From: Julie Harse
To: Elizabeth Rorie
Subject: FW: Albemarle New Johnsonville (NPDES Permit TN0062537) TDEC MAO Notification
Date: Wednesday, December 13, 2017 3:13:49 PM

Upload attached documents.

From: Randy.Reed@albemarle.com [mailto:Randy.Reed@albemarle.com]
Sent: Monday, December 11, 2017 4:09 PM
To: Julie Harse
Cc: Darrell.Fisher@albemarle.com; John.Stewart@albemarle.com; Lee Bagby; Robert Crowley
Subject: RE: Albemarle New Johnsonville (NPDES Permit TN0062537) TDEC MAO Notification

Hi Julie,

here are the SDSs for the 3 concentrations of MAO that can be stored in these portable tanks

Thanks,

Randy

Randy Reed | ALBEMARLE | Senior Advisor, SPS PSA | 856 Foote Lane, New Johnsonville, TN 37134| ☎: 931.535.6202 | ✆: 731.363.3750 | ✉: Randy.Reed@albemarle.com | www.albemarle.com

From: Julie Harse <Julie.Harse@tn.gov>
To: "Darrell.Fisher@albemarle.com" <Darrell.Fisher@albemarle.com>
Cc: Lee Bagby <Lee.Bagby@erm.com>, Robert Crowley <Robert.Crowley@erm.com>, "Randy.Reed@albemarle.com" <Randy.Reed@albemarle.com>, "John.Stewart@albemarle.com" <John.Stewart@albemarle.com>
Date: 12/11/2017 02:46 PM
Subject: RE: Albemarle New Johnsonville (NPDES Permit TN0062537) TDEC MAO Notification

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Do you have a material safety data sheet for the chemical that is stored in these tanks? Thanks.

From: Darrell.Fisher@albemarle.com [mailto:Darrell.Fisher@albemarle.com]
Sent: Thursday, December 7, 2017 4:33 PM
To: Julie Harse
Cc: Lee Bagby; Robert Crowley; Randy.Reed@albemarle.com; John.Stewart@albemarle.com
Subject: Albemarle New Johnsonville (NPDES Permit TN0062537) TDEC MAO Notification

Dear Ms. Harse

Please find attached a notification letter regarding Albemarle's New Johnsonville Site NPDES permit

TN0062537. I have also sent this to your attention via certified letter.

Regards,
Darrell Fisher

Darrell Fisher | ALBEMARLE | Operations Director Butyllithium & Specialties | 856 Foote Lane, New Johnsonville, TN 37134 | ☎: 931.535.6201 | ◑: 615.522.8976 | ✉: Darrell.Fisher@albemarle.com | www.albemarle.com

ALBEMARLE

www.albemarle-lithium.com

Please note that Rockwood Lithium has changed its brand to Albemarle and the legal company name from Rockwood Lithium Inc. to Albemarle U.S., Inc.
The e-Mail address of our users has now changed from **@rockwoodlithium.com** to **@albemarle.com**.

Make sure to update **your local directories**, master data and other files with the new e-Mail address and company name.

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ALBEMARLE®

SAFETY DATA SHEET

MAO (HT) 20% in Toluene

Preparation Date : 04-May-2011 **Revision Date:** 29-May-2015 **Revision Number:** 1

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

Product Identifier
Product Name MAO (HT) 20% in Toluene

Other means of identification
Chemical Family Organoaluminum Compound.

Recommended use of the chemical and restrictions on use
General function Catalyst.
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

For Non-Emergency 800-535-3030

'Competent Body for SDS' HSE@Albemarle.com

Emergency telephone number
Emergency Telephone Numbers +1-225-344-7147

2. HAZARDS IDENTIFICATION

Classification

Skin Corrosion/irritation	Category 1 Sub-category A
Serious eye damage/eye irritation	Category 1
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3 - (H336)
Specific target organ toxicity (repeated exposure)	Category 2
Aspiration toxicity	Category 1
Flammable liquids	Category 2
Substances or mixtures which, in contact with water, emit flammable gases	Category 1

Label elements

Emergency Overview

Danger

Hazard Statements
Causes severe skin burns and eye damage
Suspected of damaging fertility or the unborn child
May cause drowsiness or dizziness
May cause damage to organs through prolonged or repeated exposure
May be fatal if swallowed and enters airways
Highly flammable liquid and vapor
In contact with water releases flammable gases which may ignite spontaneously

Appearance Liquid **Color** Clear. **Odor** Aromatic.

Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. — No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep away from any possible contact with water, because of violent reaction and possible flash fire
Handle under inert gas. Protect from moisture
Keep cool

Response
Immediately call a POISON CENTER or doctor/physician
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing Immediately call a POISON CENTER or doctor/physician Call a POISON CENTER or doctor/physician if you feel unwell
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician Do not induce vomiting Rinse mouth
In case of fire: Use CO2, dry chemical, or foam for extinction

Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in a dry place

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

Hazards not otherwise classified (HNOC)
Not applicable
Other Information
• Reacts violently with water

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	Weight %
Toluene	108-88-3	>70
MAO	Proprietary.	<30
Trimethylaluminium	75-24-1	<5

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 Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Immediately call a POISON CENTER or doctor/physician.

Skin Contact IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Contaminated clothing cannot be washed clean and should not be re-used for any purpose. Immediately call a POISON CENTER or doctor/physician. Metal alkyls and solutions of metal alkyls react with air and with body moisture. Immediate flushing with large volumes of water will kill residual alkyl, carry away the heat of reaction, and cool burned tissue. Such burns will be predominately thermal and should be treated medically as such. Immediate application of cold water has been found to reduce the severity of burns. For treatment of injury or shock, the services of a physician are required.

Inhalation IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration, preferably mouth to mouth. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Seek immediate medical attention/advice.

Ingestion Seek immediate medical attention/advice. Aspiration hazard if swallowed - can enter lungs and cause damage. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Never give anything by mouth to an unconscious person.

Protection of First-aiders Use personal protective equipment as required. Avoid contact with skin, eyes and clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation.

Most important symptoms and effects, both acute and delayed

Symptoms Causes severe skin burns and eye damage. Immediate symptoms : ocular burning sensation, blinking, tearing and pain. Initial symptoms may be followed by chest tightness and coughing, burning of the tongue and mouth, salivation and vomiting. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. Repeated or prolonged exposure may cause central nervous system damage.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media (a) No standard methods have been developed for extinguishing large-scale aluminum alkyl solution fires. The use of dry chemical agents would typically require 10 units of dry chemical for every unit of alkyl. An appropriately designed water fog delivery system can be used to effectively control a burning or non-burning aluminum alkyl release. Water fog application will not extinguish the fire; however, water fog will accelerate the oxidation of the aluminum alkyl and is an effective media for controlling the temperature of the immediate surrounding area. The only sure way to extinguish the fire is to shut off the fuel (Alkyl) source.

Unsuitable Extinguishing Media Do not use direct application of concentrated water streams; application of water fog (mist) is quite acceptable. Water based foams, chemical foams, and halogenated extinguishers should NOT be used.

Specific Hazards Arising from the Chemical

Combustion/explosion hazards In case of fire and/or explosion do not breathe fumes. Highly volatile vapors which are heavier than air may accumulate in low areas and/or spread along ground away from handling site. A vapor accumulation may flash and/or explode if ignited.

Hazardous Combustion Products Flammable vapours and aluminium containing dust on exposure to water and moist air.

Explosion Data

Sensitivity to mechanical impact None.

Sensitivity to static discharge Yes.

Protective Equipment and Precautions for Firefighters

In those circumstances where there exists a high probability of contact with the liquid alkyls, personnel should wear aluminized safety suits over standard firefighting gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Ventilate the area. Spills of metal alkyl solutions may or may not spontaneously ignite depending upon conditions surrounding the spill. However most solutions will begin oxidizing and generating solvent vapors. As the solvent vaporizes the concentration of alkyl in the remaining solution may increase and possibly ignite. The flash point for solutions should be considered to be less than -48C. Additional precautions normally observed when handling the solvent should be followed when using solutions of metal alkyls Breathing of solvent vapors may cause headache, dizziness, nausea, vomiting and loss of consciousness. If signs or symptoms occur from breathing vapors, remove to fresh air. If breathing stops, apply artificial respiration, preferably mouth-to-mouth. Give oxygen, if needed. Get medical attention. Do NOT induce vomiting. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation

Environmental Precautions

Environmental precautions The following general procedures are recommended for spills or leaks involving portable containers of aluminum alkyl solutions. The runoff from a spill should be directed to a remote location away from any processing areas to a remotely located containment area and not allowed to enter closed sewers. The solution is reactive with water; therefore, any spillage could react violently with any free water. In the event of a spill or leak the areas should be isolated at a radius of 18 meters then evacuate the downwind area 0.16 km width and 0.32 km length.

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 Remove all sources of ignition as there is potential for a solvent vapor cloud. Water fog may be used to hasten the oxidation of the aluminum alkyl; otherwise, the area should be kept clear of all personnel until alkyl has been completely oxidized. Once the alkyls are oxidized the cleanup should follow the procedures associated with a solvent cleanup.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Wear personal protective equipment. Keep away from open flames, hot surfaces and sources of ignition. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours) To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded Do not allow aluminum alkyls, or solutions containing aluminum alkyls, to come into contact with any part of the body. The alkyls and alkyl solutions will react with the body moisture producing thermal burns. All lines and equipment that could possibly contain aluminum alkyls or aluminum alkyl solutions must be free of any residual moisture and oxygen. If a container is threatened by fire from an external source, the container should be moved from the area. Otherwise, the container and any other equipment in the area should be kept cool by the use of a water fog spray system.

Conditions for safe storage, including any incompatibilities

Storage Keep away from heat and sources of ignition. Alkyl containers should be kept in a well-ventilated area. Efforts must be made to keep water from accumulating in the recessed dome during storage and while the container is connected to the process. Keep containers tightly closed in a dry, cool and well-ventilated place. Mechanical ventilation is recommended. Protect from water.

Incompatible Materials Water. Avoid acid, alcohol, oxidizing agents, and halogenated compounds.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Component	ACGIH TLV (TWA)	OSHA PEL (TWA)	NIOSH IDLH
Toluene 108-88-3	TWA: 20 ppm	375MGM3; 100PPM 200PPM	IDLH: 500 ppm TWA: 100 ppm TWA: 375 mg/m^3 STEL: 150 ppm STEL: 560 mg/m^3
Trimethylaluminium 75-24-1	TWA: 1mg/m^3 (Al metal and insoluable compounds)	2MGM3 Al	TWA: 2 mg/m^3 Al

Appropriate engineering controls

Engineering Controls
Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face Protection Chemical goggles and the aluminized hood of a safety suit. Goggles and face shield for small scale laboratory operation.

Skin Protection Use full aluminized safety suit when transferring material (large scale) and whenever contact may occur. We recommend using a full-body aluminized proximity suit.

Respiratory protection Approved dust, fume and organic respirator when working in irritating fumes from decomposition.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash hands and face before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance Liquid
Color Clear.

Odor	Aromatic.
Odor Threshold	No information available
Molecular Weight	No information available
pH	Not available
Melting point/freezing point	-60 °C / -76 °F
Boiling Point/Range	111 °C / 232 °F (Toluene)
Flash Point	4 °C (TCC) - Toluene
Evaporation Rate	No information available
Flammability (solid, gas)	No information available
Flammability Limit in Air	
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor Pressure	
Vapor Density	No information available
Relative density	0.90
Solubility(ies)	
Water Solubility	Reacts violently with water.
Solubility in other solvents	No information available
Partition coefficient	
Autoignition temperature	No information available
Decomposition temperature	No information available
Viscosity, kinematic	No information available
Dynamic viscosity	No information available
Explosive Properties	No information available
Oxidizing Properties	No information available

10. STABILITY AND REACTIVITY

Reactivity Hazard Reacts violently with water

Stability Stable under recommended storage conditions Handle under inert gas, protect from moisture. Reacts violently with water

Hazardous Reactions No hazardous reaction expected under normal handling.

Conditions to Avoid Exposure to air. Heat, flames and sparks. Protect from water.

Materials to avoid Oxygen. Water. Avoid acid, alcohol, oxidizing agents, and halogenated compounds.

Hazardous decomposition products Flammable vapours and aluminium containing dust on exposure to water and moist air.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation Corrosive by inhalation. Causes burns. Inhalation of vapors from aluminum alkyl fires or decomposition may cause immediate irritation of the respiratory tract. Excessive or prolonged inhalation of vapors may cause "metal fume fever". Symptoms are throat irritation, headache, fever, chills, nausea, constricting sensation of the lungs. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. Exposure can cause lung damage including effects to the larynx, bronchi and pulmonary edema.

Eye contact Causes burns. Such burns will be predominately thermal and should be treated medically as such.

Skin Contact Causes burns. Such burns will be predominately thermal and should be treated medically as such. Immediate application of cold water has been found to reduce the severity of burns.

Ingestion Aspiration hazard if swallowed - can enter lungs and cause damage. Aspiration may cause pulmonary edema and pneumonitis. Ingestion causes burns of the upper digestive and respiratory tracts. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause additional affects as listed under "Inhalation".

Potential Health Effects

Acute Effects

Skin Corrosion/irritation Causes burns.

Serious eye damage/eye irritation Causes eye burns.

Respiratory irritation : Causes burns

Sensitization Not expected to be a sensitizer.

Chronic Effects

Mutagenic Effects No information available.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	ACGIH Carcinogens	IARC	NTP	OSHA Carcinogens
Toluene	108-88-3	-	Group 3	-	-
MAO	-	-	-	-	-
Trimethylaluminium	75-24-1	-	-	-	-

Reproductive Effects Possible risk of harm to the unborn child. May impair fertility.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Chronic Effects This product contains toluene. Literature data indicate that repeated or prolonged overexposure to high vapor concentrations of toluene causes central nervous system effects and possible kidney effects.

Target Organ Effects Central nervous system (CNS), Kidney, Reproductive System.

Aspiration hazard Risk of serious damage to the lungs (by aspiration). May be fatal if swallowed and enters airways.

Numerical measures of toxicity

Product Information

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

ATEmix (oral) 2955 mg/kg

ATEmix (dermal) 13636 mg/kg (rat)

Component Information

Component	Rat Oral LD50 :	Rabbit Dermal LD50 :	Rat Inhalation LC50:
Toluene 108-88-3	2600 mg/kg	12000 mg/kg	-

Other data Excessive or prolonged inhalation of fumes may cause metal fume fever. Literature data indicate that toluene causes cardiac stimulation and arrhythmia (irregular heart beat) in the laboratory animal.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Toxic to aquatic life with long lasting effects

Component	Freshwater Algae EC50/72h :	Freshwater Fish LC50/96h :	Water Flea EC50/48h :
Toluene (CAS #: 108-88-3)	134 mg/l	5.89 mg/l	-

Persistence/Degradability No information available.

Bioaccumulation/ Accumulation No information available.

Mobility in Environmental Media No information available.

Component	log Pow :
Toluene 108-88-3	2.65

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste Disposal Method Absorb and incinerate. Dispose of as hazardous waste in compliance with local and national regulations.

Contaminated Packaging Do not reuse container.

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE, (Methylaluminoxane, Toluene)
Hazard Class	4.3
Subsidiary Class	3
UN No.	3399
Packing Group	I
Description	UN 3399 Organometallic substance, liquid, water-reactive, flammable (Methylaluminoxane, Toluene), 4.3 (3), I

IMDG/IMO

IMO Class	4.3
Subsidiary Risk	3
Packing Group	I
UN-No	3399
IMO Labelling and Marking	4.3 + 3
Proper Shipping Name	Organometallic substance, liquid, water-reactive, flammable (Methylaluminoxane, Toluene)
EmS	F-G, S-N
Marpol - Annex II	Not applicable
Marpol - Annex III	Unregulated
Transport Description	UN 3399 Organometallic substance, liquid, water-reactive, flammable (Methylaluminoxane, Toluene), 4.3 (3), I

IATA/ICAO

IATA/ICAO Class	4.3 (3)
Subsidiary Risk	3
Packing Group	I
UN-No	3399
IATA/ICAO Labelling/Marking	4.3 + 3
Passenger Aircraft	Forbidden
Cargo aircraft only	Maximum net quantity per package: 1 L
Proper shipping name	Organometallic substance, liquid, water-reactive, flammable, (Methylaluminoxane, Toluene)
Transport Description	UN 3399 Organometallic substance, liquid, water-reactive, flammable (Methylaluminoxane, Toluene), 4.3 (3), I

15. REGULATORY INFORMATION

International Inventories	TSCA	DSL	NDSL	AICS	EINECS	ELINCS	ENCS	KECL	PICCS	IECSC	NZIoC
MAO (HT) 20% in Toluene	X	-	-	-	X	-	X	X	-	X	-

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
Toluene (CAS #: 108-88-3)	>70	1.0 %

SARA 311/312 Hazardous Categorization

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

Reportable and Threshold Planning Quantities

The following components have RQs and/or TPQs under SARA and/or CERCLA

Component	CERCLA RQ, lbs	SARA 302 RQ, lbs	SARA 302 TPQ, lbs
Toluene (CAS #: 108-88-3)	1000	-	-
Trimethylaluminium (CAS #: 75-24-1)	100	-	-

State Right-to-Know

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

Component	California Prop. 65	New Jersey	Massachusetts	Pennsylvania
Toluene (CAS #: 108-88-3)	Listed.	Listed.	Listed.	Listed.
Trimethylaluminium (CAS #: 75-24-1)	-	Listed.	Listed.	Listed.

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

WHMIS Hazards

B2 Flammable liquid
B6 Reactive flammable material
E Corrosive material
F Dangerously reactive material
D2B Toxic materials
D2A Very toxic materials

16. OTHER INFORMATION

NFPA	Health 3	Flammability 4	Instability 2	Physical Hazards W
HMIS	Health 3 *	Flammability 4	Physical Hazards 2	

Prepared By

Health & Environment Department
Albemarle 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 : 04-May-2011
Revision Date: 29-May-2015

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