit fabric filter controlling emissions inside the building, and the Vortex telescoping downspout controlling load-out emissions, will be Parker Hannifin BHA® Prevail® ePTFE, or equivalent, with a reported particulate control efficiency of 99.9% (see Appendix C3).

2.2 Toxic Air Pollutant (TAP) Emissions

Two of the materials are TAPs in and of themselves (Silica and Boron), and others contain constituents that are also TAPs (Silica, Uranium, and Asbestos). The TAP emission rates are calculated by multiplying the PM10 emission rate by the percentage of TAP in each material (see Appendices C4.1 – C4.4). The PM10 emission rate was chosen because this is the size of particulate emissions that can be inhaled. This evaluation is made on a material-by-material basis because at no time will two different materials be processed at the same time.

2.3 Existing Processes

The emissions from the existing processes were not changed from how they were presented in support of the existing Approval Order(s).

2.4 Air Dispersion Modeling

An air dispersion modeling analysis was not performed for this revision of the existing Approval Order due to the *de minimis* nature of the emission increases. Previous AERMOD modeling for the other site sources (see the Technical Support Document submitted in support of AO 17AQ-E049) evaluated site emission impacts against the National Ambient Air Quality Standards (NAAQS). This previously performed air quality modeling is not updated here; again because of the *de minimis* nature of the particulate emission increases associated with the Bag-to-Bulk Process with a treatment control efficiency of 99.9%.

An Appendix D section is included in this application for the sake of consistency with prior applications even though no air dispersion modeling was performed. The current Appendix D states that air dispersion modeling was not performed due to the *de minimis* nature of the increased emissions from the new process.

3.0 EMISSION STANDARD COMPLIANCE

RMESE is not aware of any federal or state emissions standards applicable to the Bag-to-Bulk process.

4.0 BACT and TBACT Analysis

It is well established that fabric filters are considered BACT and TBACT for the control of particulate and toxic air pollutant emissions that are emitted in the form of particulates. All toxic air pollutants associated with this process are in the form of particulate matter. Fabric filters installed by TRT control the emissions of these dry particulate emissions and constituents.

5.0 SUMMARY AND ANALYSIS

In summary, the new bag-to-bulk transfer process:

1. does not increase particulate emissions at levels that cause a violation of the NAAQS, and

2. does not have TAP emissions that exceed the WDOE de minimis emission rates or the SQERs after application of TBACT.

6.0 REFERENCES

Richards, J.R., Brozell, T.T., Rea, C., Boraston, J.H. and J. Hayden. “PM4 crystalline silica emission factors and ambient concentrations at aggregate-producing sources in California,” J Air Waste Manag Assoc. 2009 Nov;59(11):1287-95. doi: 10.3155/1047-3289.59.11.1287.

RMESE. TECHNICAL ANALYSIS IN SUPPORT OF NEW SOURCE REVIEW FOR A LIMESTONE/DOLOMITE DIGESTION PROCESS AND COOLING TOWER, October 2017.

USEPA. AP-42, (http://www.epa.gov/ttn/chief/efpac/index.html), accessed September, 2024.

APPENDIX A - TABLES

APPENDIX A

TABLE 1: LIST OF EXISTING AND NEW EQUIPMENT

Item NO.	Number of Equip. Items	Equipment Description
EXISTING EQUIPMENT		
Wet Chemical Batch Reactor Plant		
1.	1	1000 ft3 Calcium Oxide receiving and storage silo
2.	1	Magnesium Oxide Solid Handling Eductor ~~1000 ft3 Magnesium Oxide receiving and storage silo~~
3.	2	Nitric Acid Storage Tanks - 9,000 gallons each
4.	1	Sulfuric Acid Storage Tank - 11,000 gallons ~~8,000 gallons~~
5.	1	Nitrate Products Reactor - 5,000 gallons
6.	1	Sulfate Products Reactor - 5,000 gallons
~~7.~~	~~1~~	~~Nitrate Products Heat Exchanger, 1,200 ft2~~
8.	1	Sulfate Products Heat Exchanger, 291 ft2 ~~510 ft2~~
9.	3 ~~2~~	Filter Presses, 1-nitrate reactor stream, 1-sulfate reactor stream, 1-liquid fertilizer stream ~~(one for each reactor stream)~~
10.	9 ~~2~~	Calcium Nitrate Product Storage Tanks, 1-7,500-gallon, 1-10,000-gallon, 2-11,000-gallon, 1-12,000-gallon, 2-14,000-gallon, 1-15,000-gallon, 1-22,000-gallon ~~1-16,000-gallon, 1-20,000 gallon~~
11.	2	Magnesium Sulfate Product Storage Tanks, 20,000 gallons each
12.	1	Cooling Tower - 19,000 ft3/min air flow capacity
13.	1 ~~2~~	Dry Material Auger~~s~~, Enclosed, 1-Calcium Oxide~~, 1-Magnesium Oxide~~
14.	2	Boilers, Parker Boiler Co., 3.36 mmBTU/hr input capacity each, Natural Gas Fired Only
15.	1	12,000-gallon ~~24,000 gallon~~ batch mixing tank
16.	2 ~~1~~	Batch mixing tanks, 1-3,000-gallon, 1-6,200-gallon ~~2,500 gallon batch mixing tank~~
17.	~~1~~	Dry Material Conveyance equipment including: ~~hopper and associated elevator~~
17.1	2	Hoppers
17.2	2	Conveyor Belts , Enclosed
17.3	1	Auger, Enclosed
Dry Material Handling Plant		
1.	1	Unload Pad trenched for the below-grade conveyor
2.	1	Drag Chain Conveyor
3.	1	Dry Building with the following:
3.1		Bucket elevator
3.2		Distributing conveyor
3.3		Feed Material Hopper
3.4		Blending Tower with:
3.4.1		2-Batch Tanks
3.4.2		1-Drum Mixer
3.5		Load-out Chute and Pad
4.	1	10 - 12 TPH Dry Fertilizer Portable Conveyor
5.	1	Dry Fertilizer Portable Hopper with load-out conveyor
6.	2	Solid Handling Eductors (used to add dry fertilizer to the mixers in Industrial Tank Farm 2)

Item NO.	Number of Equip. Items	Equipment Description
Limestone/Dolomite Process (Never Fully Constructed or Placed Into Operation)		
1.	2	Storage Silos with Bin Vent Filters - 60 Ton Each
2.	3	Digesters - 5,000 gallons each
3.	1	Finishing Vessel - 5,000 gallons each
4.	1	Screw Auger - 50 T/hr
KOH Blending Process		
1.	1	Cooling Tower - 15,487 ft3/min air flow capacity
		Note: Other equipment in this process is part of the Wet Chemical Batch Reactor Plant described above.
Fertilizer Solutionizing Process		
1.	3	Mixers (closed top) - 5,000 gallons each
2.	3	Fertilizer Solution Storage Tanks - 6,000 gallons each
3.	3	Eductors (Used to add dry fertilizer to the Mixers)
4.	2	Packaging Lines
NEW EQUIPMENT		
BAG TO BULK PROCESS		
1.A	1	Silica Silo (5,851 ft3; 484 T Silica)
1.B	1	Silica Silo (4,383 ft3; 362 T Silica)
2.	2	Bin Vent Filters (1 for each Silica Silo, WhirlAirFilter, Model 230-56)
3.	1	Transfer Auger System (1,500 cfh; 124 T/hr Silica at rated capacity of silo discharge)
4.	NA	Mobile Bins (Multiple for each type of material)
5.	1	Fabic Filter (Donaldson-Torit Model DF02-8)
6.	2	Bag Unloading Stations
7.	2	35 TPH Enclosed Conveyors
8.	2	Telescoping Downspouts with Fabric Filters (Vortex VFS-25V1-A-A-A4)

APPENDIX A

TABLE 2: SUMMARY OF CURRENT PERMITTED EMISSIONS (17AQ-E049)

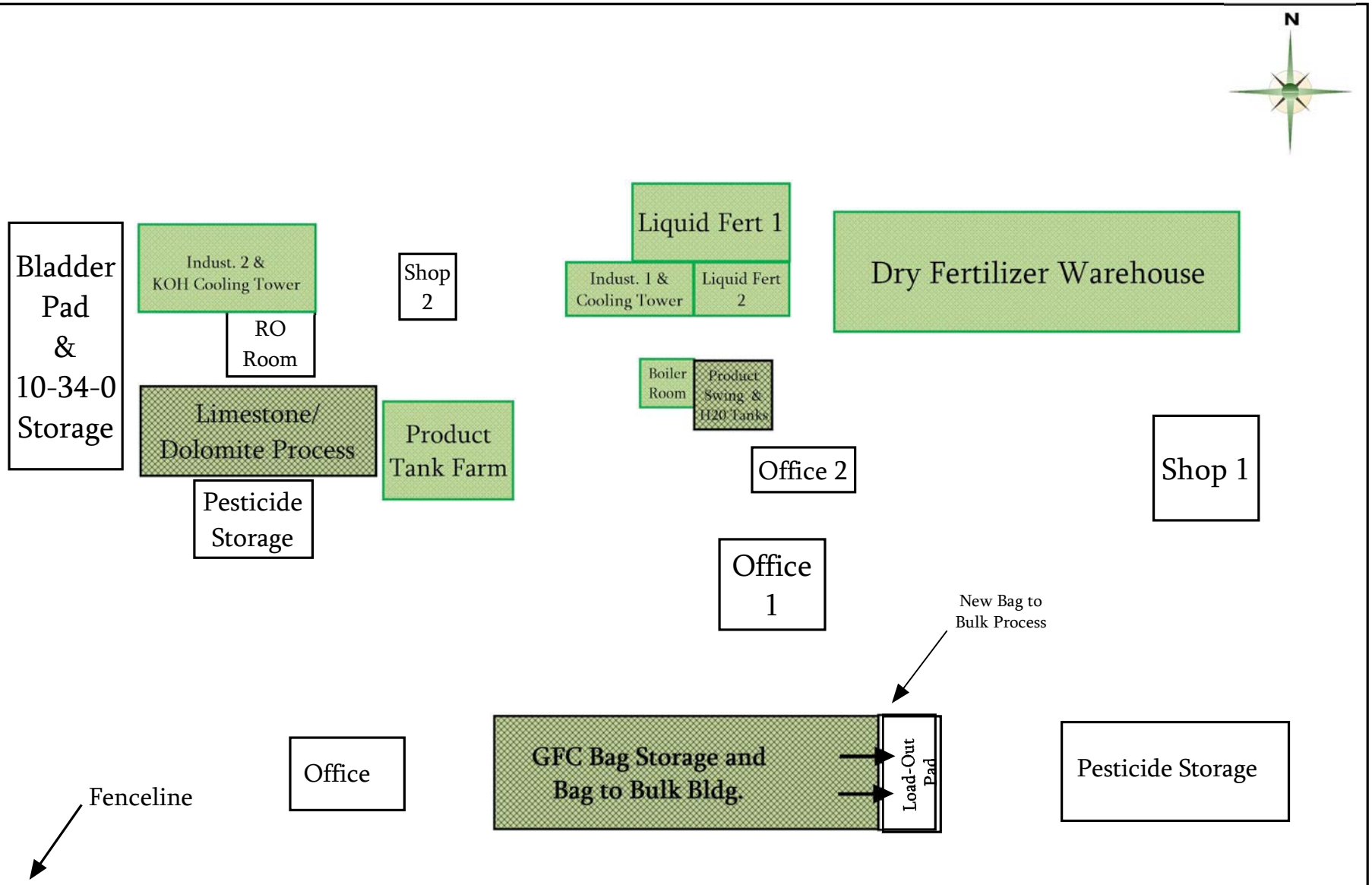
PROCESS NO.	PROCESS	PERMITTED EMISSIONS (lb/yr)														Mt/yr
		PM	PM10	PM2.5	CaO	MgO	H2SO4	HNO3	As	NO	Cr VI	VOC	NOx	CO	SOx	CO2
1	Calcium Nitrate Solution by CaO + HNO3[a]	6.1	6.1	6.1	0.92	0										
2	Magnesium Nitrate Solution by MgO + HNO3[a]				0	1.04		127[d]								
3	Zinc Nitrate Solution by ZnO + HNO3	13.1	13.1	13.1												
4	Magnesium Sulfate Solution by MgO + H2SO4					0	103[c]									
5	Cooling Tower[b]	786	786	786					0.04[e]							
6	Dry Fertilizer Handling	2,000	1,000	1,000												
7	Other (Boilers, etc.)	320	320	320						2,380	0.02[f]	1,180	3,840	4,416	80	1,709
8	Calcium Nitrate or Calcium/ Magnesium Nitrate Solution by Limestone or Dolomite + HNO3 (THE INCREASE)	310	173	67	0	0	0	7.15	0	0	0		0	0	0	8,472
9	KOH Cooling Tower	786	786	786					0.04							
	TOTAL EMISSIONS	4,220	3,083	2,977	1	1	103	134	0.08	2,380	0.02	1,180	3,840	4,416	80	10,180
	TOTAL EMISSIONS (T/yr)	2.1	1.5	1.5	4.6E-04	5.2E-04	5.2E-02	6.7E-02	4.2E-05	1.2	1.0E-05	0.6	1.9	2.2	0.04	10,180

APPENDIX A

TABLE 3: SUMMARY OF CURRENT + PROPOSED EMISSIONS (BAG-TO-BULK PROCESS)

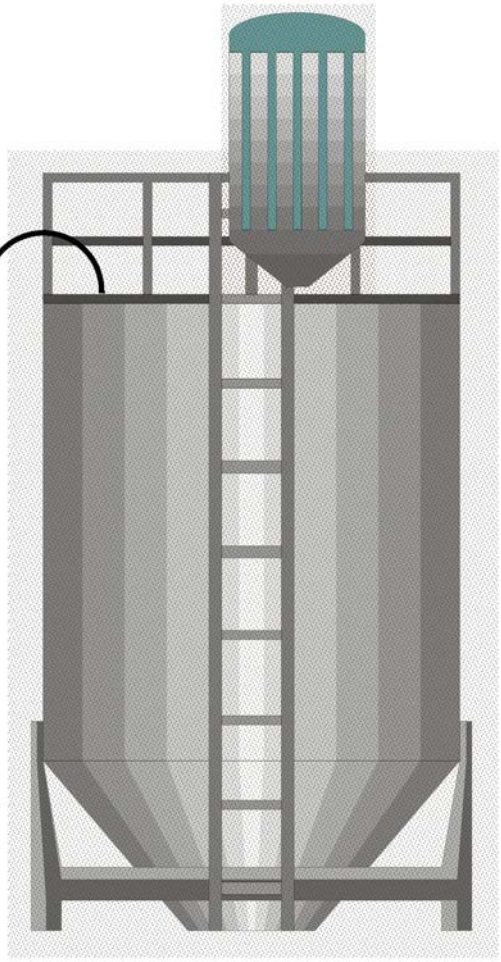
PROCESS NO.	PROCESS	PROPOSED PERMITTED EMISSIONS (lb/yr)														Mt/yr
		PM	PM10	PM2.5	CaO	MgO	H2SO4	HNO3	As	NO	Cr VI	VOC	NOx	CO	SOx	CO2
1	Calcium Nitrate Solution by CaO + HNO3[a]	6.1	6.1	6.1	0.92	0	0	127	0	0	0	0	0	0	0	0
2	Magnesium Nitrate Solution by MgO + HNO3[a]	13.1	13.1	13.1	0	1.04	0		0	0	0	0	0	0	0	0
3	Zinc Nitrate Solution by ZnO + HNO3				0	0	0		0	0	0	0	0	0	0	0
4	Magnesium Sulfate Solution by MgO + H2SO4				0	0	103	0	0	0	0	0	0	0	0	0
5	Cooling Tower[b]	786	786	786	0	0	0	0	0.04	0	0	0	0	0	0	0
6	Dry Fertilizer Handling	2,000	1,000	1,000	0	0	0	0	0	0	0	0	0	0	0	0
7	Other (Boilers, etc.)	320	320	320	0	0	0	0	0	2,380	0.02	1,180	3,840	4,416	80	1,709
8	Calcium Nitrate or Calcium/ Magnesium Nitrate Solution by Limestone or Dolomite + HNO3 (THE INCREASE)	310	173	67	0	0	0	7.15	0	0	0		0	0	0	8,472
9	KOH Cooling Tower	786	786	786	0	0	0	0.00	0.04	0	0	0	0	0	0	0
10	New Bag to Bulk Process	9	1.38	0.53	0	0	0	0.00	0.00	0	0	0	0	0	0	0
	TOTAL EMISSIONS	4,229	3,084	2,978	0.92	1.04	103	134	0.08	2,380	0.02	1,180	3,840	4,416	80	10,180
% Increase from Current Approval Order		0.21%	0.04%	0.02%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TOTAL PROPOSED EMISSIONS (T/yr)		2.1	1.5	1.5	4.6E-04	5.2E-04	5.2E-02	6.7E-02	4.2E-05	1.2	1.0E-05	0.6	1.9	2.2	0.04	10,180
[Delta] PROPOSED - CURRENT (T/yr)		0.00	6.9E-04	2.7E-04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0

APPENDIX B - Figures



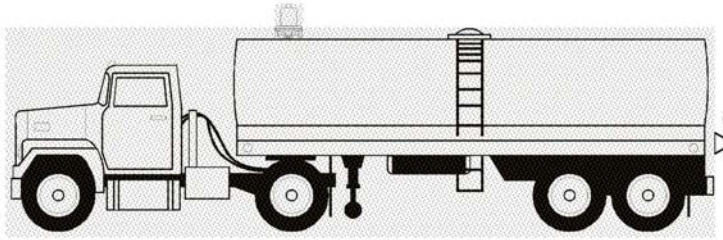
October 2021	**LEGEND**	**TWO RIVERS TERMINAL**	RME SAFETY AND ENVIRONMENTAL, LLC
Figure 1: Pasco Layout	Permitted Operations / Non Permitted Operations	3300 N. Glade Rd. Pasco, WA 99301	
RME PROJECT #: 1002010			

EMISSIONS
BAGHOUSE



+/- 30,000 lbs/hr

4" transfer hose and stand pipe



TRUCK COMPRESSOR

TOTALLY ENCLOSED TRANSFER
USING COMPRESSED AIR

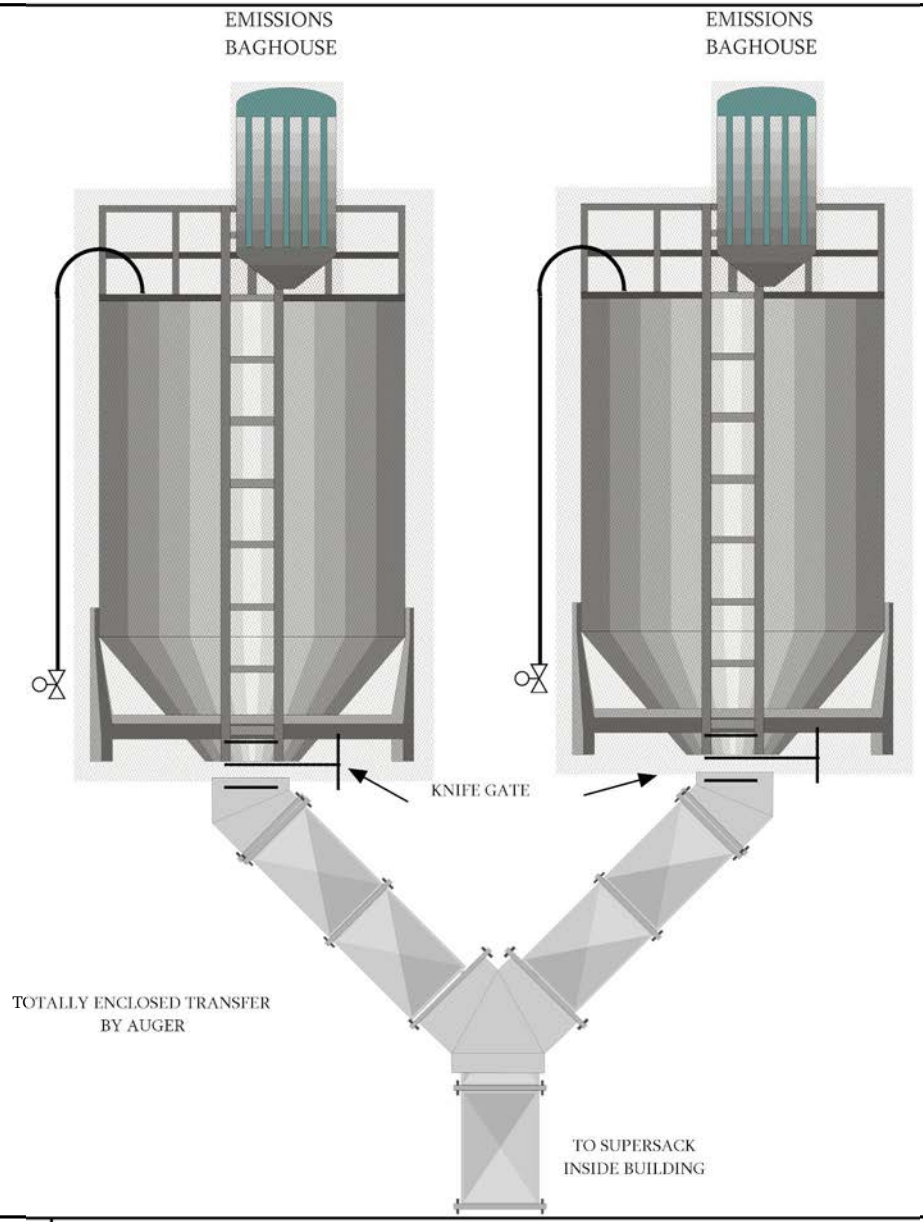
September 2024

Figure 2:
Process Flow Diagram
Silica Sand Transfer
Cargo Truck to Storage Bin

TWO RIVERS TERMINAL

3300 N. Glade Rd.
Pasco, WA 99301

RME
SAFETY AND ENVIRONMENTAL, LLC



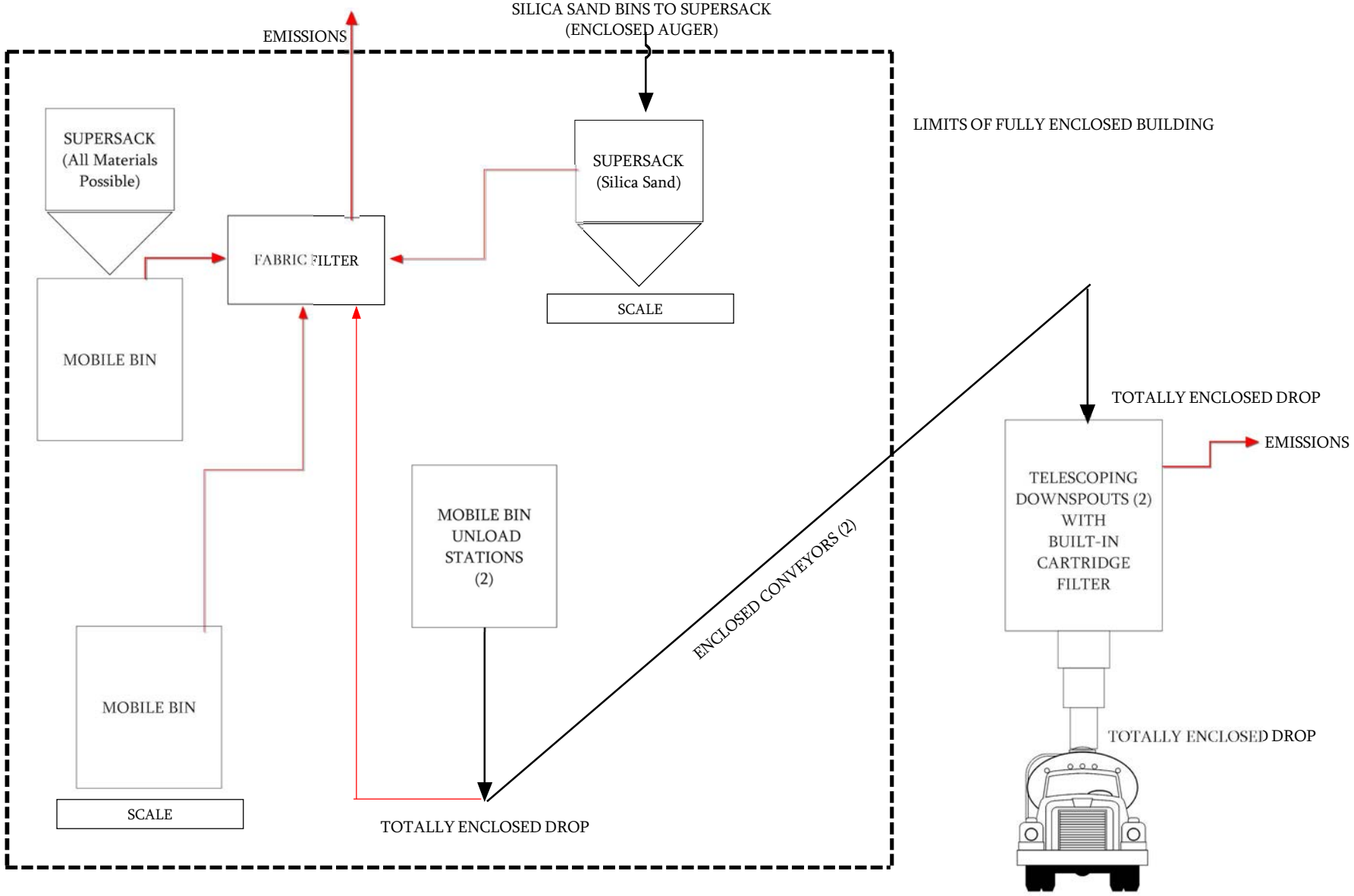
September 2024

Figure 3:
Process Flow Diagram
Silica Sand Transfer
Storage Bin To Supersack

TWO RIVERS TERMINAL

3300 N. Glade Rd.
Pasco, WA 99301

RME
SAFETY AND ENVIRONMENTAL, LLC



September 2024

Figure 4:
Process Flow Diagram
Bulk Bag to Truck Process

RME PROJECT #1002010

TWO RIVERS TERMINAL

3300 N. Glade Road
Pasco, WA 99301

RME
SAFETY AND ENVIRONMENTAL, LLC

Appendix C: Emission Calculations

APPENDIX C1: SUMMARY OF MATERIALS TO BE HANDLED IN BAG TO BULK PROCESS

MATERIAL	MOLECULAR FORMULA	CAS NO.	TAP by Itself?	CURRENT ANTICIPATED ANNUAL QTY. (Tons)	% PM10	%PM2.5		From SDS % Silica	Alt. SDS % Silica	Asbestos		Uranium	
Materials Similar to Sand													
Silica (Sand)	SiO2	14808-60-7	Yes	901.0	30.8	11.9		99.9	NA	0		0	
Aluminum Silicate (Kyanite)	Al2SiO5	1302-76-7	No	111.5	31.4	10.6		10	1	0		0	
Boric Acid	H3BO3	10043-35-3	Yes	426.9	Like Sand	Like Sand		0	NA	0		0	
Calcium Silicate (Wollastontite)	Ca2O4Si	1344-95-2	No	176.0	26.9	6.9		1	NA	60	ppmw	0	
Lithium Carbonate	Li2CO3	554-13-2	No	71.7	18.3	3.4		0	0	0		0	
Mg-Fe Silicate (Olivine)	FeH8Mg3O8Si2	1317-71-1	No	93.3	36.1	13.3		1	NA	0		0	
Sodium Carbonate (Soda Ash)	Na2CO3	497-19-8	No	11.0	0.7	0.0		0	NA	0		0	
Sucrose	C12H22O11	57-50-1	No	112.4	0.0	0.0		0	NA	0		0	
Zirconium Silicate	ZrO2·SiO2	14940-68-2	No	111.7	39.9	12.6		0.3	NA	0		300	ppmw
			Total	2015.4									
Materials Similar to Pulverized Minerals													
Ferric Oxide	Fe2O3	1317-60-8	No	124.3	75.7	42.3		1	3	0		0	
Titanium Dioxide (Rutile)	TiO2	13463-67-7	No	34.4	Powder	Powder		0	NA	0		0	
Zinc Oxide	ZnO	1314-13-2	No	93.7	95.6	50.1		0	NA	0		0	
			Total	252.4									

Note:

1. Quantity rated average of PM10 and PM2.5 content of materials similar to sand (%). 28.90 10.49

2. Quantity rated average of PM10 and PM2.5 content of materials similar to pulverized minerals (%). 85.78 46.24

APPENDIX C2: EMISSION RATES

SILICA SILO LOADIN (OUTSIDE BLDG) + SILICA SUPERSACK LOADIN (INSIDE BLDG) + MOBILE BIN LOADING (INSIDE BLDG) + TRUCK LOADOUT (OUTSIDE BLDG) - Materials Similar to Sand (The preponderance is Silica first processed through the Silica Silos before continuing to the Bag-to-Bulk process)

CONTROLLED EMISSIONS (PM)

PROCESS	MAX HOURLY RATE (T/hr)	ANNUAL RATE (T/yr)	EMISSION FACTOR (lb/ton)	REMOVAL EFFICIENCY	CONTROL EFFICIENCY BASIS	EMISSIONS (T/yr-PM)	EMISSIONS (lb/hr) - Short Term	EMISSIONS (lb/24hr)[1]
Silica Silo Load-In	15	4000	4.33E-02	99.90%	Filter Media Mfg. - See APP C3	8.66E-05	6.50E-04	1.56E-02
Silica Silo Load-Out to Super Sack	125	4000	4.33E-02	99.90%	Filter Media Mfg. - See APP C3	8.66E-05	5.41E-03	1.30E-01
Supersack Transfer to Mobile Bin	6	10000	4.33E-02	99.90%	Filter Media Mfg. - See APP C3	2.17E-04	2.60E-04	6.24E-03
Conveyor to Truck	35	10000	4.33E-02	99.90%	Filter Media Mfg. - See APP C3	2.17E-04	1.52E-03	3.64E-02
TOTAL EMISSIONS						4.33E-04	1.78E-03	1.88E-01

CONTROLLED EMISSIONS (PM10)

PROCESS	MAX HOURLY RATE (T/hr)	ANNUAL RATE (T/yr)	EMISSION FACTOR (lb/ton)	REMOVAL EFFICIENCY	CONTROL EFFICIENCY BASIS	EMISSIONS (T/yr-PM)	EMISSIONS (lb/hr) - Short Term	EMISSIONS (lb/24hr)[1]
Silica Silo Load-In	15	4000	5.20E-03	99.90%	Filter Media Mfg. - See APP C3	1.04E-05	7.80E-05	1.87E-03
Silica Silo Load-Out to Super Sack	125	4000	5.20E-03	99.90%	Filter Media Mfg. - See APP C3	1.04E-05	6.50E-04	1.56E-02
Supersack to Mobile Bin	6	10000	5.20E-03	99.90%	Filter Media Mfg. - See APP C3	2.60E-05	3.12E-05	7.49E-04
Conveyor to Truck	35	10000	5.20E-03	99.90%	Filter Media Mfg. - See APP C3	2.60E-05	1.82E-04	4.37E-03
TOTAL EMISSIONS						5.20E-05	2.13E-04	2.26E-02

CONTROLLED EMISSIONS (PM2.5) - Continuation of Materials Similar to Sand								
PROCESS	MAX HOURLY RATE (T/hr)	ANNUAL RATE (T/yr)	EMISSION FACTOR (lb/ton)	REMOVAL EFFICIENCY	CONTROL EFFICIENCY BASIS	EMISSIONS (T/yr-PM)	EMISSIONS (lb/hr) - Short Term	EMISSIONS (lb/24hr)[1]
Silica Silo Load-In	15	4000	2.53E-03	99.90%	Filter Media Mfg. - See APP C3	5.06E-06	3.80E-05	9.11E-04
Silica Silo Load-Out to Super Sack	125	4000	2.53E-03	99.90%	Filter Media Mfg. - See APP C3	5.06E-06	3.16E-04	7.59E-03
Supersack to Mobile Bin	6	10000	2.53E-03	99.90%	Filter Media Mfg. - See APP C3	1.27E-05	1.52E-05	3.64E-04
Conveyor to Truck	35	10000	2.53E-03	99.90%	Filter Media Mfg. - See APP C3	1.27E-05	8.86E-05	2.13E-03
TOTAL EMISSIONS						2.53E-05	1.04E-04	1.10E-02

MOBILE BIN LOADING (INSIDE BLDG) + TRUCK LOADOUT (OUTSIDE BLDG) - Materials Similar to Pulverized Minerals (All Originate from Supersacks)

CONTROLLED EMISSIONS (PM)

PROCESS	MAX HOURLY RATE (T/hr)	ANNUAL RATE (T/yr)	EMISSION FACTOR (lb/ton)	REMOVAL EFFICIENCY	CONTROL EFFICIENCY BASIS	EMISSIONS (T/yr-PM)	EMISSIONS (lb/hr) - Short Term	EMISSIONS (lb/24hr)[2]
Supersack to Mobile Bin	6	2000	1.98E+00	99.90%	Filter Media Mfg. - See APP C3	1.98E-03	1.19E-02	2.85E-01
Conveyor to Truck	35	2000	1.98E+00	99.90%	Filter Media Mfg. - See APP C3	1.98E-03	6.93E-02	1.66E+00
TOTAL EMISSIONS						3.96E-03	8.12E-02	1.95E+00

CONTROLLED EMISSIONS (PM10)

PROCESS	MAX HOURLY RATE (T/hr)	ANNUAL RATE (T/yr)	EMISSION FACTOR (lb/ton)	REMOVAL EFFICIENCY	CONTROL EFFICIENCY BASIS	EMISSIONS (T/yr-PM)	EMISSIONS (lb/hr) - Short Term	EMISSIONS (lb/24hr)[2]
Supersack to Mobile Bin	6	2000	3.20E-01	99.90%	Filter Media Mfg. - See APP C3	3.20E-04	1.92E-03	4.61E-02
Conveyor to Truck	35	2000	3.20E-01	99.90%	Filter Media Mfg. - See APP C3	3.20E-04	1.12E-02	2.69E-01
TOTAL EMISSIONS						6.40E-04	1.31E-02	3.15E-01

CONTROLLED EMISSIONS (PM2.5)

PROCESS	MAX HOURLY RATE (T/hr)	ANNUAL RATE (T/yr)	EMISSION FACTOR (lb/ton)	REMOVAL EFFICIENCY	CONTROL EFFICIENCY BASIS	EMISSIONS (T/yr-PM)	EMISSIONS (lb/hr) - Short Term	EMISSIONS (lb/24hr)[2]
Supersack to Mobile Bin	6	2000	1.20E-01	99.90%	Filter Media Mfg. - See APP C3	1.20E-04	7.20E-04	1.73E-02
Conveyor to Truck	35	2000	1.20E-01	99.90%	Filter Media Mfg. - See APP C3	1.20E-04	4.20E-03	1.01E-01
TOTAL EMISSIONS						2.40E-04	4.92E-03	1.18E-01

NOTES:

1. All 24-hr EMISSIONS calculated for materials like sand assume emissions occur 24 hours per day [Emissions (lb/hr) x (24)] as a 24-hr maximum (lb/24-hr). Actual time period of operation will be less; thus, actual 24-hr emissions will be less.

2. All 24-hr EMISSIONS calculated for materials like sand assume emissions occur 24 hours per day [Emissions (lb/hr) x (24)] as a 24-hr maximum (lb/24-hr). Actual time period of operation will be less; thus, actual 24-hr emissions will be less.

APPENDIX C3: FABRIC FILTER MEDIA TO BE USED ON ALL BAG TO BULK NEW PROCESSES

Fact Sheet

BHA® Preveil® ePTFE Membrane Laminat

Fractional Efficiency Test

BHA Preveil QT025

Particle Size Range (micron)	Fractional Efficiency (%)
0.3–0.4	99.93
0.4–0.55	99.98
0.55–0.7	99.90
0.7–1.0	100.00
1.0–1.3	100.00
1.3–1.6	100.00
1.6–2.2	100.00
2.2–3.0	100.00
3.0–4.0	100.00
4.0–5.5	100.00
5.5–7.0	100.00
7.0–10.0	100.00

APPENDIX C4.1: TAP "SILICA" EMISSION RATES

MATERIAL	PM10 EMISSION RATE Silica Silo Load-In (lb/24hr)[1]	PM10 EMISSION RATE Silica Silo Load-Out to Super Sack (lb/24hr)[1]	PM10 EMISSION RATE- Supersack Transfer to Mobile Bin (lb/24hr)[1]	PM10 EMISSION RATE- Conveyor to Truck (lb/24hr)[1]	SILICA CONTENT[2]	SILICA EMISSION RATE Silica Silo Load-In (lb/24hr)[3]	SILICA EMISSION RATE Silica Silo Load-Out to Super Sack (lb/24hr)[3]	SILICA EMISSION RATE- Supersack Transfer to Mobile Bin (lb/24hr)[3]	SILICA EMISSION RATE- Conveyor to Truck (lb/24hr)[3]	SILICA EMISSION RATE - Total (lb/24hr)[3]	SILICA DEMINIMIS RATE (lb/24hr)	SILICA SQER (lb/24hr)
Materials Similar to Sand												
Silica (Sand)	1.87E-03	1.56E-02	7.49E-04	4.37E-03	99.90%	1.87E-03	1.56E-02	7.48E-04	4.36E-03	2.26E-02	1.10E-02	2.20E-01
Aluminum Silicate (Kyanite)	NA	NA	7.49E-04	4.37E-03	10.00%	NA	NA	7.49E-05	4.37E-04	5.12E-04	1.10E-02	2.20E-01
Boric Acid	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA
Calcium Silicate (Wollastontite)	NA	NA	7.49E-04	4.37E-03	1.00%	NA	NA	7.49E-06	4.37E-05	5.12E-05	1.10E-02	2.20E-01
Lithium Carbonate	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA
Mg-Fe Silicate (Olivine)	NA	NA	7.49E-04	4.37E-03	1.00%	NA	NA	7.49E-06	4.37E-05	5.12E-05	1.10E-02	2.20E-01
Sodium Carbonate (Soda Ash)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA
Sucrose	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA
Zirconium Silicate1	NA	NA	7.49E-04	4.37E-03	0.30%	NA	NA	2.25E-06	1.31E-05	1.54E-05	1.10E-02	2.20E-01
Materials Similar to Pulverized Minerals												
Ferric Oxide	NA	NA	4.61E-02	2.69E-01	1.00%	NA	NA	4.61E-04	2.69E-03	3.15E-03	1.10E-02	2.20E-01
Titanium Dioxide (Rutile)	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA
Zinc Oxide	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA
									TOTAL	2.63E-02	1.10E-02	2.20E-01

NOTES:

1. From Appendix C2.

2. From Appendix C1.

3. Calculated as: PM10 Emission Rate x Silica Content.

APPENDIX C4.2: TAP "BORON" EMISSION RATES

MATERIAL	PM10 EMISSION RATE Silica Silo Load-In (lb/24hr)[1]	PM10 EMISSION RATE Silica Silo Load-Out to Super Sack (lb/24hr)[1]	PM10 EMISSION RATE- Supersack Transfer to Mobile Bin (lb/24hr)[1]	PM10 EMISSION RATE- Conveyor to Truck (lb/24hr)[1]	BORON CONTENT[2]	BORON EMISSION RATE Silica Silo Load-In (lb/24hr)[3]	BORON EMISSION RATE Silica Silo Load-Out to Super Sack (lb/24hr)[3]	BORON EMISSION RATE- Supersack Transfer to Mobile Bin (lb/24hr)[3]	BORON EMISSION RATE- Conveyor to Truck (lb/24hr)[3]	BORON EMISSION RATE - Total (lb/24hr)[3]	BORON DEMINIMIS RATE (lb/24hr)
Materials Similar to Sand											
Silica (Sand)	1.87E-03	1.56E-02	7.49E-04	4.37E-03	0.00%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA
Aluminum Silicate (Kyanite)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Boric Acid	NA	NA	7.49E-04	4.37E-03	100.00%	NA	NA	7.49E-04	4.37E-03	5.12E-03	1.1
Calcium Silicate (Wollastontite)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Lithium Carbonate	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Mg-Fe Silicate (Olivine)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Sodium Carbonate (Soda Ash)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Sucrose	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Zirconium Silicate1	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Materials Similar to Pulverized Minerals											
Ferric Oxide	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Titanium Dioxide (Rutile)	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Zinc Oxide	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
									TOTAL	5.12E-03	1.1

NOTES:

1. From Appendix C2.

2. From Appendix C1.

3. Calculated as: PM10 Emission Rate x Boron Content.

APPENDIX C4.3: TAP "URANIUM" EMISSION RATES

MATERIAL	PM10 EMISSION RATE Silica Silo Load-In (lb/24hr)[1]	PM10 EMISSION RATE Silica Silo Load-Out to Super Sack (lb/24hr)[1]	PM10 EMISSION RATE- Supersack Transfer to Mobile Bin (lb/24hr)[1]	PM10 EMISSION RATE- Conveyor to Truck (lb/24hr)[1]	URANIUM CONTENT[2]	URANIUM EMISSION RATE Silica Silo Load-In (lb/24hr)[3]	URANIUM EMISSION RATE Silica Silo Load-Out to Super Sack (lb/24hr)[3]	URANIUM EMISSION RATE- Supersack Transfer to Mobile Bin (lb/24hr)[3]	URANIUM EMISSION RATE- Conveyor to Truck (lb/24hr)[3]	URANIUM EMISSION RATE - Total (lb/24hr)[3]	URANIUM DEMINIMIS RATE (lb/24hr)
Materials Similar to Sand											
Silica (Sand)	1.87E-03	1.56E-02	7.49E-04	4.37E-03	0.00%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA
Aluminum Silicate (Kyanite)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Boric Acid	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Calcium Silicate (Wollastontite)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Lithium Carbonate	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Mg-Fe Silicate (Olivine)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Sodium Carbonate (Soda Ash)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Sucrose	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Zirconium Silicate	NA	NA	7.49E-04	4.37E-03	300 ppmw	NA	NA	2.25E-07	1.31E-06	1.54E-06	0.003
Materials Similar to Pulverized Minerals											
Ferric Oxide	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Titanium Dioxide (Rutile)	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Zinc Oxide	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
									TOTAL	1.54E-06	0.003

NOTES:

1. From Appendix C2.

2. From Appendix C1.

3. Calculated as: PM10 Emission Rate x Uranium Content.

APPENDIX C4.4: TAP "ASBESTOS" EMISSIONS

MATERIAL	PM10 EMISSION RATE Silica Silo Load-In (lb/24hr)[1]	PM10 EMISSION RATE Silica Silo Load-Out to Super Sack (lb/24hr)[1]	PM10 EMISSION RATE- Supersack Transfer to Mobile Bin (lb/24hr)[1]	PM10 EMISSION RATE- Conveyor to Truck (lb/24hr)[1]	ASBESTOS CONTENT2	ASBESTOS EMISSION RATE Silica Silo Load-In (lb/24hr)3	ASBESTOS EMISSION RATE Silica Silo Load-Out to Super Sack (lb/24hr)3	ASBESTOS EMISSION RATE- Supersack Transfer to Mobile Bin (lb/24hr)3	ASBESTOS EMISSION RATE- Conveyor to Truck (lb/24hr)3	ASBESTOS EMISSION RATE - Total (lb/24hr)3	ASBESTOS DEMINIMIS RATE (lb/24hr)
Materials Similar to Sand											
Silica (Sand)	1.87E-03	1.56E-02	7.49E-04	4.37E-03	0.00%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA
Aluminum Silicate (Kyanite)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Boric Acid	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Calcium Silicate (Wollastontite)	NA	NA	7.49E-04	4.37E-03	60 ppmw	NA	NA	4.49E-08	2.62E-07	3.07E-07	3.50E-05
Lithium Carbonate	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Mg-Fe Silicate (Olivine)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Sodium Carbonate (Soda Ash)	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Sucrose	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Zirconium Silicate	NA	NA	7.49E-04	4.37E-03	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Materials Similar to Pulverized Minerals											
Ferric Oxide	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Titanium Dioxide (Rutile)	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
Zinc Oxide	NA	NA	4.61E-02	2.69E-01	0.00%	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA
									TOTAL	3.07E-07	0.003

NOTES:

1. From Appendix C2.

2. From Appendix C1.

3. Calculated as: PM10 Emission Rate x Asbestos Content.

Appendix D: Air Dispersion Modeling

APPENDIX D: AIR DISPERSION MODELING

An air dispersion modeling analysis was not conducted to evaluate the compliance of the site PM10 and PM2.5 emissions with the National Ambient Air Quality Standards (NAAQS) because the site total increase in the PM10 emission rate is 1.38 lb/year and the site total increase in the site PM2.5 emission rate is 0.53 lb/yr. These increases in overall site emissions are *de minimis* and will not affect the prior air quality analyses conducted at the site, and which were previously submitted to WDOE for review. It is noted that the recent reduction in the annual average NAAQS PM2.5 from 12 ug/m^3 to 9 ug/m^3 will not be affected given the *de minimis* nature of the total increase in PM2.5 emissions at the site as a result of the bag-to-bulk process.

Likewise, air dispersion modeling was not conducted to evaluate compliance with the site TAP emissions of Silica, Boron, Uranium, and Asbestos because the emission rates of these TAPs do not exceed the *de minimis* emission rates for Boron, Uranium, and Asbestos; and the emission rate for Silica does exceed the Small Quantity Emission Rate (SQER) for Silica after application of TBACT. (TRT has proposed the use of filter fabric media with a proven particulate removal efficiency of at least 99.9%).

APPENDIX E: SDS

SAFETY DATA SHEET

CMP-AS SAND; CMP-AS FLOUR; CMP-AS 70,80 and 90 FLOUR

Continental Mineral Processing

Continental Mineral Proc. Corp.
P.O. Box No. 62005
Cincinnati, Ohio 45262-0005
☎ (513) 771-7190
Fax No. (513) 771-9153

SECTION 1: PRODUCT AND COMPANY INFORMATION

PRODUCT IDENTIFIER AS USED ON THE LABEL: CMP AS Continental Mineral Processing Aluminosilicate

PRODUCT GRADE / TYPES: CMP-AS SAND (UNGROUND); CMP-AS FLOUR; CMP-AS 70 FLOUR; CMP-AS 80; FLOUR; CMP-AS 90 FLOUR.

CHEMICAL NAME: Mineral mixture – Primarily aluminum silicate.

MSDS NUMBER: CMP AS 001

PRODUCT USE: Metal casting; Foundry mould; Refractory barrier; Ceramic manufacture.

RESTRICTIONS ON USE: This product is not intended to be used as:
Abrasive blasting media; or
Any product regulated by the U.S. Food and Drug Administration (FDA), including, but not limited to, human or animal food, drugs, medical devices, or cosmetics.

MANUFACTURER: Continental Mineral Processing Corp., P.O. Box 62005, Cincinnati, Ohio 45262-0005. 1-513-771-7190 (Voice); 1-513-771-9153 (Fax).

EMERGENCY INFORMATION (USA): 1-513-771-7190 (Voice); 1-513-771-9153 (Fax).

SECTION 2: HAZARD IDENTIFICATION

DANGER! May cause cancer by inhalation. May cause damage to lungs through prolonged or repeated inhalation.

GHS Classification

Health	Environmental	Physical
Carcinogen – Category 1 STOT Chronic (inhalation) Category 2	None	None

GHS Label

Symbol:

Hazard Statements
DANGER! May cause cancer by inhalation.
May cause damage to lungs through prolonged or repeated inhalation.

Precautionary Statements
Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust. Do not eat, drink or smoke when using this product. Wash thoroughly after handling.
If Exposed or Concerned: Get medical attention.
Store in a secure location.
Disposal: Waste product shall be disposed of in accordance with applicable State and local regulations.

SAFETY DATA SHEET

CMP-AS SAND; CMP-AS FLOUR; CMP-AS 70,80 and 90 FLOUR

Hazards not otherwise classified: This product contains trace amounts of the Naturally Occurring Radioactive Materials (NORMs) uranium at 0.003% and thorium at 0.002%, or less than 0.5 Bq/g specific activity. Chronic inhalation exposure to uranium and thorium may cause lung cancer.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS Registry Number	Concentration
Aluminum Silicate	12141-46-7	≤85 - 95 %
Aluminum Oxide (Non-Fibrous)	1344-28-1	≤5 – 15 %
Zircon	14940-68-2	≤5 - 12 %
Crystalline Silica (Quartz)	14808-60-7	0.1 - 1 %

SECTION 4: FIRST AID MEASURES

FIRSTAID PROCEDURES:

EyeContact: Flush eyes with clean, flowing (low pressure) water for at least 15 minutes. Get medical attention if pain or irritation persists.

Skin Contact: The compound is not hazardous by skin contact, however removal of particles and cleansing of the skin after use is advisable. Get medical attention if irritation develops or persists.

Inhalation: Move to fresh air and get medical attention if cough or other symptoms develop. If not breathing, give artificial respiration or give oxygen by trained personnel, and get immediate medical attention.

Ingestion: No specific intervention is indicated. Consult a physician if necessary.

SECTION 5: FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES: This product will not burn. No unusual fire or explosion hazards.

EXTINGUISHING MEDIA: This product is compatible with all extinguishing media. Use extinguishing media appropriate local circumstances and the surrounding environment.

PROTECTION FOR FIREFIGHTERS: Use firefighting methods appropriate to local circumstances and the surrounding environment.

SECTION 6: ACCIDENTAL RELEASE MEASURES

NOTE: Review SECTION 5 FIRE FIGHTING MEASURES and SECTION 7 HANDLING (PERSONNEL) sections before proceeding with clean- up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT recommended in SECTION 8 during clean-up.

If spilled product is uncontaminated, collect using dustless method (HEPA vacuum or wet method) and place in appropriate container for use. If spilled product is contaminated: (a) use appropriate method for the nature of contamination; and (b) consider possible toxic or fire hazards associated with the contaminating substances. Do not use compressed air. Collect spilled product in appropriate containers for recycling or disposal. See SECTION 12 for waste disposal.

SECTION 7: HANDLING AND STORAGE

HANDLING (PERSONNEL) Do not breathe dust. Avoid dust formation and accumulation in work area. Avoid contact with skin and eyes. Use normal precautions against bag breakage and spills. Use gloves and wash hands before eating, drinking, applying cosmetics or smoking to minimize dust inhalation or ingestion of residue from hands. Wash hands before breaks and at the end of workday. Use engineering controls to maintain dust levels below exposure limits of SECTION 8.

SAFETY DATA SHEET

CMP-AS SAND; CMP-AS FLOUR; CMP-AS 70,80 and 90 FLOUR

HANDLING (PHYSICAL ASPECTS) This is a fully oxidized mineral product. As such it cannot support combustion or participate in a dust explosion.

STORAGE Use good housekeeping in storage areas to prevent accumulation of dust. Keep container(s) tightly closed. Store in a dry and well-ventilated place.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Use sufficient ventilation to keep exposure to airborne contaminants below the exposure limits listed in this Section. Identify points of dust generation such as conveyor and hopper discharges and equip with effective dust extraction system to control dust at its source. Maintain good housekeeping procedures to prevent dust accumulation on exposed surfaces. See: ACGIH "*Industrial Ventilation, A Manual of Recommended Practice (latest edition).*"

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear protective safety goggles, face shield or safety glasses with side shields.

Skin Protection: Wear clothing sufficient to cover the skin, safety shoes, and impervious gloves for hand protection against dry material. Cleanse exposed skin with soap and water. Launder clothing after use.

Respiratory Protection: Use NIOSH/MSHA approved respiratory protection (air purifying or air supplying) with a type 100 (high efficiency) particulate cartridge or canister) where concentrations are above exposure limit values (see table below). A respiratory protection program that meets OSHA 29 CFR part 1910.134 and ANSI Z88.2 (recent version) requirements must be followed whenever workplace conditions warrant the use of a respirator.

Protection provided by air-purifying respirators is limited. Use a positive pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

NORMs Protection Dust inhalation is the principal exposure pathway to NORMs. Dosimetry calculations (ICRP 68) conclude that maintain total dust exposure below the following limiting values will not cause NORM exposure to exceed 1 mSv/yr, the public dose limit for exposure to radioactivity:

Aerodynamic Diameter, µm	Total Dust mg/m^3
1µm	20.0
5 µm	29.3
10 µm	45.2

Meeting the exposure limits for respirable crystalline silica (quartz) and respirable particulates shown below is protective against inhalation exposure to NORMs.

		Exposure Limits mg/m^3		
		OSHA PEL	ACGIH TLV	NIOSH REL
Chemical	Percent	15 mg/m^3 (50 MMPCF)(Total Dust); 5 mg/m^3 (15 MMPCF) (Respirable Fraction), TWA	10 mg/m^3 (Inhalable fraction) 3 mg/m^3 (Respirable Fraction)	Not established
Aluminum silicate	≤85 - 95			
Aluminum Oxide (non-fibrous)	≤5 - 15	15 mg/m^3 (50 MMPCF)(Total Dust); 5 mg/m^3 (15 MMPCF) (Respirable Fraction), TWA	10 mg/m^3 (Inhalable fraction) 3 mg/m^3 (Respirable Fraction)	Not established
Zircon	≤5 - 12	5 mg/m^3 (as Zr), TWA	5 mg/m^3 (as Zr), TWA	5 mg/m^3 (as Zr), TWA

SAFETY DATA SHEET

CMP-AS SAND; CMP-AS FLOUR; CMP-AS 70,80 and 90 FLOUR

		Exposure Limits mg/m³ (CONTINUED)		
		OSHA PEL	ACGIH TLV	NIOSH REL
Chemical	Percent			
Crystalline Silica (Quartz)	0.1 - 1	10 mg/m³ (Respirable fraction) (%SiO2)+2 250 MMPCF (%SiO2)+2 (Respirable fraction) 30 mg/m³ (Total dust) (%SiO2)+2	0.05 mg/m³ (Respirable fraction)	0.025 mg/m³ (Respirable fraction)

NOTES:
OSHA Permissible Exposure Limits (PEL) and ACGIH Threshold Limit Values (TLVs) are an 8-hour time-weighted average (TWA) concentration during a 40-hour work week. NIOSH Recommended Exposure Limit (REL) is a time-weighted average concentration for up to a 10-hour workday during a 40-hour work week.
MMPCF = Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.
(%SiO2) = The percentage of crystalline silica determined from airborne samples, except in those instances in which other methods have been shown to be applicable. Both concentration and percent quartz determined from fraction passing size-selector impactor having characteristics set forth in 29 C.F.R. 1910.1000 Table Z-3 footnote (e).

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Light brown crystalline solid
Odor :odorless
Odor threshold: Not applicable
pH: Neutral
Melting point/range:1,538 - 1,815 ℃ (2,800 - 3,299 ℉)
Boiling point: No data.
Flash point: Not applicable; does not flash.
Evaporation rate: No data.
Flammability: Non-flammable.
Vapor pressure: No data.
Vapor density: No data.
Specific gravity: 3.6 - 4.2
Water solubility: insoluble
Partition coefficient: n-octanol / water: No data.
Auto-ignition temperature: Not applicable.
Decomposition temperature: No data.
Viscosity: Not applicable.

SECTION 10: STABILITY AND REACTIVITY

REACTIVITY: Silicate minerals in this product will react with hydrofluoric acid (HF).
STABILITY: Stable.
INCOMPATIBILE MATERIALS: None.
HAZARDOUS DECOMPOSITION PRODUCTS: None.

SAFETY DATA SHEET

CMP-AS SAND; CMP-AS FLOUR; CMP-AS 70,80 and 90 FLOUR

SECTION 11: TOXICOLOGICAL PROPERTIES

INHALATION EXPOSURE to respirable crystalline silica (quartz) may result in silicosis, a serious adverse health effect.

Silicosis is a lung disease (pneumoconiosis) that can occur after chronic exposure to airborne respirable crystalline silica (quartz). Silicosis may be progressive and cause lung lesions, changes in lung function, including wheezing, shortness of breath, cough and sputum production that may be disabling. Advanced silicosis may be fatal.

The International Agency for Research on Cancer (IARC) concluded that crystalline silica inhaled in the form of quartz from occupational sources is carcinogenic to humans (Group 1). See: IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Vo. 68, "Silica, Some Silicates…" (1997).

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

There is evidence that exposure to respirable crystalline silica is associated with autoimmune diseases; increased risk of tuberculosis and kidney disease.

INHALATION EXPOSURE to zircon (zirconium silicate): Pulmonary granuloma in zirconium workers has been reported.

INHALATION EXPOSURE to aluminum silicate and aluminum oxide (non-fibrous): Inhalation exposure to respirable dust particles not otherwise regulated (PNOR) can result in pneumoconiosis.

INHALATION EXPOSURE to NORMs containing uranium and thorium may cause cancer.

INGESTION EXPOSURE: No adverse effects expected for incidental ingestion of this product.

SKIN AND EYE CONTACT: Contact may cause irritation by mechanical action.

CHRONIC HEALTH EFFECTS: See "INHALATION" subsection above with respect to silicosis, cancer status and other information relevant to human health.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with respiratory disease, including but not limited to asthma and chronic bronchitis or emphysema should not be exposed to respirable mineral dusts.

SIGNS AND SYMPTOMS OF EXPOSURE: Exposure to mineral dusts may cause mucous membrane and respiratory irritation, cough, sore throat, nasal congestion, sneezing and shortness of breath. IMPORTANT: there may be no immediate symptoms of exposure to hazardous concentrations of respirable crystalline silica (quartz) and elevated levels of airborne crystalline silica (quartz) may not be visible to the unaided eye..

NUMERICAL ESTIMATES OF TOXICITY

Crystalline Silica (Quartz): Oral approximate lethal dose (ALD): >11,000 mg/kg, rat.
Crystalline Silica (Quartz): Aquatic toxicity (LC_{50}) carp >10,000mg/L/72 hr.
Aluminum silicate: Oral toxicity (LD_{50}): 16000 mg/kg,rat.
Aluminum oxide: Oral toxicity (LD_{50}): > 2000 mg/kg (rat); no deaths reported following an acute 4-hour exposure to up to 1,000 mg Al/m^3 as aluminum oxide in groups of 12–18 male Fischer 344 rats (Thomson et al. 1986).
Zircon: Oral toxicity (LD_{50}): > 200 mg/kg, mice.

MUTAGENICITY

Quartz: Did not cause genetic damage in cultured bacterial cells; Did not cause genetic damage in animals; Genetic damage was observed in some laboratory tests on cultured mammalian cells, but not others.
Zircon: Ceramic dusts containing zirconium (zirconium oxide/yttrium oxide) proved not to be cytotoxic in 3T3-Balb/c cell lines (Dion *et al.* 1994).
Aluminum silicate: No data.

SAFETY DATA SHEET

CMP-AS SAND; CMP-AS FLOUR; CMP-AS 70,80 and 90 FLOUR

Aluminum oxide: No data.

REPRODUCTIVE TOXICITY: No data.

Additional Toxicological Information: RTECS TOXICITY DATA FOR PRODUCT COMPONENTS:

COMPONENT	CAS #	NIOSH (RTECS) #
Aluminum Silicate	12141-46-7	VV8880000
Aluminum Oxide (Al_2O_3)	1344-28-1	BD1200000
Zircon ($Zr{\cdot}SiO_4$)	14940-68-2	ZH9000000
Crystalline Silica (SiO_2)	14808-60-7	VV7330000

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SECTION 12: ECOLOGICAL INFORMATION

No data available on any adverse effects of this material on the environment. This product is insoluble in water.

SECTION 13: DISPOSAL CONSIDERATIONS

RCRA: This product, in its manufactured composition, is neither a "characteristic" nor "listed" hazardous waste when disposed of, as those terms are defined under the federal Resource Conservation and Recovery Act (42 U.S.C. 6901, et seq.).

DISPOSAL METHOD: This product is generally suitable for landfill disposal. Follow all applicable Federal, State, and local laws, rules, and regulations regarding the proper disposal of this material. If this product has been altered or contaminated with other hazardous materials, appropriate waste analysis may be necessary to determine proper method for disposal. A qualified environmental professional should determine waste characterization, disposal, and treatment methods for this material in accordance with applicable Federal, State and local requirements.

"NORM" Disposal: The presence of trace amounts of naturally occurring radioactive material (NORM) (See SECTION15) may require special disposal consideration in some jurisdictions. Because NORM disposal regulations vary from state to state, please check with the relevant NORM disposal rules in your jurisdiction.

SECTION 14: TRANSPORTATION INFORMATION

U.S.DOT INFORMATION: This product is not regulated by U.S. DOT as a hazardous material (49 CFR part 172.101).

SECTION 15: REGULATORY INFORMATION

COMPONENTS LISTED IN U.S. FEDERAL REGULATIONS AND STATE "RIGHT-TO-KNOW" LAWS:

COMPONENT	CAS #	FEDERAL					STATE (Right-to-Know)			
		RCRA	CERCLA RQ?	SARA 313	SARA EHS	TSCA Listed	PA	NJ	MA	CA
Zircon ($ZrO_2{\cdot}SiO_2$) (14940-68-2)	14940-68-2	NO	NO	NO	NO	YES	NO	NO	NO	NO
Crystalline Silica (SiO_2)	14808-60-7	NO	NO	NO	NO	YES	YES	YES	YES	YES
Aluminum Oxide (Al_2O_3)	1344-28-1	NO	NO	NO	NO	YES	YES	YES	YES	NO
Aluminum Silicate (Al_2SiO_5)	1302-76-7	NO	NO	NO	NO	YES	YES	NO	NO	NO

NORM Regulations: This product contains naturally occurring radioactive materials (NORMs) at levels below U.S. Nuclear Regulatory Commission licensing requirements at 10 C.F.R 40. However, state NORM rules vary. The Conference of Radiation Control Program Directors (CRCPD) 2004 Part N Suggested State Regulations exempt zircon from state regulation. Ohio regulations exempt zircon from regulation.

SAFETY DATA SHEET

CMP-AS SAND; CMP-AS FLOUR; CMP-AS 70,80 and 90 FLOUR

CALIFORNIA PROPOSITION 65 WARNING: THIS PRODUCT CONTAINS SUBSTANCES (QUARTZ AND RADIONUCLIDES) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

COMPONENTS LISTED IN GLOBAL INVENTORIES

COMPONENT	CAS #	AUSTRALIA	CANADA	CHINA	EU	JAPAN[1]	JAPAN[2]	KOREA	NEW ZEALAND	PHILIPPINES
Aluminum Silicate (Al_2SiO_5)	12141-46-7	YES	YES	YES	YES	NO	NO	YES	YES	NO
Aluminum Oxide (Al_2O_3)	1344-28-1	YES	YES	YES	YES	YES	YES	YES	YES	YES
Zircon ($ZrO_2 \cdot SiO_2$)	14940-68-2	YES	YES	YES	YES	YES	YES	YES	YES	YES
Crystalline Silica (SiO_2)	14808-60-7	YES	YES	YES	YES	YES	YES	YES	YES	YES

EINECS Status: On the inventory, or in compliance with the inventory
TSCA Status: On the inventory, or in compliance with the inventory
AICS Status: On the inventory, or in compliance with the inventory
DSL Status: On the inventory, or in compliance with the inventory
ENCS (JP) Status: On the inventory, or in compliance with the inventory
KECI (KR) Status: On the inventory, or in compliance with the inventory
PICCS (PH) Status: On the inventory, or in compliance with the inventory
INV (CN) Status: On the inventory, or in compliance with the inventory

SARA 313 Regulated Chemical(s): This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

CANADIAN WHMIS CLASSIFICATION: D-2A; D-2B

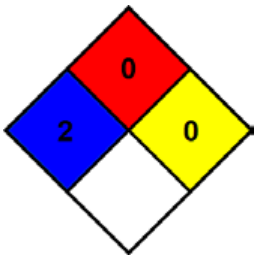
The OSHA Hazard Communication Standard 29 CFR §1910.1200 and state and local worker “Right-to-Know” laws and regulations should be strictly followed, which includes training employees on the content of this SDS. Warn your employees (and your customer users in case of resale) by posting or other means of the potential health risks associated with the use of this product and train them in the appropriate personal protective equipment, work and hygiene practices, and engineering controls which will reduce their risk of exposure. This SDS is limited to the product that is sold or distributed in the United States.

SECTION 16: OTHER INFORMATION

NFPA Health Hazard: 2 – Intense or continued exposure could cause temporary incapacitation or possible residual injury unless medical attention given.

NFPA Fire Hazard: 0 – Material will not burn.

NFPA Reactivity: 0 – Normally stable, even under fire exposure conditions and not reactive with water.



HMIS Rating
Health: 2* Moderate Hazard – Temporary or minor injury may occur.

SAFETY DATA SHEET

CMP-AS SAND; CMP-AS FLOUR; CMP-AS 70,80 and 90 FLOUR

Flammability: 0 Minimal Hazard
Physical: 0 Minimal Hazard
Personal Protection: E

ACRONYMSANDABBREVIATIONSUSEDINTHISMSDS:

ACGIH American Conference of Governmental Industrial Hygienists
Bq/g Measure of specific activity equal to 1 disintegration/second/gram
CA California Right-to-Know Law; "Proposition 65, "CCR TITLE 8 – Division 1 – Chapter 3.2 – Subchapter 1– Article 5 - §339 The Hazardous Substances List
CAS# CAS Registration Number is an assigned number to identify a material
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act, 40 CFR part 302.4 – Designation, Reportable Quantities, and Notification (Table 302.4)
CRCPD Conference of Radiation Control Program Directors
EPA United States Environmental Protection Agency
GHS Globally Harmonized System of Hazard Communication implemented by OSHA at 29 CFR §1910.1200
HMIS Hazardous Materials Identification System of the National Paint & Coatings Association
IARC International Agency for Research on Cancer
Inhalable dust Dust fraction that enters the nose / mouth during breathing (D_{50} of sampler = 50 µm)
ICRP International Commission on Radiological Protection
MA Massachusetts Right-to-Know Law; MGL PART I – TITLE XVI – CHAPTER 111F Hazardous Substances Disclosure By Employers
mg/m^3 Milligrams per cubic meter
mSv Milli-seiverts
MSHA Mine Safety and Health Administration
N/A Not applicable
NFPA National Fire Protection Association
NIOSH National Institute of Occupational Safety and Health
NJ New Jersey Right-to-Know Law; NJAC 8:59 - Worker and Community Right to Know Act
NORM Naturally Occurring Radioactive Material
NTP U.S. National Toxicology Program
OSHA Occupational Safety and Health Administration
PA Pennsylvania Right-to-Know Law; 34 PA Code § 323. Hazardous Substance List (Appendix A)
PEL Permissible Exposure Limit (OSHA)
RCRA Resource Conservation and Recovery Act (EPA), 40 CFR part 261 - Identification and Listing of Hazardous Waste
REL Recommended Exposure Limit (NIOSH)
Respirable dust The sub-fraction of inhalable dust that penetrates to the alveolar region of lung (D_{50} of sampler = 4µm)
RQ Reportable Quantity
RTECS Registry of Toxic Effects of Chemical Substances: This database contains toxic effects data on some 140,000 chemicals. It is built and maintained by NIOSH.
SARA Superfund Amendments and Reauthorization Act, 40 CFR part 372.65 - Toxic Chemical Release Reporting: Community Right-to-Know
SARA EHS (SARA Extremely Hazardous Substances) 40 CFR part 355 - Emergency Planning and Notification (Appendices A & B)
STEL Short-term exposure limit (ACGIH)
STOT Specific Target Organ Toxicity
STP Standard temperature and pressure (T = ~70^{o}F, P = 1 atm)
TCLP Toxicity Characteristic Leaching Procedure (EPA Method 1311)
TLV Threshold Limit Value (ACGIH)
TSCA Toxic Substances Control Act, 40 CFR 716.120 - Health and Safety Data Reporting
TWA Time Weighted Average
USDOT United Stated Department of Transportation

SAFETY DATA SHEET

CMP-AS SAND; CMP-AS FLOUR; CMP-AS 70,80 and 90 FLOUR

DISCLAIMER:

This Safety Data Sheet (SDS) is to be used only for this product in its present form. If this product is altered or used as a component in another material, the information on this SDS may not be applicable. This document is generated for the purpose of distributing health, safety, and environmental data to users of the product. This SDS is not a specification sheet, nor should any displayed data be construed as a specification. Some of the information presented and conclusions drawn herein are obtained from sources other than direct test data on the product.

The information and data herein are believed to be accurate and have been compiled from sources believed reliable. The Buyer of this product assumes all risk of use, storage, and handling of the product in compliance with applicable Federal, State and local laws and regulations. CONTINENTAL MINERAL PROCESSING MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, CONCERNING THE ACCURACY OR COMPLETENESS OF THE INFORMATION AND DATA HEREIN. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY EXCLUDED. Continental Mineral Processing will not be liable for claims relating to any party's use of or reliance on information and data contained herein, regardless of whether it is claimed that the information and data are inaccurate, incomplete, or otherwise misleading.

Date of Safety Data Sheet Preparation: January 2, 2014

END OF SDS No. CMP AS 001

THREE ELEPHANT® Boric Acid
Safety Data Sheet

1. Product and Company Identification

Product Name	THREE ELEPHANT® Boric Acid
Other Product Name(s)	Boric Acid; Boracic acid; orthoboric acid; Boron Trihydroxide; Hydrogen orthoborate; Trihydroxyborane
Product Use	Manufacturing of products, including, but not limited to, glue, charcoal, reagent chemicals, ceramics, borosilicate glass, fiberglass, alloys. Not for use in the manufacture of pesticides.
Manufacturer	SEARLES VALLEY MINERALS INC. 13200 MAIN STREET; P.O. BOX 367 TRONA, CALIFORNIA 93592-0367 Information (760) 372-2291
Emergency Telephone Numbers	1-800-424-9300 (USA/Canada CHEMTREC) +1 (703) 527-3887 (International & Maritime CHEMTREC)

2. Hazards Identification

Emergency Overview: A white crystalline solid that may cause mild irritation to the skin, eyes and respiratory tract. Not flammable.

OSHA Regulatory Status	Hazardous
WHMIS Regulatory Status	Hazardous
OSHA Classification	Eye corrosion/irritation 2B Reproductive Toxicity 2
OSHA Signal Word	WARNING
OSHA Hazard Statements	May damage fertility or the unborn child.
OSHA Precautionary Statements	Do not handle until all safety precautions have been read and understood. Wear protective gloves and safety eyewear. Wash thoroughly after handling. If on skin, wash with plenty of water. Wash contaminated clothing before reuse. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If inhaled: Remove person to fresh air and keep comfortable for breathing. If skin irritation occurs or eye irritation persists, get medical attention. Store in a well ventilated place. Keep container tightly closed. Dispose of container in accordance with Federal and local regulations.
OSHA Label Symbols	
Other Hazards Not Specified by OSHA	Oral Acute Toxicity Category 5

** Note: Label designed to meet OSHA & FHSA label requirements and may contain additional phrases.

Potential Health Effects:

Skin	Can cause mild skin irritation.
Eyes	Causes mild eye irritation.
Ingestions	Low toxicity. May cause discomfort.
Inhalation	May cause mild irritation if inhaled.
Chronic Effects	May cause reproductive effects affecting fertility and/or development of the unborn child.

Ingredients found on established carcinogen lists:

Ingredient	NTP Status	IARC Statue	OSHA List
No ingredients listed in this section.	---	---	---

3. Composition / Information on Ingredients

Chemical Name	CAS #	EINECS #	Wt. %
Boric Acid*	10043-35-3	233-139-2	99.75

*May contain trace amounts of naturally-occurring substances including arsenic and other metals. See Section 15 for California Proposition 65 Warning.

4. First Aid Measures

Skin	Wash with plenty of water. Wash contaminated clothing before reuse. Seek medical attention if skin irritation occurs.
Eyes	Rinse eyes cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Seek medical attention if irritation persists.
Ingestions	If you feel unwell, contact a doctor or poison control center.
Inhalation	Remove to fresh air. Seek medical advice in case of irritation.
Advice to Physician	Treat symptomatically.

5. Fire Fighting Measures

Extinguishing Media	Any media suitable for surrounding fire.
Fire/Explosion Hazards	None indicated.
Fire Fighting Procedures	Wear normal firefighting gear suitable for surrounding fire. Self-contained respiratory protection may be required.
Flammable Limits	None.
Flash Point	Not flammable.
Autoignition Temperature	None.
Hazardous Combustion Products	May produce boron compounds if involved in a surrounding fire.

6. Accidental Release Measures

Personal Precautions	Wear proper personal protective equipment indicated in Section 8.
Containment	Not normally required as this is a solid material not normally mobile.
Clean Up	Sweep up and place into container for reuse and/or disposal.
Notification Requirements	None normally required.

7. Handling and Storage

Handling	Wear proper personal protective equipment indicated in Section 8. Wash hands before eating or drinking.
Storage	Should be stored in a dry location. Keep packages tightly closed to minimize dust formation. Keep out of the reach of children.

8. Exposure Controls / Personal Protection

Engineering Controls	Use local exhaust to keep airborne level below safe exposure guidelines listed below.

Personal Protective Equipment:

Eyes and Face	Wear safety glasses or chemical dust goggles to avoid accidental eye contact.
Respiratory	Not required for properly ventilated areas. Otherwise use a NIOSH approved dust respirator.
Hands, Arms, and Body	Not normally required. Use work glove when handling product transfers or if skin is already irritated. Use rubber or neoprene gloves for handling product solutions.
Other	Safety shower and an eyewash should be available for emergency exposures.

Exposure Guidelines:

Ingredient	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL	California PEL
Boric Acid (as nuisance dust) H_3BO_3	15 mg/m^3 total dust 5 mg/m^3 respirable dust	None	15 mg/m^3 total dust 5 mg/m^3 respirable dust	None	10 mg/m^3 total dust 5 mg/m^3 respirable dust

9. Physical and Chemical Properties

Appearance & Physical State	White, crystalline solid
Odor:	None
Odor Threshold	None
pH (1% solution)	3.9 (4 % solution at 68 °F)
Specific Gravity	1.44
Bulk Density	Not available
Initial Boiling Point & Range	Not applicable
Melting Point /Freezing Point	326.2 °F (169 °C)
Evaporation Rate	Not applicable
Percent Volatile	None
Solubility in Water	4.7% at 68 °F (20 °C)
Vapor Density	Not applicable
Vapor Pressure	Not applicable
Upper/ Lower Flammable Limits	None
Flash Point	None
Auto ignition Temperature	Not flammable
Flammability (solid, gas)	Not flammable
Octanol/water partition coefficient	Not determined
Decomposition temperature	See section 10
Viscosity	Solid – Not applicable

10. Stability and Reactivity

Stability	Normally stable. Forms partial hydrate in moist air. When heated, the material is converted to MetaBorax Acid (HBO_2). On further heating material is converted to Boric Oxide (B_2O_3).
Conditions to avoid	Keep away from high temperatures and strong reducing agents
Materials to avoid	Borax Acid reacts with strong reducing agents such as metal hydrides or alkali metals producing explosive hydrogen gas.
Polymerization	Does not occur.
Hazardous Decomposition Products	None known.

11. Toxicological Information

Eye	Can cause mild irritation. Boric Acid, when applied to the eyes of albino rabbits (Draize test), produced effects of mild erythema, and mild to moderate discharge in 5 of 6 rabbits. All signs subsided by the fourth day after application.

Skin	LD_{50} (dermal, rabbit) > 2000 mg/kg. Can cause mild irritation. Boric Acid was applied to the skin of albino rabbits; slight to no irritation persisted 72 hours after application. No evidence of tissue damage was found.
Oral	LD_{50} (oral, rat) 2660 mg/kg.
Inhalation	ACGIH establish that exposures above safe levels stated in section 8 may produce upper respiratory irritation. Occupational exposure to safe levels not expected to produce any adverse effects.
Chronic	- A report issued by the National Toxicology Program showed "no evidence of carcinogenicity" from a full two-year bioassay on Boric Acid on mice at feed doses of 2,500 to 5,000 ppm in the diet. No mutagenic activity was observed for Boric Acid in a recent battery of four short-term mutagenicity assays. - Classification = Reproductive toxin Category 1B based on EU CLP classification. Dietary levels of Boric Acid of 6,700 ppm in chronic feeding studies in rats and dogs produced testicular changes {Weir, Fisher, 1972}. In chronic feeding studies of mice on diets containing 5,000 ppm Boric Acid, testicular atrophy was present, while mice fed 2,500 ppm Sodium Tetraborate Pentahydrate showed no significant increase in testicular atrophy. In another chronic Boric Acid study, degeneration of seminiferous tubules was present together with a reduction of germ cells in mice fed 4,500 ppm Sodium Tetraborate Pentahydrate. - Boric Acid at dietary levels of 1,000 ppm administered to pregnant female rats throughout gestation caused a slight reduction in fetal weight, but was considered close to the no observable effect level. Doses of 2,000 ppm and above caused fetal malformations and maternal toxicity. In mice, the no effect level for fetal weight reduction and maternal toxicity was 1,000 ppm Boric Acid. Fetal weight loss was noted at dietary levels of 2,000 ppm and above. Malformations (agenesis or shortening of the thirteenth rib) were seen at 4,000 ppm [Heindal et al., 1992]. The doses administered were many times in excess of those to which humans would normally be exposed.

12. Ecological Information

Acute ecotoxicity	Boron naturally occurs in seawater at an average concentration of 5 mg B/liter. In laboratory studies the acute toxicity (96-hr LC_{50}+) for under-yearling Coho salmon (Onchorhynchus kisutch) in seawater was determined as 40 mg B/L (added as Sodium Metaborate). The Minimum Lethal Dose for minnows exposed to Boric Acid at 200 °C for 6 hours is 18,000 to 19,000 mg/L in distilled water, 19,000 to 19,500 in hard water. Rainbow trout (S. gairdneri) 24-day LC_{50} = 150.0 mg/B/L 36-day NOEC-LOEC++ = 0.75-1 mg/B/L Goldfish (Carassius auratus) 7-day NOEC-LOEC = 26.50 mg/B/L 3-day LC_{50} = 178 mg/B/L Daphnids 48-hour LC_{50} = 133 mg/B/L 21-day NOEC-LOEC = 6-13 mg/B/L
Chronic ecotoxicity	Not determined.
Other Information	Not considered to bioaccumulate or to be persistant in the environment.

13. Disposal Considerations

RCRA Status	Not a hazardous waste if discarded.
Disposal Method	Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult all federal, state, and local hazardous waste regulations to ensure complete and accurate classification and disposal.

14. Transportation Considerations

DOT Proper Shipping Name	Not regulated for transport
DOT Primary Hazard Class	Not applicable
DOT UN / NA Number	Not applicable
DOT Packing Group	Not applicable
TDG (Canada)	Not regulated
IMDG (International water)	Not regulated
ICAO (Air transport)	Not regulated

15. Regulatory Information

UNITED STATES:

Toxic Substances Control Act (TSCA)

TSCA Inventory Status	Listed on TSCA Chemical Inventory
Other TSCA Issues	None

SARA Title III/CERCLA

Ingredients with "Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs).

Ingredient	**SARA/CERCLA RQ (lb)**	**SARA EHS TPQ (lb)**
No ingredients listed in this section	---	---

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SARA 311 Hazard Class	Immediate, Delayed.

SARA 313 Toxic Chemicals:

The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirements. CAS numbers and weight percent are found in Section 2.

Ingredient	**Comment**
No ingredients listed in this section.	---

State Right-To-Know

California Proposition 65

⚠ **WARNING:** This product can expose you to chemicals including arsenic, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Additional Regulatory Information:	Not listed in Clean Water Act or in Safe Drinking Water Act.

CONEG Model Legislation	Meets all CONEG requirements relating to heavy metal limitations on components of packaging materials.
FEDERAL DRUG AGENCY (FDA)	Pursuant to 21 CFR 175.105, 176.180, and 181.30, Boric Acid is approved by the FDA for use in adhesive components of packaging materials, as a component of paper coatings on such materials, or for use in the manufacture thereof, which materials are expected to come in contact with dry food products.

CANADA:

WHMIS Classification	D2A, Classified in conformance with the Controlled Products Regulations and contains all data required by that regulation.
WHMIS Ingredient Disclosure List	Boric Acid is listed.

DSL Status (Domestic substances list)	Listed on DSL.

Ingredients for this product also found on the chemical inventories of Australia, China, Korea, European Union, Japan and the Philippines.

16. Other Information

- This material is not intended for use in pesticide manufacture.
- Keep out of the reach of children.

Issue Date:	January 1, 2020
Previous Issue Date:	August 21, 2018
Changes from previous version:	Updated Sections 2, OSHA Classification, Oral Acute Toxicity Category 5, moved to Other Hazards not specified by OSHA.

National Fire Protection Assoc. (NFPA) Classification:
4 = Severe; 3 = Serious; 2 = Moderate; 1 = Slight, 0 = Minimal

Health	1
Flammability	0
Reactivity	0

Hazardous Materials Information Systems (HMIS):
4 = Extreme; 3 = High; 2 = Moderate; 1 = Slight; 0 = Insignificant

Health	1
Flammability	0
Physical Hazard	0

The information appearing herein is based upon data obtained from the generator and/or recognized technical sources. While the information is believed to be accurate, Searles Valley Minerals Inc. (SVM) makes no representations as to its accuracy or sufficiency. Conditions of use are beyond SVM's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the material is suitable for their particular purposes and they assume all risk of their use, or reliance upon, information contained herein. This information relates only to the material designated herein and does not relate to its use in combination with any other material or in any other process.

IMERYS

Safety Data Sheet in compliance with OSHA Hazard Communication Standard (29 CFR 1910.1200)

1. IDENTIFICATION

1.1 Product Identifiers:

NYAD® 325	NYAD® FP	NYGLOS® 1000	NYCOR® R
NYAD® 400	NYAD® 40	NYGLOS® 20	ULTRAFIBE® 30
NYAD® 1250	NYAD® 45	NYGLOS® 12	ULTRAFIBE® II
NYAD® G	RRIMGLOS® I	NYGLOS® 8	ULTRAFIBE® 4W
NYAD® G 35	RRIMGLOS® II	NYGLOS® 5	WOLLASTONITE FS
NYAD® G L/B	RRIMGLOS® 4W	NYGLOS® 4W	WOLLASTONITE WFS

1.2 Synonyms: Wollastonite, Calcium silicate mineral (calcium metasilicate)

1.3 Identified uses: plastics/elastomers, paints and coatings, adhesives and sealants, construction, friction and metallurgy

1.4 Supplier

- Company name: IMERYS Wollastonite USA, LLC
- Address: 803 Mountain View Drive, Willsboro NY, 12996 USA
- Telephone: +1 518-963-4262
- Fax: +1 518-963-1110

1.5 Emergency Telephone Number

Emergency telephone number: 1-518-963-4262
Available outside office hours? No

2. HAZARD(S) IDENTIFICATION

2.1 GHS Classification:

Physical and Chemical Hazards: No classification
Human Health: No classification
Environment: No classification

2.2 Label Elements:

- Pictogram None
- Signal Word None
- Hazard Statement None
- Precautionary statements None

Long term exposure to crystalline silica can cause lung injury (silicosis). IARC and NTP have determined that crystalline silica inhaled from occupational sources can cause cancer in humans. Risk of injury is dependent on the duration and level of exposure.

Handling wollastonite can create dust. Long-term exposure to high concentrations of any type or size of dust can cause irritation and be uncomfortable or harmful if the body's natural defense mechanisms are overwhelmed or incapacitated. As a general rule, control airborne dust and avoid creating or breathing dusts.

Wollastonite is a naturally occurring mineral which can contain impurities in its natural form. Imerys specifically tests its wollastonite product for the presence of asbestos. Those tests ensure the absence of asbestos at levels above

60 ppm (0.006% mass ratio) with 99% confidence. This means the product can contain traces of asbestos below 60 ppm. Imerys continually strives to improve its testing methods to ensure the highest purity of its products.

The National Toxicology Program ("NTP"), the International Agency for Research on Cancer ("IARC"), and the Occupational Safety and Health Administration ("OSHA") have all identified asbestos as a human carcinogen. Inhalation of asbestos dust may be irritating, leading to symptoms such as a cough and chest pain. Chronic inhalation exposure may cause (i) asbestosis, interstitial fibrosis of the lung tissue, which may lead to death due to respiratory or cardiac failure; (ii) pleural effusion; (iii) pleural and peritoneal mesothelioma; (iv) bronchogenic carcinoma; (v) lung cancer; (vi) cancer of the gastrointestinal tract and larynx; and (vii) other secondary lung or respiratory infections. There also are potential health effects of non-inhalation exposure to asbestos.

3. COMPOSITION/INFORMATION ON INGREDIENTS

The above mentioned products are a natural association of wollastonite, calcite, diopside and feldspar.

Chemical name	Mineral name	CAS No.	Content (%)	Classification
Calcium metasilicate	Wollastonite	13983-17-0	>94	None
Calcium carbonate	Calcite	1317-65-3	<2	None
Magnesium Calcium silicate	Diopside	14483-19-3	<2	None
Aluminum silicate	Feldspar	68476-25-5	<2	None
Silicon dioxide	Crystalline silica	14808-60-7	<1	None

4. FIRST-AID MEASURES

Description of First-aid Measures

Inhalation: Remove to fresh air.

Ingestion: Drink plenty of water. Never give liquid to an unconscious person.

Skin Contact: Wash skin thoroughly with soap and water.

Eye Contact: Immediately rinse with water for several minutes.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing Media: All extinguishing media can be used.

5.2 Special Hazards Arising from the Substance or Mixture: The product is not flammable, combustible or explosive. No hazardous thermal decomposition.

5.3 Advice for Fire-fighters: No specific special fire-fighting protection is required.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment and Emergency Procedures: Use proper respiratory and personal protective equipment. MSHA/NIOSH or OSHA/NIOSH approved respirator recommended. Spilled materials may cause slippery conditions when wet. Care should be exercised when walking on spills on floor or concrete pads.

6.2 Methods and Material for Containment and Cleaning Up: Vacuum, pump or scoop spilled material into containers for reclaiming or disposal. Do not discharge into drains, watercourses or onto the ground.

7. HANDLING AND STORAGE

7.1 Precautions for Safe Handing: Minimize dust generation and accumulation. If excessive dust is generated, provide adequate ventilation and use proper respiratory and personal protective equipment.

7.2 Conditions for Safe Storage: Store in a cool and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters: Follow workplace regulatory exposure limits for all types of airborne dust (e.g., total dust and total respirable dust). In the U.S., the ACGIH OEL (Occupational Exposure Limit) measured as an 8-hour TWA (Time Weighted Average) is 1 mg/m^3 for wollastonite (inhalable). The OSHA PEL (Permissible Exposure Limit) is 5 mg/m^3. For the equivalent limits in other countries, please a competent occupational hygienist or the local regulatory authority.

8.2 Appropriate Engineering Controls: **Use exhaust ventilation, if required, to maintain dust concentration below recommended exposure limits.**

8.3 Individual Protection Measures:

(a) Eye Protection: Wear side shield safety glasses.

(b) Hand Protection: Rubber gloves are recommended for prolonged exposure.

(c) Respiratory Protection: If a respirator is required, use of a MSHA/NIOSH or OSHA/NIOSH approved respirator is recommended.

8.4 Environmental Exposure Controls: Avoid wind dispersal.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance: Acicular, free flowing non-metallic white mineral powder
9.2 Odor: Odorless
9.3 pH: 9.9 (10% slurry in water)
9.4 Melting Point: 1540 °C, does not freeze
9.5 Flammability: Not flammable
9.6 Upper/Lower Flammability or Explosive Limits: Not explosive. Limits do not apply.
9.7 Relative density: 2.9 g/cm^3
9.8 Solubility(ies):
Solubility in water: Negligible
Solubility in acid: Yes
9.9 Explosive properties: Not explosive
9.10 Oxidizing properties: Non-oxidizing

10. STABILITY AND REACTIVITY

10.1 Reactivity: Inert, not reactive
10.2 Chemical Stability: Chemically stable under normal conditions
10.3 Possibility of Hazardous Reactions: No hazardous reactions
10.4 Conditions to Avoid: None
10.5 Incompatible Materials: None known
10.6 Hazardous Decomposition Products: None

11. TOXICOLOGICAL INFORMATION

See section 2 for additional information.

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity: No specific adverse effects known
12.2 Persistence and Degradability: Not relevant
12.3 Bioaccumulative Potential: Not relevant
12.4 Mobility in Soil: Negligible
12.5 Other Adverse Effects: No specific adverse effects known

13. DISPOSAL CONSIDERATIONS

13.1 Waste Disposal Information: Where possible, recycling is preferable to disposal. Product should be disposed in compliance with local regulations.

13.2 Disposal of Packaging: Dust formation from residues in packaging should be avoided and suitable worker protection assured. Store used packaging in enclosed receptacles. The re-use of packaging is not recommended. Recycling and disposal of packaging should be carried out by an authorized waste management company. Recycling and disposal of packaging should be carried out in compliance with local regulations.

14. TRANSPORT INFORMATION

14.1 UN number: Not regulated

14.2 Transport Hazard Class(es):

ADR: No classification assigned
IMDG: No classification assigned
ICAO/IATA: No classification assigned
RID: No classification assigned
DOT: No classification assigned

14.3 Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code: Not regulated

15. REGULATORY INFORMATION

15.1 U.S. Regulations:

EPA-TSCA: Wollastonite is exempt from the *TSCA Inventory* as a naturally occurring mineral.
EPA-CERCLA Reportable Quantity: Not applicable.
EPA-SARA Title III: Substances in this product are not reportable under Section 313.
EPA-FIFRA: Wollastonite is present on the list of Pesticide Product Inert Ingredients.
FDA: Approved as pigment or colorant in food contact surface coatings, 21 CFR 175.300.
OSHA: Particulate is regulated as nuisance dust –Particulate Not Otherwise Regulated (PNOR).
ACGIH: Particulate is regulated as a nuisance dust – Particulate Not Otherwise Classified (PNOC).

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65):
WARNING: This product can expose you to chemicals including respirable crystalline silica, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

15.2 International Regulations:

Industrial Safety and Health Law: This product does not contain harmful or controlled hazardous substances under ISHL.
Toxic Chemical Control Act: This product does not contain chemical substances regulated as toxic, observational, restricted or banned under TCCA.
Dangerous Substance Management Law: This product does not contain chemical substances regulated under DSML.
Waste Management Law: Dispose of this product in accordance with the waste treatment standards prescribed in Waste Management Law.

15.3 Chemical Safety Assessment: Exempted from REACH registration in accordance with Annex V.7.

15.4 Other Regulations:

Australia: **AICS:** Wollastonite is included in the *Australian Inventory of Chemical Substances*, June 1996 Edition.

Canada: **DSL:** As a naturally occurring substance, wollastonite is considered to be on the Canadian Domestic Substances List (DSL).
WHMIS: Not controlled by WHMIS.

China: **IECSC:** Wollastonite is included in the *Inventory of Existing Substances in China*.

EEC: **EINECS/ELINCS:** All components of this product are included in the EINECS and ELINCS EEC Chemical Inventories.
IUCLID: Chemical information on wollastonite has been submitted for inclusion in the *International Uniform Chemical Information Database.*

67/548/EEC: ALTox a/s has on 27/7/98 evaluated and determined that wollastonite is not to be classified according to EEC directive (67/548/EEC).
95/3/EC, Annex III: Listed for use in plastic materials and articles intended to come into contact with foodstuffs.

Germany: Water Hazard Classification – NWG (non-hazardous to water).

Japan: **ENCS:** Wollastonite is exempt from the list of *Existing and New Chemical Substances* as a naturally occurring mineral.

Korea: **ECL:** Wollastonite is included in the *Korean Existing Chemical List*, ECL Number KE-35416.

New Zealand: **ERMA:** Wollastonite is included in the Environmental Risk Management Authority.

Philippines: **PICCS:** Wollastonite is included in the *Philippine Inventory of Chemicals and Chemical Substances*.

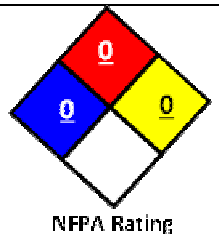
Taiwan: **ECN**: Wollastonite is on the Inventory Control List.

16. OTHER INFORMATION

HMIS and NFPA Ratings:

Health	**1**
Flammability	**0**
Physical Hazard	**0**
Personal Protection	**B**

HMIS Rating



NFPA Rating

Health = 0
Flammability = 0
Instability = 0
Special = none

Date of Current Revision: June 27, 2019
Date of Last Revision: May 30, 2019
Reason for Change: Added info to section 15.1 to address California Prop 65

References and Sources:

Douglas, D. (2001). Chrysotile Asbestos Health Assessment of Alternatives. National Occupational Health and Safety Commission, March 2001. Available online at: http://www.nohsc.gov.au/pdf/drafts/chrysotile-ha-mar-01.pdf. IARC Monograph (1997). 68:283-305.

Maxim, L.D., and E.E. McConnell, (2005). A Review of the Toxicology and Epidemiology of Wollastonite. *Inhalation Toxicology* 17:451-466.

Maxim, L.D., et al (2014). Wollastonite toxicity: an update. *Inhalation Toxicology* 26 (2):95-112.

TOMES®: Hazardous Substances Data Bank, Registry of Toxic Effects Chemical Substances.

Notice to Reader:
This safety data sheet complements the technical data sheets but does not replace them. The information it contains is based upon our present knowledge of the product on the date indicated. It is given in good faith. Users should be warned about the risks associated with using the product for a different purpose than that for which it was developed, and particularly for uses for which we are not qualified to give advice.

These regulatory prescriptions are provided with a view to helping users meet their obligations when using this product. This list is not considered exhaustive and does not exempt users from their obligations to comply with any further prescriptions, other than those mentioned above, concerning product possession and handling for which they are solely responsible.

Only the English version is authoritative.

Safety Data Sheet

SECTION 1: IDENTIFICATION

Product Identifier: Natural Red Iron Oxide
Product Code: APC 901
Recommended Use: Pigmenting Agent

Supplier Information: Alabama Pigments Company
346 Rickey Road
McCalla, AL. 35111
Telephone Number: 205-938-3065
Fax Number: 205-938-0015
Emergency Number: 800-531-1172

SECTION 2: HAZARDS IDENTIFICATION

Physical State: Solid Powder
Color: Brownish/Red
Classification of the Substance or Mixture: Not classified
Signal Word: No signal word
Hazard Statements: No known significant effects or critical hazards.
Hazard Not Otherwise Classified Precautionary Statements:
Prevention: Not applicable
Response: Not applicable
Storage: Not applicable
Disposal: Not applicable
Supplemental Information: Not applicable

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

CAS No.: 1317-60-8	Iron Oxide Red Pigment	≥ 72%

Chemical Characterization: Natural iron oxide Fe_2O_3

SECTION 4: FIRST-AID MEASURES

Description of First-Aid Measure:
Eye Contact: Flush thoroughly for 15 minutes with running water. Seek medical attention
Ingestion: Give large amounts of water to induce vomiting. Seek medical attention.
Inhalation: Remove victim to fresh air. Give artificial respiration if the victim is not breathing. Seek medical attention with any breathing difficulties.
Skin Contact: Remove contaminated clothing. Wash area with soap and water.
Potential Acute Health Effects:

Ingestion: Not a normal route of exposure. Ingestion of large amounts may cause gastrointestinal disturbances. Symptoms may include salivation, pain, nausea, vomiting and diarrhea.
Inhalation: Dust may cause mechanical irritation to the respiratory tract. Excessive exposure above the TLV can cause mild pulmonary irritation.
Eye Contact: Will result in no specific effects other than mechanical irritation due to abrasion.
Skin Contact: Not absorbed by the body, irritation may occur by mechanical abrasion.
Potential Chronic Health Effects: Prolonged and repeated inhalation of iron dust may result in Silicosis or "iron pigmentation". Silicosis is considered to be a benign condition and does not appear to progress to fibrosis. It generally requires 6-10 years of exposure. Little or no change is found upon physical examination. This material is considered carcinogenic by its content of crystalline silica. Long-term exposure to airborne silica can cause silicosis, a form of progressive and disabling pulmonary fibrosis. Individuals with silicosis are predisposed to develop tuberculosis.
Note to Physician: No specific treatment
Protection of First-Aiders: No special measures required

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media:
Suitable Extinguishing Media: Use an extinguishing agent suitable for the surrounding fire. In case of fire, use water, spray (fog), foam or dry chemical.
Unsuitable Extinguishing Media: None Known
Special Hazards Arising From the Chemical: No specific fire or explosion hazard.
Hazardous Thermal Decomposition Products: No specific data
Special Protective Actions for Fire-Fighters: Isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special Protective Equipment For Fire-Fighters: Self-contained breathing apparatus and eye protection.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures:
No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing dust. Put on appropriate personal protective equipment.

Environmental Precautions:
Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and Materials for Containment and Cleaning Up:
Move containers from spill area. Approach release from upwind. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor.
General: Refer to local, state, or federal regulations for specific disposal information. Pursuant to 40 CFR Part 261 of the Resources Conservation and Recovery Act (RCRA) regulations currently in effect, discarded iron oxide would not be classified as a hazardous waste.
Land Spill: Vacuum or scoop up spilled material for recovery or disposal, avoid dusting conditions and use good ventilation. Wetting the spill area with water spray may help reduce airborne dust levels.
Water Spill: Product is inert and stable. Decomposition nor polymerization will occur.

SECTION 7: HANDLING AND STORAGE

Handling:
Precautions for Safe Handling
Avoid breathing dust. Remove contaminated clothing and protective equipment before entering eating areas. Workers should wash hands and face before eating, drinking or smoking. Put on appropriate personal protection

equipment. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed.

Storage:

Conditions for Safe Storage

Storage Temperature: Ambient

Shelf Life: Unlimited

Storage Pressure: Atmospheric

General: Avoid excessive moisture, which causes material to clump.

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Occupational Exposure Limits:

Component Name/Formula	CAS No.	% WT	OSHA-PEL	ACGIH-TLV
Inert or nuisance dust				
Total dust		100	15 mg/m^3	
Respirable			5 mg/m^3	
Iron oxide fume*	1309-37-1	0	10 mg/m^3 TWA	5 mg/m^3 TWA
Iron oxide (Fe_2O_3)	1317-60-8	79-84		
Total dust			15 mg/m^3 TWA	10 mg/m^3 TWA
Respirable				5 mg/m^3 TWA
Crystalline silica (SiO_2)**	14808-60-7	8-15		
Total dust			30 mg/m^3	
Respirable			10 mg/m^3 TWA	0.1 mg/m^3 TWA

*Under the normal conditions of use for this product, fumes as Fe_2O_3 are not present. Iron oxide fume conditions are created under extremely high temperature, as with welding or smelting

**OSHA Hazardous Components (29CFR 1910.1200). This material is considered a carcinogen by IARC because it contains crystalline silica at levels greater than 0.1%. Inhalation of dust in excess of the TLV may cause mild pulmonary irritation. Long term over-exposure may cause silicosis.

Appropriate Engineering Controls: Use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. Provide mechanical ventilation of confined spaces.

Personal Protection:

Hygiene Measures:

Be sure to wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period

Respiratory Protection: If exposure limits are exceeded, use an appropriate NIOSH dust respirator.

Skin Protection: Gloves appropriate for the job conditions.

Eye/Face Protection: Safety glasses or dust tight goggles.

Medical Surveillance: Not available

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid Powder

Color: Brownish/Red

Odor: Odorless

Odor Threshold: Not available

PH: 5.0-7.0
Boiling Point: Not available
Melting Point: >1000 Fº
Flash Point: Non-Flammable
Explosion Limits: 0
Vapor Pressure: Not available
Specific Gravity (Relative Density): 4.5
Bulk Density: 0.88-1.12 g/cm³
Solubility: 0.2-0.6%

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Not available
Chemical Stability: Stable
Possibility of Hazardous Reactions: Under normal conditions of storage and use, hazardous reactions will not occur
Conditions to Avoid: None
Incompatible Materials: None
Hazardous Decomposition Products: None

SECTION 11: TOXICOLOGICAL INFORMATION

Information On The Likely Routes Of Exposure: Dermal contact. Eye contact. Inhalation Ingestion.
Skin Contact: May cause mechanical irritation (abrasion).
Eye Contact: Will result in no specific effects other than mechanical irritation due to abrasion.
Inhalation: Dust may cause mechanical irritation to the respiratory tract. Excessive exposure above the TLV can cause mild pulmonary irritation.
Ingestion: Not a normal route of exposure. Ingestion of large amounts may cause gastrointestinal disturbances. Symptoms may include salivation, pain, nausea, vomiting and diarrhea.
Carcinogenicity: This material is considered carcinogenic by its content of crystalline silica
Information on Toxicological Effects: Prolonged and repeated inhalation of iron dust may result in Silicosis or "iron pigmentation". Silicosis is considered to be a benign condition and does not appear to progress to fibrosis. It generally requires 6-10 years of exposure. Little or no change is found upon physical examination. This material is considered carcinogenic by its content of crystalline silica. Long-term exposure to airborne silica can cause silicosis, a form of progressive and disabling pulmonary fibrosis. Individuals with silicosis are predisposed to develop tuberculosis.

SECTION 12: ECOLOGICAL INFORMATION

Conclusion/Summary: Persistence and Degradability Conclusion/Summary: Not available.
Bio accumulative Potential: Not available.
Mobility in Soil Water Partition: Not available.
Other Adverse Effects: No known significant effects or critical hazards.

SECTION 13: DISPOSAL CONSIDERATIONS

Disposal /Methods: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Waste disposal should be in accordance with existing federal state, provincial and or local environment controls laws.

RCRA Classification: Natural iron oxides are not hazardous wastes per 40 CFR 261.24 or 261.3. However consult with the state environmental regulatory agency before disposing of this material, as state regulations may be stricter then federal regulations.

SECTION 14: TRANSPORT INFORMATION

DOT: Not regulated as dangerous goods.

IATA: Not regulated as dangerous goods.
IMDG: Not regulated as dangerous goods.

SECTION 15: REGULATORY INFORMATION

SARA311/31： None.
SARA title III Section 302 Extremely Hazardous Substances: None.
SARA Title III Section 313 Toxic Chemicals: None.
US EPA CERCLA Hazardous Substances (40 CFR 302): None.
Ingredient Name: Hematite, Natural Red Iron Oxide
CAS Number: CAS No.: 1317-60-8

SECTION 16: OTHER INFORMATION

Revision Date: May 6, 2015
Reason for revision: Not applicable
DISCLAIMER: The information provided on this Safety Data Sheet is correct to the best of our knowledge. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release, and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

P45-NR Ferric Oxide

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Revision Date: Date of issue: 07/22/2021 Version: 1.0

SECTION 1: IDENTIFICATION

1.1. Product Identifier

Product Form: Mixture

Product Name: P45-NR Ferric Oxide

Synonyms: Natural Red Iron Oxide

1.2. Intended Use of the Product

Use of the substance/mixture: Inorganic pigment used as a colorant for industrial, commercial, and consumer applications.

1.3. Name, Address, and Telephone of the Responsible Party

Company

Hoover Color

A Division of Cathay Industries (USA), Inc.

2170 Julia Simpkins Road

Hiwassee, VA 24347

540-980-7233

www.hoovercolor.com

1.4. Emergency Contact : Burl Bowman bbowman@cathayindusa.com

Emergency Number 24/7 : Domestic & Canada 1-800-633-8253 PERS (Professional Emergency Resource Services); International 1-801-629-0667 Cathay Customer # 12060

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

Classification (GHS-US)

Not classified

2.2. Label Elements

GHS-US Labeling

No labeling applicable

2.3. Other Hazards

Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions.

2.4. Unknown Acute Toxicity (GHS-US)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Not applicable

3.2. Mixture

Name	Product Identifier	%	Classification (GHS-US)
Iron Oxide (Fe_2O_3)	(CAS No) 1317-60-8	95 - 99	Not classified
Silica, Amorphous	(CAS No) 7631-86-9	1 - < 3	Not classified
Other components below reportable limits	N/A	3 - < 4	Not classified

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of First Aid Measures

First-aid Measures General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label if possible).

First-aid Measures After Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

First-aid Measures After Skin Contact: Rinse immediately with plenty of water. Remove contaminated clothing. Wash contaminated clothing before reuse. Obtain medical attention if irritation develops or persists.

First-aid Measures After Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention. Obtain medical attention if there is persistent irritation.

First-aid Measures After Ingestion: Do not induce vomiting. Rinse mouth. Seek medical attention if any problems arise.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/Injuries: Not expected to present a significant hazard under anticipated conditions of normal use.

Symptoms/Injuries After Inhalation: May cause respiratory irritation.

Symptoms/Injuries After Skin Contact: May cause skin irritation.

Symptoms/Injuries After Eye Contact: Obtain medical attention if there is persistent irritation.

Symptoms/Injuries After Ingestion: Ingestion is not likely to be harmful or have adverse effects.

Chronic Symptoms: None expected under normal conditions of use.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If you feel unwell, seek medical advice (show the label where possible).

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not flammable.

Explosion Hazard: Product is not explosive.

Reactivity: Hazardous reactions will not occur under normal conditions.

5.3. Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use water spray or fog for cooling exposed containers.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Other Information: Refer to Section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Avoid breathing dust.

6.1.1. For Non-emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Use safe, appropriate practices.

6.1.2. For Emergency Responders

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Stop spill if safe to do so. Eliminate ignition sources. Ventilate area.

6.2. Environmental Precautions

Prevent entry to sewers and public waters.

6.3. Methods and Material for Containment and Cleaning Up

For Containment: Contain and collect as any solid.

Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. Spills should be contained with mechanical barriers. Transfer spilled material to a suitable container for disposal.

6.4. Reference to Other Sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations.

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use.

Incompatible Products: Strong acids. Strong bases. Strong oxidizers.

7.3. Specific End Use(s)

Inorganic pigment used as a colorant for industrial, commercial, and consumer applications.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

Inert or Nuisance Dust		
USA ACGIH	ACGIH TWA (mg/m³)	3 mg/m^3 Respirable fraction 10 mg/m^3 Total Dust

USA OSHA	OSHA PEL (TWA) (mg/m³)	5 mg/m³ Respirable fraction 15 mg/m³ Total Dust

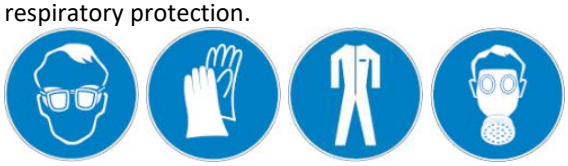
Iron oxide (CAS 1309-37-1)/(CAS 1317-60-8) (Fe_2O_3)		
USA ACGIH	ACGIH TWA (mg/m³)	5 mg/m³ (respirable fraction)
USA NIOSH	NIOSH REL (TWA) (mg/m³)	5 mg/m³ (dust and fume)
USA IDLH	US IDLH (mg/m³)	2500 mg/m³ (dust and fume)
USA OSHA	OSHA PEL (TWA) (mg/m³)	10 mg/m³ (fume) 15 mg/m³ (total dust) 5 mg/m³ (respirable fraction)

Silica, Amorphous (CAS 7631-86-9)		
USA OSHA	OSHA PEL (TWA) (mg/m³)	0.8 mg/m³
USA NIOSH	NIOSH REL (TWA) (mg/m³)	6 mg/m³

8.2. Exposure Controls

Appropriate Engineering Controls : Ensure adequate ventilation, especially in confined areas. Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure. Ensure all national/local regulations are observed.

Personal Protective Equipment : Protective goggles. Gloves. Protective clothing. Insufficient ventilation: wear respiratory protection.



Materials for Protective Clothing : Suitable materials with adequate ventilation.

Hand Protection : Wear protective gloves.

Eye Protection : Safety glasses with side shields, or goggles, are recommended.

Skin and Body Protection : Wear suitable protective clothing.

Respiratory Protection : Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Environmental Exposure Controls : Do not allow the product to be released into the environment.

Consumer Exposure Controls : Do not eat, drink or smoke during use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State : Solid

Appearance : Red powder

Odor : None

Odor Threshold : No data available

pH : 7 – 7.5

Evaporation Rate : No data available

Melting Point : > 1000 °C (1832 °F)

Freezing Point : No data available

Boiling Point : No data available

Flash Point : Not applicable

Auto-ignition Temperature : Not applicable

Decomposition Temperature : No data available

Flammability (solid, gas) : Solid, Not flammable

Vapor Pressure : No data available

Relative Vapor Density at 20 °C : No data available

Relative Density : No data available

Specific Gravity : 4.9

Tap Density : 1.2 g/cc

Solubility : Insoluble

Partition Coefficient: N-octanol/water : No data available

Viscosity : Not applicable

9.2. Other Information

VOC content : 0 %

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity: Hazardous reactions will not occur under normal conditions.

10.2. Chemical Stability: Stable under recommended handling and storage conditions (see section 7).

10.3. Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

10.4. Conditions to Avoid: Contact with incompatible materials.

10.5. Incompatible Materials: Strong acids. Strong bases. Strong oxidizers.

10.6. Hazardous Decomposition Products: Not available

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on Toxicological Effects

Acute Toxicity: Not classified

Iron oxide (Fe_2O_3) (1317-60-8)	
LD50 Oral Rat	> 10,000 mg/kg

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: Not classified

Iron oxide (Fe_2O_3) (1317-60-8)	
IARC group	3 Not classifiable as to carcinogenicity to humans

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: May cause respiratory irritation.

Symptoms/Injuries After Skin Contact: May cause skin irritation.

Symptoms/Injuries After Eye Contact: Obtain medical attention if there is persistent irritation.

Symptoms/Injuries After Ingestion: Ingestion is not likely to be harmful or have adverse effects.

Chronic Symptoms: None expected under normal conditions of use.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity: No additional information available

12.2. Persistence and Degradability: No additional information available

12.3. Bioaccumulative Potential: No additional information available

12.4. Mobility in Soil: No additional information available

12.5. Other Adverse Effects

Other Information : Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

Ecology – Waste Materials: Avoid release to the environment.

SECTION 14: TRANSPORT INFORMATION

14.1. In Accordance with DOT: Not regulated for transport

14.2. In Accordance with IMDG: Not regulated for transport

14.3. In Accordance with IATA: Not regulated for transport

SECTION 15: REGULATORY INFORMATION

15.1 US Federal Regulations

Iron oxide (Fe_2O_3) (CAS 1317-60-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Silica, Amorphous (CAS 7631-86-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D): Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA): Immediate Hazard – No Delayed Hazard – No

SARA 313 (TRI Reporting): Not regulated.

15.2 US State Regulations

Silica, Amorphous (CAS 7631-86-9)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. – California Proposition 65: This material is not know to contain any chemicals currently listed as carcinogens or reproductive toxins.

International:

COUNTRY	CHEMICAL INVENTORY	STATUS
Europe	EINECS	215-275-4
Canada	DSL	Not Listed
Canada	NDSL	Listed
China	IECSC	Listed
Japan	ENCS	Exempt
Australia	AICS	Listed
Korea	KECL	Listed
New Zealand	NZIoC	Listed
Philippines	PICCS	Exempt

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Review or Revision Date : 07/22/2021 First issued.

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

HMIS III Rating

Health : 1 Slight Hazard - Irritation or minor reversible injury possible

Flammability : 0 Minimal Hazard

Physical : 0 Minimal Hazard

Personal Protection : E (glasses, gloves, dust respirator)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SDS US (GHS HazCom)

ALBEMARLE®

SAFETY DATA SHEET

051-GHS

LITHIUM CARBONATE

Preparation Date : 13-Apr-2016 **Revision Date:** 13-Apr-2018 **Revision Number** 2.01

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name LITHIUM CARBONATE

Other means of identification

Synonyms

401260 Lithium Carbonate BG <40 micron
401223 Lithium Carbonate, "fines"

Chemical Family Inorganic Salt
CAS-No 554-13-2
Formula Li2CO3

Recommended use of the chemical and restrictions on use

General function Raw material for chemical industry, pharmaceutical and the glass industry.
Uses advised against No information available

Details of the supplier of the safety data sheet

Company Albemarle Corporation
451 Florida Street
Baton Rouge, LA 70801

Albemarle U.S., Inc.
348 Holiday Inn Drive
Kings Mountain, NC 28086

For Non-Emergency 704-739-2501 (8AM-5PM M-Th; 8AM-12PM Fri)

'Competent Body for SDS' Department of product safety
productsafety@albemarle.com

Emergency telephone number

Emergency Telephone Numbers In case of emergency, call Albemarle emergency response at +1 225 344 7147

2. HAZARDS IDENTIFICATION

Classification

Acute Toxicity - Oral	Category 4
Serious eye damage/eye irritation	Category 2
Chronic aquatic toxicity	Category 3

Label elements

Emergency Overview

Warning

Hazard Statements
Harmful if swallowed
Causes serious eye irritation

Harmful to aquatic life with long lasting effects

Physical state Crystalline powder. **Color** White. **Odor** Odorless.

Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear eye/face protection
Avoid release to the environment

Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
IF ON SKIN: Wash with plenty of soap and water
IF INHALED: Move to fresh air.
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell Rinse mouth

Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Not applicable
Other Information
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms

401260 Lithium Carbonate BG <40 micron
401223 Lithium Carbonate, "fines"

Pure substance/mixture Substance

Component	CAS-No	Weight %
Lithium carbonate	554-13-2	<=100

Note: The exact concentrations of the above listed chemicals are being withheld as a trade secret.

4. FIRST AID MEASURES

First aid measures

General Advice Take off contaminated clothing and shoes immediately. First aid responders should pay attention to self-protection and use the recommended protective clothing. Move out of dangerous area. Keep warm and in a quiet place.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

Skin contact Wash off immediately with soap and plenty of water. If symptoms persist, call a physician.

Inhalation IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. If breathing has stopped, apply artificial respiration. If symptoms persist, call a physician.

Ingestion Clean mouth with water and drink afterwards plenty of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a physician immediately.

Protection of First-aiders Use personal protective equipment as required.

Most important symptoms and effects, both acute and delayed

Symptoms Discomfort. Irritating to eyes. Harmful if swallowed. Symptoms of overexposure include nausea, vomiting, rashes, dizziness, drowsiness, central nervous system effects.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media Water spray jet, Dry powder, Carbon dioxide (CO2), Foam.

Unsuitable Extinguishing Media High volume water jet.

Specific Hazards Arising from the Chemical

Combustion/explosion hazards High temperatures may liberate toxic or corrosive gases.

Hazardous Combustion Products Carbon monoxide, Carbon dioxide (CO2).

Explosion Data

Sensitivity to mechanical impact None.

Sensitivity to static discharge None.

Protective Equipment and Precautions for Firefighters

Wear self-contained breathing apparatus and protective suit. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Ensure adequate ventilation. Wear suitable protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe dust. Keep people away from and upwind of spill/leak. Handle in accordance with good industrial hygiene and safety practice

For emergency responders Use personal protective equipment as required.

Environmental Precautions

Environmental precautions Do not flush into surface water or sanitary sewer system. Avoid release to the environment

Methods and material for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning up Take up mechanically and collect in suitable container for disposal. Avoid dust formation.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Mechanical ventilation is recommended. Wear personal protective equipment. Avoid dust formation. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from moisture.

Incompatible Materials Avoid strong acids and oxidizers. Fluorine.

Dust Explosion Properties Avoid dust formation.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Component	CAS-No	ACGIH TLV (TWA)	OSHA PEL (TWA)	NIOSH IDLH
Lithium carbonate	554-13-2	-	-	-

Component	CAS-No	Alberta	British Columbia	Ontario	Quebec
Lithium carbonate	554-13-2	-	-	-	-

Appropriate engineering controls

Engineering Controls Showers.
Eyewash stations.
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face Protection Tightly fitting safety goggles.

Skin Protection If repeated or prolonged skin contact or contamination of clothing is likely, protective clothing should be worn. Rubber gloves resistant to chemical permeation

Hand protection Gloves resistant to chemical permeation.

Respiratory protection Whenever workplace conditions warrant, wear properly fitted, approved respirator with high-efficiency (dust/fume/mist) filter cartridges.

General Hygiene Considerations When using, do not eat, drink or smoke. Wash hands before breaks and at the end of workday. Avoid contact with skin, eyes and clothing. Wear suitable gloves and eye/face protection. Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Crystalline powder.
Color White.
Odor Odorless.
Odor Threshold None

Molecular Weight 73.89 g/mol
pH 9 - 11 at 1 g/l (as aqueous solution)
Melting point/freezing point 722 °C / 1332 - °F Method: OECD Test Guideline 102
Boiling Point/Range ca 1,310 °C / 2390 - °F
Flash Point Not applicable
Evaporation Rate No data available.
Flammability (solid, gas) No data available
Flammability Limit in Air
Upper flammability limit: No data available
Lower flammability limit: No data available
Vapor Pressure 1 hPa (610 °C)
Vapor Density No data available

Density	2.11 g/cm3 (20°C), ca. 750 kg/m^3 (Bulk Density)
Solubility(ies)	
Water Solubility	8.4 g/l (20 °C) Method: OECD Test Guideline 102
Solubility in other solvents	No data available
Partition coefficient	No data available
Autoignition temperature	No data available
Decomposition temperature	>600 °C
Viscosity, kinematic	No data available
Dynamic viscosity	No data available
Explosive Properties	No data available
Oxidizing Properties	No data available

10. STABILITY AND REACTIVITY

Reactivity Hazard No data available.

Stability Stable.

Hazardous Reactions May react with strong acids generating heat with boiling and spattering.

Conditions to Avoid Avoid moisture. Excess heat.

Materials to avoid Fluorine, Avoid strong acids and oxidizing agents.

Hazardous decomposition products Thermal decomposition of this product can produce lithium and carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation No.

Eye contact Yes.

Skin contact No.

Ingestion Yes. Harmful if swallowed.

Potential Health Effects

Acute Effects

Skin Corrosion/irritation Not irritating. (. OECD Test No. 404: Acute Dermal Irritation/Corrosion.).

Serious eye damage/eye irritation Irritating to eyes. (. OECD Test No. 405: Acute Eye Irritation/Corrosion.).

Respiratory irritation No data available

Sensitization Buehler Test: Not a skin sensitizer. (guinea pig). (. OECD Test No. 406: Skin Sensitization.).

STOT - single exposure No information available.

Chronic Effects

Mutagenic Effects OECD Test No. 476: In vitro Mammalian Cell Gene Mutation Test: negative. (with or without metabolic activation).
OECD Test No. 473: In vitro Mammalian Chromosome Aberration Test: negative. (with or without metabolic activation).
Not mutagenic in AMES Test.

Carcinogenicity There are no known carcinogenic chemicals in this product.

Component	CAS-No	ACGIH	IARC	NTP	OSHA

		Carcinogens			Carcinogens
Lithium carbonate	554-13-2	-	-	-	

Reproductive Effects Two-generation reproductive toxicity: (rat). oral: Maternal toxicity: NOAEL (No observed adverse effect level). 15 mg/kg bw/day. Developmental Toxicity:. NOAEL (No observed adverse effect level). 45 mg/kg bw/day. (. OECD Test No. 416: Two-Generation Reproduction Toxicity.).

STOT - repeated exposure No information available.

Chronic Effects No information available

Aspiration hazard No information available.

Numerical measures of toxicity

Product Information

The following values are calculated based on chapter 3.1 of the GHS document .

LD50 Oral: Rat Oral LD50: 525 mg/kg (Lit).

LD50 Dermal: Rat Dermal LD50: > 3000 mg/kg

Inhalation LC50: LC50/inhalation/4h/rat : > 2.17 mg/L

Component Information

Component	Rat Oral LD50:	Rabbit Dermal LD50:	Rat Dermal LD50 :	Rat Inhalation LC50:
Lithium carbonate 554-13-2	525 mg/kg	-	>3000 mg/kg	> 2.17 mg/L (4 h)

12. ECOLOGICAL INFORMATION

Ecotoxicity

Harmful to aquatic life with long lasting effects

Component	Freshwater Algae EC50/72h :	Freshwater Fish LC50/96h :	Water Flea EC50/48h :
Lithium carbonate (CAS #: 554-13-2)	>400 mg/l	30.3 mg/l	33 mg/l

Persistence/Degradability Not applicable: inorganic.

Bioaccumulation/ Accumulation Not likely to bioaccumulate.

Mobility in Environmental Media No information available.

Other adverse effects Slightly water endangering. Avoid subsoil penetration.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste Disposal Method Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging Do not reuse container.

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name	NOT REGULATED FOR TRANSPORTATION
Hazard Class	Not regulated
UN No.	Not regulated
Packing Group	Not regulated
Description	Not regulated

TDG Not regulated

IMDG/IMO

IMO Class	Not regulated
Packing Group	Not regulated
UN-No	Not regulated
IMO Labelling and Marking	Not regulated
Proper Shipping Name	Not regulated
Transport Description	Not regulated

IATA/ICAO

IATA/ICAO Class	Not regulated
Packing Group	Not regulated
UN-No	Not regulated
IATA/ICAO Labelling/Marking	Not regulated
Proper shipping name	Not regulated
Transport Description	Not regulated

15. REGULATORY INFORMATION

International Inventories	TSCA	DSL	NDSL	AICS	EINECS	ENCS	KECL	PICCS	IECSC	NZIoC	TCSI
LITHIUM CARBONATE	X	X	-	X	X	X	X	X	X	X	X

(X) Complies (-) Does not Comply

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Component	Weight %	SARA 313 - De minimis
Lithium carbonate (CAS #: 554-13-2)	<=100	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Reportable and Threshold Planning Quantities

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

State Right-to-Know

This product contains the following chemicals regulated in the states listed below.

Component	California Prop. 65	New Jersey	Massachusetts	Pennsylvania
Lithium carbonate (CAS #: 554-13-2)	Developmental	X	X	-

WHMIS Hazards

D2B Toxic materials

16. OTHER INFORMATION

NFPA	Health 2	Flammability 0	Instability 0	Physical Hazards 0
HMIS	Health 2	Flammability 0	Physical Hazards 0	

Prepared By Health & Environment DepartmentAlbemarle Corporation

FOR ADDITIONAL NONEMERGENCY PRODUCT INFORMATION, CONTACT:

HEALTH AND ENVIRONMENT DEPARTMENT
ALBEMARLE CORPORATION
451 FLORIDA ST.
BATON ROUGE, LA. 70801
(800) 535-3030

Preparation Date : 13-Apr-2016
Revision Date: 13-Apr-2018

Disclaimer:

The information contained herein is accurate to the best of our knowledge. The Company makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances.

End of Safety Data Sheet

U.S. SILICA COMPANY SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier: Silica Sand, Ground Silica, and Fine Ground Silica

Product Name/Trade Names:
Sand and Ground Silica Sand (sold under various names: ASTM TESTING SANDS • GLASS SAND • FILPRO® · FLINT SILICA • DM-SERIES • F-SERIES • FOUNDRY SANDS • FJ-SERIES H-SERIES • L-SERIES • N-SERIES • NJ SERIES • OK-SERIES • P-SERIES • T-SERIES • hydraulic fracturing sand, all sizes • frac sand, all sizes • MIN-U-SIL® Fine Ground Silica • MYSTIC WHITE II® • #1 DRY • #1 SPECIAL • PENN SAND® • PRO WHITE® · SILURIAN® · Q-ROK® • SIL-CO-SIL® Ground Silica • MICROSIL® • SUPERSIL® • MASON SAND • GS SERIES • PERSPEC • proppant, all sizes • SHALE FRAC® - SERIES • KOSSE WHITE® • OTTAWA WHITE® • OPTIJUMP® • LIGHTHOUSE™

Chemical Name or Synonym:
Crystalline Silica (Quartz), Sand, Silica Sand, Flint, Ground Silica, Fine Ground Silica, Silica Flour.

Recommended use of the chemical and restrictions on use: (non-exhaustive list): brick, ceramics, foundry castings, glass, grout, hydraulic fracturing sand, frac sand, proppant, mortar, paint and coatings, silicate chemistry, silicone rubber, thermoset plastics.

DO NOT USE U.S. SILICA COMPANY SAND OR GROUND SILICA FOR SAND BLASTING

Manufacturer:

U.S. Silica Company
24275 Katy Freeway, Suite 600
Katy, TX 77494
U.S.A.

Phone: 800-243-7500
Emergency Phone: 301-682-0600
Fax: 301-682-0691

2. HAZARD(S) IDENTIFICATION

Classification:

Physical	Health
Not Hazardous	Carcinogen Category 1A Specific Target Organ Toxicity – Repeated Exposure Category 1

DANGER
May cause cancer by inhalation.
Causes damage to lungs through prolonged or repeated exposure by inhalation.
Response:
If exposed or concerned: Get medical advice.
Disposal:
Dispose of contents/containers in accordance with national and local regulation

Prevention
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust.
Do not eat, drink or smoke when using this product.
Wear protective gloves and safety glasses or goggles.
In case of inadequate ventilation wear respiratory protection.

Date of preparation/revision: December 19, 2019

3. COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS No.	Percent
Crystalline Silica (quartz)	14808-60-7	95-99.9

4. FIRST-AID MEASURES

Inhalation: First aid is not generally required. If irritation develops from breathing dust, move the person from the overexposure and seek medical attention if needed.

Skin contact: First aid is not required.

Eye contact: Wash immediately with plenty of water. Do not rub eyes. If irritation persists, seek medical attention.

Ingestion: First aid is not required.

Most important symptoms/effects, acute and delayed: Particulates may cause abrasive eye injury. Inhalation of dust may cause respiratory tract irritation. Symptoms of exposure may include cough, sore throat, nasal congestion, sneezing, wheezing and shortness of breath. Prolonged inhalation of respirable crystalline silica above certain concentrations may cause lung diseases, including silicosis and lung cancer.

Indication of immediate medical attention and special treatment, if necessary: Immediate medical attention is not required.

5. FIRE-FIGHTING MEASURES

Suitable (and unsuitable) extinguishing media: Use extinguishing media appropriate for surrounding fire.

Specific hazards arising from the chemical: Product is not flammable, combustible or explosive.

Special protective equipment and precautions for fire-fighters: None required.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures: Wear appropriate protective clothing and respiratory protection (see Section 8). Avoid generating airborne dust during clean-up.

Environmental precautions: No specific precautions. Report releases to regulatory authorities if required by local, state and federal regulations.

Methods and materials for containment and cleaning up: Avoid dry sweeping. Do not use compressed air to clean spilled sand or ground silica. Use water spraying/flushing or ventilated/HEPA filtered vacuum cleaning system. Wet before sweeping. Dispose of in closed containers.

7. HANDLING AND STORAGE

Precautions for safe handling:

Avoid generating dust. Do not breathe dust. 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. Use adequate exhaust ventilation and dust collection to reduce respirable crystalline silica dust levels to below the permissible exposure limit ("PEL"). Maintain and test ventilation and dust collection equipment. Use all available work practices to control dust exposures, such as water sprays. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Keep airborne dust concentrations below permissible exposure limits.

Where necessary to reduce exposures below the PEL or other applicable limit (if lower than the PEL), wear a respirator approved for silica containing dust when using, handling, storing or disposing of this product or bag. See Section 8, for further information on respirators. Do not alter the respirator. Do not wear a tight-fitting respirator with facial hair such as a beard or mustache that prevents a good seal between the respirator and face. Maintain, clean, and fit test respirators in accordance with applicable standards. Wash or vacuum clothing that has become dusty.

Participate in training, exposure monitoring, and health surveillance programs to monitor any potential adverse health effects that may be caused by breathing respirable crystalline silica. The OSHA Respirable Crystalline Silica Standards; 29CFR1910.1053, 1915.1053 and 1926.1053, 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 SAND OR GROUND SILICA FOR SAND BLASTING

Conditions for safe storage, including any incompatibilities: Use dust collection to trap dust produced during loading and unloading. Keep containers closed and store bags to avoid accidental tearing, breaking, or bursting.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure guidelines:

Component	OSHA PEL	ACGIH TLV	NIOSH REL
Crystalline Silica (quartz, cristobalite and tridymite)	0.05 mg/m3 TWA (respirable dust)	0.025 mg/m3 TWA (respirable dust)	0.05 mg/m3 TWA (respirable dust)

If crystalline silica (quartz) is heated to more than 870°C, quartz can change to a form of crystalline silica known as tridymite; if crystalline silica (quartz) is heated to more than 1470°C, quartz can change to a form of crystalline silica known as cristobalite.

Appropriate engineering controls: Use adequate general or local exhaust ventilation to maintain concentrations in the workplace below the applicable exposure limits listed above. Refer to OSHA Standards 29CFR1910.1053, 1915.1053 and 1926.1053 for additional information.

Respiratory protection: If it is not possible to reduce airborne exposure levels to below the OSHA PEL or other applicable limit 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 OSHA Respirator Standard 29CFR1910.134(d). ***Assigned protection factor (APF)*** means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by the Standard. 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/m3, then a respirator with an APF of 10 should reduce the concentration of particulate to 15 ug/m3. In additional a cartridge change-out schedule must be developed based on the concentrations in the workplace.

1. -- Assigned Protection Factors[5]

Type of respirator[1], [2]	Quarter mask	Half mask	Full facepiece	Helmet/ hood	Loose-fitting facepiece
1. Air-Purifying Respirator	5	[3] 10	50	.....	.....
2. Powered Air-Purifying Respirator (PAPR)	.....	50	1,000	[4] 25/1,000	25
3. Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode	.....	10	50	.....	.....
• Continuous flow mode	.....	50	1,000	[4] 25/1,000	25
• Pressure-demand or other positive-pressure mode	.....	50	1,000	.....	.....
4. Self-Contained Breathing Apparatus (SCBA)					
• Demand mode	.....	10	50	50	.....
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	.....	.....	10,000	10,000	.....

Notes: [1] Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2] The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3] This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4] The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators and receive an APF of 25.

[5] These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

Skin protection: Maintain good industrial hygiene. Protection recommended for workers suffering from dermatitis or sensitive skin.

Eye protection: Safety glasses with side shields or goggles recommended if eye contact is anticipated.

Other: None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color, etc.): White or tan sand: granular, crushed or ground to a powder.
Odor: None.

Odor threshold: Not determined	**pH:** 6-8
Melting point/freezing point: 3110°F/1710°C	**Boiling point/range:** 4046°F/2230°C
Flash point: Not applicable	**Evaporation rate:** Not applicable
Flammable limits: LEL: Not applicable	**UEL:** Not applicable
Vapor pressure: Not applicable	**Vapor density:** Not applicable
Relative density: 2.65	**Solubility(ies):** Insoluble in water
Partition coefficient: n-octanol/water: Not applicable	**Auto-ignition temperature:** Not determined
Decomposition temperature: Not determined	**Viscosity:** Not applicable
Flammability (solid, gas): Not applicable	

10. STABILITY AND REACTIVITY

Reactivity: Not reactive under normal conditions of use.
Chemical stability: Stable.
Possibility of hazardous reactions: Contact with powerful oxidizing agents, such as fluorine, chlorine trifluoride and oxygen difluoride, may cause fires.
Conditions to avoid: Avoid generation of dust in handling and use.
Incompatible materials: Powerful oxidizers such as fluorine, chlorine trifluoride, and oxygen difluoride and hydrofluoric acid.
Hazardous decomposition products: Silica will dissolve in hydrofluoric acid and produce a corrosive gas, silicon tetrafluoride.

11. TOXICOLOGICAL INFORMATION

Acute effects of exposure:
Inhalation: Inhalation of dust may cause respiratory tract irritation. Symptoms of exposure may include cough, sore throat, nasal congestion, sneezing, wheezing and shortness of breath.
Ingestion: Ingestion in an unlikely route of exposure. If dust is swallowed, it may irritate the mouth and throat.
Skin contact: No adverse effects are expected.
Eye contact: Particulates may cause abrasive injury.

Chronic effects: Prolonged **i**nhalation of respirable crystalline silica may cause lung disease, silicosis, lung cancer and other effects as indicated below.

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

A. SILICOSIS

Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute:

Chronic or Ordinary Silicosis is the most common form of silicosis and can occur after many years (10 to 20 or more) of prolonged repeated inhalation of 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. Complicated silicosis or PMF symptoms, if present, are shortness of breath and cough. 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 pumonale).

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

B. CANCER
IARC - The International Agency for Research on Cancer ("IARC") concluded that “crystalline silica in the form of quartz or cristobalite dust is *carcinogenic to humans (Group 1)”.* For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 100C,"A Review of Human Carcinogens: Arsenic, Metals, Fibres and Dusts " (2011).

NTP classifies “Silica, Crystalline (respirable size)” as Known to be a human carcinogen.

C. AUTOIMMUNE DISEASES
Several studies have reported excess cases of several autoimmune disorders -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis -- among silica-exposed workers.

D. TUBERCULOSIS
Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to tuberculosis bacteria. Individuals with chronic silicosis have a three-fold higher risk of contracting tuberculosis than similar individuals without silicosis.

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* is available from NIOSH - Publications Dissemination, 4676 Columbia Parkway, Cincinnati, OH 45226, or through the NIOSH web site, www.cdc.gov/niosh/topics/silica, then click on the link "NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica" found under "Hazard Review".

For a more recent review of the health effects of respirable crystalline silica, the reader may consult *Fishman's Pulmonary Diseases and Disorders*, Fourth Edition, Chapter 57. "Coal Workers' Lung Diseases and Silicosis".

The US Occupational Safety and Health Administration (OSHA) Crystalline Silica Standards 29CFR1910.1053, 1915.1053 and 1926.1053, Appendix B describes the silica related diseases and provides resources and references.

Numerical measures of toxicity:
Crystalline Silica (quartz): LD50 oral rat >22,500 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity: Crystalline silica (quartz) is not known to be ecotoxic.
Persistence and degradability: Silica is not degradable.
Bioaccumulative potential: Silica is not bioaccumulative.
Mobility in soil: Silica is not mobile in soil.
Other adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in full compliance with national regulations.

14. TRANSPORT INFORMATION

UN number: None
UN proper shipping name: Not regulated
Transport hazard classes(es): None
Packing group, if applicable: None
Environmental hazards: None

Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code): Not determined **Special precautions:** None known.

15. REGULATORY INFORMATION

UNITED STATES (FEDERAL AND STATE)

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

RCRA: This product 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): This product contains the following chemicals subject to SARA 302 or SARA 313 reporting: None above the de minimus concentrations.

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).

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 non-cancer effect REL of 3µg for silica (crystalline, respirable). A chronic REL is an airborne level of a substance at or below which no non-cancer 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.

Texas Commission on Environmental Quality: The Texas CEQ has established chronic and acute Reference Values and short term and long term Effects Screening Levels for crystalline silica (quartz). The information can be accessed through www.tceq.texas.gov.

CANADA

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

OTHER NATIONAL INVENTORIES

Australian Inventory of Chemical Substances (AICS): All of the components of this product are listed on the AICS inventory or exempt from notification requirements.

China: Silica is listed on the IECSC inventory or exempt from notification requirements.

Japan Ministry of International Trade and Industry (MITI): All of the components of this product are existing chemical substances as defined in the Chemical Substance Control Law Registry Number 1-548.

Korea Existing Chemicals Inventory (KECI) (set up under the Toxic Chemical Control Law): Listed on the ECL with registry number 9212-5667.

New Zealand: Silica is listed on the HSNO inventory or exempt from notification requirements.

Philippines Inventory of Chemicals and Chemical Substances (PICCS): Listed for PICCS.

Taiwan: Silica is listed on the CSNN inventory or exempt from notification requirements.

16. OTHER INFORMATION

Date of preparation/revision: December 19, 2019

Hazardous Material Information System (HMIS):

Health *
Flammability 0
Physical Hazard 0
Protective Equipment E
* For further information on health effects, see Sections 2, 8 and 11 of this MSDS.

National Fire Protection Association (NFPA):

Health 0
Flammability 0
Instability 0

Web Sites with Information about Effects of Crystalline Silica Exposure:

The Occupational Safety and Health Administration (OSHA) web site contains information on the OSHA standard related to respirable crystalline silica at https://www.osha.gov/dsg/topics/silicacrystalline/index.html.

The U.S. National Institute for Occupational Safety and Health (NIOSH) maintains a site with information about crystalline silica and its potential health effects at http://www.cdc.gov/niosh/topics/silica.

The IARC Monograph that includes crystalline silica, Volume 100C, can be accessed in PDF form at the IARC web site, http://monographs.iarc.fr/ENG/Monographs/PDFs/index.php.

U. S. Silica Company Disclaimer

The information and recommendations contained herein are based upon data believed to be up to- date and 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 and users of silica must comply with all applicable health and safety laws, regulations, and orders. In particular, they are under an obligation to carry out a risk assessment for the particular work places and to take adequate risk management measures in accordance with the national implementation legislation of EU Directives 89/391 and 98/24.

SAFETY DATA SHEET

Sodium Carbonate, Anhydrous

SDS # : 497-19-8
Revision date: 2020-01-29
Format: NA
Version 5.08

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name Soda Ash

Other means of identification

Product Code(s) 497-19-8

Synonyms Sodium carbonate, anhydrous; Carbonic acid, disodium salt; Disodium carbonate

Chemical Family Alkali salt

Recommended use of the chemical and restrictions on use

Recommended Use: Glass manufacture, Personal care, Detergent, Water treatment chemical, Chemical processing

Restrictions on Use: See section 16 for more information

Manufacturer Address

Genesis Alkali Wyoming, LP
1735 Market Street
Philadelphia, PA 19103
Tel: +1 877-362-2248 or +1 215-845-4500
www.alkali.genesisenergy.com

Emergency telephone number

1 307 / 872 2452 (Plant - Green River, WY)
1 303/ 389-1409 (Medical - U.S. - Call Collect)

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Serious eye damage/eye irritation	Category 2

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Warning

Hazard Statements
H319 - Causes serious eye irritation

Precautionary Statements - Prevention
P264 - Wash face, hands and any exposed skin thoroughly after handling
P280 - Wear protective gloves/protective clothing/eye protection/face protection
Precautionary Statements - Response

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/ attention

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
May be harmful if swallowed.
Prolonged or repeated contact may dry skin and cause irritation

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Family Alkali salt.
Formula Na_2CO_3

Chemical name	CAS-No	Weight %
Sodium carbonate	497-19-8	100

Synonyms are provided in Section 1.

4. FIRST AID MEASURES

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.

Skin Contact Wash off with warm water and soap. Get medical attention if irritation develops and persists. Remove and wash contaminated clothing before re-use.

Inhalation Remove person to fresh air. If signs/symptoms continue, get medical attention.

Ingestion Never give anything by mouth to an unconscious person Get medical attention if symptoms occur

Most important symptoms and effects, both acute and delayed Causes serious eye damage / eye irritation.

Indication of immediate medical attention and special treatment needed, if necessary Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing agent suitable for type of surrounding fire.

Specific Hazards Arising from the Chemical Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes

Hazardous Combustion Products Fumes of sodium oxide. Carbon oxides (COx).

Explosion data
Sensitivity to Mechanical Impact Not sensitive.
Sensitivity to Static Discharge Not sensitive.

Protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Avoid dust formation. Sweep up to prevent slipping hazard.

Other For further clean-up instructions, call Emergency Hotline number listed in Section 1 "Product and Company Identification" above.

Environmental Precautions Do not flush into surface water or sanitary sewer system.

Methods for Containment Prevent large quantities of this product from contacting vegetation or waterways. Cover with plastic sheet to prevent spreading. Pick up and transfer to properly labeled containers. Keep in suitable and closed containers for disposal.

Methods for cleaning up Pick up and transfer to properly labeled containers. Keep in suitable and closed containers for disposal. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling Use air conveying/mechanical systems for bulk transfer to storage. Provide appropriate exhaust ventilation at places where dust is formed. In case of insufficient ventilation, wear suitable respiratory equipment if release of airborne dust is expected. Make sure the locations of the eye washers and safety showers are close to the workstation locations.

Storage Store in original container. Keep in properly labeled containers. Keep container tightly closed.

Incompatible products Aluminum. Powdered aluminum. Acids

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Ingredient	Agency	Workplace Exposure Limits
Carbonic acid sodium salt (1:2)	OSHA PEL (TWA) (mg/m^3)	10 mg/m^3 Total dust; 5 mg/m^3 Respirable fraction
Carbonic acid sodium salt (1:2)	MSHA	10 mg/m^3 Total dust

8.2 Exposure

Appropriate engineering controls

Engineering measures Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction.

Individual protection measures, such as personal protective equipment

Eye/Face Protection

Wear safety glasses or protective glasses with side shields. If splash potential exists, wear full face shield or chemical goggles.

Skin and Body Protection

Wear suitable protective clothing. Protective shoes or boots.

Hand Protection

Wear protective gloves. If handling solutions, impervious gloves recommended (e.g. Nitrile or Neoprene)

Respiratory Protection

In case of inadequate ventilation wear respiratory protection.

Hygiene measures Handle in accordance with good industrial hygiene and safety practice. Make sure the locations of the eye washers and safety showers are close to the workstation locations.

General information These recommendations apply to the product as supplied

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Granules
Physical State	Solid
Color	White
Odor	odorless
Odor threshold	Not applicable
pH	11.4 (1% solution in water)
Melting point/freezing point	851 °C
Boiling Point/Range	No information available
Flash point	Not applicable
Evaporation Rate	No information available
Flammability (solid, gas)	Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes
Flammability Limit in Air	
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	No information available
Vapor density	No information available
Density	No information available
Specific gravity	2.52
Water solubility	212.5 g/L @ 20 °C
Solubility in other solvents	No information available
Partition coefficient	No information available
Autoignition temperature	No information available
Decomposition temperature	400 °C

Viscosity, kinematic	No information available
Viscosity, dynamic	No information available
Explosive properties	Not explosive
Oxidizing properties	Non-oxidizing
Molecular weight	105.99
Bulk density	0.86 - 1.12 g/cm³ (Dense grades) 0.70 - 0.90 g/cm³ (Light Grades)
K_{st}	0 bar m/s

10. STABILITY AND REACTIVITY

Reactivity None under normal use conditions.

Chemical Stability Stable. Decomposes by reaction with strong acid.

Possibility of Hazardous Reactions None under normal processing.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Exposure to air or moisture over prolonged periods.

Incompatible materials Aluminum. Powdered aluminum. Acids.

Hazardous Decomposition Products Sodium oxides. Carbon oxides (COx).

11. TOXICOLOGICAL INFORMATION

Product Information

LD50 Oral	2,800 mg/kg (rat)
LD50 Dermal	> 2,000 mg/kg (rabbit)
LC50 Inhalation	

Eye Contact	Irritating to eyes.
Skin Contact	Non-irritating
Sensitization	Patch test on human volunteers did not demonstrate sensitization properties.

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic toxicity	No known effect.
Mutagenicity	No information available
Carcinogenicity	Not recognized as carcinogenic by Research Agencies (IARC, NTP, OSHA, ACGIH).
Reproductive toxicity	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.
Aspiration hazard	No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Sodium carbonate (497-19-8)				
Active Ingredient(s)	Duration	Species	Value	Units
Sodium Carbonate	96 h LC50	Bluegill sunfish	300	mg/L
Sodium Carbonate	48 h EC50	*Ceriodaphnia*	200-227	mg/L

Persistence and degradability Biodegradability does not pertain to inorganic substances.

Bioaccumulation Does not bio-accumulate.

Mobility Dissociates into ions.

Other Adverse Effects None known.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). Dispose of in accordance with local regulations.

Contaminated Packaging Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT NOT REGULATED
TDG NOT REGULATED
ICAO/IATA NOT REGULATED
IMDG/IMO NOT REGULATED

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic health hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

California Proposition 65

WARNING: *This product can expose you to chemicals including lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov .*

U.S. State Right-to-Know Regulations
This product is not listed on state right-to-know regulations

International Inventories

Component	TSCA (United States)	DSL (Canada)	EINECS/ELINCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)
Sodium carbonate 497-19-8 (100)	X	X	X	X	X	X	X	X

Mexico - Grade Moderate risk, Grade 2

16. OTHER INFORMATION

NFPA	**Health Hazards** 2	**Flammability** 0	**Instability** 0	**Special Hazards** -
HMIS	**Health Hazards** 2	**Flammability** 0	**Physical hazard** 0	**Personal Protection** X

NFPA/HMIS Ratings Legend Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0

Product Certifications

This product is certified to NSF/ANSI Standard 60 for use in drinking water treatment at the specified maximum use limit. The MUL (maximum use level) for sodium carbonate, anhydrous is 150 mg/L under NSF/ANSI Standard 60.

OU Kosher Certification

NSF Certified to NSF/ANSI 60

Halal: IFANCA

Revision date: 2020-01-29
Revision note Updated Section 8.

Disclaimer

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Prepared By:

Genesis Alkali, LLC

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End of Safety Data Sheet

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Ste 1400
Atlanta, GA 30339
678.741.8275
natsugar.com

Safety Data Sheet

Section 1: Identification

Product identifier

Product Name • **Granulated Sugar**

Product Code • N/A

Relevant identified uses of the substance or mixture and uses advised against

Recommended use • Human Food and Sweetening Agent

Details of the supplier of the safety data sheet

Company

National Sugar Marketing LLC
100 Galleria Parkway SE
Suite 1400
Atlanta, GA 30339

Telephone (General) • 208-383-6500

Emergency telephone number

Manufacturer • 208-383-6515 – Mike Fowers

Section 2: Hazard Identification

United States (US)
According to OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012

- Dust explosion potential
- Nuisance dust

Label elements

OSHA HCS 2012

- Product is subject to labeling requirements of Federal Food, Drug, and Cosmetic Act, 21 U.S.C. 301 *et seq.* (29 CFR §1910.1200(5)(iii)

Explosive

OSHA PEL

- Product is explosive if TWA Dust = 15 milligrams of substance per cubic meter of air (15 mg/m^3). (29 CFR §1926.55 Appendix A)

NIOSH REL

- Product is explosive if TWA Dust = 10 milligrams of substance per cubic meter of air (10 mg/m^3). (The National Institute for Occupational Safety and Health)

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Inhalation

OSHA PEL	• Product is an inhalation irritant if TWA = 5 milligrams of substance per cubic meter of air (5 mg/m^3). (29 CFR §1926.55 Appendix A)
NIOSH REL	• Product is an inhalation irritant if TWA = 5 milligrams of substance per cubic meter of air (5 mg/m^3). (The National Institute for Occupational Safety and Health)
Other	• Product has no hazardous components. (29 CFR §1910.1200)
Note	• SDS data pertains to the product as delivered in the original shipping container(s). Risks of adverse effects are lessened by following all prescribed safety precautions including the use of proper personal protective equipment.

Section 3: Composition/Information on Ingredients

Substances

Synonyms	• Sugar • Saccharose • α-D-glucopyranosyl-(1→2)-β-D-fructofuranoside • β-D-fructofuranosyl-(2→1)-α-D-glucopyranoside
CAS No.	• 57-50-1
Formula	• $C_{12}H_{22}O_{11}$
Molecular Weight	• 342.30 g/mol

Section 4: First Aid Measures

Description of first aid measures

Eye	• Flush eyes immediately with copious amounts of water.
Inhalation	• Move affected person to fresh air. Administer oxygen if breathing is difficult.
Note	• Eye and respiratory discomfort may be experienced at high dust concentrations. Pre-existing respiratory conditions or allergies may be aggravated.

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Section 5: Fire-Fighting Measures

Extinguishing Media

Suitable Extinguishing Media	• Extinguish with water, foam, carbon dioxide, or dry powder.

Special Hazards

Combustible Dust	• When TWA Dust = 15 milligrams of substance per cubic meter of air. (29 CFR §1926.55 Appendix A)
Hazardous Combustion Products	• Carbon Oxides
Hazardous Decomposition	• When heated acrid smoke and fumes are emitted.
Hazardous Reactivities & Incompatibilities	• Oxidizers, sulfuric acid, and nitric acid
Ignition Temperature	• 420˚ C
Advice for Firefighters	• Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Section 6: Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal Precautions	• Avoid dust formation. Avoid breathing vapors, mist or gas. Wear appropriate personal protective equipment.

Methods and material for containment and cleaning up

Spill Cleanup	• Sweep up spilled substance and remove to safe place. Dust deposits should not be allowed to accumulate on surfaces, as this may form an explosive mixture if released into the atmosphere in sufficient concentration. Non-sparking tools should be used.

Section 7: Handling and Storage

Precautions for safe handling

Handling	• Minimize dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust may form.

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Conditions for safe storage, including any incompatibilities

Storage	• Store at ambient temperature and humidity. Temperature should be less than 32° C Relative humidity should be less than 70%. Precautions should be taken to provide for adequate electrical grounding and bonding, or inert atmospheres. Refer to NFPA 654: Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids 2013 edition, for safe handling. Also refer to NFPA 61: Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities 2013 edition.

Section 8: Exposure Controls/Personal Protection

Exposure Limits

Explosive

OSHA PEL	• Product is explosive if TWA Dust = 15 milligrams of substance per cubic meter of air (15 mg/m^3). (29 CFR §1926.55 Appendix A)
NIOSH REL	• Product is explosive if TWA Dust = 10 milligrams of substance per cubic meter of air (10 mg/m^3). (The National Institute for Occupational Safety and Health)

Inhalation

OSHA PEL	• Product is an inhalation is an irritant if TWA = 5 milligrams of substance per cubic meter of air (5 mg/m^3). (29 CFR §1926.55 Appendix A)
NIOSH REL	• Product is an inhalation is an irritant if TWA = 5 milligrams of substance per cubic meter of air (5 mg/m^3). (The National Institute for Occupational Safety and Health)

Exposure Controls

Engineering Controls	• Ventilation should be matched to conditions. Local exhaust ventilation or other engineering controls should be used to maintain airborne levels to an acceptable level. Explosion suppression systems are advised. Use only electrical equipment and powered industrial trucks classified for the appropriate conditions.

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Respiratory Protection	• Respirators are to be used if exposure exceeds recommended limits. NIOSH – approved dust mask may be used in dusty conditions.
Hygiene Measures	• Current Good Manufacturing Practices should be followed. Refer to U.S. Food and Drug Administration Code of Federal Regulations 21 CFR 110.

Key to abbreviations
NIOSH = National Institute of Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures.

Section 9: Physical and Chemical Properties

Material Description

Appearance	• Crystalline solid
Color	• White
Density	• 1.5805 g/cu cm @ 17° C
Melting Point	• 185.5° C
Molecular Formula	• $C_{12}H_{22}O_{11}$
Molecular Weight	• 342.30 g/mol
Odor	• Sweet
pH	• 6 – 7 in 50% water solution
Solubility in Water	• Very soluble in water (200 gm/100gm water at 20° C
Taste	• Sweet

Section 10: Stability and Reactivity

Reactivity	• No dangerous reaction know under conditions of normal use
Chemical stability	• Stable product at normal temperatures
Incompatible Materials	• Oxidizers, sulfuric acid, and nitric acid
Conditions to avoid	• Excessive dust
Hazardous Decomposition	• When heated to decomposition acrid smoke and fumes are

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emitted.

Section 11: Toxicological Information

Information on toxicological effects

Carcinogens	• None listed
Acute Toxicity	
Test results	• Oral LD50 (Rat): 29,700 mg/kg
Chronic Toxicity	• No additional adverse health effects noted
Other Acute	• No additional adverse health effects noted

Section 12: Ecological Information

Toxicity	• Not dangerous to the environment based on ecotoxicity studies

Section 13: Disposal Considerations

General Information	• Dispose of waste in accordance with local authority requirements

Section 14: Transport Information

General Information	• Transport in food grade containers/trailers
Other Information	• No other transportation requirements

Section 15: Regulatory Information

OSHA	• OSHA HCS 2012 • 29 CFR §1910.1200 • 29 CFR §1926.55 Appendix A
U.S. Federal Regulations	• Code of Federal Regulations Title 21 Part 110

Section 16: Other Information

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Hazard Ratings

National Fire Protection Association (NFPA)

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

Preparation Date:	04/20/15
Revision Date:	05/23/19
Review Date:	05/23/19
Version:	03
Supersedes:	02

National Sugar Marketing LLC
100 Galleria Parkway SE
Suite 1400
Atlanta, GA 30339

KRONOS

PRODUCT DATA SHEET
Web site: www.kronostio2.com
KRONOS, INC USA Tel: (800) 866-5600
KRONOS CANADA, INC Canada Tel: (514) 397-3501
KRONOS EUROPE, INC. Europe Tel: (32) 2 549-0077

KRONOS® 3025

Titanium Dioxide

Non Pigmentary TiO_2 for Glass and Ceramic Manufacturing

Applications

Automotive Glass
Container and flat glass
Glass beads
Optical glass

Typical Properties

Crystal Structure	Principally Rutile
Bulking Density	75 pounds/cubic foot
Moisture	0.7% maximum
Composition:	
TiO_2	99.0 %
Iron	50 ppm
Particle Size	
+70 Mesh	0.4 %
+400 Mesh	40 +%

Characteristics

Lowers the melting point of glass
Reduces high temperature viscosity of glass melt
Reduces UV light transmission
In colored glass - shifts to longer light wavelengths
Improves chemical resistance of glass
Improves brilliance of glass by increasing refractive index and dispersion of the glass

Classifications

CAS Number 13463-67-7

2/01

SAFETY DATA SHEET

Zinc Oxide

EverZinc
The Global Zinc Expert

Section 1. Identification

GHS product identifier : Zinc Oxide

Chemical name : Zinc oxide

Product code : Not available.

Other means of identification : Not available.

Product type : Solid.

Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Paint, rubber, ink, plastics, enamel, glass, astringent topical protectant, antiseptics, electronics, adhesives, chemical products, cosmetics.

Manufacturer : EverZinc Canada
1550 Brouillette
St-Hyacinthe, QC
Canada, J2S 7B8
Tel: (450) 774-9151

Emergency telephone number (with hours of operation) : CHEMTREC, U.S.: 1-800-424-9300 International: +1-703-527-3887

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Zinc oxide

Other means of identification : Not available.

CAS number/other identifiers

CAS number : 1314-13-2

Ingredient name	%	CAS number
Zinc oxide	95 - 100	1314-13-2

United States: The exact percentage (concentration) in the composition has been withheld as a trade secret in accordance with paragraph (i) of §1910.1200.
Canada: The exact percentage (concentration) in the composition has been withheld as a trade secret in accordance with the amended HPR as of April 2018.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact : Wash contaminated skin with soap and water. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

Section 4. First aid measures

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
metal oxide/oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Spill : Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid release to the environment.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures.

Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

United States

Occupational exposure limits

Ingredient name	Exposure limits
Zinc oxide	**NIOSH REL (United States, 10/2016).** CEIL: 15 mg/m³ Form: Dust TWA: 5 mg/m³ 10 hours. Form: Dust and fumes STEL: 10 mg/m³ 15 minutes. Form: Fertilizer and/or industrial use. **OSHA PEL (United States, 5/2018).** TWA: 5 mg/m³ 8 hours. Form: Fertilizer and/or industrial use. TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 15 mg/m³ 8 hours. Form: Total dust **ACGIH TLV (United States, 3/2018).** TWA: 2 mg/m³ 8 hours. Form: Respirable fraction STEL: 10 mg/m³ 15 minutes. Form: Respirable fraction

Canada

Occupational exposure limits

Ingredient name	Exposure limits
Zinc oxide	**CA Quebec Provincial (Canada, 1/2014).** TWAEV: 5 mg/m³ 8 hours. Form: Fertilizer and/or industrial use. STEV: 10 mg/m³ 15 minutes. Form: Fertilizer and/or industrial use. **CA Alberta Provincial (Canada, 6/2018).** 8 hrs OEL: 2 mg/m³ 8 hours. Form: Respirable 15 min OEL: 10 mg/m³ 15 minutes. Form: Respirable **CA British Columbia Provincial (Canada, 7/2018).** TWA: 2 mg/m³ 8 hours. Form: Respirable STEL: 10 mg/m³ 15 minutes. Form: Respirable **CA Saskatchewan Provincial (Canada, 7/2013).** STEL: 10 mg/m³ 15 minutes. Form: Respirable dust and fume. TWA: 2 mg/m³ 8 hours. Form: Respirable dust and fume. **CA Ontario Provincial (Canada, 1/2018).** TWA: 2 mg/m³ 8 hours. Form: Respirable fraction STEL: 10 mg/m³ 15 minutes. Form: Respirable fraction

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure controls/personal protection

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Solid.

Color : White.

Odor : Odorless.

Odor threshold : Not applicable.

pH : Neutral.

Melting point : 1975°C (3587°F)

Boiling point/boiling range : Not available.

Flash point : Not applicable.

Evaporation rate : Not applicable.

Flammability (solid, gas) : Not applicable.

Lower and upper explosive (flammable) limits : Not applicable.

Vapor pressure : Not available.

Vapor density : Not applicable.

Relative density : 5.61

Solubility : Not available.

Partition coefficient: n-octanol/water : Not applicable.

Auto-ignition temperature : Not applicable.

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : Chlorinated rubber: Violent reaction or explosion with zinc oxide at 215 ˚C.
Flax oil: Exothermic reaction with possibility of ignition.
Magnesium: If heated: explosive reaction.
Strong bases and acids: Possibility of violent reaction.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity
There is no data available.

Irritation/Corrosion
There is no data available.

Sensitization
There is no data available.

Mutagenicity
There is no data available.

Carcinogenicity
There is no data available.

Reproductive toxicity
There is no data available.

Teratogenicity
There is no data available.

Specific target organ toxicity (single exposure)
There is no data available.

Specific target organ toxicity (repeated exposure)
There is no data available.

Aspiration hazard
There is no data available.

Information on the likely routes of exposure : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Section 11. Toxicological information

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : No known significant effects or critical hazards.

Potential delayed effects : No known significant effects or critical hazards.

Long term exposure

Potential immediate effects : No known significant effects or critical hazards.

Potential delayed effects : No known significant effects or critical hazards.

Potential chronic health effects

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

There is no data available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Zinc oxide	Acute EC50 0.042 mg/L Fresh water	Algae - Pseudokirchneriella subcapitata - Exponential growth phase	72 hours
	Acute LC50 98 µg/L Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 320 ppm Fresh water	Fish - Lepomis macrochirus	96 hours
	Chronic NOEC 0.017 mg/L Fresh water	Algae - Pseudokirchneriella subcapitata - Exponential growth phase	72 hours

Persistence and degradability

There is no data available.

Bioaccumulative potential

There is no data available.

Mobility in soil

Section 12. Ecological information

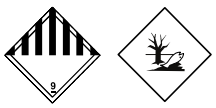
Soil/water partition coefficient (K_{OC}) : There is no data available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	UN3077	UN3077
UN proper shipping name	-	-	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide). Marine pollutant (Zinc oxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide)
Transport hazard class(es)	-	-	9 	9 
Packing group	-	-	III	III
Environmental hazards	No.	No.	Yes.	No.

AERG : 171

Additional information

IMDG : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

IATA : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b)**: All components are listed or exempted.
Clean Water Act (CWA) 307: Zinc Oxide

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

Name	EHS	SARA 302 TPQ		SARA 304 RQ	
		(lbs)	(gallons)	(lbs)	(gallons)
Cadmium Oxide	Yes.	100 / 10000	-	100	-

SARA 304 RQ : 100000000000 lbs / 45400000000 kg

SARA 311/312

Classification : Not applicable.

SARA 313

	Product name	CAS number
Form R - Reporting requirements	Zinc oxide	1314-13-2
Supplier notification	Zinc oxide	1314-13-2

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: Zinc oxide

New York : None of the components are listed.

New Jersey : The following components are listed: Zinc oxide

Pennsylvania : The following components are listed: Zinc oxide

California Prop. 65

WARNING: This product can expose you to chemicals including Cadmium Oxide, which is known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to chemicals including Lead Monoxide, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Canadian lists

Canada inventory (DSL NDSL) : All components are listed or exempted.

Canadian NPRI : The following components are listed: Zinc oxide

CEPA Toxic substances : None of the components are listed.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
Not classified.	

History

Date of issue mm/dd/yyyy : 08/30/2019

Date of previous issue : 04/30/2017

Version : 4

Prepared by : KMK Regulatory Services Inc.

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

EverZinc Canada is a name used by G.H. Chemicals ltd.

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

SECTION 1: IDENTIFICATION

Continental Mineral Processing

Continental Mineral Proc. Corp.
P.O. Box No. 62005
Cincinnati, Ohio 45262-0005
☎ (513) 771-7190
Fax No. (513) 771-9153

PRODUCT NAME: Zircon Sand / Zircon Flour/Spectralux

SYNONYMS: Zirconium Silicate; 200, 325, 400, 600 Zircon Flour; Z-Std.; Z-Course; Zircon Sand; Premium Zircon Sand; Spectralux 1500,3500, 4500, 5500, 6000, 7000

MSDS NUMBER: CMP01

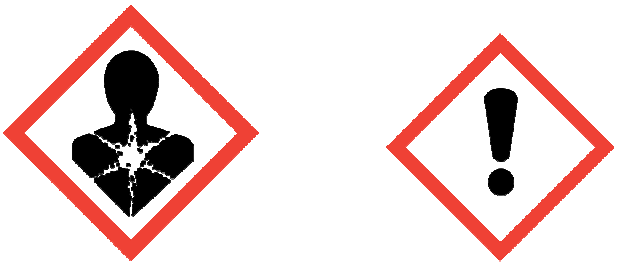
DESCRIPTION: ZIRCON SAND and ZIRCON FLOUR are specially sized grades of the mineral zircon - a naturally occurring zirconium silicate. Uses include: source of zirconium oxide, metallic zirconium and hafnium, abrasives, refractories, enamels, refractory porcelain, catalyst, silicon rubbers, foundry cores.

SECTION 2: HAZARDS IDENTIFICATION

CLASSIFICATION:

Acute Toxicity – Inhalation: Category 4
Eye Irritation: Category 2B
Target Organ Toxicity (Repeated Exposure): Category 2
Skin Irritation: Category 2
Carcinogenicity: Category 1A

Symbols:



Signal Word: Danger

Hazard Statements:

Harmful if inhaled. Causes skin irritation. Causes eye irritation. May cause cancer by inhalation of dust and particulates. May cause damage to eyes and lungs through repeated expose to dust particles.

SAFETY DATA SHEET
ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

Precautionary Statements:

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breath dust. Wash hands, arms, face and exposed skin thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Avoid breathing dust. Use only outdoors or in a well-ventilated area. Wear protective gloves and eye/face protection. Use personal protective equipment as required.

Response:

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center or doctor if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. IF SKIN IRRITATION OCCURS: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF EXPOSED OR CONCERNED: Get medical advice/attention.

Storage:

Store in a well-ventilated place. Store locked up.

Disposal:

Dispose of contents and container in accordance with local, state and federal regulations.

Other hazard information:

EMERGENCY OVERVIEW: Not a fire or spill hazard. Not acutely toxic. Avoid breathing dust. Take appropriate steps to minimize dusty conditions while handling or cleaning up spills.

HEALTH EFFECTS:

Primary Route of Exposure: Inhalation.

Relevant Route(s) of Exposure:

Eye Contact: Contact with particulate may cause slight to moderate eye irritation due to abrasive action.

Skin Contact: Prolonged contact may cause skin irritation due to abrasive action.

Inhalation: Inhalation of high concentrations of airborne particulate is irritating to the nose, throat, and respiratory tract.

Ingestion: Not toxic by ingestion. Swallowing large amounts may cause gastrointestinal disturbances due to abrasive action or mechanical blockage.

Target Organs: Respiratory system, eyes.

Acute Effects of Exposure: Excessive, short-term exposure to airborne mineral dusts and particulate may cause upper respiratory and eye irritation.

Signs and Symptoms of Acute Dust Exposure: tearing of eyes, burning sensation in the throat, cough, chest discomfort.

SAFETY DATA SHEET
ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

Chronic Effects of Exposure:

Silica: Crystalline silica (quartz) is a known cause of lung disease (silicosis). Respirable size quartz has been classified as a human carcinogen (lung cancer). Zircon contains trace amounts of quartz. Take precautions to avoid inhaling zircon dust or creating dusty conditions.

Several recent epidemiology studies have shown that in addition to silicosis, there is limited evidence of an excess of lung cancer in occupations involving exposures mainly to Crystalline Silica, such as stone cutters and granite industry workers.

Uranium and Thorium: Zircon contains naturally occurring radioactive materials ("NORM") in the uranium and thorium series, in equilibrium, at typical specific activities of 0.3 to 0.7 Bq/g thorium (85 - 165 ppm) and 0.3 to 3.7 Bq/g uranium (28 - 300 ppm).

Zircon is exempt from Nuclear Regulatory Commission ("NRC") regulations for source material per 10 CFR 40, since it falls under the definition of "unimportant quantity source material" containing less than 0.05% uranium or thorium. Some states may apply NRC type radiation protection standards for NORM above background levels, or may have NORM specific regulations. It is recommended that you consult and comply with current regulations.

The main radiological hazard from the product is internal exposure from small amounts of alpha particles given off by inhaled dust. Industrial hygiene practices aimed at control of airborne dust can lessen the potential for exposure and suitable dust control measures shall be employed to ensure occupational exposure to generated dust and alpha particles are kept as low as reasonably achievable. Overexposure by inhalation to inhaled dusts containing radioactive uranium, thorium, and radium may cause lung cancer. External exposure is from gamma radiation. Low level gamma radiation in proximity to bulk or bagged stockpiles of zircon may present a lesser, external exposure that can be managed by limiting close proximity for long time periods to large volumes of material.

With respect to dust exposure from sand (8 hr/day TWA basis, 10 µm aerodynamic, or about 5 µm physical diameter particle size used for calculation purposes), evaluation and calculation of OSHA PEL's (29 CFR 1910), ACGIH TLV's, and NRC standards (10 CFR 20) for zircon, trace crystalline silica, and trace radionuclides indicate that a level of approximately 5 mg/m^3 of total dust (or 4.0 mg/m^3 respirable dust) will ensure that intake is less than the NRC public dose limit for radionuclides, less than OSHA and ACGIH limits for respirable and total quartz, and less than OSHA and ACGIH limits for zircon.

With respect to dust exposure from flour (8 hr/day TWA basis, 1 µm aerodynamic, or about 0.5 µm physical diameter particle size used for calculation purposes), evaluation and calculation of OSHA PEL's (29 CFR 1910), ACGIH TLV's, and NRC standards (10 CFR 20) for zircon, trace crystalline silica, and trace radionuclides indicate that a level of approximately 2.3 mg/m^3 of total dust will ensure that intake is less than the NRC public dose limit for radionuclides, less than OSHA and ACGIH limits for respirable and total quartz, and less than OSHA and ACGIH limits for zircon.

Quartz and radionuclides are listed by the IARC and NTP as known to be carcinogenic to humans. Classified 1 – Proven for humans (IARC).

Medical Conditions Generally Known to be Aggravated by Exposure: The excessive inhalation of mineral dust may aggravate pre-existing chronic lung conditions including, but not limited to, bronchitis, emphysema, and asthma.

Reproductive Hazards: No reproductive hazards known.

ENVIRONMENTAL: No adverse environmental effects known. This product is insoluble in water. Prevent waste product from entering streams, water bodies, and wastewater systems and dispose of properly.

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS PLUS OTHER SIGNIFICANT COMPONENTS:

COMPONENT	SYNONYMS AND TRADE NAMES	CAS #	% BY WT.
$ZrO_2 \cdot SiO_2$	Zirconium silicate; Zircon flour; Zircon sand	14940-68-2	97 - 99
SiO_2	Quartz; crystalline silica; silica sand	14808-60-7	Trace[1]
TiO_2	Titanium dioxide	13463-67-7	Trace[1]
Al_2O_3	Aluminum oxide; alumina	1344-28-1	0.1 -- 2
Al_2SiO_5	Kyanite; Aluminum Silicate	1302-76-7	0.1 – 2
U (natural)	Uranium (natural)	7440-61-1	Trace[2,4]
Th (natural)	Thorium (natural)	7440-29-1	Trace[3,4]

NOTES:

1. The product contains trace amounts (<0.3 %) crystalline silica and traces of other identified compounds as impurities, which exist in complex mineralogical phases within the zircon.
2. The product contains 0.0028% - 0.030% Uranium, which exists in complex mineralogical phase within the zircon.
3. The product contains 0.0085% - 0.016% Thorium, which exists in complex mineralogical phase within the zircon.
4. Daughter products are present typically at equilibrium concentrations.

OCCUPATIONAL EXPOSURE LEVELS:

COMPONENT	CAS #	% BY WT.	OSHA PEL [mg/m^3]	OSHA CEILING [mg/m^3]	ACGIH TLV [mg/m^3]	ACGIH STEL [mg/m^3]	LISTED CARCINOGEN (YES/NO)		
							NTP	IARC	OSHA
Zircon ($ZrO_2 \cdot SiO_2$)	14940-68-2	97 - 99	5 (as Zr)	N/A	5 (as Zr)	10 (as Zr)	NO	NO	NO
Crystalline Silica (SiO_2)	14808-60-7	<0.3	See Footnote 3		0.025 as respirable dust		YES	Yes; Group I	YES
Titanium Dioxide (TiO_2)	13463-67-7	<0.3	5 (resp.) 15 (total)		10		NO	Not Classified; Group 3	
Aluminum Oxide (Al_2O_3) (See Footnote 2)	1344-28-1	0.1 - 2	5 (respirable) 15 total		10		NO	NO	NO
Aluminum Silicate (Al_2SiO_5) (See Footnote 2)	1302-76-7	0.1 - 2	5 (resp.); 15 (total)		2 (as Al)		NO	NO	NO
U (natural)	7440-61-1	28 - 300 ppm	0.05 (insoluble) as U		0.2 as U	0.6 (insoluble) as U		Inad-equate	
Th (natural)	7440-29-1	85 - 160 ppm	Not Estab.		--	--		Inad-equate	

NOTES:

1. Exposure limits listed for each ingredient is for exposure to dust that may be generated during product transfer and handling.
2. OSHA standards are for particulate not otherwise regulated (PNOR) ("Nuisance Dust").
3. OSHA Table Z-3 establishes the following limits for quartz:

OSHA Table Z-3	Mmpcf(a)	Mg/m^3
Quartz (respirable)	250(b) %SiO2 +5	10 mg/m^3 %SiO2 +2
Quartz (total)	------	30 mg/m^3 %SiO2 +2

Notes to Table Z-3:

(a) mmpcf = millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.

(b) Percent quartz is the amount determined from airborne samples. Both concentration and percent quartz determined from fraction passing size-selector impactor having characteristics set forth in 29 C.F.R. 1910.1000 Table Z-3 footnote (e).

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

SECTION 4: FIRST AID MEASURES

FIRST AID PROCEDURES:

Eye Contact: Flush eyes with clean, flowing (low pressure) water for at least 15 minutes. Get medical attention if pain or irritation persists.

Skin Contact: The compound is not hazardous by skin contact, however removal of particles and cleansing of the skin after use is advisable. Get medical attention if irritation develops or persists.

Inhalation: Move to fresh air and get medical attention if cough or other symptoms develop. If not breathing, give artificial respiration or give oxygen by trained personnel, and get immediate medical attention.

Ingestion: Rinse mouth with clean water and do not swallow. Give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

NOTE TO PHYSICIANS: Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES: Material will not burn. No unusual fire or explosion hazards.

EXTINGUISHING MEDIA: Use extinguishing media appropriate to combustibles in the surrounding area.

PROTECTION FOR FIREFIGHTERS: Wet material should be kept out of eyes and off skin. As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

CONTAINMENT: Product is dry solid (granular or powder) and not water soluble. Prevent spilled product from entering streams, water bodies, and wastewater systems.

CLEANUP: Vacuum or sweep up dry material and place in a container for reuse. Avoid creating airborne dust. Wear NIOSH/MSHA-approved respiratory protection (air-purifying or air-supply), gloves, long sleeved clothing and eye protection to prevent irritation from contact and inhalation.

COLLECTION: Collect spilled product in appropriate container. Re-use if possible.

REPORTING: ***SEE SECTION 15: REGULATORY INFORMATION***

EVACUATION: Isolate hazard area. Keep unnecessary and unprotected personnel from entering.

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

SECTION 7: HANDLING AND STORAGE

HANDLING: Minimize dust generation and accumulation. Avoid breathing dust. Avoid contact with skin and eyes. Handle to minimize generation of airborne dust. Use engineering controls to maintain dust levels below exposure limits

STORAGE: Store in a cool, dry area. Keep container closed when not in use.

WARN YOUR EMPLOYEES (AND YOUR CUSTOMERS - USERS IN CASE OF RESALE) BY POSTING AND OTHER MEANS OF THE HAZARDS AND OSHA PRECAUTIONS TO BE USED. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT OSHA PRECAUTIONS.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Use ventilation to keep exposure to airborne contaminants below the exposure limits listed in ***SECTION 3***. Identify points of dust generation such as conveyor and hopper discharges and equip with effective dust extraction system to control dust at its source. Maintain good housekeeping procedures.

Radiation Occupational exposure should be as low as reasonably achievable (ALARA principle), but should not exceed a total of 100 mSv over five consecutive years (ICRP).

PERSONAL PROTECTIVE EQUIPMENT:

Eye & Face Protection: Mechanical (abrasive) eye irritant. Wear protective safety goggles.

Skin Protection: Wear clothing sufficient to cover the skin, safety shoes, and gloves for hand protection against dry material. Launder clothing after use.

Respiratory Protection: Use NIOSH/MSHA approved respiratory protection (air purifying or air supplying) with a type 100 (high efficiency) particulate cartridge or canister when concentrations are above exposure limit value. A respiratory protection program that meets OSHA 29 CFR part 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respirator.

Protection provided by air-purifying respirators is limited. Use a positive pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

General Hygiene Considerations: Wash thoroughly after using product. Wash contaminated clothing. Wash hands and face before eating, drinking or smoking.

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Sand-like or fine powder that can vary in color from the typical gray/white to red to brown to colorless.
ODOR: Odorless.

PHYSICAL/CHEMICAL PROPERTIES:

Bulk density:	100 - 175 lbs/ft^3	**Freeze Point:**	Solid at STP	**% volatile by vol:**	0% H_2O
Water solubility:	Insoluble	**Melting Point:**	>2100 ^oC	**Vapor Density**:	N/A
pH: (10% aqueous slurry)	6 – 7.5	**Boiling Point:**	6500 ^oC	**Vapor Pressure:**	N/A

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable under normal conditions of storage. Material is non-reactive.

CONDITIONS TO AVOID: None under normal conditions.

MATERIALS TO AVOID: Hydrofluoric Acid, Strong Oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS: None under normal conditions.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11: TOXICOLOGICAL PROPERTIES

RTECS TOXICITY DATA FOR PRODUCT COMPONENTS:

COMPONENT	CAS #	NIOSH (RTECS) #
Zircon ($ZrO_2 \cdot SiO_2$)	14940-68-2	ZH9000000
Crystalline Silica (SiO_2)	14808-60-7	VV7330000
Titanium Dioxide (TiO_2)	13463-67-7	XR2275000
Aluminum Oxide (Al_2O_3)	1344-28-1	BD1200000
Aluminum Silicate (Al_2SiO_5)	1302-76-7	BD1450000
U (natural)	7440-61-1	YR3490000
Th (natural)	7440-29-1	XO6400000

Quartz (non-inhalable):

Dermal : No adverse effects expected.

Oral ALD : > 11,000 mg/kg , rat

SAFETY DATA SHEET
ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

Skin irritation :	No skin irritation, animals (unspecified species)
Eye irritation :	slight irritation, animals (unspecified species)
Skin sensitization :	Did not cause sensitization on laboratory animals., animals (unspecified species)
Mutagenicity :	Did not cause genetic damage in cultured bacterial cells. Did not cause genetic damage in animals. Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others.
Reproductive toxicity :	No adverse effects expected.

Quartz:

Dermal :	No adverse effects expected.
Oral ALD :	> 11,000 mg/kg , rat
Inhalation :	human Effects of breathing high concentration of respirable particles may include: Breathing difficulties Cough Adverse body weight effects Lung damage
Skin irritation :	No skin irritation, animals (unspecified species)
Eye irritation :	Slight irritation, animals (unspecified species)
Skin sensitization :	Did not cause sensitization on laboratory animals., animals unspecified species)
Repeated dose toxicity :	Inhalation Fluid retention in lungs (pulmonary oedema), lung effects, inflammation, Chronic lung disease, Fibrosis
Carcinogenicity :	An increased incidence of tumours was observed in laboratory animals. An increased risk of cancer in humans has been shown in workplace based studies.
Mutagenicity :	Did not cause genetic damage in cultured bacterial cells. Did not cause genetic damage in animals. Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others.
Reproductive toxicity :	No adverse effects expected.

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

SECTION 12: ECOLOGICAL INFORMATION

Constituents identified in ***Section 3*** are contained within the zircon crystal structure and will not leach under Toxicity Characteristic Leaching Procedure (TCLP) testing conditions of EPA SW-846 Test Method 1311. No data available on any adverse effects of this material on the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

RCRA: This product, as manufactured, is not a RCRA listed hazardous waste and does not exhibit any characteristics of a hazardous waste, including toxicity (by EPA TCLP method.)

DISPOSAL METHOD: This product is generally suitable for landfill disposal. Follow all applicable Federal, State, and local laws, rules, and regulations regarding the proper disposal of this material. If this product has been altered or contaminated with other hazardous materials, appropriate waste analysis may be necessary to determine proper method for disposal. A qualified environmental professional should determine waste characterization, disposal, and treatment methods for this material in accordance with applicable Federal, State and local requirements.

"NORM" Disposal: The presence of naturally occurring radioactivity from U (natural) and Th (natural) may require evaluation for disposal as NORM (See Section15). Because NORM disposal regulations vary from state to state, please check with the relevant NORM disposal rules in your jurisdiction.

SECTION 14: TRANSPORTATION INFORMATION

USDOT INFORMATION: This product is not regulated by USDOT as a hazardous material (49 CFR part 172.101). No UN code assigned. No placard required for transportation.

FURTHER EU DIRECTIVE INFORMATION: Not classified as dangerous in the meaning of transport regulations

SECTION 15: OTHER REGULATORY INFORMATION

COMPONENTS LISTED IN FEDERAL REGULATIONS AND STATE "RIGHT-TO-KNOW" LAWS:

COMPONENT	CAS #	FEDERAL					STATE (Right-to-Know)			
		RCRA	CERCLA RQ?	SARA 313	SARA EHS	TSCA Listed	PA	NJ	MA	CA
Zircon ($ZrO_2 \cdot SiO_2$) (14940-68-2)	14940-68-2	NO	NO	NO	NO	YES	NO	NO	NO	NO
Crystalline Silica (SiO_2)	14808-60-7	NO	NO	NO	NO	YES	YES	YES	YES	YES
Titanium Dioxide (TiO_2)	13463-67-7	NO	NO	NO	NO	YES	YES	YES	YES	NO
Aluminum Oxide (Al_2O_3)	1344-28-1	NO	NO	NO	NO	YES	YES	YES	YES	NO
Aluminum Silicate (Al_2SiO_5)	1302-76-7	NO	NO	NO	NO	YES	YES	NO	NO	NO
U (natural)	7440-61-1	NO	YES(a)	NO	NO	YES	YES	YES	YES	YES
Th (natural)	7440-29-1	NO	YES(b)	NO	NO	YES	YES	YES	YES	YES

Notes: (a) CERCLA Reportable Quantity (RQ) for radionuclides at 40 C.F.R. 302.4 Appendix B lists RQ for U (natural) at 1 E 11 pCi (3.7E9 Bq) and Th(natural) at 1 E 10 pCi (3.7 E7 Bq). At the low concentrations of natural U and Th in zircon, RQ reporting for these constituents would be triggered by the "release" of 18,000 pounds of zircon.

SAFETY DATA SHEET
ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

NORM Regulations: This product contains naturally occurring radioactive materials (NORM) at levels below U.S. Nuclear Regulatory Commission licensing requirements at 10 C.F.R 40. However, state NORM rules vary. The Conference of Radiation Control Program Directors (CRCPD) 2002 Part N Suggested State Regulations exempt zircon from state regulation. Ohio regulations exempt zircon from regulation at O.R.C. 3701:1-43.

CALIFORNIA PROPOSITION 65 WARNING: THIS PRODUCT CONTAINS SUBSTANCES (Quartz, Radionuclides and Titanium Dioxide*) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

*airborne, unbound particles of respirable size only.

COMPONENTS LISTED IN GLOBAL INVENTORIES

COMPONENT	CAS #	AUSTRALIA	CANADA	CHINA	EU	JAPAN[1]	JAPAN[2]	KOREA	NEW ZEALAND	PHILIPPINES
Zircon ($ZrO_2 \cdot SiO_2$) (14940-68-2)	14940-68-2	YES	YES	YES	YES	YES	YES	YES	YES	YES
Crystalline Silica (SiO_2)	14808-60-7	YES	YES	YES	YES	YES	YES	YES	YES	YES
Titanium Dioxide (TiO_2)	13463-67-7	YES	YES	YES	YES	YES	YES	YES	YES	YES
Aluminum Oxide (Al_2O_3)	1344-28-1	YES	YES	YES	YES	YES	YES	YES	YES	YES
Aluminum Silicate (Al_2SiO_5)	1302-76-7	YES	YES	YES	YES	NO	NO	YES	YES	NO
U (natural)	7440-61-1	YES	YES	NO	YES	NO	NO	YES	YES	YES
Th (natural)	7440-29-1	YES	YES	NO	YES	NO	NO	NO	YES	YES

AUSTRALIA – Inventory of Chemical Substances (AICS) as amended through January 5, 2010
CANADA – Domestic Substances List (DSL) as amended through December 23, 2009
CHINA – Inventory of Existing Chemical Substances (IECSC) as amended through December 2008
EU – European Inventory of Existing Commercial Chemical Substances (EINECS)
JAPAN[1] – Inventory of Existing & New Chemical Substances (ENICS) as amended through November 10, 2006
JAPAN[2] – Industrial Safety & Health Law (ISHL) Inventory as amended through September 25, 2009
KOREA – Existing Chemicals Inventory (KECI) as amended through November 4, 2009
NEW ZEALAND – New Zealand Inventory of Chemicals (NZIoC) as published by ERMA New Zealand (November 2009)
PHILIPPINES – Inventory of Chemicals and Chemical Substances (PICCS) 2008

CANADIAN WHMIS CLASSIFICATION: D-2A; D-2B

SECTION 16: OTHER INFORMATION

DO NOT USE IN MEDICAL APPLICATIONS INVOLVING PERMANENT IMPLANTATION IN THE HUMAN BODY.

THE REQUIRED TESTING HAS NOT BEEN DONE TO QUALIFY ANY OF OUR PRODUCTS FOR DIRECT INCLUSION IN FOOD, DRUGS, OR COSMETIC FORMULATIONS.

WARN YOUR EMPLOYEES (AND YOUR CUSTOMERS – USERS IN CASE OF RESALE) BY POSTING AND OTHER MEANS OF THE HAZARDS AND OSHA PRECAUTIONS TO BE USED. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT OSHA PRECAUTIONS.

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

HMIS (NPCA)	
HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
PERSONAL PROTECTION	E

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM of the National Paint & Coatings Association

HEALTH

0 – Normal Material
1 – Slightly Hazard/Significant irritation
2 – Hazardous/Temporary incapacitation or residual injury
3 – Extreme Danger/Serious or permanent injury
4 – Deadly

REACTIVITY

0 – Stable
1 – Unstable under heat or pressure
2 – Violent chemical change under heat or pressure
3 – Shock and heat may detonate
4 – Capable of Detonation or Explosion

FLAMMABILITY

0 – Will not burn
1 – Must be preheated before ignition will occur (Flash point greater than 200°F)
2 – Must be moderately heated before ignition will occur (Flash point 100°F to 200°F)
3 – Can be ignited under almost all ambient temperatures (Flash point 73°F to 100°F)
4 – Will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or will burn readily when dispersed in air (Flash point below 73°F)

PERSONAL PROTECTION

A – Safety Glasses
B – Safety Glasses + Gloves
C – Safety Glasses + Gloves + Apron
D – Face Shield + Gloves + Apron
E – Safety Glasses + Gloves+ Dust Respirator
F – Safety Glasses + Gloves + Apron + Dust Respirator
G – Safety Glasses + Gloves + Vapor Respirator

H – Splash Goggles + Gloves + Apron + Vapor Respirator
I – Safety Glasses + Gloves + Dust and Vapor Respirator
J – Splash Goggles + Gloves + Apron + Dust and Vapor Respirator
K – Air Line Hood or Mask + Gloves + Full Suit Boots
X – Ask supervisor or safety specialist for handling instructions.

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

HC 2012/GHS LABEL:

ZIRCON SAND/ZIRCON FLOUR/SPRECTRALUX

DANGER

Hazard Statements:

Harmful if inhaled. Causes skin irritation. Causes eye irritation. May cause cancer by inhalation of dust and particulates. May cause damage to eyes and lungs through repeated expose to dust particles.

Precautionary Statements:

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breath dust. Wash hands, arms, face and exposed skin thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Avoid breathing dust. Use only outdoors or in a well-ventilated area. Wear protective gloves and eye/face protection. Use personal protective equipment as required.

Response:

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center or doctor if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. IF SKIN IRRITATION OCCURS: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF EXPOSED OR CONCERNED: Get medical advice/attention.

Storage:

Store in a well-ventilated place. Store locked up.

Disposal:

Dispose of contents and container in accordance with local, state and federal regulations.

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ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

ADDITIONAL INFORMATION LABEL:

CAUTION!

Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling and use. Keep in a closed container in a well-ventilated area.

WARNING:

Silica: Crystalline silica (quartz) is a known cause of lung disease (silicosis). Respirable size quartz has been classified as a human carcinogen (lung cancer). Zircon contains trace amounts of quartz. Take precautions to avoid inhaling zircon dust or creating dusty conditions.

Uranium and Thorium: Zircon contains naturally occurring radioactive materials ("NORM") in the uranium and thorium series, in equilibrium, at typical specific activities of 0.4 to 0.7 Bq/g thorium (85 – 165 ppm) and 0.4 to 3.7 Bq/g uranium (28 – 300 ppm). The main radiological hazard from the product is internal exposure from small amounts of alpha particles given off by inhaled dust. Low level gamma radiation in proximity to bulk or bagged stockpiles of zircon may present a lesser, external exposure that can be managed by limiting close proximity for long time periods to large volumes of material.

FIRST AID MEASURES:

Eye Contact: Remove material by immediately flushing eyes with clean, flowing, water (low pressure) for at least 15 minutes. Get medical attention if pain or irritation persists.

Skin Contact: **W**ash affected area with mild soap and water to remove any dust adhering to the skin. Get medical attention if irritation develops or persists.

Inhalation: If exposed to excessive levels of dusts, remove to fresh air and get medical attention if cough or other symptoms develop. If not breathing, give artificial respiration or give oxygen by trained personnel, and get medical attention.

Ingestion: If ingested and victim is conscious, give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

CALIFORNIA PROPOSITION 65 WARNING: THIS PRODUCT CONTAINS SUBSTANCES (Quartz, Radionuclides and Titanium Dioxide*) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

*airborne, unbound particles of respirable size only.

SEE SDS FOR ADDITIONAL INFORMATION

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

ACRONYMS AND ABBREVIATIONS USED IN THIS MSDS:

ACGIH	American Conference of Governmental Industrial Hygienists
CA	California Right-to-Know Law; "Proposition 65, "*CCR TITLE 8 – Division 1 – Chapter 3.2 – Subchapter 1 – Article 5 - §339 The Hazardous Substances List*
CAS#	CAS Registration Number is an assigned number to identify a material
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act, *40 CFR part 302.4 – Designation, Reportable Quantities, and Notification (Table 302.4)*
CRCPD	Conference of Radiation Control Program Directors
EPA	United States Environmental Protection Agency
HMIS	Hazardous Materials Identification System of the National Paint & Coatings Association
IARC	International Agency for Research on Cancer
ICRP	International Commission on Radiological Protection
MA	Massachusetts Right-to-Know Law; *MGL PART I – TITLE XVI – CHAPTER 111F Hazardous Substances Disclosure By Employers*
mg/m^3	Milligrams per cubic meter
mSv	Milli-seiverts
MSHA	Mine Safety and Health Administration
N/A	Not applicable
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NJ	New Jersey Right-to-Know Law; *NJAC 8:59 - Worker and Community Right to Know Act*
NORM	Naturally Occurring Radioactive Material
NTP	U.S. National Toxicology Program
OSHA	Occupational Safety and Health Administration
PA	Pennsylvania Right-to-Know Law; *34 PA Code § 323. Hazardous Substance List (Appendix A)*
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act (EPA), *40 CFR part 261 - Identification and Listing of Hazardous Waste*
REL	Recommended Exposure Limit (NIOSH)
RQ	Reportable Quantity
RTECS	*Registry of Toxic Effects of Chemical Substances*: This database contains toxic effects data on some 140,000 chemicals. It is built and maintained by NIOSH.
SARA	Superfund Amendments and Reauthorization Act, *40 CFR part 372.65 - Toxic Chemical Release Reporting: Community Right-to-Know*
SARA EHS	*(SARA Extremely Hazardous Substances) 40 CFR part 355 - Emergency Planning and Notification (Appendices A & B)*
STEL	Short-term exposure limit (ACGIH)
STP	Standard temperature and pressure (T = ~70^{o}F, P = 1 atm)
TCLP	Toxicity Characteristic Leaching Procedure (EPA Method 1311)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act, *40 CFR 716.120 - Health and Safety Data Reporting*
TWA	Time Weighted Average
USDOT	United Stated Department of Transportation

DISCLAIMER:

This Material Safety Data Sheet (MSDS) is to be used only for this product in its present form. If this product is altered or used as a component in another material, the information on this MSDS may not be applicable. This document is generated for the purpose of distributing health, safety, and environmental guidance. This MSDS is not a specification sheet, nor should any displayed data be construed as a specification. Some of the information presented and conclusions drawn herein are obtained from sources other than direct test data on the product.

The information and data herein are believed to be accurate and have been compiled from sources believed reliable. It is offered for your consideration, investigation, and verification. The Buyer of this product assumes all risk of use, storage, and handling of the product in compliance with applicable Federal, State and local laws and regulations. **CONTINENTAL MINERAL PROCESSING** MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, CONCERNING THE ACCURACY OR COMPLETENESS OF THE INFORMATION AND DATA HEREIN. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY EXCLUDED. **Continental Mineral** will not be liable for claims relating to any party's use of or reliance on information and data contained herein, regardless of whether it is claimed that the information and data are inaccurate, incomplete, or otherwise misleading.

SAFETY DATA SHEET

ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX

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(M)SDS Preparation Date:	February 2001
(M)SDS Last Review Date:	March 2013
SDS Last Revision:	March 2013

Appendix F: SEPA Review

(Other than the current project scope (Bag-to-Bulk process), nothing has changed since the SEPA Checklist was submitted in 2017. The 2017 checklist (with some figures redacted) is resubmitted here)

SEPA ENVIRONMENTAL CHECKLIST
FRANKLIN COUNTY, WASHINGTON

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

***Instructions for applicants*:**

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

For guidance on completing this form or assistance in understanding a question, visit http://www.ecy.wa.gov/programs/sea/sepa/ChecklistGuidance.html

The SEPA Handbook is available online at: http://www.ecy.wa.gov/programs/sea/sepa/handbk/hbintro.html

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the supplemental sheet for nonproject actions (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background

1. Name of proposed project, if applicable:

Contruction of and Operation of Bag-to-Bulk Process

2. Name of applicant:

Two Rivers Terminal, LLC

3. Address and phone number of applicant and contact person:

Two Rivers Terminal, LLC
3300C North Glade Road
Pasco, WA 99301

Contract Person:
Steve Peot
steve@tworiversterminal.com
509-547-7776

4. Date checklist prepared:
September 30, 2024

5. Agency requesting checklist:
Washington Department of Ecology

6. Proposed timing or schedule (including phasing, if applicable):
November 2024

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Application for revision to Approval Order 17AQ-E049 (the air permit) to Washington Department of Ecology.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
No.

10. List any government approvals or permits that will be needed for your proposal, if known.

Washington Department of Ecology Approval Order 17AQ-E049 (the air permit) will need to be revised.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this

page. (Lead agencies may modify this form to include additional specific information on project description.)

Two Rivers Terminal, LLC. (TRT) is an existing and operating agricultural fertilizer blending and distribution facility located on currently developed industrial property.

The facility plans to install a new process at its Pasco location in addition to the processes that are currently in operation. The new process is required to transfer solid Glass Forming Chemicals form bags to a truck.

Drawings which describe the project are provided in Attachment A.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The facility is located outside of Pasco, Washington at approximate geographic coordinates as follows:

- Latitude: 46.320433° Longitude: -119.12243°
- Section 25, Township 10 North, Range 29 East

  3300C North Glade Road
  Pasco, WA 99301

The general location of the new process is shown on Diagrams 1 and 2 provided at the end of this checklist.

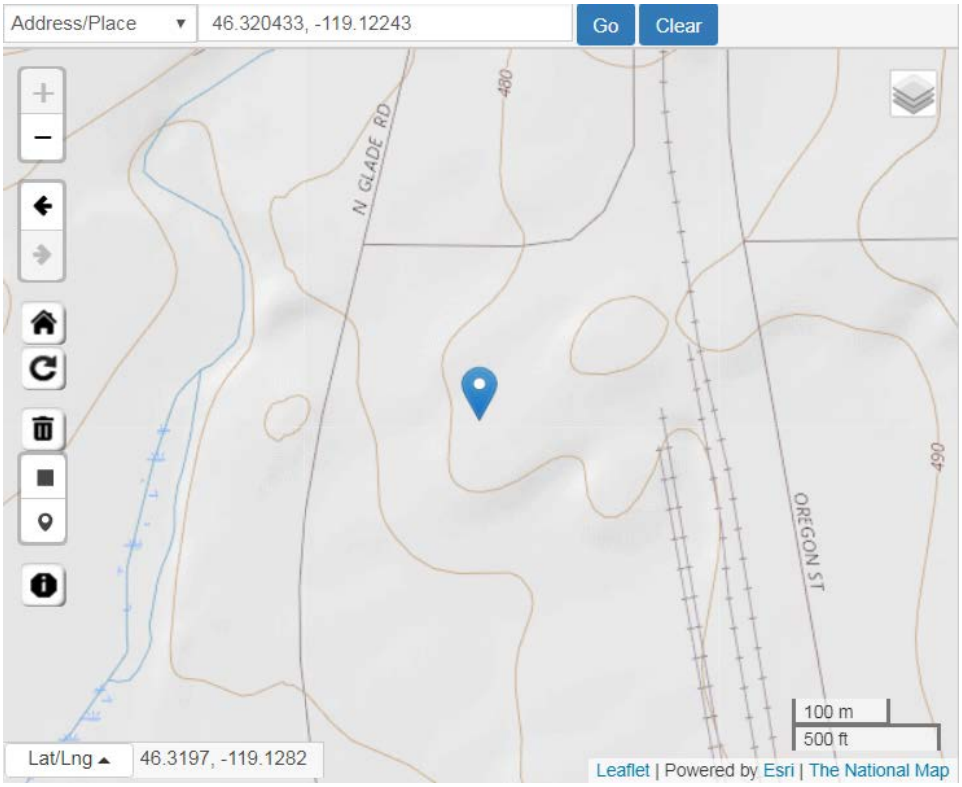
B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site:

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other

The area where the new process (72' L x 15' W) will be sited is generally flat.



b. What is the steepest slope on the site (approximate percent slope)?

<4.6% at location on facility where new construction will be located.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Site soils are classified by the Natural Resources Conservation Service as Quincy loamy fine sand (SM, SP-SM).

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

No, all soils in the immediate site vicincity have similar classification per the NRCS.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

No soil disturbance is required for this project.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

No.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

There will be no increase in impervious areas as a resulf of this new operation.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

None necessary because no soil disturbance is required.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

- Construction: None.
- Operation: There will be emissions of particulate matter in accordance with a WDOE Approval Order.
- Maintenance: None

The air pollutant emission rate computations completed for the air permit application shows that human health and environment not affected by emissions.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No, this is a project at an industrial facility.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Air pollution control systems include bin vent filters and another in building fabric filter process to control the emissios from process operations. See the application to the WDOE for additional details concerning this new process. Air emissions from the new process result in a net increase in total site particulate emissions of less than 2 lb/year of particulate matter from the site in total.

3. **Water**

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

There is a drainage ditch located 785 feet west of the proposed new construction. There are no liquid discharges from the process which relies on fabric filters to control air pollutant emissons.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Site has existing well. This project will not require additional wells. Water will not be discharged to the ground.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Site has existing septic field. This Project will not involve any addition to the septic system or need to.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Most all equipment will be located inside a building. There will be no stormwater runoff.

2) Could waste materials enter ground or surface waters? If so, generally describe.

No, equipment is inside a building or within site contiainment systems.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

None. None are required. No liquids will be used in the construction and operation of this new process that the pre-existing industrial facility.

4. **Plants**

a. Check the types of vegetation found on the site:

The site is a previously developed fertilizer blending and distribution facility with tank farms, haul roads, storage buildings, equipment yard, and office buildings. The area where the project will be located has no vegetation.

b. What kind and amount of vegetation will be removed or altered?

None.

c. List threatened and endangered species known to be on or near the site.

None.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

None.

e. List all noxious weeds and invasive species known to be on or near the site.

None.

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

None. The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings.

b. List any threatened and endangered species known to be on or near the site.

None. The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings.

c. Is the site part of a migration route? If so, explain.

The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings. There are no areas conducive to migratory bird habitats on the site.

d. Proposed measures to preserve or enhance wildlife, if any:

None. The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings.

e. List any invasive animal species known to be on or near the site.

None. The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings.

6. **Energy and Natural Resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity will be used to power air pollution control systems that are part of the bag to bulk transfer process.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

None necessary.

7. **Environmental Health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal?
If so, describe.

No. The emissions of toxic air pollutants has been considered as part of the air permit application and the level of toxic emissions are below the Small Quantity Emission Rate with Toxic Best Available Air Pollution Control Technology (TBACT) or de minimis emission rate values published by the Washington Department of Ecology.

1) Describe any known or possible contamination at the site from present or past uses.

Bulk chemical and fertilizer products are stored in containment structures and inside buildings to mitigate the effect of spills. Spills that might occur outside containment, such as from trucks or from small containers, are cleaned up immediately as they occur. The spilled material is either recycled back to the process or disposed at a licensed waste disposal facility.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

There are no piping systems in the vicinity of the process.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

The process involves the transfer of silica and other hazardous air pollutants from one container to another. Fabric filter media has been specified in the Approval Order application to WDOE with a 99.9% control efficiency.

4) Describe special emergency services that might be required.

Emergency services will be no different from the services already required due to the nature of existing processes.

5) Proposed measures to reduce or control environmental health hazards, if any:

The process will containers and other equipment rated for the manufacturing process. The processes will be located inside a building or within overall site containment structures. Process operators are trained on the hazards of the process and how to mitigate those hazards.

b. Noise

1) What types of noise exist in the area which may affect your project (for example:traffic, equipment, operation, other)?

No noise will affect offsite persons from this new project.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Air pollution control fans and blowers during normal business hours.

3) Proposed measures to reduce or control noise impacts, if any:

None necessary.

8. **Land and Shoreline Use**

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings. Another fertilizer facility is located immediately to the north of the site, and a transport and petroleum transfer facility is located immediately to the south of the site. Areas to the east and west are farmland. (See Diagram 1).

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

The site has not been used as working farmlands or working forest lands in the recent past.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

No.

c. Describe any structures on the site.

The site structures include tank farms, haul road, storage buildings, equipment yard, and office buildings. The preponderance of the new project will occur in an existing building.

d. Will any structures be demolished? If so, what?

No.

e. What is the current zoning classification of the site?

Industrial

f. What is the current comprehensive plan designation of the site?

Industrial

g. If applicable, what is the current shoreline master program designation of the site?

Not Applicable.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

No.

i. Approximately how many people would reside or work in the completed project?

Perhaps 2 to 4 new employees or contacted personnel.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Not Applicable

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Not Necessary.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

Not Necessary.

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Not Applicable

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Not Applicable

c. Proposed measures to reduce or control housing impacts, if any:

Not Applicable

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Fifty feet. No new building materials are proposed because no new buildings will be constructed.

b. What views in the immediate vicinity would be altered or obstructed?

None.

b. Proposed measures to reduce or control aesthetic impacts, if any:

None Necessary.

11. **Light and Glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

None.

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

None Necessary.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity?

None.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Not necessary.

13. **Historic and cultural preservation**

The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings.

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers ? If so, specifically describe.

No. The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

No. The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

None necessary. The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

None necessary. The site is a previously developed fertilizer blending and distribution facility with tank farms, haul road, storage buildings, equipment yard, and office buildings.

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

North Glade Road, see Diagrams 1 and 2. Access is by gravel entry.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

No.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

No change in parking spaces, and none necessary.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

No.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

Existing truck traffic is estimated at 13 loads per day that occurs up to 365 days per year. Project may require an additional 2 loads of truck traffic per day.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No. Based on visual observation, traffic on North Glade Road is not excessive.

h. Proposed measures to reduce or control transportation impacts, if any:

None necessary.

15. **Public Services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

No. The existing facility requires the services of the Fire Department in the event of a fire or hazardous chemical release. The addition of the new process does not affect or change the current need.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Two Rivers Terminal in conjunction with its insurance company conducts inspections and maintenance of its equipment to the minimize the likelihood and severity of fire and chemical releases.

16. **Utilities**

a. Circle utilities currently available at the site:

electricity: Big Bend Electric Co-Op, Inc.
natural gas, Cascade Natural Gas
water, Existing Two Rivers Terminal owned well
refuse service, Basin Disposal Inc.
telephone, CTLQL – Century Link
sanitary sewer, Not Applicable
septic system, Septic system operated by Two Rivers Terminal, LLC
other _____

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Electricity for the pumps is the only utility proposed. It will be obtained from existing site service.

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee: Steve Peot

Position and Agency/Organization General Manager, Two Rivers Terminal, LLC

Date Submitted: September 30, 2024

DIAGRAM 1: GENERAL SITE LOCATION

DIAGRAM 2: DETAILED SITE LOCATION