ATTACHMENT 7

Safety Data Sheet for Example Plastic Feedstock

1 Identification

· **Product identifier**

· **Trade name:** polypropylene

· **Application of the substance / the preparation:**
Product for industrial research and applicability tests.
· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
GRACE
W. R. Grace & Co.-Conn
7500 Grace Drive
Columbia MD 21044
U. S. A.

· **Information department:**
Health and Safety (9 AM to 5 PM-EST) 1-410-531-4000
MSDS.Davison@grace.com

· **Emergency telephone number:**
Chemtrec North America: +1-800-424-9300
Chemtrec International: +1-703-527-3887
Other Emergencies (24hr): +1-410-531-4000

2 Hazard(s) identification

· **Classification of the substance or mixture**
The substance is not classified, according to the Globally Harmonized System (GHS).
· **Label elements**
· **GHS label elements** None
· **Hazard pictograms** None
· **Signal word** None
· **Hazard statements** None
· **Classification system:**

· **NFPA ratings (scale 0 - 4)**

Health = 0
Fire = 1
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 0
Fire = 1
Reactivity = 0

· **Hazard not otherwise classified**
WARNING: Product dust together with air may develop ignitable and explosive mixtures

3 Composition/information on ingredients

· **Chemical characterization: Substances**

· **Additonal information:**

· **CAS No. and description:**		
9003-07-0	polypropylene	100%

USA

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4 First-aid measures

· **Description of first aid measures**

· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:**
Generally the product does not irritate the skin.
Wash with water.
After contact with the molten product, cool rapidly with cold water.
Do not pull solidified product away from the skin.
Seek medical treatment.
· **After eye contact:**
Flush opened eye with large quantities of running water for at least 30 minutes. If symptoms occur, consult a doctor.

· **After swallowing:** Seek medical attention. Do not induce vomiting.

· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed**
No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**

· **Suitable extinguishing agents:**
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **Hazardous combustion products**
In case of fire, the following can be released:
Carbon monoxide and carbon dioxide
· **Advice for firefighters**

· **Protective equipment:**
Do not inhale explosion gases or combustion gases.
Wear personal protective equipment.
Wear respiratory protective device.
· **Additional information**
Collect contaminated fire fighting water separately. It must not enter the sewage system.
Dispose of fire debris and contaminated fire fighting water in accordance with official regulations.
WARNING: Product dust together with air may develop ignitable and explosive mixtures
Prevent formation of dust.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Remove persons from danger area.
Wear protective clothing.
WARNING: Product dust together with air may develop ignitable and explosive mixtures
Keep away from ignition sources
· **Environmental precautions:**
Do not allow to enter sewers, surface or ground water.
Prevent from spreading (e.g. by damming-in or oil barriers).
· **Methods and material for containment and cleaning up:**
Vacuuming or wet sweeping may be used to avoid dust dispersal.
Vacuuming or wet sweeping may be used to avoid dust dispersal.

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· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**

· **PAC-1:**	
	5.2 mg/m³
· **PAC-2:**	
	58 mg/m³
· **PAC-3:**	
	350 mg/m³

7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Keep away from heat and direct sunlight.
Prevent formation of dust.
Provide suction extractors if dust is formed.
Use appropriate industrial vacuum cleaners or central vacuum systems for dust removal.
Take precautionary measures against static discharges.

· **Information about protection against explosions and fires:**
Dust can combine with air to form an explosive mixture.
When transferring this material into flammable solvents, use proper grounding to avoid static electric sparks.
WARNING: Product dust together with air may develop ignitable and explosive mixtures
When transferring this material, use proper grounding to avoid static electric sparks.
· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.

· **Information about storage in one common storage facility:** Store away from foodstuffs.

· **Further information about storage conditions:** None.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:**
Dust control and material handling systems should contain explosion relief vents, an explosion suppression system or other explosion suppression or prevention controls. Ensure that dust-handling systems are designed in a manner to prevent the escape of dust into the work area. Use only appropriately classified electrical equipment and powered industrial trucks.
· **Control parameters**
· **Components with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** Valid lists at time of creation were used as basis.
· **Exposure controls**
· **Personal protective equipment:**

· **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.

· **Breathing equipment:**
As appropriate for the employee exposure, use a NIOSH approved respirator and cartridge.

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USA

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· **Protection of hands:**

Protective gloves

Check protective gloves prior to each use for their proper condition.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Nitrile rubber, NBR
Butyl rubber, BR
Strong fabric gloves
Leather gloves
Recommended thickness of the material: ≥ 0.35 mm

· **For the permanent contact gloves made of the following materials are suitable:**
Butyl rubber, BR
Nitrile rubber, NBR

· **Eye protection:**

Safety glasses

· **Body protection:** Protective work clothing

* 9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Granulate
Color:	Transparent
· **Odor:**	Odorless
· **Odor threshold:**	Not applicable.
· **pH-value at 20 °C (68 °F):**	7
· **Change in condition**	
Melting point/Melting range:	120-170 °C (248-338 °F)
Boiling point/Boiling range:	Not determined.
· **Flash point:**	Not determined.
· **Flammability (solid, gaseous):**	Not determined.
· **Ignition temperature:**	410 °C (770 °F)
· **Decomposition temperature:**	~250 °C (~482 °F)
· **Auto igniting:**	Product is not self-igniting.

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USA

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· **Danger of explosion:**	Danger of dust explosion.
· **Explosion limits:**	
Lower:	Not applicable.
Upper:	Not applicable.
· **Vapor pressure:**	Not applicable.
· **Density at 20 °C (68 °F):**	0.90 - 0.92 g/cm³ (7.5105 - 7.6774 lbs/gal)
· **Bulk density at 20 °C (68 °F):**	0.5 kg/m³
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water:	Insoluble.
· **Coefficient of water/oil distribution:**	Not available.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability** No decomposition if used and stored according to specifications.
· **Possibility of hazardous reactions**
WARNING: Product dust together with air may develop ignitable and explosive mixtures
As the product is supplied it is not capable of dust explosion; however enrichment with fine dust causes risk of dust explosion.
· **Conditions to avoid**
In case of thermal decomposition caused by smouldering and incomplete combustion toxic fumes may be developed.
· **Incompatible materials:** Protect from contamination.
· **Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Aldehyde
At temperatures above 250°C, depolymerization and the release of starting monomers can arise.

11 Toxicological information

· **Information on toxicological effects**

· **Acute toxicity:**

· **Primary irritant effect:**

· **on the skin:** No irritant effect.

· **on the eye:** Irritating effect.
· **Respiratory sensitization** No further relevant information available.
· **Skin sensitization** No further relevant information available.

· **Additional toxicological information:**

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**
3

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· **NTP (National Toxicology Program)**
Substance is not listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**
Substance is not listed.

· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Carcinogenicity** No further relevant information available.
· **Mutagenicity** No further relevant information available.
· **Reproductive toxicity** No further relevant information available.
· **Specific target organ toxicity (single exposure)** No further relevant information available.
· **Specific target organ toxicity (repeated exposure)** No further relevant information available.

12 Ecological information

· **Toxicity**

· **Aquatic toxicity:** No further relevant information available.

· **Persistence and degradability** No further relevant information available.

· **Behavior in environmental systems:**

· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.

· **Additional ecological information:**
· **General notes:** Do not allow product to reach ground water, water course or sewage system.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Precautions for disposal:**

· **Recommendation:**
Disposal must be made according to official regulations.
Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State/provincial and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state/ provincial and local requirements.

14 Transport information

· **UN-Number**	
· **DOT, ADR, ADN, IMDG, IATA**	None
· **UN proper shipping name**	
· **DOT, ADR, ADN, IMDG, IATA**	None
· **Transport hazard class(es)**	
· **DOT, ADR, ADN, IMDG, IATA**	
· **Class**	None

(Contd. on page 7)

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· **Packing group** · **DOT, ADR, IMDG, IATA**	None
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	Not dangerous according to the above specifications. GRACE recommendation for air transport: Cargo aircraft only.

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **SARA**

· **SARA 302/304**
Substance is not listed.

· **SARA 313**
Substance is not listed.

· **SARA 311/312** Combustible Dust.

· **TSCA (Toxic Substances Control Act):**
ACTIVE

· **Hazardous Air Pollutants**
Substance is not listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**
Substance is not listed.

· **Chemicals known to cause reproductive toxicity for females:**
Substance is not listed.

· **Chemicals known to cause reproductive toxicity for males:**
Substance is not listed.

· **Chemicals known to cause developmental toxicity:**
Substance is not listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**
Substance is not listed.

· **TLV (Threshold Limit Value established by ACGIH)**
Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
Substance is not listed.

· **Canadian DSL**

9003-07-0	polypropylene

· **Canadian NDSL**
Substance is not listed.

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USA

Trade name: polypropylene

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· **European EINECS**
The corresponding monomers are listed in EINECS.

Substance is not listed.

· **Philippines Inventory of Chemicals and Chemical Substances PICCS**

Substance is listed.

· **Inventory of the Existing Chemical Substances manufactured or imported in China IECSC**

9003-07-0	polypropylene

· **Australian Inventory of Chemical Substances AICS**

Substance is listed.

· **Existing and New Chemical Substance List ENCS**

6-402

· **Korean Existing Chemical Inventory KECI**

KE-29389

· **TCSCA (Taiwan)**

Substance is not listed.

· **New Zealand Inventory of Chemicals (NZIoC)**

Substance is listed.

· **Existing Chemical Directory of Thailand (DIW)**

Substance is listed.

· **TCSI - Taiwan Chemical Substance Inventory**

Substance is listed.

· **GHS label elements** None
· **Hazard pictograms** None
· **Signal word** None
· **Hazard statements** None

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** GRACE Safety & Health Department
· **Other information:**
Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling

· **Contact:**
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D-67545 Worms, Germany
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· **Other information:**
· **Date of preparation / last revision** 01/08/2021 / 3.1
· **The first date of preparation** 06/06/2006
· **Number of revision times and the latest revision date** 3.2 / 01/08/2021
· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
· **Others** No further relevant information available.
· *** Data compared to the previous version altered.**

1 Identification

· **Product identifier**

· **Trade name:** Polyethylene

· **Application of the substance / the preparation:** Raw material
· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
GRACE
W. R. Grace & Co.-Conn
7500 Grace Drive
Columbia MD 21044
U. S. A.

· **Information department:**
Health and Safety (9 AM to 5 PM-EST) 1-410-531-4000
MSDS.Davison@grace.com

· **Emergency telephone number:**
Chemtrec North America: +1-800-424-9300
Chemtrec International: +1-703-527-3887
Other Emergencies (24hr): +1-410-531-4000

2 Hazard(s) identification

· **Classification of the substance or mixture**
The substance is not classified, according to the Globally Harmonized System (GHS).
· **Label elements**
· **GHS label elements** None
· **Hazard pictograms** None
· **Signal word** None
· **Hazard statements** None
· **Hazard not otherwise classified** The product is combustible.

3 Composition/information on ingredients

· **Chemical characterization: Substances**

· **Additonal information:**

· **CAS No. and description:**		
9002-88-4	Polyethylene	100%

4 First-aid measures

· **Description of first aid measures**

· **General information:**
Immediately remove contaminated clothing if necessary to prevent direct skin contact.

· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:**
Immediately wash with water at least for 30 minutes and rinse thoroughly.
Seek medical treatment.
· **After eye contact:**
Flush opened eye with large quantities of running water for at least 30 minutes. If symptoms occur, consult a doctor.

· **After swallowing:** Seek medical attention. Do not induce vomiting.

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· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed**
No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**

· **Suitable extinguishing agents:**
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

· **For safety reasons unsuitable extinguishing agents:** Water with full jet
· **Hazardous combustion products**
Carbon monoxide and carbon dioxide
Can form explosive gas-air mixtures.
· **Advice for firefighters**

· **Protective equipment:**
Wear personal protective equipment.
Wear respiratory protective device.
· **Additional information**
Cool receptacles with water spray.
Dispose of fire debris and contaminated fire fighting water in accordance with official regulations.
Heating of container(s) will cause the pressure to rise with risk of bursting.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Ensure adequate ventilation
Keep away from ignition sources
Wear protective clothing.
Wear respiratory protective device.
· **Environmental precautions:**
Damp down dust with water spray.
Do not allow to enter sewers, surface or ground water.
· **Methods and material for containment and cleaning up:**
Dispose of the collected material according to regulations.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**

· **PAC-1:**
16 mg/m³

· **PAC-2:**
170 mg/m³

· **PAC-3:**
1,000 mg/m³

USA

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7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Keep away from heat and direct sunlight.
Any deposit of dust which cannot be avoided must be regularly removed.
Take precautionary measures against static discharges.
No special measures required.

· **Information about protection against explosions and fires:**
WARNING: Product dust together with air may develop ignitable and explosive mixtures
Keep ignition sources away. Do not smoke.
Protect against electrostatic charges.
The product is flammable.
· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:**
Use only receptacles specifically permitted for this substance/product.

· **Information about storage in one common storage facility:** Store away from foodstuffs.

· **Further information about storage conditions:** Store in dry conditions.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.
· **Control parameters**
· **Components with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** Valid lists at time of creation were used as basis.
· **Exposure controls**
· **Personal protective equipment:**

· **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Do not inhale dust / smoke / mist.
Prevent contact with the eyes and skin.

· **Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to lack of information no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.


Protective gloves

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· **Material of gloves**
Recommended thickness of the material: ≥ 0.35 mm
Leather gloves

· **For the permanent contact in work areas without heightened risk of injury (e.g. Laboratory) gloves made of the following material are suitable:**
Leather gloves

(Contd. on page 4)

Trade name: Polyethylene

(Contd. of page 3)

· **For the permanent contact gloves made of the following materials are suitable:**
Leather gloves

· **For the permanent contact of a maximum of 15 minutes gloves made of the following materials are suitable:**
Leather gloves

· **Not suitable are gloves made of the following materials:** Strong fabric gloves

· **Eye protection:**

Safety glasses

· **Body protection:** Protective work clothing

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Solid
Color:	White
· **Odor:**	Odorless
· **Odor threshold:**	Not applicable.
· **pH-value (50 g/l) at 20 °C (68 °F):**	7
· **Change in condition**	
Melting point/Melting range:	120-135 °C (248-275 °F)
Boiling point/Boiling range:	Not determined.
Drip point:	50-150 °C (122-302 °F) (DIN 51801 & ASTM D 3954-9)
· **Flash point:**	>220 °C (>428 °F) (DIN 51758)
· **Flammability (solid, gaseous):**	Flammable.
· **Ignition temperature:**	>350 °C (>662 °F)
· **Decomposition temperature:**	Not applicable.
· **Auto ignition temperature:**	Product is not self-igniting.
· **Danger of explosion:**	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· **Explosion limits:**	
Lower:	Not applicable.
Upper:	Not applicable.
· **Vapor pressure:**	Not applicable.
· **Density at 20 °C (68 °F):**	~0.93 g/cm³ (~7.76085 lbs/gal)
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Insoluble.
· **Coefficient of water/oil distribution:**	>6 log POW (calculated)

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· **Viscosity:**	
Dynamic at 120 °C (248 °F):	<400 mPas (DIN 53019)
Kinematic:	Not applicable.
· **Other information**	
Particle characteristics	Not determined.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability** No decomposition if used and stored according to specifications.
· **Possibility of hazardous reactions**
As the product is supplied it is not capable of dust explosion; however enrichment with fine dust causes risk of dust explosion.
· **Conditions to avoid**
In case of thermal decomposition caused by smouldering and incomplete combustion toxic fumes may be developed.
· **Incompatible materials:** Protect from contamination.
· **Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Flammable gases/vapors
Hydrocarbons

11 Toxicological information

· **Information on toxicological effects**

· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
9002-88-4 Polyethylene		
Oral	LD50	7,950 mg/kg (rat)

· **Primary irritant effect:**

· **on the skin:**		
9002-88-4 Polyethylene		
Irritation of skin	IS	0 (-)

· **on the eye:**		
9002-88-4 Polyethylene		
Irritation of eyes	IS	0 (-)

· **Sensitization:** No sensitizing effects known.
· **Skin sensitization** No further relevant information available.

· **Additional toxicological information:**

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**
3

· **NTP (National Toxicology Program)**
Substance is not listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**
Substance is not listed.

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· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Carcinogenicity** No further relevant information available.
· **Mutagenicity** No further relevant information available.
· **Reproductive toxicity** No further relevant information available.
· **Specific target organ toxicity (single exposure)** No further relevant information available.
· **Specific target organ toxicity (repeated exposure)** No further relevant information available.

12 Ecological information

· **Toxicity**

· **Aquatic toxicity:** No further relevant information available.

· **Persistence and degradability** No further relevant information available.
· **Other information:**
Do not allow product to reach sewage system, groundwater and any water course.
By the insolubility in water there is a separation at every filtration and sedimentation process.

· **Behavior in environmental systems:**

· **Bioaccumulative potential**
Due to the distribution coefficient n-octanol/water an accumulation in organisms is possible.
· **Mobility in soil** No further relevant information available.

· **Additional ecological information:**
· **General notes:**
Do not allow product to reach ground water, water course or sewage system.
Not hazardous for water.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Precautions for disposal:**

· **Recommendation:**
Disposal must be made according to official regulations.
Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State/provincial and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state/ provincial and local requirements.

14 Transport information

· **UN-Number** · **DOT, ADR, ADN, IMDG, IATA**	Not applicable.
· **UN proper shipping name** · **DOT, ADR, ADN, IMDG, IATA**	Not applicable.
· **Transport hazard class(es)** · **DOT, ADR, ADN, IMDG, IATA** · **Class**	Not applicable.

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· **Packing group** · **DOT, ADR, IMDG, IATA**	Not applicable.
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Not applicable.
· **Segregation groups**	-
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	Not dangerous according to the above specifications. GRACE recommendation for air transport: Cargo aircraft only.

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **SARA**

· **SARA 302/304**
Substance is not listed.

· **SARA 313**
Substance is not listed.

· **SARA 311/312** Not applicable.

· **TSCA (Toxic Substances Control Act):**
ACTIVE

· **Hazardous Air Pollutants**
Substance is not listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**
Substance is not listed.

· **Chemicals known to cause reproductive toxicity for females:**
Substance is not listed.

· **Chemicals known to cause reproductive toxicity for males:**
Substance is not listed.

· **Chemicals known to cause developmental toxicity:**
Substance is not listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**
Substance is not listed.

· **TLV (Threshold Limit Value)**
Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
Substance is not listed.

· **Canadian DSL**

9002-88-4	Polyethylene

(Contd. on page 8)

(Contd. of page 7)

· **Canadian NDSL**
Substance is not listed.

· **European EINECS**
Substance is not listed.

· **Philippines Inventory of Chemicals and Chemical Substances PICCS**
Substance is listed.

· **Inventory of the Existing Chemical Substances manufactured or imported in China IECSC**

9002-88-4	Polyethylene

· **Australian Inventory of Industrial Chemicals (AIIC)**
Substance is listed.

· **Existing and New Chemical Substance List ENCS**
6-1

· **Korean Existing Chemical Inventory KECI**
KE-28877

· **TCSCA (Taiwan)**
EPEP4A01714252

· **Russian Register of Potentially Hazardous Chemical and Biological Substances (RPOHV)**
№ ВТ-000548 от 14.07.1995 г.

· **New Zealand Inventory of Chemicals (NZIoC)**
Substance is listed.

· **Existing Chemical Directory of Thailand (DIW)**
Substance is listed.

· **TCSI - Taiwan Chemical Substance Inventory**
Substance is listed.

· **Mexican National Inventory of Chemical Substances (INSQ)**
Substance is listed.

· **GHS label elements** None
· **Hazard pictograms** None
· **Signal word** None
· **Hazard statements** None
· **Classification system:**

· **NFPA ratings (scale 0 - 4)**

Health = 1
Fire = 1
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 1
Fire = 1
Reactivity = 0

*

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** GRACE Safety & Health Department

(Contd. on page 9)

(Contd. of page 8)

· **Contact:**
SALES OFFICES

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· **Other information:**
· **Date of preparation / last revision** 03/11/2022 / 3.2
· **The first date of preparation** 05/07/2003
· **Number of revision times and the latest revision date** 3.3 / 03/10/2022
· **Abbreviations and acronyms:**
ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
· **Others** No further relevant information available.
· *** Data compared to the previous version altered.**

ATTACHMENT 8

Electric Flameless Thermal Oxidizer Vendor Information

ELECTRIC FTO
FLAMELESS THERMAL OXIDIZER

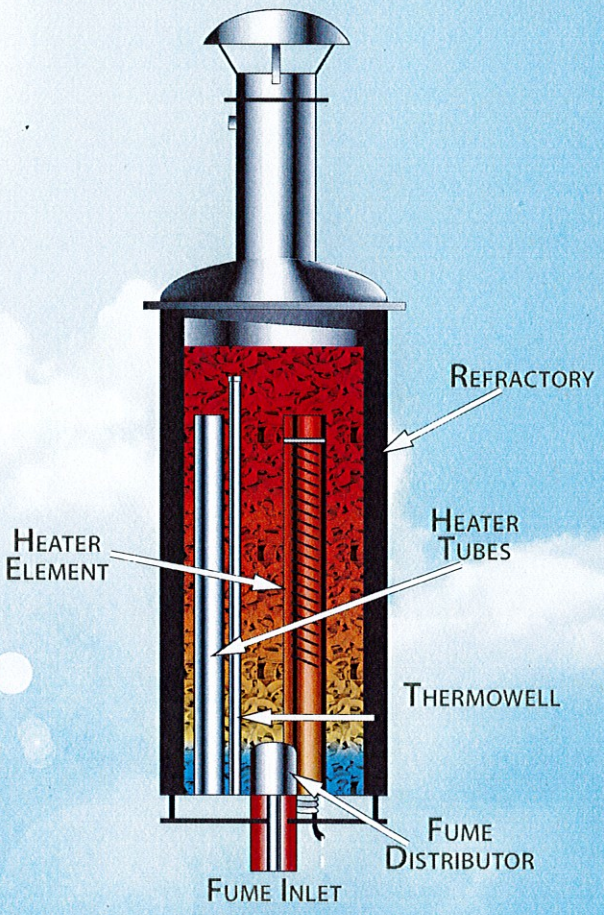
High Destruction Efficiency, Low NOx, Electrically Heated

The *PCC Electric FTO (EFTO)* consistently treats Volatile Organic Compounds (VOCs) in waste gas streams yielding removal efficiencies of 99.9999%. The thermal oxidation is accomplished at 1800°F to avoid production of thermal NOx and to minimize operating costs. Thermal NOx levels are <1 ppmv.

The *PCC Electric FTO* consists of a carbon steel, refractory-lined oxidation vessel. The vessel contains three spiral-wound electric resistance heater elements in 310SS protection tubes surrounded by a bed of randomly packed inert ceramic saddles. The *PCC Electric FTO* is fully automatic and there are no moving parts in the oxidizer. Alternate materials of construction are available as required based on the waste gas composition. A typical system requires 480V 3phase 100 amp, 120V 1 phase 20 amp, and 5 scfm of instrument air at 80 psig.

How the PCC Electric FTO Works

The *PCC EFTO* consists of a vertical, refractory-lined vessel filled with ceramic media. The ceramic media is pre-heated to a calculated temperature through the use of an electric resistance heater. Electrical energy is only required as a supplement to the heat content of the fume and to preheat the ceramic bed during start-up.



The waste gas and air are pre-mixed at the bottom of the vessel and introduced into the unit. The organic compounds found in the waste gas are oxidized and discharged into the atmosphere via a stack extension on the top of the unit.

The *PCC Electric FTO* operates well below the Lower Flammable Limit (LFL), eliminating the possibility of a flame within the system. The fume oxidizes as it passes through the oxidation zone releasing heat, which is transferred into the surrounding ceramic matrix thus maintaining the operating temperature of the bed without the need for supplemental heat via the electric heaters.

Simplicity of Design

The *PCC EFTO's* simplicity of design and portability make it a multi-purpose piece of equipment for multiple low volume gas treatment applications. The *PCC EFTO's* standardized design requires minimal customization. The modular configuration makes it simple to install.

PROCESS COMBUSTION CORPORATION
300 Weyman Road, Suite 400 · Pittsburgh, PA 15236 · (412) 655-0955 · pcc@pcc-group.com · www.pcc-group.com

Call now for a competitive proposal!

January 9, 2024

Susan Nash, Regulatory and Compliance Engineer Sr.
Air and Radiation Administration
Air Quality Permits Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
susan.nash@maryland.gov

W. R. Grace & Co.- Conn. Columbia, MD facility's application for a planned pilot-scale test catalytic chemical conversion process was submitted to MDE on August 7, 2023.

The following is a response to your question, received on January 5, 2024, regarding emissions estimates in our application; namely, "How were the emissions estimates done for both stacks and for all types of pollutants [criteria, GHG, TAPs, etc.}".

Estimated emissions (along with relevant information in footnotes and assumed control efficiencies) for the Thermal Oxidizer (TO) Stack and the Regenerator Exhaust Vent are presented in Tables 1 and 2, for the TO Stack and Table 3, for the Regenerator Exhaust Vent, in Attachment 5 of the application. A summary of the bases and assumptions for the emissions estimates are given below.

For the TO Stack:

- Criteria pollutants
  - VOC based on gaseous hydrocarbon yield (i.e., mass hydrocarbon per mass raw material) and typical distribution of hydrocarbons from catalytic cracking estimated from
    - Bench scale lab testing results
    - Published technical papers of similar reactions
    - Understanding of cracking chemistry of the raw material
    - Mass balance of the system
  - PM estimated from
    - Assumed percentage of outlet particulate fines based on system catalyst inventory
- GHG pollutants
  - CO_2 estimated from
    - Bench scale lab testing results
    - Published technical papers of similar reactions
    - Understanding of cracking chemistry of the raw material
    - Mass balance of the system
    - As a result of the destruction of hydrocarbons in the TO, assumed moles of hydrocarbon carbon input to TO are converted to mass of CO_2 (one mole of carbon to one mole of CO_2)

    - Methane based on gaseous hydrocarbon yield (i.e., mass hydrocarbon per mass raw material) and typical distribution of hydrocarbons from catalytic cracking estimated from
        - Bench scale lab testing results
        - Published technical papers of similar reactions
        - Understanding of cracking chemistry of the raw material
        - Mass balance of the system
- TAPs
    - Six of the speciated VOC pollutants are Class II TAPs. See Criteria Pollutants bullet above for VOC.

For the Regenerator Exhaust Vent:

- All pollutants
    - Based on 20 years of experience on operating regenerators from other similar pilot plants (eg., Davison Circulating Riser (DCR))
- Criteria pollutants
    - CO estimated from
        - Assumed lean burn (excess oxygen) resulting in trace CO at detection limit
    - NO estimated from
        - Published technical paper of similar process (and similar N content of raw feed and lean combustion)
    - PM estimated from
        - Assumed percentage of outlet particulate fines based on system catalyst inventory
- GHG pollutants
    - CO_2 estimated from
        - Carbon balance of coke deposited on spent catalyst

Please contact me with any questions.

Sincerely,

Daniel Resca
Project Manager
W.R. Grace & Co.-Conn
Daniel.resca@grace.com
410-531-4570

HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
3430 Court House Drive ■ Ellicott City, Maryland 21043 ■ 410-313-2350
Lynda D. Eisenberg, AICP, Director FAX 410-313-3467

September 13, 2024

To Whom It May Concern:

In September of 2023, WR Grace requested a Zoning Compliance Certificate associated with an application for a research-scale pilot plant for development purposes only at the request of Maryland Department of the Environment (MDE). The zoning compliance certificate was limited to whether this use is permitted at 7500 Grace Drive (Building 30 Lab 120).

A letter was issued to WR Grace and MDE in September of 2023 confirming R&D as an allowable use according to the following:

The property was zoned Residential in the first zoning regulations adopted in 1948 and rezoned as follows:

- 1961: R-40 (Residential, One and Two-Family Detached)
- 1977: R (Rural)
- 1986: PEC (Planned Employment Center) Zoning Board Case No. 814

The research and development laboratory land use was permitted as a matter of right in the PEC zoning district in 1991. This use was legally established in Building 30, as approved through SDP-91-090 in 1991.

The research and development establishments land use was removed as a matter of right use from the PEC zoning district during the 2013 Comprehensive Zoning.

Section 129.0.A of the Howard County Zoning Regulations, states that a nonconforming use is "any lawful existing use, whether of a structure or a tract of land, which does not conform to the use regulations of the zoning district in which it is located, either on the effective date of these Regulations or as a result of any subsequent amendment thereto. Therefore, the research and development activity on the Property is a nonconforming use.

A nonconforming use may be continued subject to the requirements of Section 129.0.B. The proposed research and development lab complies with these requirements.

More recently on August 19, 2024, because of numerous zoning inquiries regarding this site, the Maryland Department of the Environment requested DPZ to again verify the allowance of this use. The Department of Planning and Zoning received a zoning complaint on August 8, 2024, alleging that Engineering and Scientific Research is occurring at the property and is not in conformance with the PEC district. On Monday September 9, 2024, the Chief of Public Service and Zoning Administration along with representatives from the Maryland Department of the Environment and WR Grace visited the site and toured the inside of the facility to investigate possible zoning violations. During this inspection there were no zoning violations observed and no unapproved exterior development evident. WR Grace further supported their nonconforming use status by providing a letter indicating that the building has been used for research and development without cessation since 2013.

Attached is the close out letter indicating no zoning violations found at 7500 Grace Drive (Building 30 Lab 120) along with the WR Grace letter mentioned above.

The Department of Planning and Zoning only has the authority to inspect and validate the zoning and site conditions of the property and is not the issuer of the Air Quality Permit. The Maryland Department of Environment issues the permit and has previously conducted public meetings to receive comments and questions. Further concerns and questions may be directed to MDE's Shannon Heafey. Her contact information is below.

Shannon Heafey, Public Participation Coordinator Air Quality Permits Program, Air and Radiation Administration Maryland Department of the Environment
1800 Washington Boulevard, Baltimore, Maryland 21230 shannon.heafey@maryland.gov
410-537-4433

Sincerely,

Geoff Goins, Division Chief
Public Service and Zoning Administration

Cc: Lynda Eisenberg, DPZ Director

HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
3430 Courthouse Drive ■ Ellicott City, Maryland 21043 ■ 410-313-2350

Lynda D. Eisenberg, AICP, Director

www.howardcountymd.gov
FAX 410-313-3391
TDD 410-313-2323

September 13, 2024

Nana Adadey
7252 Mainstream Way
Columbia, MD 21044

RE: Alleged Zoning Violation
7500 Grace Drive
CE-24-107

Ms. Adadey,

In response to your request regarding the above-mentioned property a representative of the Zoning Division inspected the property on September 9, 2024. There were no violations of the Howard County Zoning Regulations or Subdivision and Land Development Regulations found for this property. Since there are no violations, the case is closed.

If you are interested in reviewing the case file for more details, please submit a written request to me at 3430 Court House Drive Ellicott City, MD 21043 or via email to ggoins@howardcountymd.gov.

Thank you for referring this matter to the Division of Public Service and Zoning Administration. If you have any questions concerning this case, please contact Geoff Goins at (410) 313-4350.

Sincerely,

DocuSigned by:
Lynda Eisenberg
DE9E3B54B3144...

Lynda D. Eisenberg, AICP, Director
Department of Planning and Zoning

Any person aggrieved by a decision of the Department of Planning and Zoning ***may file an appeal to the Board of Appeals.*** *An appeal to this notice must be filed within 30 days of the date of the notice and must state the alleged error or other grounds for the appeal. Instructions and forms for filing an appeal may be obtained from the Department of Planning and Zoning.*

GRACE
Talent | Technology | Trust

Scott K. Purnell
Vice President, R&D
Refining Technologies

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W. R. Grace & Co.
7500 Grace Drive
Columbia, MD. USA 21044

September 9, 2024

W. R. Grace Building 30: Use

To Whom it May Concern:

I am writing to confirm that Building 30 on our property at 7500 Grace Drive, Columbia, MD has been in continuous use for research and development (R&D) activities since 2013 without cessation.

Examples of R&D work conducted in this building includes:

- Catalytic performance testing of Grace methanol-to-olefins (MTO) catalysts whereby methanol is reacted with our catalysts at high temperatures and converted to ethylene, propylene and other products. Catalysts are tested for activity, selectivity, and stability and compared against each other and over a range operating conditions.
- Catalytic performance testing of Grace RANEY® hydrogenation catalysts. RANEY catalysts are used in a range of hydrogenation reactions from nitro compounds to amines, carbonyls to alcohols, nitriles to amines, olefins, and acetylenes to saturates. Also, they are widely used in reductive alkylations, reductive aminations and ammonolysis of alcohols. Catalysts are tested for activity, selectivity, and stability and compared against each other and over a range operating conditions.
- Drying and high-temperature heat treatment of Grace Fluid Cracking Catalysts (FCC) and Additives as well as zeolites such as USY and ZSM-5.
- Studies whereby fluidizable catalysts with different particle size distributions and morphologies are studied over a range of air flow rates to compare their fluidization properties.
- Bench-scale sample handling including sample collection, separation, screening, preparation and submission to in-house and third-party analytical laboratories, etc.

If you have any further questions, please do not hesitate to contact me.

Sincerely,

Scott K. Purnell
Vice President, R&D

APPENDIX B
W.R. Grace &Co.-CONN
Letter Dated Oct 10, 2024

GRACE
Talent | Technology | Trust™

Ms. Apple Chapman
Assistant General Counsel
Regulatory & EHS

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W. R. Grace & Co.-Conn.
7500 Grace Drive
Columbia, MD 21044

Suna Yi Sariscak, Manager
Air Quality Permits Program
Maryland Department of the Environment
Air and Radiation Management Administration
1800 Washington Boulevard, Suite 720
Baltimore, Maryland 21230-1720
MDE.Submit-AirPermits@Maryland.gov

October 10, 2024

Sent Via Electronic Mail

Re: Supplemental Information for Permit to Construct Research-Scale Pilot Plant, W.R. Grace & Co., 7500 Grace Drive, Columbia MD
Docket No. 16-23

Dear Ms. Sariscak:

W.R. Grace & Co. – Conn. (Grace) submitted the above-referenced application for a permit to construct in August 2023. We understand that questions have been raised regarding whether the proposed unit is subject to the requirements of NSPS Subpart EEEE, 40 C.F.R. Part 60, Subpart EEEE, which regulates, among other things, small municipal solid waste (MSW) incinerators. We are writing to provide confirmation that the unit is not subject to these requirements for reasons including the following: first, the unit will not process MSW; and second, the unit is exempt as a laboratory analysis unit.

I. Background

Purpose

Grace seeks to permit a pilot-scale project to research a new catalytic chemical process to convert plastics back into their original components. The purpose of this pilot plant is to develop data to assess the technical and economic feasibility of this advanced conversion technology. If successful, the technology could be licensed or sold to refineries and chemical manufacturing facilities to enable more efficient and low-pollution recycling of plastic wastes into useful raw materials and feedstocks.

Currently, plastic waste is often disposed either in landfills or by incineration. The only widely available commercial recycling technology for plastics is mechanical recycling, which involves breaking down the plastic into smaller pieces to be melted and re-used as recycled plastic. Mechanical recycling, however, has a substantial downside: plastic begins to lose its integrity as it is mechanically recycled—especially after multiple cycles. Grace's unique technology, if proven, will provide a new recycling option that is both more environmentally friendly and more commercially desirable: it will use a chemical reaction to break down the plastic into its component parts, such as ethylene, propylene, and butylene. These chemicals are commercially valuable and can be used to manufacture virgin plastic or for other uses.

The specific project that Grace proposes for its Columbia, Maryland R&D facility involves a pilot-scale process, which is several orders of magnitude smaller than a commercial process. The unit is designed to process only small quantities of various types of plastics to test/assess the process solely for research and development purposes.

Process

The process itself is shown in the attached drawing. The process begins by feeding plastic pellets into the unit's reactors along with a heated catalyst, nitrogen, and steam. No oxygen or flame is present in the reaction chamber; instead, heat is required to activate the catalyst and trigger the chemical reaction. This process is known as catalytic chemical conversion, or catalytic pyrolysis. The heated catalyst interacts with the plastic to break it down into its component parts, which at this point are entirely in a gaseous phase. The gas exits the reactor through a cyclone, which captures any small bits of catalyst that may be entrained in the gases and returns them to the reactor. From the cyclone, the gases enter a condenser unit to separate the products into gas and liquid fractions.[1] All liquids appropriate disposal; waste gases are controlled through a thermal oxidizer.

During the process, the catalyst becomes coated with catalytic coke, a soot-type substance that prevents the catalyst from interacting with the plastic feedstock. As a result, the catalyst is sent to a catalyst regenerator in a continuous process. The regenerator is like those used at many industrial catalytic processes and is an integral part of the process. The regenerator

[1] As described in more detail below, this pilot unit will employ a condenser for this stage of the process, but Grace anticipates that a commercial-sized unit would employ one or more distillation processes to separate out the gas and liquid fractions into individual products.

oxidizes the coke, which removes it from the catalyst, and the regenerated catalyst is returned to the reactor.

Contemplated Research Unit

The contemplated unit is specifically designed only for testing purposes. The unit will be different in several ways from a commercial unit.

First, the unit is very small, processing only 1 kg/hr of plastic pellets. Yearly operation is expected to be less than or equal to 4000 hours/year, compared with commercial operations that generally strive for more than 85% annual uptime, or 7400+ hours/year.

Second, the feedstock characteristics will be significantly different from a commercial unit. A commercial unit will likely be fed rough-shredded post-consumer plastics direct from a recycling facility, whereas the pilot process is only capable of feeding clean and carefully pre-sized pelletized plastics. The pilot project will have two phases of feed testing. In the first phase, the feedstock for the unit will comprise virgin plastic pellets bought from commercial suppliers. Grace plans to use a variety of types of pellets to assess the potential reaction products from different types of plastics (numbers 1-7). In addition, Grace may also add non-hazardous materials that are typically used as additives in manufacturing plastics, such as calcium carbonate, so that it may test the impact of these materials on the reaction output.[2]

If the results of the first phase indicate that the process is technologically feasible and commercially viable, Grace hopes to conduct a second phase of the pilot project to test recycled plastics. The unit cannot, however, directly process plastic waste. Rather, it is designed to accept only cleaned, pelletized plastic. Therefore, if and when the site moves to the second phase of the operation, it will need to either clean and pelletize recycled plastic before the plastic is fed to the process, or purchase cleaned, pelletized recycled plastic. This type of pelletized recycled plastic is often commercially sold as feedstock for a variety of manufacturing processes, including highly regulated food contact applications.

Third, we anticipate that a commercially sized process would conduct significant additional processing, including, for example, multiple distillations to separate the individual gaseous and liquid compounds produced by the process, and then use or sell those products as raw materials or feedstocks. The small size of the project here, however, means that it is not economically feasible to further process and sell or re-use the products. Instead, the pilot project

[2] Note that Grace will *not* intentionally add PFAS as part of its testing program.

will use a condenser to separate the vent stream from the reactor into liquid and gaseous components.

Grace will assess both the material yields and the chemical composition of each stream by sending the materials through analytical equipment such as a gas chromatograph. The results of these tests will be used to assess the technical and commercial viability of the operation and assess any environmental and/or commercial implications (*e.g.*, production of either useful or undesirable byproducts when particular types or combinations of materials are processed). After this testing is complete, the liquids will be sent off-site for proper treatment and disposal, and the gases will be sent to a thermal oxidizer with 99.99% combustion efficiency.

II. Applicability of NSPS EEEE

EPA has promulgated a variety of regulations for incinerators. NSPS Subpart EEEE applies to new incineration units that meet the definition of "very small municipal waste combustion units" and that are not otherwise excluded. 40 C.F.R. § 60.2885. A "municipal waste combustion unit" is defined as:

> any setting or equipment that combusts municipal solid waste (as defined in this subpart) including, but not limited to, field-erected, modular, cyclonic burn barrel, and custom-built incineration units (with or without energy recovery) operating with starved or excess air, boilers, furnaces, pyrolysis/combustion units, and air curtain incinerators (except those air curtain incinerators listed in § 60.2888(b))."

40 C.F.R. § 60.2977. "Municipal solid waste" (MSW), in turn, is defined as:

> refuse (and refuse-derived fuel) collected from the general public and from residential, commercial, institutional, and industrial sources consisting of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustible materials and non-combustible materials such as metal, glass and rock, provided that: (1) the term does not include industrial process wastes or medical wastes that are segregated from such other wastes; and (2) an incineration unit shall not be considered to be combusting municipal solid waste for purposes of this subpart if it combusts a fuel feed stream, 30 percent or less of the weight of which is

> comprised, in aggregate, of municipal solid waste, as determined by § 60.2887(b).

Id.

Finally, Subpart EEEE excludes "laboratory analysis units," which are defined as units that [burn] samples of materials only for the purpose of chemical or physical analysis." *Id.* § 60.2887(j).

The proposed project does not fall within the scope of Subpart EEEE, for reasons including: (1) the unit does not combust MSW;[3] and (2) the unit is an exempt "laboratory analysis unit."

A. The feedstock is not "municipal solid waste."

As discussed above, phase 1 of the project will use virgin plastic pellets as feedstock. These pellets are commercially available and sold on the market for a number of uses. They are not and cannot be considered to be "refuse" or "refuse-derived fuel" within the meaning of the definition of MSW because they have never been "discarded."

The same holds true for the second phase, which will use cleaned, recycled plastic pellets. In this phase, the material used as feedstock may have begun as a waste material (*i.e.*, it was discarded from any number of residential, commercial, industrial, or institutional sources) in some past iteration, but the cleaned, processed plastic pellets used as feedstock are considered a new product and are no longer waste. Indeed, EPA has determined and courts have held that this feedstock is not a waste[4] and these types of clean, recycled plastic pellets are commercially available from a number of sources and can be used to make a variety of products, including

---

[3] Please note that the catalytic chemical process does not "combust" any materials. While Subpart EEEE does refer to "pyrolysis" units, EPA's focus at the time was on "pyrolysis/combustion" units – *i.e.*, those that use direct application of heat alone to burn/destroy materials, not catalytic chemical units that rely on a catalyst to chemically break down a material into its component parts. *See* 70 Fed. Reg. 74870, 74876-66 (Dec. 16, 2005).

[4] *See* 76 Fed. Reg. 15456, 15537 ("Collected plastic is generally sent to a reclaimer, who will sort, grind, and clean the plastic. The cleaned and sorted plastic is sent to a manufacturer who will use it as feedstock. These are clear examples where discarded materials are processed into legitimate non-waste products."); *Cf. Alternate Fuels, Inc. v. Dir. of Illinois E.P.A.*, 215 Ill. 2d 219, 240 (2004), as modified on denial of reh'g (June 16, 2005) (holding that plastic pesticide containers that were cleaned, shredded into chips, and sold as fuel did not constitute "waste" because the material was a new product that had been returned to the economic stream of commerce).

plastic bottles, piping, decking, or textiles. *See*, *e.g.*, https://www.ptonline.com/products/mechanically-recycled-food-contact-hdpe-

We note that Subpart EEEE does apply to "refuse-derived fuel." *See* 40 C.F.R. §§ 60.2977. In this case, however, the pelletized plastic is not a "fuel" at all, because it is not being combusted (or otherwise used) for its heating or energy value.[5] Indeed, the heat required to activate the catalyst, generate steam for the process, and run the thermal oxidizer will be provided by electricity, using the existing electrical service at the Columbia site. In particular, the equipment identified in the permit application will be heated/cooled as follows:

1) Reactors and risers, heated by electric heater, with power provided and controlled by skid-mounted panel.
2) Reactor gas cyclone, heated by electric heater, with power provided and controlled by skid-mounted panel.
3) Reactor gas stabilization column, cooled by heat exchangers with circulating coolants, which are powered and controlled by skid-mounted electric chillers.
4) Electric flameless thermal oxidizer, heated by electric heater, with power provided and controlled by skid-mounted panel.
5) Spent catalyst stripper, heated by electric heater, with power provided and controlled by skid-mounted panel.
6) Spent catalyst regenerator, heated by electric heater, the power is provided and controlled by skid-mounted panel.
7) Steam generators, heated by electric heater, with power provided and controlled by skid-mounted panel.
8) Some associated hoppers, vessels/tanks, conveyance systems, and piping are heat traced by electric heaters, with power provided and controlled by on-skid panel.

Nor are other parts of the process where heat is used – *i.e.*, the thermal oxidizer and the catalyst regeneration unit – subject to Subpart EEEE.

---

[5] Refuse-derived fuel consists of mixed MSW subject to some basic level of shredding and sorting of non-combustibles. *See* "Energy Recovery from the Combustion of Municipal Solid Waste (MSW)," available at: https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw; *see also* 76 Fed. Reg. 15456, 15537 ("Another example is scrap tires retrieved from waste tire piles that have been shredded/chipped into [tire derived fuel (TDF)] with the wire removed. In this instance, the scrap tires have been sufficiently processed and thus, the TDF would not be considered a solid waste when burned as a fuel. On the other hand, scrap tires from waste tire piles that have been shredded/chipped without the metal wire removed, would not be considered to have been sufficiently processed, and any TDF that is generated in such a fashion would be considered a waste-derived fuel."). Due to the level of sorting, cleaning, and processing required to manufacture them, as well as the variety of their non-fuel uses, the plastic pellets that Grace intends to use are not refuse-derived fuel.

Thermal oxidizer. The pilot plant will use a thermal oxidizer to destroy the gas stream exiting the condenser. As discussed above, this gas stream would normally be considered a "product" (and not a "waste"). In this case, however, the unit is too small to produce the kind of volume necessary for commercial viability; accordingly, the pilot plant will use the thermal oxidizer to destroy the product after it has been analyzed by the gas chromatograph. These kinds of gases, however, are expressly excluded from the definition of MSW, because they are uncontained and segregated from any other waste streams.[6] As such, the thermal oxidizer is not subject to Subpart EEEE; instead, it is treated and permitted as an air pollution control device and will be subject to appropriate emissions limits and monitoring requirements under the permit.

Catalyst regeneration unit. The chemical reaction process leads to the development of coke, or a sooty layer, on the catalyst. Because an effective chemical reaction requires catalyst with a sufficient clean surface area, the catalyst must be treated in a regeneration unit, which uses heat and oxygen to oxidize the coke. The catalyst regeneration unit operates continuously while the process is running to ensure a sufficient supply of clean catalyst.

These types of regeneration processes are used across a variety of industries and are consistently regulated as part of the process, not as a waste management unit.[7] Indeed, if the catalyst could be used only once before being disposed of, this catalytic chemical process would be cost-prohibitive; the regeneration is necessary to make the process commercially viable.[8]

Moreover, the materials heated in the catalyst regeneration unit are not "municipal solid waste" for purposes of Subpart EEEE. Specifically, all such materials are by-products of the on-site industrial/R&D activities. They are not "collected from" multiple off-site sources, as is required if Subpart EEEE is to apply. *See* 40 C.F.R. § 60.2977 (MSW must be "collected from the general public *and* from residential, commercial, institutional, and industrial sources.") (emphasis added).

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[6] *See* 40 C.F.R. § 60.2977 (defining "municipal solid waste" to exclude "industrial process wastes . . . that are segregated from such other wastes," and limiting "solid waste" to "contained gaseous material resulting from industrial . . . activities"); *see also* 70 Fed. Reg. 74870, 74877 ("It is important to note, however, that [thermal oxidizers and flameless thermal oxidizers] often are used to combust uncontained gases (generally from industrial processes) and are not used to dispose of solid waste. Such units would not be subject to the final OSWI rules.").

[7] *See, e.g.*, 40 C.F.R. Part 60, Subpart J (regulating, among other things, fluid catalytic cracking unit catalyst regenerators at refineries); 40 C.F.R. Part 63, Subpart UUU (regulating process vents from catalyst regeneration and reforming processes at refineries).

[8] Once the catalyst is completely spent and can no longer be used effectively in the process, is it considered a "waste" and will be properly disposed of at a permitted waste management facility.

In sum, no part of the pilot plant will combust municipal solid waste as those terms are defined in Subpart EEEE, and therefore the unit is not subject to Subpart EEEE's requirements.

B. The pilot process is an exempt "laboratory analysis unit."

In addition to not processing any MSW, the unit also is exempt from Subpart EEEE as a "laboratory analysis unit." 40 C.F.R. § 60.2887(j). Subpart EEEE expressly excludes units that "[burn][9] samples of materials only for the purpose of chemical or physical analysis."

Grace's pilot project falls squarely within this provision. As discussed above, the sole purpose of the project is to allow Grace to gather and analyze data on the products generated by the proposed catalytic chemical process. In particular, the site intends to weigh the products and evaluate them in a gas chromatograph to assess the composition of the products and the yield and quantity of each potentially useful material.

The unit in question is *not* designed to produce any gases or liquids for sale; indeed, the quantity of material that the unit is capable of processing (1 kg/hr) is so small that attempting to use the unit to manufacture a product for sale would not be commercially viable. Grace will thus receive no immediate economic benefit from this operation; indeed, it will be incurring costs to purchase feedstocks, provide power, and operate the process, without the benefit of generating any revenue. In sum, this pilot project would never be commercially viable as proposed. Accordingly, the pilot project qualifies as a "laboratory analysis unit" that is exempt from regulation under Subpart EEEE.

III. Conclusion

We appreciate the opportunity to address MDE's questions regarding the appropriate regulations to apply to this proposed project, and we hope we have addressed the concerns you raised. We believe that this new process technology will provide a more environmentally beneficial method of managing and re-using plastic wastes, producing more valuable products with lower environmental impacts. But we need to complete this project and conduct the planned testing to determine whether the process can work as efficiently and cost-effectively as we believe it will – and, indeed, to assess whether this process will be at all commercially viable.

[9] As noted above, the process in question does not in fact "burn" anything; rather, it uses a catalytic chemical reaction to break plastic molecules into their individual components.

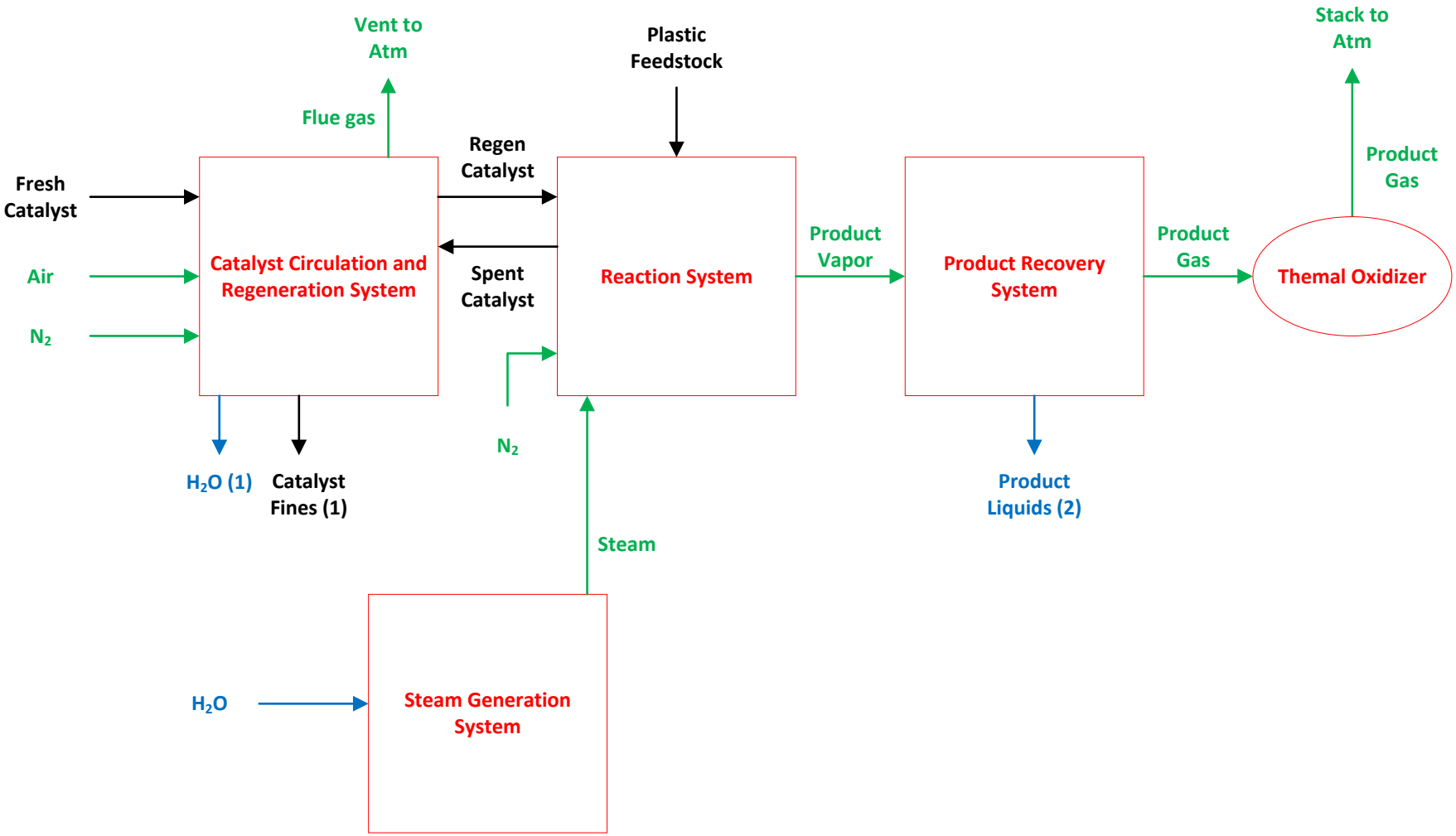
Thank you for your assistance in ensuring that this project is properly permitted, and please let us know if you have any additional questions or need additional information.

Sincerely,

Ms. Apple Chapman
Assistant General Counsel
Regulatory & EHS

Attachment

Simplified Process Flow Diagram for Proposed Research Pilot Scale Test Catalytic Chemical Conversion Process



Notes:
(1) Non-hazardous waste disposal
(2) Transfer to 3rd party treatment facility