

Crown Cork & Seal USA, Inc.
770 Township Line Road
Yardley, PA 19067
tel: 215- 698-5100



September 24, 2020

Ms. Jennifer DeMay P.E.
Engineering Supervisor
ORCAA
2940 Limited Way
Olympia, WA98502

RE: 20NOC1451 Data Request

Dear Ms. DeMay

Enclosed is our response to the agency questions on Crown's NOC application 20NOC1451 for the installation of a 3rd beverage can production line at our Olympia, WA facility.

An electronic copied as also emailed to your attention. If there are any additional questions or needed information please contact me at 267-226- or Mike Herron at 609-334-5524.

Sincerely,

Michael A. Antry
Vice President
Environment, Health & Safety

Encl.

Cc:file

NOC Application # 20NOC1451

Addendum #1

Crown Cork & Seal

September 22,200

Michael A. Antry

Information needed to complete NOC Application – 20NOC1451

Questions from ORCA

1. Technical descriptions – a summary page of all can making equipment along with technical specification form our vendors is attached to this submittal.
2. Respray – Line 3 will be equipped with a respray function to touch up potential defect cans.

The Respray/Supersorter acts similarly to a depalletizer directly into the LSM section.

This allows cans which have a minor defect on interior spray to be given a second spray and eliminate potential metal exposure issues.

When the super sorter is in use it operates in place of the full line using some Line 3 LSM equipment to accomplish this task.

The super sorter will operate in place of full line speeds at lower cans per minute and equal to lower lacquer application rates depending on the extent of the potential defect. The super sorter when in use will reduce line capacity and overall emission rates from the full Line 3 maximum production schedule listed. Ideally the super sorter will be used infrequently on an extremely limited basis.

All emitting equipment is previously included in the line 3 line layout, respray when needed will occur on Line 3 equipment in place of full production speeds.

3. All line #3 production equipment will be dedicated to the production of cans on line #3. In reviewing this it was determined the that actual maximum production capacity is 3000 cans/min for line 3. This is limited by the can washer and the Internal bake oven. Emission calculations will be revised and including in the amended permit application.
4. The only changes proposed for lines 1 & 2 are the replacement of the 2 internal bake ovens and the pin oven on line 2. The bodymakers will remain the bottleneck for these lines and there is no increase in production.
5. Phenol is no longer in use at the facility, it was present in on inside spray coating that is now obsolete. The revised calculations that will be included in the amended permit application will now include emissions of Ethylene Glycol Monohexyl Ether.
6. Emission test report for our beverage can facility in Batesville, Mississippi is included beginning on page _____. Capture efficiency during this testing average 77%.
7. The existing waste water treatment facility will be completely removed during this project. A full description of the new treatment system will be included in the amended permit application, there ae no emissions to air associated with this process.

September 25, 2020

Delivery by FedEx

Jennifer DeMay
Olympic Region Clean Air Agency
2940 Limited Lane
Olympia, Washington 98502

Re: Notice of Construction Application (20NOC1451) – Response to Data Request and Addendum
Crown Cork & Seal Company, Inc.
Olympia, Washington

Ms. DeMay:

Enclosed are responses to two of ORCAA's information requests on the Crown Cork and Seal Company, Inc. (Crown) Notice of Construction (NOC) application to modify the existing two production lines (Lines 1 and 2) and construct a third production line (Line 3) at the metal beverage can manufacturing facility located in Olympia, Washington. Crown has also confirmed that the Line 3 capacity will be 3,000 cans per minute (cpm), an increase from the 2,800 cpm capacity listed in the original NOC application. Detailed information on the two information request items and the updated Line 3 throughput rate are described below.

Information Request Item 5 – Phenol and ethylene glycol monohexyl ether (EGHE) from inside spray lacquers.

The proposed inside spray coatings that would be applied on Line 3 do not include either Lacquer 2012825 or Lacquer 2012823, which are the only two inside spray coatings approved for Line 1 and Line 2 that include phenol. The NOC application inadvertently stated the glycol ether compound in the inside spray as diethylene glycol butyl ether (DGBE) instead of ethylene glycol monohexyl ether (EGHE). Ramboll has updated the emission calculations to correctly reference glycol ether emissions from the Line 3 inside spray operation as EGHE, which is not considered a toxic air pollutant (TAP) in WAC 173-460, but is included as part of the updated hazardous air pollutant (HAP) emission summary.

The emission calculations from overvarnish were also revised to remove DGBE emissions because none of the overvarnish coatings include DGBE or any other glycol ether compounds. Ramboll has enclosed an updated emission inventory summary as part of the updated NOC application discussed further below, and Ramboll will provide ORCAA with an electronic spreadsheet of calculations.

Information Request Item 7 – Wastewater treatment plant changes

Enclosed is a summary and Piping and Instrumentation Diagram (P&ID) of the planned changes to the wastewater pretreatment system. In general, the treatment system will remain a

chemical/physical process, with no aeration processes, liquid reagents, and will not see pollutant or reagent concentrations high enough to exert more than negligible partial pressures. Accordingly, the wastewater treatment process continues to have trivial emissions.

Updated Line 3 Capacity

Crown has confirmed the Line 3 capacity as 3,000 cpm. Ramboll has updated sections of the enclosed NOC application, including:

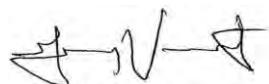
- References to Line 3 throughput capacity were revised from 2,800 cpm to 3,000 cpm;
- Emissions from Line 3 emission units were updated to reflect the slightly higher throughput capacity and glycol ether emissions from inside spray and overvarnish coatings were corrected (in response to Information Request Item 5); and
- The air quality impact analysis for sulfuric acid emissions from the Line 3 washer was updated to reflect the higher Line 3 throughput capacity and an increase to the Line 3 washer stack.

No additional TAPs require further review as a result of updating the Line 3 throughput capacity and emission calculations, and model-predicted sulfuric acid concentrations are less than TAP screening thresholds. An updated NOC application addendum in PDF will be provided to ORCAA by email.

Crown will provide responses to the remaining five information requests under separate submittal to ORCAA.

Please do not hesitate to contact me at 314.590.2958, if you have any questions about the responses to your information requests.

Sincerely,



Greg Verret, PE
Principal

cc: Mike Antry, Crown Cork and Seal Company
Mike Herron, Crown Cork and Seal Company

Proposed Treatment System:**Overview:**

Crown Cork and Seal will install a new wastewater pretreatment plant, including but not limited to: a larger EQ tank, auxiliary tanks, chemical makeup system, chemical dosing, and a filter press. The wastewater pretreatment system currently at the location will be decommissioned and scrapped when the new pretreatment plant starts up.

The new wastewater pretreatment plant will have two treatment trains with each wastewater treatment train will have duty/standby EQ pumps capable of pumping 60 GPM to the oil coalescing separator. From the oil coalescing separator, the system is gravity fed as follows: first reaction tank with 3 chambers, clarifier, second reaction tank with 3 chambers, clarifier, neutralization tank, clarifier, and combined sample tank for both treatment trains.

Wastewater Treatment Process:

Wastewater from the equalization tank is pumped to the oil coalescing separators for the separation of water and free oil. Between the EQ pumps and oil coalescing separators, there is an addition of sulfuric acid dosing and static mixing to bring the pH down to a 2.0- 2.5 range to help separate emulsified oils. It then flows via gravity to the first treatment tank. In the first compartment of the main treatment tank (called coagulation), cationic polymer and PAC are added. Mixing takes place to reduce the pH, facilitate the removal of emulsified oils by the acid and polymer, and begin coagulation of particles to be removed from the wastewater.

The wastewater then flows into the second compartment of the main treatment tank (called the neutralization stage). Magnesium chloride and NaOH are added for oil removal and to raise up the pH to prepare for flocculation.

The third compartment of the main treatment tank (called flocculation) introduces anionic polymer. In the flocculation tank an anionic polymer is metered in and the wastewater undergoes a slow mixing process to develop the size of the floc. There are pH control monitors in each of the first two treatment stages to allow the operator to determine if the pH in each stage is within acceptable parameters.

Solids are separated out of the wastewater stream using a low profile clarifier. The clarifier removes suspended solids from the waste stream using baffles and inclined plates. The water then flows through a weir from the clarifier going to a 3-stage secondary treatment for additional treatment.

Stage 1 of the secondary treatment introduces magnesium chloride to bind with any free oil still in the stream. Stage 2 meters in an acid to adjust the pH to an acceptable range for flocculation. In stage 3, anionic polymer (floc) is added to promote bonding and create a bigger floc for better settling.

After the secondary treatment, the solids are separated out of the wastewater stream using a low profile clarifier.

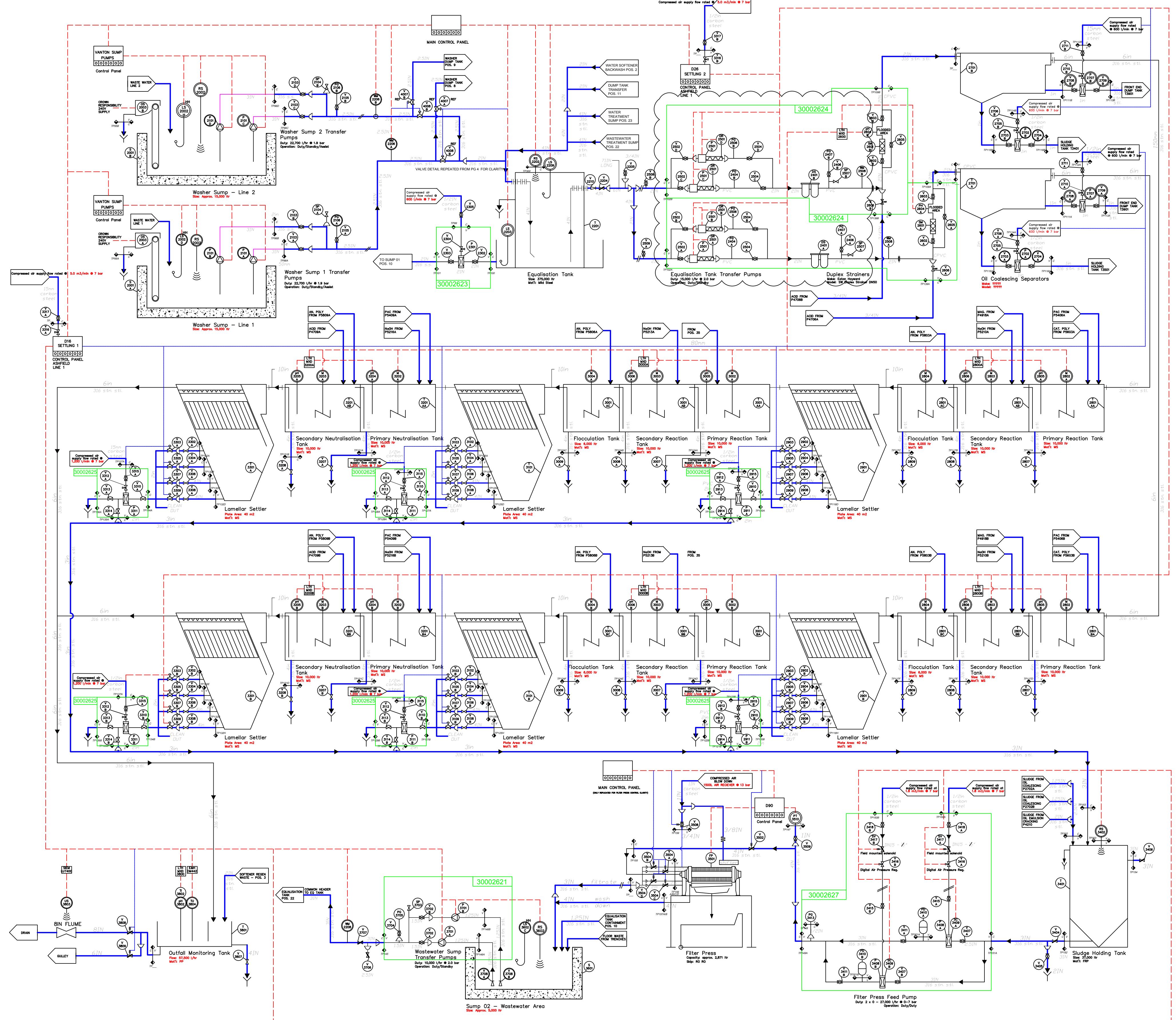
Description of Current and Proposed Treatment System

The wastewater then flows into a pH correction tank with 2 stages. The first stage is called the neutralization stage. This is where the pH is adjusted to approximately 8 to 9 or an acceptable discharge limit by a caustic soda (sodium hydroxide) solution. A pH controller is used to control the metering of the caustic soda solution. The second stage is the acidification stage, which adds sulfuric acid to make sure the pH is at an acceptable discharge level. The wastewater is then passed through a low profile clarifier for removal of solids.

The effluent water from the clarifier then enters the final tank (the sample tank) which combines with the train B wastewater treatment system. The sample tank is where the sampling and final monitoring will take place before the effluent is pumped to the outfall. Discharge flow is monitored after the discharge pumps.

Sludge Dewatering:

Wet sludge is collected from all of the low profile clarifiers and transferred to a sludge holding tank. The wet sludge is transferred to the hydraulically-closed filter press via the air-operated filter press feed pump. This pump is furnished with a filter feed, which serves as a surge suppressor on the discharge line to permit a steady and uniformly-pressurized flow to the filter plates. The filter feed pumps are controlled directly from the filter press HMI or main HMI in the area.



PIPING STANDARDS FOR NORTH AMERICAN PLANTS
CROWN'S GLOBAL PIPING UNITS STANDARD IS THE USE OF THE METRIC SYSTEM. FOR NORTH AMERICAN PLANT PROJECTS THE PIPING STANDARD IS TO USE IMPERIAL UNITS AND FOLLOW THE EQUIVALENT PIPE SIZE CONVERSION CHART HERE ALONG WITH ANSI TYPE PIPE FLANGES.

PIPING — METRIC TO IMPERIAL EQUIVALENTS	
6mm	1/4"
10mm	5/16"
15mm	1/2"
20mm	3/4"
25mm	1"
32mm	1 1/4"
40mm	1 1/2"
45mm	1 3/4"
65mm	2 1/2"
80mm	3"
100mm	4"
125mm	5"
150mm	6"
200mm	8"
250mm	10"
300mm	12"

LEGEND
 — PIPING TO BE SUPPLIED BY PIPING CONTRACTOR FROM DESIGNATED TIE-IN POINTS NOTED ON DRAWING
 — PIPING SUPPLIED WITH EQUIPMENT SKID
 — PIPING SUPPLIED WITH EQUIPMENT SKID
 — PNEUMATIC POLY. TUBING
 - - - ELECTRICAL/DIGITAL WIRING BETWEEN EQUIPMENT AND CONTROL PANEL
 ♦ PIPING TIE-IN CONNECTION POINT.
 "C" DESIGNATES PIPING TO BE BY PIPING CONTRACTOR
 "V" DESIGNATES PIPING SUPPLIED BY EQUIPMENT VENDOR

Crown Cork & Seal Company, Inc.
770 Township Line Road
Yardley, PA 19067
tel: 215- 698-5100



December 1, 2020
Ms. Jennifer DeMay P.E.
Engineering Supervisor
ORCAA
2940 Limited Way
Olympia, WA 98502

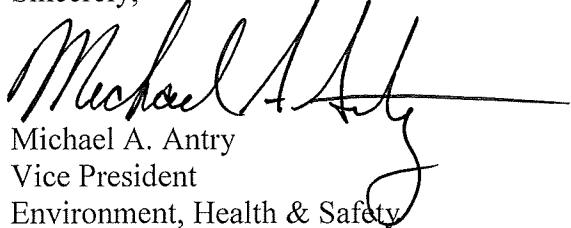
RE: 20NOC1451 Data Request #2

Dear Ms. DeMay:

Enclosed is our response to the agency's questions concerning Crown's NOC application 20NOC1451 for the installation of a 3rd beverage can production line at our Olympia, WA facility.

An electronic copy was also emailed to your attention. If there are any additional questions please contact Mike Herron at 609-334-5524 or me at 267226-9229.

Sincerely,


Michael A. Antry
Vice President
Environment, Health & Safety

NOC Application # 20NOC1451

Crown Cork & Seal

December 1, 2020

Michael A. Antry

Information needed to complete NOC Application – 20NOC1451

Questions from ORCA

1. Can forming-
 - a. The can forming processes of cupping and necking will not generate mists during their operations. The new bodymakers (drawn and iron) are completely enclosed machines. As such, any mists that may be generated during these processes are contained.
 - b. There are no TAPs contained in any of the materials referenced here – Form B is attached. The coolant we will use has changed since the original application; DTI-350 will be replaced with FM-540B. The information on Form B is for the new material.
 - c. Local ventilation is provided in this area and vented to the atmosphere, TAPs and Particulate Matter are not expected in this exhaust.
2. Can washer solutions
 - a. There are no TAPs contained in any of the materials referenced here – Form B is attached. The mobility enhancer we will use has changed since the original application; ME-50 will be replaced with M-PT 115. The information on Form B is for the new material.
3. The application contains an oversight – the current washer chemical in use will also be used on line #3.
4. We do not have any copies of tests at this or other Crown facilities. We were under the impression that the rate we were using was from a Crown location; upon further investigation it was determined it was from an industry test.
5. While you are correct that with two decorators we could operate the line with one during label change overs, there are many other issues that present us with downtime over the year – lacquer spray machine cleaning, clearing jams from the bodymaker, etc. The one major difference between the new line and the existing lines is that the new line will be capable of making several different size cans. During size conversions no cans are produced on the line. We expect 90% annual efficiency to be higher than what we will actually achieve.
6. Can washer usage - The intent for usage at 100,000 gallons was to accommodate for washer up time usage, not necessarily cans produced emissions. Both washers will be up for a comparable timeframe. In the past the plant typically had one washer running, leading to the annual usage rates (50,000 gallons). The intent was not to claim a higher application rate per can. The new washer is rated at 3000 cpm. The old washer had a

5000 cpm capacity limited by bodymakers at 3960. An annual usage rate using a comparable ratio is adequate:

$$50,000 \text{ gallons} / 3960 \text{ cpm} = 12.62$$

$$12.62 \times 3000 \text{ cpm} = 37,879 \text{ Gallons} + 50,000 \text{ gallons} = 87,879 \text{ gallons annually site wide}$$

7. Changes to 16MOD1178

High concentration sulfuric acid is not regularly used in the washer--only in the event of supply chain disruption. We can leave the existing 5000 gallons per 12/months as listed in 16MOD1178 or remove if necessary, but would prefer to leave as is, no increase. We can address any future changes to chemistry as they arise.

FORM 5B
NO TOXIC AIR POLLUTANTS
IN PROPRIETARY INGREDIENTS

This form must be completed for any material used in your proposed operation that includes proprietary ingredients not identified in Safety Data Sheets (SDS) or other literature used to characterize air emissions from your proposed operations. By completing and signing this form you certify that the proprietary portions of the materials listed on the form do not contain any Toxic Air Pollutants (TAP). This information is necessary to meet the criteria for approval under Washington's requirements for new stationary sources of TAP (Chapter 173-460 WAC: CONTROLS FOR NEW SOURCES OF TOXIC AIR POLLUTANTS). All fields must be completed for materials listed with proprietary ingredients.

1. Facility/Source Name: Crown Cork & Seal Company USA Inc
2. Company Name (if different): _____
3. Facility Address: 1202 Fones Rd Olympia Washington 98501
4. Mailing Address: _____

5. Materials Proposed with proprietary ingredients:

Product Name and Identification #	Manufacturer	Description ¹	Proprietary Content ² (% by wt or vol.)	TAP in Proprietary Content? ³ (yes/no)
SNL-3	Henkel	Copper Lube	1-10	No
L-FM 540B	Henkel	Coolant	21-45	No
M-PT 115	Henkel	Mobility aid	1-5	No

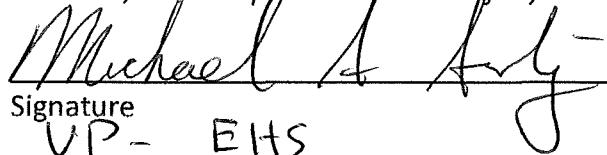
¹. For "Description," describe the general use category of the product with proprietary ingredients. Examples include, but are not limited to: solvent, catalyst, autobody paint, marine bottom paint, epoxy resin.

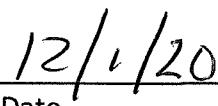
². List the percent by weight or volume of the proprietary content claimed of the material used.

³. Disclose whether the proprietary content of the material used contains any TAP listed in WAC 173-460-150 (list attached to this form) by a "yes" or "no".

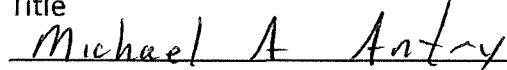
Certification:

By my signature below, I certify that all information and statements in this form are true, accurate, and complete to the best of my knowledge.


Signature
VP - EHS


Date

Title



Printed Name



Revision Number: 002.4

Issue date: 05/09/2019

1. PRODUCT AND COMPANY IDENTIFICATION

Product name:	BONDERITE L-FM 540B ACHESON	IDH number:	2170462
Product type/use:	Lubricant	Region:	United States
Restriction of Use:	None identified	Contact information:	
Company address:		Telephone:	+1 (860) 571-5100
Henkel Corporation One Henkel Way Rocky Hill, Connecticut 06067		MEDICAL EMERGENCY Phone:	Poison Control Center 1-877-671-4608 (toll free) or 1-303-592-1711
		TRANSPORT EMERGENCY Phone:	CHEMTREC 1-800-424-9300 (toll free) or 1-703-527-3887
		Internet:	www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER:	CAUSES SKIN IRRITATION. MAY CAUSE AN ALLERGIC SKIN REACTION. CAUSES SERIOUS EYE DAMAGE. MAY CAUSE DAMAGE TO ORGANS THROUGH PROLONGED OR REPEATED EXPOSURE.
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HAZARD CLASS	HAZARD CATEGORY
SKIN IRRITATION	2
SERIOUS EYE DAMAGE	1
SKIN SENSITIZATION	1
SPECIFIC TARGET ORGAN TOXICITY - REPEATED EXPOSURE	2

PICTOGRAM(S)



Precautionary Statements

Prevention:	Do not breathe vapors, mist, or spray. Wash affected area thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves, eye protection, and face protection.
Response:	IF ON SKIN: Wash with plenty of water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if you feel unwell. If skin irritation or rash occurs: Get medical attention. Take off contaminated clothing.
Storage:	Not prescribed
Disposal:	Dispose of contents and/or container according to Federal, State/Provincial and local governmental regulations.

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Component(s)	CAS Number	Percentage*
Alkyl ethanolamine	Proprietary	5 - 10
Amine soap	Proprietary	5 - 10
Surfactant	Proprietary	5 - 10
Amine salt	Proprietary	5 - 10
Tris(2-hydroxyethyl)hexahydro triazine	4719-04-4	1 - 5
Polyglycol oleate	Proprietary	1 - 5
Sodium EDTA	64-02-8	1 - 5
N,N'-Methylenebismorpholine	5625-90-1	1 - 5

* Exact percentages may vary or are trade secret. Concentration range is provided to assist users in providing appropriate protections.

4. FIRST AID MEASURES

- Inhalation:** If symptoms are experienced, remove source of contamination or move victim to fresh air. If symptoms develop and persist, get medical attention.
- Skin contact:** For skin contact, flush with large amounts of water. Seek immediate medical attention.
- Eye contact:** Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Seek medical attention at once.
- Ingestion:** Get medical attention. DO NOT induce vomiting unless directed to do so by medical personnel.
- Symptoms:** See Section 11.

5. FIRE FIGHTING MEASURES

- Extinguishing media:** Use media appropriate for surrounding material.
- Special firefighting procedures:** Wear full protective clothing. Wear self-contained breathing apparatus.
- Unusual fire or explosion hazards:** This product is an aqueous mixture which will not burn.
- Hazardous combustion products:** Irritating and toxic gases or fumes may be released during a fire.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

- Environmental precautions:** Prevent further leakage or spillage if safe to do so. Wear appropriate personal protective equipment.
- Clean-up methods:** Absorb spill with inert material. Shovel material into appropriate container for disposal. Dispose of according to Federal, State and local governmental regulations.

7. HANDLING AND STORAGE

Handling:

Avoid contact with eyes, skin and clothing. Avoid breathing vapors or mists of this product. Provide adequate ventilation. Wash thoroughly after handling. Do not take internally. Do not mix this product with fluids which contain NITRITES/NITRATES. NITROSAMINE may be formed.

Storage:

Not available.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous Component(s)	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Alkyl ethanolamine	None	None	None	None
Amine soap	None	None	None	None
Surfactant	None	None	None	None
Amine salt	None	None	None	None
Tris(2-hydroxyethyl)hexahydro triazine	None	None	None	None
Polyglycol oleate	None	None	None	None
Sodium EDTA	None	None	None	None
N,N'-Methylenebismorpholine	None	None	None	None

Engineering controls:

Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.

Respiratory protection:

If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.

Eye/face protection:

Wear safety glasses; chemical goggles (if splashing is possible).

Skin protection:

Chemical resistant, impermeable gloves. Gloves should be tested to determine suitability for prolonged contact. Use of impervious apron and boots are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Color:	Amber
Odor:	Amine
Odor threshold:	Not available.
pH:	10 - 10.5
Vapor pressure:	Not determined
Boiling point/range:	> 100 °C (> 212°F)calculated
Melting point/ range:	Not determined
Specific gravity:	1.0 - 1.1
Vapor density:	Not applicable
Flash point:	Not determined
Flammable/Explosive limits - lower:	Not available.
Flammable/Explosive limits - upper:	Not available.
Autoignition temperature:	Not determined
Flammability:	Not applicable
Evaporation rate:	Not applicable
Solubility in water:	Complete
Partition coefficient (n-octanol/water):	Not determined
VOC content:	Not determined
Viscosity:	50 - 100 mPa.s
Decomposition temperature:	Not available.

10. STABILITY AND REACTIVITY

Stability:	Stable at normal conditions.
Hazardous reactions:	None under normal processing.
Hazardous decomposition products:	Upon decomposition, this product may yield oxides of nitrogen and ammonia, carbon dioxide, carbon monoxide and other low molecular weight hydrocarbons.
Incompatible materials:	Do not mix with nitrates.
Reactivity:	This product may react with strong acids or oxidizing agents.
Conditions to avoid:	Store away from incompatible materials.

11. TOXICOLOGICAL INFORMATION

Relevant routes of exposure: Skin, Inhalation, Eyes, Ingestion

Potential Health Effects/Symptoms

Inhalation:	Inhalation of vapors or mists of the product may be irritating to the respiratory system.
Skin contact:	Causes skin irritation. May cause allergic skin reaction.
Eye contact:	Causes serious eye damage.
Ingestion:	Ingestion of this product is unlikely. However, ingestion of product may produce gastrointestinal irritation and disturbances.

Hazardous Component(s)	LD50s and LC50s	Immediate and Delayed Health Effects
Alkyl ethanolamine	None	Allergen, Irritant
Amine soap	None	Irritant, Corrosive, Skin, Allergen, Liver, Kidney, Lung, Nervous System
Surfactant	None	No Records
Amine salt	None	Irritant, Corrosive, Skin, Allergen, Liver, Kidney, Lung, Nervous System
Tris(2-hydroxyethyl)hexahydro triazine	None	Irritant, Allergen
Polyglycol oleate	None	Irritant
Sodium EDTA	Oral LD50 (Rat) = > 2,000 mg/kg	Irritant
N,N'-Methylenebis(morpholine	None	Allergen, Irritant

Hazardous Component(s)	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Alkyl ethanolamine	No	No	No
Amine soap	No	No	No
Surfactant	No	No	No
Amine salt	No	No	No
Tris(2-hydroxyethyl)hexahydro triazine	No	No	No
Polyglycol oleate	No	No	No
Sodium EDTA	No	No	No
N,N'-Methylenebis(morpholine	No	No	No

12. ECOLOGICAL INFORMATION

Ecological information:

Do not empty into drains / surface water / ground water.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal. This product contains a chelating agent.

Hazardous waste number: Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name:	Not regulated
Hazard class or division:	None
Identification number:	None
Packing group:	None

International Air Transportation (ICAO/IATA)

Proper shipping name:	Not regulated
Hazard class or division:	None
Identification number:	None
Packing group:	None

Water Transportation (IMO/IMDG)

Proper shipping name:	Not regulated
Hazard class or division:	None
Identification number:	None
Packing group:	None

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act inventory.

TSCA 12 (b) Export Notification: None above reporting de minimis

CERCLA/SARA Section 302 EHS: None above reporting de minimis.
CERCLA/SARA Section 311/312: Immediate Health, Delayed Health
CERCLA/SARA Section 313: None above reporting de minimis.

California Proposition 65: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. This product contains a chemical known in the State of California to cause cancer.

Additional Regulatory Information: This product is controlled for export by the United States Department of Commerce. The Export Classification Control Number (ECCN) is 1C995.a.2.a

Canada Regulatory Information

CEPA DSL/NDSL Status: One or more components are not listed on, and are not exempt from listing on either the Domestic Substances List or the Non-Domestic Substances List.

16. OTHER INFORMATION

This safety data sheet contains changes from the previous version in sections: New Material Safety Data Sheet format.

Prepared by: Regulatory Affairs

Issue date: 05/09/2019

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Revision Number: 002.3

Issue date: 07/11/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: BONDERITE M-PT 115 MOBILITY ENHANCER known as DEOXYLYTE 115
IDH number: 1019345

Product type: Post rinse additive
Restriction of Use: None identified
Company address: Henkel Corporation
 32100 Stephenson Highway
 Madison Heights, MI 48071

Region: United States
Contact information:
 Telephone: 248.583.9300
 MEDICAL EMERGENCY Phone: Poison Control Center
 1-877-671-4608 (toll free) or 1-303-592-1711
 TRANSPORT EMERGENCY Phone: CHEMTREC
 1-800-424-9300 (toll free) or 1-703-527-3887
 Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
 NOT CLASSIFIED. READ ENTIRE SAFETY DATA SHEET.

HAZARD CLASS	HAZARD CATEGORY
None	None

PICTOGRAM(S)
None

Precautionary Statements

Prevention: Not prescribed
Response: Not prescribed
Storage: Not prescribed
Disposal: Not prescribed

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Component(s)	CAS Number	Percentage*
4-Nonylphenol, branched	Proprietary	1 - 5

* Exact percentage is a trade secret. Concentration range is provided to assist users in providing appropriate protections.

4. FIRST AID MEASURES

Inhalation:	If mist or vapor of this product is inhaled, remove person immediately to fresh air. Seek medical attention if symptoms develop or persist.
Skin contact:	For skin contact flush with large amounts of water. Obtain medical attention if irritation persists.
Eye contact:	In case of contact with the eyes, rinse immediately with plenty of water for 15 minutes, and seek immediate medical attention.
Ingestion:	Get immediate medical attention. Do not induce vomiting. Give one to two glasses of water or milk. Never give anything by mouth to a victim who is unconscious or is having convulsions.
Symptoms:	See Section 11.

5. FIRE FIGHTING MEASURES

Extinguishing media:	Use media appropriate for surrounding material.
Special firefighting procedures:	Wear full protective clothing. Wear self-contained breathing apparatus.
Unusual fire or explosion hazards:	This product is an aqueous mixture which will not burn.
Hazardous combustion products:	Not available.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions:	Contain spill. Prevent further leakage or spillage if safe to do so. Wear appropriate protective equipment and clothing during clean-up.
Clean-up methods:	Collect spilled material with an inert absorbent such as sand or vermiculite. Place in properly labeled closed container. Flush area with water to remove trace residue.

7. HANDLING AND STORAGE

Handling:	Avoid contact with eyes, skin and clothing. Avoid breathing vapors or mists of this product. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.
Storage:	For safe storage, store at or below 48.9 °C (120°F) Keep in a cool, well ventilated area. Thaw and mix thoroughly if frozen.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous Component(s)	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
4-Nonylphenol, branched	None	None	None	None

Engineering controls:	Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.
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Respiratory protection:	If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.
Eye/face protection:	Wear chemical goggles; face shield (if splashing is possible).
Skin protection:	Wear impervious gloves for prolonged contact. Use of impervious apron and boots are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Color:	Light amber
Odor:	Mild
Odor threshold:	Not available.
pH:	3.4 - 3.8
Vapor pressure:	Not determined
Boiling point/range:	> 100 °C (> 212°F) calculated
Melting point/ range:	0 °C (32°F) calculated
Specific gravity:	1.00 - 1.02 at 16 °C (60.8 °F)
Vapor density:	Not determined
Flash point:	> 100.00 °C (> 212°F)
Flashback:	Not applicable
Flame projection:	Not applicable
Flammable/Explosive limits - lower:	Not available.
Flammable/Explosive limits - upper:	Not available.
Autoignition temperature:	Not determined
Evaporation rate:	Not applicable
Solubility in water:	Complete
Partition coefficient (n-octanol/water):	Not available.
VOC content:	< 5 % (calculated)
Viscosity:	Not available.
Decomposition temperature:	Not available.

10. STABILITY AND REACTIVITY

Stability:	Stable at normal conditions.
Hazardous reactions:	Will not occur.
Hazardous decomposition products:	Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
Incompatible materials:	This product may react with strong acids, bases and oxidizing agents.
Reactivity:	Not available.
Conditions to avoid:	No data available.

11. TOXICOLOGICAL INFORMATION

Relevant routes of exposure: Skin, Inhalation, Eyes

Potential Health Effects/Symptoms

Inhalation: This product is irritating to the respiratory system.
Skin contact: No skin irritation can be expected from single short-term exposure to this product. Prolonged or repeated contact may produce some irritation.
Eye contact: Liquid is mildly irritating to eyes. Vapors may also produce eye irritation.
Ingestion: Acute ingestion may result in mild gastrointestinal distress.

Hazardous Component(s)	LD50s and LC50s	Immediate and Delayed Health Effects	
4-Nonylphenol, branched	None	No Target Organs	

Hazardous Component(s)	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
4-Nonylphenol, branched	No	No	No

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Dispose of according to Federal, State and local governmental regulations.

Hazardous waste number: Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

International Air Transportation (ICAO/IATA)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

Water Transportation (IMO/IMDG)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12 (b) Export Notification: None above reporting de minimis
CERCLA/SARA Section 302 EHS: None above reporting de minimis
CERCLA/SARA Section 311/312: Immediate Health

CERCLA/SARA Section 313: None above reporting de minimis

California Proposition 65: This product contains a chemical known in the State of California to cause cancer.

Canada Regulatory Information

CEPA DSL/NDSL Status: All components are listed on or are exempt from listing on the Canadian Domestic Substances List.

16. OTHER INFORMATION

This safety data sheet contains changes from the previous version in sections: Updated composition in Section 3.

Prepared by: John DiCerbo, Sr. Regulatory Affairs Specialist

Issue date: 07/11/2014

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NOC Application # 20NOC1451

Crown Cork & Seal

January 12, 2021

Michael A. Antry

Information needed to complete NOC Application – 20NOC1451

Questions from ORCA

1. A Mist control system will be installed in the bodymaker area. The oil mist unit installed to filter the vacuum which is generated by a central fan for the interconnecting conveyor that transfers cans from the bodymaker to the trimmer

The oil mist unit for Olympia is supplied by Delta Neu (UK)

2. The washer will utilize Sulphuric Acid and Bonderite C-IC, The SDS for these materials are attached – pages 8-19.

Hot Water Heaters

3. The two existing hot water heaters will be removed from the plant and the new hot water heaters will be used as follows:
 - One for the washer that is for lines 1 & 2
 - One for the washer in line #3 and the coolant filter
 - One stand-by

The three units are combined and sequenced so they will cycle as needed.

BACT

4. BACT IBO – PIN

BACT is required for modified emission units, where a physical change or a change in the method of operation increases the amount of any air contaminant emitted by the emission unit. For beverage can coating, EPA has determined that an emission unit is the entire coating operation based on the definition of an affected facility in 40 CFR 60 Subpart WW (exterior base coating operations, overvarnish coating operations, and inside spray coating operations).¹ Each coating operation emission unit is composed of the combination of a coating application, a flashoff area, and a curing oven.

Crown's proposed replacement of the natural gas-fired Line 2 pin oven (2.59 MMBtu/hr) and the replacement of the Line 1 and Line 2 natural gas-fired IBOs (3.93 MMBtu/hr each) was evaluated to determine if a modification of the Line 1 inside spray coating emission unit and the Line 2 overvarnish and inside spray coating emission unit had occurred. Crown's evaluation concludes that the proposed oven replacements would not increase either coating or combustion emissions, thus the project would not be classified as a modification and would not trigger BACT. Crown does not propose to increase the Line 1 and Line 2 production rates or make any physical changes to the

¹ EPA Letter for Coors Container on February 6, 1990 - <https://www.epa.gov/sites/production/files/2015-07/documents/coors.pdf>

existing decorators and LSMs. Therefore, the changes will not increase VOC or TAP emission from the overvarnish or inside spray coating operation on Lines 1 and 2. Moreover, there will be a decrease in combustion emissions because the replacement ovens are more efficient, combusting less natural gas, and emit less NO_x compared to the existing ovens:

- Line 1 IBO (current oven rating = 5.0 MMBtu/hr; replacement oven rating = 3.93 MMBtu/hr total);
- Line 2 IBO (current oven rating = 5.0 MMBtu/hr; replacement oven rating = 3.93 MMBtu/hr total); and
- Line 2 Pin Oven (current oven rating = 3.0 MMBtu/hr; replacement oven rating = 2.59 MMBtu/hr total).

A summary of the change in potential uncontrolled emissions for the Line 1 and Line 2 coating operations is presented in the table below. The proposed changes will decrease NO_x, CO, and PM₁₀/PM_{2.5} emissions from the coating lines and there will be no increase in VOC or TAP emissions as a result of the proposed changes.

Because the Line 1 and Line 2 coating operation emission units are not being modified as a result of the proposed project (no emission increases), BACT does not apply to the replacement ovens. More importantly, Crown is voluntarily proposing a significant decreases in VOC and TAP emissions from Line 1 and Line 2 coating operations by controlling Line 1 and Line 2 pin oven emissions, LSM emissions, and IBO emissions with the new RTO after the RTO becomes operational.

Emission Unit	NOx ¹	CO ¹	PM ₁₀ /PM _{2.5} ¹	VOC	EGBE	PGME	EGHE
	Ib/hr	tpy	Ib/hr	tpy	Ib/hr	tpy	Ib/hr
Line 2 Overvarnish Coating Operation - existing	0.29	1.28	0.25	1.08	0.022	0.1	6.4
Line 2 Overvarnish Coating Operation - Pin Oven Change	0.25	1.10	0.21	0.93	0.019	0.03	6.4
Change in Emissions	-0.04	-0.18	-0.03	-0.15	-0.003	-0.02	0.0
Line 1 Inside Spray Coating Operation - Existing	0.51	2.22	0.43	1.86	0.071	0.30	22.6
Line 1 Inside Spray Coating Operation - IBO Change	0.38	1.66	0.32	1.41	0.062	0.25	22.6
Change in Emissions	-0.13	-0.56	-0.10	-0.46	-0.009	-0.04	0.0
Line 2 Inside Spray Coating Operation	0.51	2.22	0.43	1.86	0.071	0.30	22.6
Line 2 Inside Spray Coating Operation - IBO Change	0.38	1.66	0.32	1.41	0.062	0.25	22.6
Change in Emissions	-0.13	-0.56	-0.10	-0.46	-0.009	-0.04	0.0

Notes:

1 – NOx, CO, and particulate matter emissions include natural gas combustion emissions from the respective pin oven or IBO.

BACT Proposal

Crown's proposed Line 3 metal can surface coating VOC control system will generate an overall VOC control efficiency in excess of 73%, which is within the range of overall control efficiencies found in the RACT/BACT/LAER Clearinghouse (RBLC) database search. Since this project is not a major NSR or PSD permit, the level of control does not have to meet LAER or PSD BACT levels. Crown is also proposing to control emission from the existing Line 1 and 2 coating operations. Our application proposes a plant-wide minimum VOC capture efficiency of 75% and a minimum destruction efficiency of 98% for the RTO controlling the combined VOC emissions from all three lines. The Line 3 capture efficiency will likely have to exceed 75% in order to achieve this plant-wide capture level, as the older Line 1 and 2 coating application systems likely generate less than the proposed plant-wide 75% capture efficiency requirement. Older beverage can coating equipment when tested may show capture efficiency below 70%, as evidenced by the attached copy of a recent VOC control efficiency test at a similarly aged Crown facility that showed a plant-wide capture efficiency of 61%, page 20.

The RBLC database contains Lowest Achievable Emission Rate (LAER) determinations for new can coating operations installed at other facilities located in ozone NAAQS non-attainment areas. The determinations listed in Table 5-1 illustrate LAER which are ceiling values, included to show the effective maximum control in the beverage can industry. These LAER determinations indicate VOC capture efficiencies of up-to 80% for non-enclosed coating processes, and VOC destruction efficiencies up to 98% using thermal oxidizers. Crown's proposed plant-wide 75% capture efficiency will require Line 3 to operate at LAER comparable level, given the expected lower capture achieved by Lines 1 and 2. Any further increase in overall capture efficiency above 75% would potentially require significant modification of existing older equipment that lies outside the scope of the Line 3 project application. Crown's proposed RTO destruction efficiency and overall control limit is currently approaching prior LAER demonstrations, which detail the ceiling on achievable control, while accounting for the potential for older existing equipment to impact the overall control demonstration.

5. Solvent BACT

Solvents were recently evaluated for replacement with COVID supply chain issues for IPA, however all Solvents that were During a changeover, the Line 3 decorator close capture hoods are required to be lifted open as they would prevent Crown employees from completing the printing head changeover. The capture system is still operating during the changeover and would capture some of the IPA solvent emissions, but it is difficult to quantify how much IPA would be collected and controlled by the RTO. Crown conservatively estimated 100% of IPA usage would be fugitive emissions for the permit

application; however, a portion of these IPA emissions would actually be captured and controlled during a changeover.

Crown is continuously evaluating lower VOC content solvents to clean the decorator printheads; however, the solvents evaluated to date either do not effectively clean the decorator equipment, are too aggressive and damage the printing heads, or result in potential unsafe work conditions due to flammability concerns. Crown will continue to evaluate potential lower VOC solvent options as they become available on the market. Additionally, a portion of the IPA is used in parts washers to clean parts removed from the decorators. Since these parts do not have to dry as rapidly as those clean in place on the decorator, Crown will also investigate the use of a lower VOC content cleaner for the parts washers.

The one LAER determination for Ball Metal Beverage Container Corporation that indicated cleaning solvents for their Can Manufacturing Line 3 would be 50% VOC is not accurate. The facility permits for Line 3 (N130 and 3290) do not limit the VOC content of cleaning solvents and the subsequent permit application for Can Manufacturing Line 4 at the facility states that IPA (100% VOC) is used as the cleaning solvent for Line 1, Line 2, Line 3, and Line 4.

Emission Calculations

6. An incorrect (old) SDS was included in the application for the inks applied at the plant. The new inks do not contain Diethylene Glycol Monohexyl Ether or an HAP. An SDS is attached on pages 21-32 for the new ink formulation.
7. Our application rates are developed from the standard film weight (mg/can) we are required to apply in order to provide a quality container. The size variations on line #3 dictate a higher application rate.
8. Crown reviewed the IPA usage associated with cleaning the proposed Line 3 decorators and determined the maximum IPA usage for Line 3 will be 2.6 gallons/hr (17.05 lb/hr). Ramboll US Consulting updated the air quality impact analysis evaluating hourly IPA emissions from Line 3 decorator cleaning activities using AERMOD and the same modeling methodology described in the September 2020 permit application. Updated rooftop vent stack parameters and associated hourly IPA emissions (half of fugitive IPA emissions released through each of two rooftop vents) are presented in the table below.

Stack ID	Emission Unit	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Diameter (m)	IPA Emissions (lb/hr)
RVENT1	Rooftop Vent (fugitives from Line 3 Decorators)	12.2	293	3.59	0.91	8.52
RVENT2	Rooftop Vent (fugitives from Line 3 Decorators)	12.2	293	3.59	0.91	8.52

The results of the updated IPA modeling simulation for Line 3 decorator cleaning are summarized and compared with the appropriate ASILs in the table below. The modeled-predicted IPA concentrations are less than the applicable ASIL.

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	ASIL¹ ($\mu\text{g}/\text{m}^3$)	Over ASIL?
IPA	1-Hour	3,149	3,200	No

¹ TAP-specific acceptable source impact levels (ASILs) from WAC 173-460-150.

9. We agree with this section and update calculations are attached for the RTO Bypass period at page 33.

1. Identification

Product identifier SULFURIC ACID 50% NSF
Other means of identification None.
Recommended use ALL PROPER AND LEGAL PURPOSES
Recommended restrictions None known.
Manufacturer/Importer/Supplier/Distributor information
Manufacturer
Company name Brenntag Pacific Inc.
Address 10747 Patterson Place
Santa Fe Springs, CA 90670
Telephone 562-903-9626
E-mail Not available.
Emergency phone number 800-424-9300 CHEMTREC

2. Hazard(s) identification

Physical hazards Not classified.
Health hazards Skin corrosion/irritation Category 1A
Serious eye damage/eye irritation Category 1
Environmental hazards Not classified.
OSHA defined hazards Not classified.
Label elements



Signal word Danger
Hazard statement Causes severe skin burns and eye damage.
Precautionary statement
Prevention Do not breathe mist or vapor. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.
Response If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. 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/doctor. Wash contaminated clothing before reuse.
Storage Store locked up.
Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC) None known.
Supplemental information None.

3. Composition/information on ingredients**Mixtures**

Chemical name	Common name and synonyms	CAS number	%
SULFURIC ACID		7664-93-9	49.941
Other components below reportable levels			50.059

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Foam. Powder. Carbon dioxide (CO ₂).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.
Environmental precautions	Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Respiratory protection is "only required" when sprays are present in the air.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US, OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)		
Components	Type	Value
SULFURIC ACID (CAS 7664-93-9)	PEL	1 mg/m ³

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
SULFURIC ACID (CAS 7664-93-9)	TWA	0.2 mg/m ³	Thoracic fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
SULFURIC ACID (CAS 7664-93-9)	TWA	1 mg/m ³

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

The following are recommendations for Personnel Protective Equipment (PPE). The employer/user of this product must perform a Hazard Assessment of the workplace according to OSHA regulations 29 CFR 1910.132 to determine the appropriate PPE for use while performing any task involving potential exposure to this product.

Eye/face protection

Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection**Hand protection**

Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other

Wear appropriate chemical resistant clothing.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties**Appearance**

Physical state	Liquid.
Form	Liquid.
Color	CLEAR COLORLESS
Odor	NO CHARACTERISTIC
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	-35 °F (-37.22 °C)
Initial boiling point and boiling range	382.8 °F (194.89 °C) estimated
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.

Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	11.63 lbs/gal
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Percent volatile	50.06 % estimated
Specific gravity	1.39

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity	Not available.
Skin corrosion/irritation	Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1 % are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity

This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure

Not classified.

Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components	Species	Test Results
SULFURIC ACID (CAS 7664-93-9)		
Aquatic Crustacea	EC50	Daphnia magna > 100 mg/l, 48 hours
	LC50	Aesop shrimp (<i>Pandalus montagui</i>) 42.5 mg/l, 48 hours
		Cockle (<i>Cerastoderma edule</i>) 200 - 500 mg/l, 48 hours
		Common shrimp, sand shrimp (<i>Crangon crangon</i>) 70 - 80 mg/l, 48 hours
		Green or European shore crab (<i>Carcinus maenas</i>) 70 - 80 mg/l, 48 hours
Fish	LC50	Starry, european flounder (<i>Platichthys flesus</i>) 100 - 330 mg/l, 48 hours
		Western mosquitofish (<i>Gambusia affinis</i>) 42 mg/l, 24 hours
		42 mg/l, 48 hours
		42 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN2796

UN proper shipping name SULFURIC ACID (WITH NOT MORE THAN 51% ACID)

Transport hazard class(es)

Class 8

Subsidiary risk -

Packing group II

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

ERG number 157

DOT information on packaging may be different from that listed.



15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

SULFURIC ACID (CAS 7664-93-9) Listed.

SARA 304 Emergency release notification

SULFURIC ACID (CAS 7664-93-9) 1000 LBS

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1060)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
-------------------	---

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
SULFURIC ACID	7664-93-9	1000	1000 lbs		

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
SULFURIC ACID	7664-93-9	49.941

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act Not regulated.
(SDWA)

Drug Enforcement Administration (DEA), List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

SULFURIC ACID (CAS 7664-93-9) 6552

Drug Enforcement Administration (DEA), List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

SULFURIC ACID (CAS 7664-93-9) 20 %WV

DEA Exempt Chemical Mixtures Code Number

SULFURIC ACID (CAS 7664-93-9) 6552

US state regulations

US. California Controlled Substances, CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. Massachusetts RTK - Substance List

SULFURIC ACID (CAS 7664-93-9)

US. New Jersey Worker and Community Right-to-Know Act

SULFURIC ACID (CAS 7664-93-9)

US. Pennsylvania Worker and Community Right-to-Know Law

SULFURIC ACID (CAS 7664-93-9)

US. Rhode Island RTK

SULFURIC ACID (CAS 7664-93-9)

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On Inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s). A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	05-08-2015
Revision date	08-18-2016
Version #	11
HMIS® ratings	Health: 3 Flammability: 0 Physical hazard: 0
NFPA ratings	Health: 3 Flammability: 0 Instability: 1
Disclaimer	While Brenntag believes the information contained herein to be accurate, Brenntag makes no representation or warranty, express or implied, regarding, and assumes no liability for, the accuracy or completeness of the information. The Buyer assumes all responsibility for handling, using and/or reselling the Product in accordance with applicable federal, state, and local law. This SDS shall not in any way limit or preclude the operation and effect of any of the provisions of Brenntag's terms and conditions of sale.
Revision information	Toxicological information: Acute toxicity

Material Safety Data Sheet



Revision Number: 002.2

Issue date: 03/07/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name:	BONDERITE C-IC 120WN ACID CLEANER known as RIDOLINE 120WN	IDH number:	594390
Product type:	Cleaner	Region:	United States
Company address:	Contact information: Telephone: 248.583.9300 MEDICAL EMERGENCY Phone: Poison Control Center 1-877-671-4608 (toll free) or 1-303-592-1711 TRANSPORT EMERGENCY Phone: CHEMTREC 1-800-424-9300 (toll free) or 1-703-527-3887 Internet: www.henkelna.com		
Henkel Corporation 32100 Stephenson Highway Madison Heights, MI 48071			

2. HAZARDS IDENTIFICATIONEMERGENCY OVERVIEWHMIS:

Physical state:	Liquid	HEALTH:	*4
Color:	Red	FLAMMABILITY:	0
Odor:	Sharp	PHYSICAL HAZARD:	0

Personal Protection: See MSDS Section 8

DANGER-CORROSIVE! CAUSES EYE, SKIN AND RESPIRATORY TRACT BURNS.
MAY BE HARMFUL IF SWALLOWED, ABSORBED THROUGH SKIN OR INHALED.
HIGHLY TOXIC

Relevant routes of exposure: Skin, Inhalation, Eyes

Potential Health Effects

Inhalation:	Mists, vapors or liquid may cause severe irritation or burns.
Skin contact:	This product is severely irritating to the skin and may cause burns. Following skin exposure to this product, the sensation of irritation or pain may be delayed. Hydrofluoric acid will penetrate the skin and attack underlying tissue and bone. Large burns (over 25 square inches) may also cause hypocalcemia and other systemic effects which may be fatal.
Eye contact:	This product is severely irritating to the eyes and may cause irreversible damage including burns and blindness.
Ingestion:	This product may produce corrosive damage to the gastrointestinal tract if it is swallowed. Ingestion of small amounts of this product may result in potentially fatal hypocalcemia and systemic toxicity. Ingestion of large amounts of this product may result in fluoride poisoning including symptoms of calcification of the ligaments and severe bone changes making normal movements painful, mottling of the teeth, pulmonary fibrosis, anemia, anorexia, dental effects, and possibly death.

Existing conditions aggravated by exposure: Eye, skin and respiratory disorders.

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

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous components	CAS NUMBER	%
Hydrogen fluoride	7664-39-3	10 - 30

4. FIRST AID MEASURES

- Inhalation:** If mist or vapor of this product is inhaled, remove person immediately to fresh air. Seek medical attention if symptoms develop or persist.
- Skin contact:** Remove contaminated clothing and footwear. Rinse with large amounts of running water. GET MEDICAL ATTENTION IMMEDIATELY! If iced 0.13% benzalkonium chloride (Zephiran) solution or 2.5% calcium gluconate gel are available, the rinsing may be limited to 5 minutes, with the soaks or gel applied as soon as the rinsing is stopped. If benzalkonium chloride or calcium gluconate gel is not available, rinsing must continue until medical treatment is provided.
- Eye contact:** In case of contact with the eyes, rinse immediately with plenty of water for 15 minutes, and seek immediate medical attention.
- Ingestion:** Get immediate medical attention. DO NOT induce vomiting unless directed to do so by medical personnel. Give one to two glasses of water or milk. Never give anything by mouth to a victim who is unconscious or is having convulsions.
- Notes to physician:** Ocular exposure to corrosive fluoride compounds has been treated with isotonic sodium chloride or magnesium chloride. Dermal exposure to corrosive fluoride compounds has been treated with calcium gluconate or calcium carbonate gel applied topically to the affected areas to relieve pain at the site of exposure. Treatment of hypocalcemia associated with corrosive fluoride compounds exposure may be corrected by intravenous calcium gluconate or calcium chloride. Treatment of hypomagnesemia may be corrected by intravenous magnesium sulfate.

5. FIRE FIGHTING MEASURES

- Flash point:** Not applicable
- Autoignition temperature:** Not applicable
- Flammable/Explosive limits - lower:** Not applicable
- Flammable/Explosive limits - upper:** Not applicable
- Extinguishing media:** Dry chemical.
- Special firefighting procedures:** Wear full protective clothing. Wear self-contained breathing apparatus.
- Unusual fire or explosion hazards:** This product is an aqueous mixture which will not burn.
- Hazardous combustion products:** Irritating and toxic gases or fumes may be released during a fire. Flammable and explosive hydrogen gas may be formed when hydrofluoric acid reacts with certain metals. Hydrogen fluoride gas may evolve when chemical is subjected to prolonged high temperature.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

- Environmental precautions:** Prevent further leakage or spillage if safe to do so. Wear appropriate protective equipment and clothing during clean-up. Do not allow product to enter sewer or waterways.

Clean-up methods: Absorb spill with inert material. Shovel material into appropriate container for disposal. Dispose of according to Federal, State and local governmental regulations.

7. HANDLING AND STORAGE

Handling: Avoid contact with eyes, skin and clothing. Avoid breathing mists or aerosols of this product. Wash thoroughly after handling. Do not take internally. For industrial use only.

Storage: Keep container tightly closed and in a cool, well-ventilated place away from incompatible materials. Thaw and mix thoroughly if frozen.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Hydrogen fluoride	(SKIN) (as F) 0.5 ppm TWA (as F) 2 ppm Ceiling (as F)	3 ppm TWA	None	None

Engineering controls: Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.

Respiratory protection: If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.

Eye/face protection: Wear chemical goggles; face shield (if splashing is possible).

Skin protection: Chemical resistant, impermeable gloves. Gloves should be tested to determine suitability for prolonged contact. Use of impervious apron and boots are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Color:	Red
Odor:	Sharp
Odor threshold:	Not available.
pH:	< 1.0
Vapor pressure:	Not determined
Boiling point/range:	> 100 °C (> 212°F)
Melting point/ range:	Not determined
Specific gravity:	1.05 - 1.10 at 15.56 °C (60.01 °F)
Vapor density:	Not determined
Flash point:	Not applicable
Flammable/Explosive limits - lower:	Not applicable
Flammable/Explosive limits - upper:	Not applicable
Autoignition temperature:	Not applicable
Evaporation rate:	Not available.
Solubility in water:	Complete
Partition coefficient (n-octanol/water):	Not determined
VOC content:	Not applicable

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions.

Hazardous reactions: Will not occur.

Hazardous decomposition products: May liberate hydrogen fluoride.

Incompatible materials: This product may react with strong alkalies. This material will react with glass, concrete, certain metals, silica containing materials, rubber, leather, and many organics.

Conditions to avoid: Store away from incompatible materials.

11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Hydrogen fluoride	No	No	No

Hazardous components	Health Effects/Target Organs
Hydrogen fluoride	Allergen, Blood, Bone Marrow, Cardiac, Central nervous system, Corrosive, Irritant, Kidney, Liver, Lung, Muscle, Nervous System, Respiratory, Teeth

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal.

Hazardous waste number: This product, if discarded directly, would be a characteristic RCRA corrosive waste (D002). This product contains a component or components identified as hazardous under 40 CFR 261.24. U134: Hydrogen fluoride

14. TRANSPORT INFORMATION

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Hydrofluoric acid solution
Hazard class or division: 8 (6.1)
Identification number: UN 1790
Packing group: II
DOT Reportable quantity: Hydrofluoric acid

International Air Transportation (ICAO/IATA)

Proper shipping name: Hydrofluoric acid solution
Hazard class or division: 8 (6.1)
Identification number: UN 1790
Packing group: II

Water Transportation (IMO/IMDG)

Proper shipping name: HYDROFLUORIC ACID solution
Hazard class or division: 8 (6.1)
Identification number: UN 1790
Packing group: II

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.

TSCA 12(b) Export Notification: None above reporting de minimus

CERCLA/SARA Section 302 EHS: Hydrogen fluoride (CAS# 7664-39-3).
CERCLA/SARA Section 311/312: Immediate Health, Delayed Health
CERCLA/SARA 313: This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Hydrogen fluoride (CAS# 7664-39-3).

CERCLA Reportable quantity: Hydrogen fluoride (CAS# 7664-39-3) 100 lbs. (45.4 kg)

California Proposition 65: No California Proposition 65 listed chemicals are known to be present.

Canada Regulatory Information

CEPA DSL/NDSL Status: All components are listed on or are exempt from listing on the Canadian Domestic Substances List.

WHMIS hazard class: D.1.A, D.2.A, E

16. OTHER INFORMATION

This material safety data sheet contains changes from the previous version in sections: New information added in Section(s): 1, 6 and 7.

Prepared by: John DiCerbo, Sr. Regulatory Affairs Specialist

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2.0 Summary of Results

AST conducted compliance testing at the Crown facility in La Crosse, Wisconsin on June 25, 2019. Testing consisted of determining the emission rates of VOC at the two (2) inlets (Hot and Cold) and one (1) RTO. The mass emission rates were used to calculate the DRE and CE of VOC on the RTO. Additional testing was performed to determine the site-specific coefficient for HCHO on the Hot Inlet.

Tables 2-1 through 2-3 provide summaries of the emission testing results with comparisons to the applicable WDNR permit limits. Any difference between the summary results listed in the following tables and the detailed results contained in appendices is due to rounding for presentation.

Table 2-1
Summary of VOC Results – RTO Inlets

Run Number	Run 1	Run 2	Run 3	Average
Date	6/25/19	6/25/19	6/25/19	—
Hot Inlet				
Volatile Organic Compounds Data				
Concentration (as propane), ppmvd	297.1	324.3	334.1	318.5
Concentration (as carbon), ppmvd	891.2	973.0	1,002.3	955.5
Emission Rate (as propane), lb/hr	17.8	19.8	19.7	19.1
Emission Rate (as carbon), lb/hr	14.6	16.1	16.1	15.6
Cold Inlet				
Volatile Organic Compounds Data				
Concentration (as propane), ppmvd	167.7	196.7	181.7	182.0
Concentration (as carbon), ppmvd	503.1	590.0	545.2	546.1
Emission Rate (as propane), lb/hr	4.5	5.2	4.7	4.8
Emission Rate (as carbon), lb/hr	3.6	4.2	3.8	3.9
Capture Efficiency				
VOC Emissions Applied (as carbon), lbs	33.3	34.2	28.9	32.1
VOC Emissions Captured (as carbon), lbs	18.2	20.4	19.9	19.5
Captured Efficiency, %	54.7	59.7	68.9	61.1

SAFETY DATA SHEET

AP 2PC METAL DECO GENERIC SDS

Section 1. Identification

Product no. : 1499321
Product name : AP 2PC METAL DECO GENERIC SDS

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

Identified uses : Printing inks, coatings, toners, and related materials
Uses advised against : Not available
Manufacturer : INX International Ink Co.
MSDS Department
150 N Martingale Rd, Suite 700
Schaumburg, Illinois 60173
United States
800.347.4657
24 Hour Emergency Phone : 800.535.5053 INFOTRAC 24 Hour Spill and Emergency (+1 352 323 3500 outside of North America)
SDS Email Information : MSDS@inxintl.com

Section 2. Hazards identification

Classification of the substance or mixture : SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B
SKIN SENSITIZATION - Category 1

Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 23.6 %

GHS label elements

Hazard pictograms :



Signal word : Warning
Hazard statements : Causes eye irritation.
May cause an allergic skin reaction.

Precautionary statements

General : Read label before use.

Prevention	: Wear protective gloves. Wear eye or face protection. Avoid breathing vapor. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace.
Response	: IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. 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 attention.
Storage	: Not applicable.
Disposal	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements	: None known.
Hazards not otherwise classified	: None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	%	CAS number
1,3,5-Triazine-2,4,6-triamine, polymer with formaldehyde, methylated	7 - 10	68002-20-0
Dibutylaminoethanol	3 - 5	102-81-8
Calcium carbonate	2 - 3	471-34-1
Gum rosin	0.1 - 0.2	8050-09-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

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. Continue to rinse for at least 10 minutes. If irritation persists, get medical attention.

- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occur personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Skin contact** : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. 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. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes eye irritation.
- Inhalation** : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- Skin contact** : May cause an allergic skin reaction.
- Ingestion** : May be irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
irritation
watering
redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
- Ingestion** : No specific data.

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

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

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** : In a fire or if heated, a pressure increase will occur and the container may burst.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
halogenated compounds
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 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. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of 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

- Small spill**
- : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill**
- : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. in container for disposal according to local regulations (see Section 13) Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage**Preccautions for safe handling**

- Protective measures**
- : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- 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. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

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 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.

Section 8. Exposure controls/personal protection**Control parameters****Occupational exposure limits**

Ingredient name	Exposure limits
Version: 0.0	Date of issue/Date of revision: 00/00/0000 Date of previous issue: 05/15/2015

Dibutylaminoethanol	OSHA PEL 1989 (1989-03-01) PEL: Permissible Exposure Level 14 mg/m ³ 2 ppm NIOSH REL (1994-06-01) Time Weighted Average (TWA) 14 mg/m ³ 2 ppm ACGIH TLV (1994-09-01) TLV-TWA: Threshold Limit Value - Time weighted average PEL: Permissible Exposure Level 3.5 mg/m ³ 0.5 ppm
Calcium carbonate	OSHA PEL (1993-06-30) PEL: Permissible Exposure Level 15 mg/m ³ Form: Total dust PEL: Permissible Exposure Level 5 mg/m³ 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. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a r 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: chemical splash goggles.

Skin protection

- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check duri protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be involved and should be approved by a specialist before handling this prod

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with is necessary. Respirator selection must be based on known or anticipated exposure levels of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	:	liquid
Color	:	Depends upon product selection
Odor	:	Not available.
Odor threshold	:	Not available.
pH	:	Not available.
Melting point	:	Not available.
Boiling point	:	Not available.
Flash point	:	Not Measured. Material is not expected to flash.
Evaporation rate	:	Not available.
Flammability (solid, gas)	:	Not available.
Lower and upper explosive (flammable) limits	:	Lower: Not available. Upper: Not available.
Vapor pressure	:	Not available.
Vapor density	:	Not available.
Density	:	1.173 g/cm ³
Relative density	:	1.17
Solubility	:	Not available.
Partition coefficient: n-octanol/water	:	Not available.
Auto-ignition temperature	:	Not available.
Decomposition temperature	:	Not available.
Viscosity	:	Dynamic: Not available. Kinematic: Not available.
Volatile.	:	13.03 %(m) Weight % 16.3 %(V) Volume %
VOC %	:	13.03 %(m) Weight % 16.29 %(V) Volume %
Coating VOC	:	1.27 lb/gal 153 g/l

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	:	No specific data.

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

Product/ingredient name	Result	Species	Dose	Exposure
Dibutylaminoethanol	LD50 Oral	Rat	1,070 mg/kg	-
Calcium carbonate	LD50 Oral	Rat	6,450 mg/kg	-
Gum rosin	LD50 Oral	Rat	7,600 mg/kg	-

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Calcium carbonate	Eyes - Severe irritant	Rabbit	-	24 hrs	-
	Skin - Moderate irritant	Rabbit	-	24 hrs	-

Conclusion/Summary

- Skin** : Not available.
- Eyes** : Not available.
- Respiratory** : Not available.

Sensitization

Conclusion/Summary

- Skin** : Not available.
- Respiratory** : Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP

Reproductive toxicity

Conclusion/Summary : Not available.

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Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)**Aspiration hazard**

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

- | | |
|---------------------|---|
| Eye contact | : Causes eye irritation. |
| Inhalation | : Exposure to decomposition products may cause a health hazard.
Serious effects may be delayed following exposure. |
| Skin contact | : May cause an allergic skin reaction. |
| Ingestion | : May be irritating to mouth, throat and stomach. |

Symptoms related to the physical, chemical and toxicological characteristics

- | | |
|---------------------|--|
| Eye contact | : Adverse symptoms may include the following:
irritation
watering
redness |
| Inhalation | : No specific data. |
| Skin contact | : Adverse symptoms may include the following:
irritation
redness |
| Ingestion | : No specific data. |

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

- | | |
|------------------------------------|------------------|
| Potential immediate effects | : Not available. |
| Potential delayed effects | : Not available. |

Long term exposure

- | | |
|------------------------------------|------------------|
| Potential immediate effects | : Not available. |
| Potential delayed effects | : Not available. |

Potential chronic health effects

- | | |
|---------------------------|---|
| Conclusion/Summary | : Not available. |
| General | : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels. |

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**

Not available.

Section 12. Ecological information**Toxicity**

Product/ingredient name	Result	Species	Exposure
Dibutylaminoethanol	Acute EC50 73.7 mg/l Fresh water	Aquatic invertebrates. Water flea	48 h
Calcium carbonate			
	Acute LC50 56,000 mg/l Fresh water	Fish - Western mosquitofish	96 h
	Chronic NOEC 61,000 mg/l Fresh water	Fish - Rainbow trout,donaldson trout	28 d
	Chronic NOEC 61,000 mg/l Fresh water	Fish - Rainbow trout,donaldson trout	35 d
	Chronic NOEC 61,000 mg/l Fresh water	Fish - Rainbow trout,donaldson trout	42 d
	Chronic NOEC 61,000 mg/l Fresh water	Fish - Rainbow trout,donaldson trout	35 d
	Chronic NOEC 61,000 mg/l Fresh water	Fish - Rainbow trout,donaldson trout	42 d

Conclusion/Summary : Not available.

Persistence and degradability

Conclusion/Summary : Not available.

Mobility in soil

Soil/water partition coefficient (KOC)	:	Not 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 at all time protection and waste disposal legislation and any regional local authorit 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 compli 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. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. 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

Regulatory information	Proper shipping name	UN - Number	Hazard classification	Packing group	Additional information
IATA	Not Restricted.			-	
IMDG	Not Restricted.			-	
DOT Classification	Not Restricted.			-	
Mexico Classification	Not Restricted.			-	
TDG Class	Not Restricted.			-	

Section 15. Regulatory information

U.S. Federal regulations : United States inventory (TSCA 8b):
Not determined.

**Clean Air Act Section 112(b)
Hazardous Air Pollutants (HAPs)** : Not listed

SARA 302/304

SARA 304 RQ : 456621 lbs

SARA 311/312

Classification : Immediate (acute) health hazard

Composition/information on ingredients

Name	%	Classification
1,3,5-Triazine-2,4,6-triamine, polymer with formaldehyde, methylated	7 - 10	312 DELAY HLTH312 IMMED HLTHAH
Dibutylaminoethanol	3 - 5	312 FIRE312 IMMED HLTHAH

Calcium carbonate	2 - 3	312 FIRE312 IMMED HLTHAH
Gum rosin	0.1 - 0.2	AH

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer., WARNING: This product contains less than 1% of a chemical known to the Sta reproductive harm.

International regulations

- International lists**
- : **Australia inventory (AICS):** Not determined.**Canada inventory (DSL/NDSL):** Not determined.
 - Europe inventory:** Not determined.
 - Japan inventory:** Not determined.
 - China inventory (IECSC):** Not determined.
 - Korea inventory:** Not determined.
 - New Zealand Inventory of Chemicals (NZIoC):** Not determined.
 - Philippines inventory (PICCS):** Not determined.

Section 16. Other information**History**

- Date of printing** : 05/15/2015
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Prepared by : MSDS@inxintl.com
References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate its subsidiaries, assumes any liability whatsoever for the accuracy or co determination of suitability of any material is the sole responsibility o should be used with caution. Although certain hazards are described herei that exist.

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Date of issue/Date of revision: 00/00/0000

Date of previous issue: 05/15/2015

Crown Cork & Seal Company, Inc.
Olympia, WA

Facility-Wide Emissions Summary - Maximum Rates

Criteria Pollutants

Pollutant	Line 3 Normal		Line 3 Normal Fugitive		Line 3 RTO Bypass		Project Combustion		Total Project	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
NO _x	--	--	--	--	--	--	2.29	10.04	2.3	10.0
CO	--	--	--	--	--	--	2.02	8.83	2.0	8.8
PM	0.037	0.14	0.02	0.07	0.04	0.006	0.23	1.00	0.3	1.2
PM10	0.037	0.14	0.02	0.07	0.04	0.006	0.23	1.00	0.3	1.2
PM2.5	0.037	0.14	0.02	0.07	0.04	0.006	0.23	1.00	0.3	1.2
VOC	0.87	3.37	22.8	87.7	48.75	4.4	0.16	0.72	72.6	96.2
Sulfuric Acid Mist	0.05	0.18	--	--	--	--	--	--	0.05	0.2

Toxic Air Pollutants (Maximum Emission Increase from Project) - Normal Operation

Pollutant	Avg. Period	Line 3	Lines 1-2	Total	SQER	Model (Y/N)?
Hydrofluoric Acid	24-hr	0.38	0	0.38	1.00	N
Sulfuric Acid	24-hr	1.12	0	1.12	0.07	Y
EGBE	24-hr	184	-586.9	-402.4	6.10	N
IPA	1-hr	17.1	0	17.1	5.90	Y
PGME	24-hr	0.0	-12.6	-12.6	520.00	N
Formaldehyde	year	339.1	-14890.2	-14551.1	27.00	N

Toxic Air Pollutants (Maximum Emission Increase from Project) - RTO Bypass Operation

Pollutant	Avg. Period	Line 3	Lines 1-2	Total	SQER	Model (Y/N)?
Hydrofluoric Acid	24-hr	0.38	-0.2	0.14	1.00	N
Sulfuric Acid	24-hr	1.12	-0.7	0.41	0.07	Y
EGBE	24-hr	464.1	-399.2	64.9	6.10	Y
IPA	1-hr	17.1	-4.9	12.1	5.90	Y
PGME	24-hr	0.0	-8.5	-8.5	520.00	N
Formaldehyde	year	614.2	-14890.2	-14276	27.00	N

Crown Cork & Seal Company, Inc.
Olympia, WA

Facility-Wide Emissions Summary - Maximum Rates

Hazardous Air Pollutants

Pollutant	Line 3		Project Combustion		Total Project	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
EGHE	1.0	1.7	--	--	1.0	1.7
Formaldehyde ³	1.4	0.3	1.4E-03	6.3E-03	1.4	0.3
Sulfuric Acid Mist	0.05	0.18	--	--	4.7E-02	1.8E-01
Arsenic	--	--	3.8E-06	1.7E-05	3.8E-06	1.7E-05
Benzene	--	--	4.0E-05	1.8E-04	4.0E-05	1.8E-04
Beryllium	--	--	2.3E-07	1.0E-06	2.3E-07	1.0E-06
Cadmium	--	--	2.1E-05	9.2E-05	2.1E-05	9.2E-05
Chromium	--	--	2.7E-05	1.2E-04	2.7E-05	1.2E-04
Cobalt	--	--	1.6E-06	7.0E-06	1.6E-06	7.0E-06
Dichlorobenzene	--	--	2.3E-05	1.0E-04	2.3E-05	1.0E-04
Hexane	--	--	3.4E-02	1.5E-01	3.4E-02	1.5E-01
Lead	--	--	9.5E-06	4.2E-05	9.5E-06	4.2E-05
Manganese	--	--	7.2E-06	3.2E-05	7.2E-06	3.2E-05
Mercury	--	--	5.0E-06	2.2E-05	5.0E-06	2.2E-05
Naphthalene	--	--	1.2E-05	5.1E-05	1.2E-05	5.1E-05
Nickel	--	--	4.0E-05	1.8E-04	4.0E-05	1.8E-04
Selenium	--	--	4.6E-07	2.0E-06	4.6E-07	2.0E-06
Toluene	--	--	6.5E-05	2.8E-04	6.5E-05	2.8E-04
Acenaphthene	--	--	3.4E-08	1.5E-07	3.4E-08	1.5E-07
Acenaphthylene	--	--	3.4E-08	1.5E-07	3.4E-08	1.5E-07
Anthracene	--	--	4.6E-08	2.0E-07	4.6E-08	2.0E-07
Benz(a)anthracene	--	--	3.4E-08	1.5E-07	3.4E-08	1.5E-07
Benzo(a)pyrene	--	--	2.3E-08	1.0E-07	2.3E-08	1.0E-07
Benzo(b)fluoranthene	--	--	3.4E-08	1.5E-07	3.4E-08	1.5E-07
Benzo(k)fluoranthene	--	--	3.4E-08	1.5E-07	3.4E-08	1.5E-07
Chrysene	--	--	3.4E-08	1.5E-07	3.4E-08	1.5E-07
benzo(a,h)anthrancene	--	--	2.3E-08	1.0E-07	2.3E-08	1.0E-07
Fluoranthene	--	--	5.7E-08	2.5E-07	5.7E-08	2.5E-07
Fluorene	--	--	5.3E-08	2.3E-07	5.3E-08	2.3E-07
deno(1,2,3-cd)pyrene	--	--	3.4E-08	1.5E-07	3.4E-08	1.5E-07
2-Methylnaphthalene	--	--	4.6E-07	2.0E-06	4.6E-07	2.0E-06
3-Methylcholanthrene	--	--	3.4E-08	1.5E-07	3.4E-08	1.5E-07
Dimethylbenz[a]anthracene	--	--	3.1E-07	1.3E-06	3.1E-07	1.3E-06
Phenanthrene	--	--	3.2E-07	1.4E-06	3.2E-07	1.4E-06
Pyrene	--	--	9.5E-08	4.2E-07	9.5E-08	4.2E-07
TOTAL						2.3

Crown Cork & Seal Company, Inc.
Olympia, WA

Line 3 Can Washing
Can Washer Stack

Detail:

Operating Parameters

Normal Production (hrs/yr)	8,560
RTO Bypass (hrs/yr)	200
Line 3 Rated Capacity (cans/min)	3,000
Line 3 Efficiency	90%
Line 3 Normal Production Rate (cans/min)	2,700
Capture Efficiency	100.0%

Pollutant	Emission Factor ¹		Emissions ²		
	Ib/MM can	Ib/hr	Ib/day	Ib/yr	tons/yr
Hydrofluoric Acid	0.089	0.016	0.38	126.30	0.063
Sulfuric Acid	0.26	0.047	1.12	368.97	0.18

¹ Emission factors are based on past studies conducted at Crown Cork facilities.

² Hourly emissions based on Line 3 rated throughput of 2,800 cpm. Daily emissions based on the maximum hourly rate and continuous operation for 24 hours. Annual emissions based on the maximum hourly rate, the 90% line efficiency, and continuous operation for 8,760 hours per year.

Line 3 Process Line - VOC Emissions, including RTO Bypass Scenario

Detail:

Operating Parameters			
Normal Production (hrs/yr)			8,560
RTO Bypass (hrs/yr)			200
Line 3 Rated Capacity - Normal (cans/min)			3,000
Line 3 RTO Bypass Rate (cans/min)			2,000
Line 3 Production Efficiency			90%
Inside Spray Capture Efficiency			75%
Inside Spray Destruction Efficiency			98.0%
Varnish/Ink Capture Efficiency			75%
Varnish/Ink Destruction Efficiency			98.0%
UV Varnish Capture and Control			0%

VOC Emissions

Material	Use	Application Rate (gall/1,000 cans)	lb VOC/gal solids ¹	Normal Operation ³			RTO Bypass ⁴	
				Annual Usage (gal/yr)	Controlled Emissions (tpy)	VOC Fugitive Emissions (tpy)	Annual Usage (gal/yr)	VOC Emissions (tpy)
Various	Inside Spray	0.20	18.5%	6.5	277.344	2.50	41.69	4,800
Various	Varnish	0.070	35.4%	2.9	97.070	0.75	12.46	2.89
Various	Ink	0.0089	83.9%	1.52	12.332	0.12	1.96	0.86
UV Varnish	Rim Coat	0.0019	96.4%	0.010	2.565	—	0.012	0.14
IPA ²	Cleanup IPA	—	—	6.6	9,630	—	44	0.0002
						31.58	153	0.50

¹ The solids percentage and VOC content for each material is based on the worst case formulation out of the possible coatings/inks, based on information provided in manufacturer SDSs.

² IPA usage is calculated using a 1,125 gallon per hour rate for production of 2,800 cans per hour. IPA usage rate was provided by Crown Cork personnel. Annual usage of IPA does not include the 90% line efficiency factor.

³ Annual usage of each material during normal operation is based on the Line 3 rated capacity of 3,000 cpm, 90% line efficiency, 8,560 hr/year of normal operation, and the respective application rate. Annual emissions during normal operation assume that 100% of the VOC content will be emitted, and are based on the annual usage, and the respective capture efficiency and destruction efficiencies for each application (Inside spray 75% CE and 98% DRE, Varnish and Ink 75% CE and 98% DRE, and no control for Rim Coat or Cleanup IPA).

⁴ Annual usage of each material during RTO bypass is based on the reduced Line 3 capacity of 2,000 cpm, 200 hr/year of RTO bypass operation, and the respective application rate. Annual emissions during normal operation assume that 100% of the VOC content will be emitted, and are based on the annual usage, and no control.

Crown Cork & Seal Company, Inc.
Olympia, WA

Material	Use	Density (lb/gal)	n-Butanol	Ethyleneglycol Monobutyl Ether (EGBE)	Dimethyl ethanolamine (DMEA)	n-Amyl Alcohol (n-AmOH)	Isopropyl Alcohol (IPA)	Propylene Glycol Methyl Ether (PGME)	Tricdecyl alcohol (TDA)	Ethylene Glycol Monohexyl Ether (EGHE)	Formaldehyde
	CAS No. :	71-36-3		111-76-2	108-01-0	71-41-0	67-63-0	107-98-2	TAP	112-70-9	112-25-4
	TAP?			TAP							TAP
Various	Inside spray	8.46	5.20%	6.80%	1.10%	3.20%	0.00%	0.00%		0.50%	HAP
Various	Varnish	8.90	2.20%	7.40%	2.70%	0.00%	0.00%	0.00%		0.00%	0.00%
Various ²	Ink	9.78	0.00%	5.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%
IPA	Cleanup	6.56	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%

¹ Material content based on the worst case formulation of the possible coating/ink, based on manufacturer SDS.

² More than 500 types of ink products are used, this calculation uses a reasonable worst-case density (9.78 lb/gal) and VOC content (5%)

Material	Use	Application (gal/hr)	n-Butanol	EGBE	DMEA	n-AmOH	IPA	PGME	TDA	EGHE	Formaldehyde ²
	CAS No. :	71-36-3		111-76-2	108-01-0	71-41-0	67-63-0	107-98-2	TAP	112-70-9	112-25-4
	TAP?			TAP							TAP
Various	Inside spray	36.0	15.84	20.71	3.35	9.75	0.00	0.00		1.52	HAP
Various	Varnish	12.6	2.47	8.30	3.03	0.00	0.00	0.34		0.00	0.01
Various	Ink	1.6	0.00	0.00	0.78	0.00	0.00	0.00		0.00	0.00
IPA	Cleanup	2.6	0.00	0.00	0.00	0.00	0.00	17.05		0.00	0.00
	Total Uncontrolled Emission Factor		18.30	29.01	7.16	9.75	17.05	0.00		1.52	2.06
	Total Fugitive Emissions		4.58	7.25	1.79	2.44	17.05	0.00		0.38	0.00
	Total Controlled Speciated VOC Emissions		0.27	0.44	0.11	0.15	0.00	0.00		0.01	0.04

¹ Hourly emissions are based on the Line 3 rated capacity of 2,800 ppm, the material application rate, specified VOC content, and respective capture efficiency and destruction efficiency for the application.

² Resin curing in the oven forms formaldehyde. It is captured 100% in the oven and routed to the RTO. The formation rate is from 2009 stack test at Crown's Olympia Washington plant.

Formaldehyde Emissions ²	11.4 lbs formed/MM can	Capture Efficiency	Uncontrolled Emissions, lb/hr
	100%		2.05

Speciated VOC Emissions

Pollutant	Normal Operation ¹	RTO Bypass ²	Maximum Emissions
n-Butanol	CAS	Ib/hr	Ib/yr
	71-36-3	4.9	116.4
	EGBE	111-76-2	7.7
	DMEA	108-01-0	1.9
	n-AmOH	71-41-0	2.6
	IPA	67-63-0	17.1
	PGME	107-98-2	0.0
	TDA	112-70-9	0.1
	EGHE	112-25-4	0.4
	Formaldehyde	50-00-0	0.04

¹ Hourly emissions during normal operation are based on Line 3 rated throughput of 2,800 ppm. Daily emissions based on the maximum hourly rate, the 80% line efficiency, and continuous operation for 8,560 hours per year. IPA annual emissions based on annual decorator changeovers.

² Hourly emissions during RTO bypass operation are based on the reduce Line 3 throughput of 2,000 ppm. Daily emissions based on the maximum hourly rate and operation for 200 hours per year.

Line 3 Process Line - PM Emissions, including RTO Bypass Scenario

Detail:

Operating Parameters

Normal Production (hrs/yr)	8,560
RTO Bypass (hrs/yr)	200
Line 3 Rated Capacity (cans/min)	3,000
Line 3 RTO Bypass Rate (cans/min)	2,000
Line 3 Efficiency	90%

VOC Emissions

Material	Use	Application Rate (gal./,000 cans)	Vol % Solids	Ib VOC/gal solids	Normal Annual Usage (gall/yr)	RTO Bypass Annual Usage (gal/yr)
Various	Inside Spray	0.20	18.5%	6.5	277,344	4,800

Overspray (LSM) PM

21.1% solids content by weight
 94% material transfer efficiency
 95% capture efficiency
 90% deposition of PM escaping capture
 99.0% removal efficiency of LSM filters
 99.0% removal efficiency of LSM filters (RTO Bypass)

PM Emissions	Solids Applied	Solids in Overspray	Overspray to work area	Controlled Emissions ³	Controlled Emissions	Controlled Emissions	Plant Vent Fugitives	Plant Vent Fugitives	Total PM Emissions
	(lbs/yr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/yr)	(tpy)
Normal Operation ¹	495,076	29,705	1,485	0.037	282	0.14	0.02	149	0.074
RTO Bypass ²	8,568	514	26	0.02	5	0.0024	0.01	3	0.001

¹ Hourly emissions during normal operation are based on Line 3 rated throughput of 3,000 cpm. Annual emissions based on the maximum hourly rate, the 90% line efficiency, and continuous operation for 8,560 hours per year.

² Hourly emissions during RTO bypass operation are based on the reduce Line 3 throughput of 2,000 cpm. Annual emissions based on the maximum hourly rate and continuous operation for 200 hours per year.

³ Controlled emissions are based on a 94% material transfer efficiency, 95% capture efficiency. During normal operation, the LSM exhaust vents through the LSM fabric filters, then to the RTO for a combined destruction efficiency of 99%. During RTO bypass, the LSM exhaust vents through the LSM fabric filters which have a removal efficiency of 99% and then atmosphere.

⁴ Uncontrolled emissions that are emitted as fugitives through the plant vents are calculated based on the 94% material transfer efficiency and the 5% of the overspray that is not captured by the PM control system. Uncontrolled emissions are calculated based on 90% of the overspray particulates being deposited in the plant and 10% of the overspray exhausting through plant vents.

Lines 1 & 2 Process Lines - Normal Control Operating Scenario
 Crown Cork & Seal Company, Inc.
 Olympia, VA

Detail:

Operating Parameters			
Normal Production (hrs/yr)	8,560		
RTO Bypass (hrs/yr)	200		
Combined Lines 1 & 2 Rated Capacity (cans/min)	3,800		
Line 1 / Line 2 RTO Bypass Rate (cans/min)	1,900		
Line 1 and Line 2 Production Efficiency	90%		
Inside Spray Capture Efficiency	75%		
Inside Spray Destruction Efficiency	98.0%		
Varnish/Ink Capture Efficiency	75%		
Varnish/Ink Destruction Efficiency	98.0%		
UV Varnish Capture and Control	0.0%		
IPA Retention in Shop Towels (Waste)	0.0%		

Material	Use	Application Rate (gal/1,000 cans)	Vol % Solids ¹	lb VOC/gal solids ¹	Annual Usage (gall/yr)	Normal Operation ³		RTO Usage (gall/yr)	VOC Emissions (tpy)	VOC Emissions (tpy)	Annual Usage (gall/yr)	VOC Emissions (tpy)	RTO Bypass ⁴
						VOC Controlled Emissions (tpy)	Fugitive Emissions (tpy)						
Various	Inside Spray	0.18	18.5%	7.2	297,000	2.97	49.45	4,207	2.80				
Various	Varnish	0.060	35.4%	2.90	90,000	0.69	11.55	1,377	0.71				
Various	Ink	0.0039	83.9%	1.52	15,621	0.15	2.49	203	0.13				
UV Varnish	Rim Coat	0.00185	96.4%	0.01	3,250	--	0.016	42	0.0002				
IPA ²	Cleanup IPA	--	--	6.56	12,840	--	42.11	150	0.49				

¹ The solids percentage and VOC content for each material is based on the worst case formulation out of the possible coatings/inks, based on information provided in manufacturer SDSs.

² IPA usage is calculated using a 1.5 gallon per hour rate for production of 3,800 cans per hour. IPA usage rate was provided by Crown Cork personnel. Annual usage of IPA does not include the 90% line efficiency factor.

³ Annual usage of each material during normal operation is based on the combined Line 1 and 2 rated capacity of 3,800 cpm, 90% line efficiency, 8,560 hr/year of normal operation, and the respective application rate. Annual emissions during normal operation assume that 100% of the VOC content will be emitted, and are based on the annual usage, and the respect capture efficiency and destruction efficiencies for each application (Inside spray 75% CE and 98% DRE, Varnish and Ink 75% CE and 98% DRE, no control for Rim Coat and IPA).

⁴ Annual usage of each material during RTO bypass is based on only Line 2 operating at its rated capacity of 1,900 cpm, 200 hr/year of RTO bypass operation, and the respective application rate. Annual emissions during normal operation assume that 100% of the VOC content will be emitted, and are based on the annual usage, and no control.

Lines 1 & 2 Process Lines - Normal Control Operating Scenario
 Crown Cork & Seal Company, Inc.
 Olympia, WA

Material	Use	Density (lb/gal)	Ethylene Glycol Monobutyl Ether (EGBE)	Isopropyl Alcohol (IPA)	Speciated VOC (% By Weight) ¹
	CAS No. :	111-76-2		67-63-0	107-98-2
	TAP?	TAP		TAP	TAP
	HAP?				HAP
Various	Inside spray	8.46	6.80%	0.00%	0.20%
Various	Varnish	8.90	7.40%	0.00%	0.00%
Various ²	Ink	9.78	0.00%	0.00%	0.00%
IPA	Cleanup	6.56	0.00%	100.00%	0.00%

¹ Material content based on the worst case formulation of the possible coating/ink, based on manufacturer SDSs.

² More than 500 types of ink products are used, this calculation uses a reasonable worst-case density (9.78 lb/gal) and VOC content (5%).

Material	Use	Application (gallons)	Speciated VOC Emissions (lb/hr) ¹		
			EGBE	IPA	PGME
	CAS No. :	111-76-2		67-63-0	107-98-2
	TAP?	TAP		TAP	TAP
	HAP?				HAP
Various	Inside spray	42.1	24.20	0.00	0.71
Various	Varnish	13.8	9.07	0.00	0.00
Various	Ink	2.0	0.00	0.00	0.00
IPA	Cleanup	1.50	0.00	9.84	0.00
	Total Uncontrolled Emission Factor		33.27	9.84	0.71
	Fugitive Emissions		8.32	9.84	0.18
	Total Controlled Speciated VOC Emissions		0.50	0.00	0.01

Can Washer Hydrofluoric Acid Emissions ³					
0.089	Ibs formed/MM can				
100%	Capture Efficiency				
0.02	Uncontrolled Emissions, lb/hr				
0.01	RTO Bypass Emissions, lb/hr				

¹ Hourly emissions are based on the Line 3 rated capacity of 2,800 cpm, the material application rate, speciated VOC content, and respective capture efficiency and destruction efficiency for the application.

² Resin curing in the oven forms formaldehyde. It is captured 100% in the oven and routed to the RTO. The formation rate is from 2008 stack test at Crown's Olympia Washington plant.

³ Emission factors are based on past studies conducted at Crown Cork Facilities.

Potential TAP Emissions

Material	CAS	Ib/hr	Ib/day	Ib/yr	Total Annual
EGBE	111-76-2	8.8	211.6	67922	395.2
IPA	67-63-0	9.8	236.1	75801	4.9
PGME	107-98-2	0.2	4.5	1453	0.4
EGHE	112-25-4	0.5	11.3	3633	0.9
Formaldehyde	50-00-0	0.05	1.2	400	1.3
Hydrofluoric Acid	7664-39-3	0.02	0.5	156	0.01
Sulfuric Acid	7664-93-9	0.06	1.4	457	0.03

¹ Hourly emissions during normal operation are based on the combined Line 1 and 2 rated throughput of 3,800 cpm. Daily emissions based on the maximum hourly rate and continuous operation for 24 hours. Annual emissions based on the maximum hourly rate, the 90% line efficiency, and continuous operation for 8,560 hours per year.

² Hourly emissions during RTO bypass operation are based on only Line 2 operating at its rated capacity of 1,900 cpm. Daily emissions based on the maximum hourly rate and continuous operation for 24 hours. Annual emissions based on the maximum hourly rate and continuous operation for 200 hours per year.

Lines 1 & 2 Process Lines - Normal Control Operating Scenario
 Crown Cork & Seal Company, Inc.
 Olympia, WA

TAP Emissions Netting

Pollutant	CAS	Past Actual ¹			Future Potential - Normal Operation			Avg. Period	Net Change (lb/avg. period)
		lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr		
EGBE	111-76-2	33.3	798.5	101,201	8.8	211.6	71,249	24-hr	-587
IPA	67-63-0	9.8	236.1	68,301	9.8	236.1	76,785	1-hr	0
PGME	107-98-2	0.7	17.1	—	0.2	4.5	1,524	24-hr	-12.6
Formaldehyde	50-00-0	2.6	62.4	15,551	0.1	1.2	660	year	-14,890
Hydrofluoric Acid	7664-39-3	0.02	0.5	143	0.02	0.5	158	24-hr	0
Sulfuric Acid	7664-93-9	0.06	1.4	418	0.06	1.4	463	24-hr	0

¹ Annual baseline emissions are based on the average of actual emissions over the previous two year period. Short-term baseline emissions are calculated based on emission factors and Lines 1 and 2 operating at full capacity.

TAP Emissions Netting

Pollutant	CAS	Past Actual ¹			Future Potential - RTO Bypass			Avg. Period	Net Change (lb/avg. period)
		lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr		
EGBE	111-76-2	33.3	798.5	101,201	16.6	399.2	71,249	24-hr	-399
IPA	67-63-0	9.8	236.1	68,301	4.9	118.1	76,785	1-hr	-4.9
PGME	107-98-2	0.7	17.1	—	0.4	8.5	1,524	24-hr	-8.5
Formaldehyde	50-00-0	2.6	62.4	15,551	1.3	31.2	660	year	-14,890
Hydrofluoric Acid	7664-39-3	0.0	0.5	143	0.01	0.2	158	24-hr	-0.2
Sulfuric Acid	7664-93-9	0.1	1.4	418	0.03	0.7	463	24-hr	-0.7

¹ Annual baseline emissions are based on the average of actual emissions over the previous two year period. Short-term baseline emissions are calculated based on emission factors and Lines 1 and 2 operating at full capacity.

Lines 1 & 2 Process Lines - Baseline Emissions Data
 Crown Cork & Seal Company, Inc.
 Olympia, WA

Annual Emissions (tpy)

Year	Month	VOC	HF	EGHE	Formaldehyde	EGBE	n-Butanol	DMEA	Amyl Alcohol	IPA	PGME	Sulfuric Acid
	CAS:	VOC	7664-39-3	112-25-4	50-00-0	111-76-2	71-36-3	108-01-0	71-41-0	67-63-0	107-98-2	7664-93-9
	HAP?		HAP	HAP	HAP	TAP				TAP	TAP	TAP
	TAP?		TAP			TAP				TAP	TAP	TAP
2018	JANUARY	17.82	0.01	0.48	0.63	4.40	4.42	1.07	2.67	1.97	0.00	0.02
2018	FEBRUARY	14.99	0.01	0.38	0.57	3.51	3.56	0.85	2.09	1.97	0.00	0.02
2018	MARCH	15.24	0.01	0.37	0.55	3.37	3.40	0.82	2.02	2.87	0.00	0.01
2018	APRIL	16.66	0.01	0.40	0.58	3.71	3.74	0.90	2.23	3.12	0.00	0.02
2018	MAY	22.13	0.01	0.55	0.75	5.22	5.12	1.27	3.05	3.61	0.00	0.02
2018	JUNE	20.40	0.01	0.49	0.72	4.56	4.53	1.10	2.68	3.92	0.00	0.02
2018	JULY	20.99	0.01	0.52	0.76	4.85	4.84	1.19	2.87	3.30	0.00	0.02
2018	AUGUST	20.86	0.01	0.50	0.75	4.73	4.73	1.16	2.74	3.79	0.00	0.02
2018	SEPTEMBER	19.77	0.01	0.49	0.72	4.62	4.62	1.14	2.67	3.30	0.00	0.02
2018	OCTOBER	18.99	0.01	0.46	0.70	4.39	4.46	1.07	2.45	3.02	0.00	0.02
2018	NOVEMBER	18.61	0.01	0.46	0.67	4.37	4.30	1.09	2.54	2.89	0.00	0.02
2018	DECEMBER	15.06	0.01	0.38	0.55	3.47	3.47	0.85	2.11	2.53	0.00	0.01
2019	JANUARY	18.54	0.01	0.48	0.71	4.43	4.41	1.09	2.67	2.69	0.00	0.02
2019	FEBRUARY	15.28	0.00	0.40	0.54	3.85	3.74	0.94	2.18	2.26	0.00	0.01
2019	MARCH	15.00	0.01	0.37	0.56	3.60	3.63	0.89	2.00	2.39	0.00	0.01
2019	APRIL	13.04	0.00	0.29	0.50	3.01	3.04	0.74	1.51	2.48	0.00	0.01
2019	MAY	16.41	0.01	0.37	0.62	3.87	3.95	0.95	1.86	2.80	0.00	0.02
2019	JUNE	19.03	0.01	0.46	0.74	4.46	4.59	1.08	2.41	3.01	0.00	0.02
2019	JULY	19.61	0.01	0.49	0.74	4.60	4.56	1.14	2.67	3.19	0.00	0.02
2019	AUGUST	18.86	0.01	0.42	0.71	4.40	4.57	1.07	2.13	3.36	0.00	0.02
2019	SEPTEMBER	12.32	0.00	0.27	0.45	2.83	2.98	0.68	1.34	2.16	0.00	0.01
2019	OCTOBER	17.34	0.01	0.42	0.66	4.14	4.16	1.03	2.27	2.53	0.00	0.02
2019	NOVEMBER	23.53	0.01	0.70	0.66	6.44	6.53	1.57	3.81	1.80	0.00	0.02
2019	DECEMBER	18.79	0.01	0.44	0.69	4.37	4.32	1.10	2.34	3.36	0.00	0.02
2-Year Average (tpy)		214.64	0.07	5.30	7.78	50.60	50.84	12.39	28.66	34.15	0.00	0.21
2 Year Average (lb/yr)		429,278	143	10,592	15,551	101,201	101,675	24,787	57,316	68,301	0.00	418

Project Combustion Source Emissions
 Crown Cork & Seal Company, Inc.
 Olympia, WA

Summary:

Emission Source		CO	CO ₂	CH ₄	N ₂ O	NO _x	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO _{2e}
Project Combustion Sources		8.83	15,760.05	0.30	0.03	10.04	1.00	1.00	1.00	0.00	0.08	0.08	15,776.32

Detail:

Emission Source	Heat Input Rating (MMBTU/hr)	Hourly Fuel Flow (MMcf/hr)	Max. Operating Hours	Annual Fuel Flow (MMcf/yr)
Pin Oven 2 (single burner)	2.6	2.52E-03	8760	22.11
Pin Oven 3a (single burner)	2.59	2.52E-03	8760	22.11
Pin Oven 3b (single burner)	2.59	2.52E-03	8760	22.11
IBO 1 (three burners)	3.93	3.83E-03	8760	33.55
IBO 2 (three burners)	3.93	3.83E-03	8760	33.55
IBO 3 (three burners)	3.93	3.83E-03	8760	33.55
RTO Burner (single burner)	11.2	1.09E-02	8760	95.63

Pollutant	CO	CO ₂	CH ₄	N ₂ O	NO _x	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO _{2e}
AP-42 Emission Factors (lb/MMscf) ^b	84	120.017	2.3	0.2	100	7.6	7.6	7.6	0.0005	0.6	5.50	see below
New Burner (Ovens) NOx Emission Factors (lb/MMscf) ^c	84	120.017	2.3	0.2	99	7.6	7.6	7.6	0.0005	0.6	5.50	see below
New Burner (RTO) NOx Emission Factors ^d	38	120.017	2.3	0.2	37	7.6	7.6	7.6	0.0005	0.6	5.50	see below

a Emission factors obtained from AP-42 Chapter 1.4, Table 1.4-2.

b Greenhouse gas emission factors obtained from 40 CFR Part 98 Subpart C, Tables C-1 and C-2 for natural gas. CO_{2e} calculated based on global warming potential (GWP) for each Greenhouse gas; CO₂ = 1; CH₄ = 25; and N₂O = 298 (40 CFR Part 98, Subpart A).

c NOx emission factor for oven burners based on the manufacturer guarantee (80 ppm NO_x at 3% O₂), vendor data indicates NO_x concentrations range from 9 - 50 ppm @ 3% O₂ during normal operation.

d Typical NO_x and CO emission factors for RTO Maxon Kinedizer LE burner is 30 ppm NO_x @ 3% O₂ (0.036 lb/MMBtu) and 50 ppm CO @ 3% O₂ (0.057 lb/MMBtu).

1,026 Btu/scf, NG H-I-V

GWP	GHG
1	100% max. sustained firing rate
25	24 Daily Operating hours
298	8760 Annual Operating hours

Project Combustion Source Emissions
 Crown Cork & Seal Company, Inc.
 Olympia, WA

Emission Source	CO	CO ₂	CH ₄	N ₂ O	NO _x	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO _{2e}
Pin Oven 2 (single burner)	0.21	303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
Pin Oven 3a (single burner)	0.21	303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
Pin Oven 3b (single burner)	0.21	303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
IBO 1 (three burners)	0.32	460	8.66E-03	8.66E-04	0.38	2.91E-02	2.91E-02	2.91E-02	1.92E-06	0.0023	0.021	460
IBO 2 (three burners)	0.32	460	8.66E-03	8.66E-04	0.38	2.91E-02	2.91E-02	2.91E-02	1.92E-06	0.0023	0.021	460
IBO 3 (three burners)	0.32	460	8.66E-03	8.66E-04	0.38	2.91E-02	2.91E-02	2.91E-02	1.92E-06	0.0023	0.021	460
RTO Burner (single burner)	0.41	1,310	2.47E-02	2.47E-03	0.40	8.30E-02	8.30E-02	8.30E-02	5.46E-06	0.0065	0.060	3,602
New Equipment (non-exempt) Total	2.02	3,598.18	0.07	6.78E-03	2.29	0.23	0.23	0.23	1.50E-05	0.02	0.16	5,892

- Non-exempt new equipment includes Pin Ovens 2, 3a, and 3b; and IBO 1, 2, and 3.

Emission Source	CO	CO ₂	CH ₄	N ₂ O	NO _x	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO _{2e}
Pin Oven 2 (single burner)	0.93	1,327	0.03	0.003	1.1	0.08	0.08	0.08	5.53E-06	0.007	0.061	1,328
Pin Oven 3a (single burner)	0.93	1,327	0.03	0.003	1.1	0.08	0.08	0.08	5.53E-06	0.007	0.061	1,328
Pin Oven 3b (single burner)	0.93	1,327	0.03	0.003	1.1	0.08	0.08	0.08	5.53E-06	0.007	0.061	1,328
IBO 1 (three burners)	1.4	2,014	0.04	0.004	1.7	0.13	0.13	0.13	8.39E-06	0.010	0.092	2,016
IBO 2 (three burners)	1.4	2,014	0.04	0.004	1.7	0.13	0.13	0.13	8.39E-06	0.010	0.092	2,016
IBO 3 (three burners)	1.4	2,014	0.04	0.004	1.7	0.13	0.13	0.13	8.39E-06	0.010	0.092	2,016
RTO Burner (single burner)	1.8	5,738	0.11	0.011	1.8	0.36	0.36	0.36	2.39E-05	0.029	0.26	5,744
New Equipment (non-exempt) Total	8.8	15,760.05	0.30	0.030	10.0	1.00	1.00	1.00	6.57E-05	0.079	0.72	15,776

- Non-exempt new equipment includes Pin Ovens 2, 3a, and 3b; and IBO 1, 2, and 3.

Project Combustion Source Emissions
Crown Cork & Seal Company, Inc.
Olympia, WA

Toxic Air Pollutants

Pollutant ^a	Emission Factor (lb/MMscf)	Pin Oven 2 (lb/hr)	Pin Oven 3a (lb/hr)	Pin Oven 3b (lb/hr)	IBO 1 (lb/hr)	IBO 2 (lb/hr)	IBO 3 (lb/hr)	New Equipment (non-exempt) Emissions (lb/day)
NOx	1.00E+02	0.25	0.25	0.38	0.38	0.32	0.32	1.91
CO	8.40E+01	0.21	0.21	0.32	0.32	0.32	0.32	38.4
SO ₂	6.00E+03	1.51E+03	1.51E+03	2.30E+03	2.30E+03	2.30E+03	2.30E+03	14,028
Arsenic	2.00E+04	5.05E+07	5.05E+07	7.66E+07	7.66E+07	7.66E+07	7.66E+07	100
Benzene	2.10E+03	5.30E+06	5.30E+06	8.04E+06	8.04E+06	8.04E+06	8.04E+06	3.34E+02
Beryllium	1.20E+05	3.03E+08	3.03E+08	4.60E+08	4.60E+08	4.60E+08	4.60E+08	45.8
Cadmium	1.10E+03	2.78E+06	2.78E+06	4.21E+06	4.21E+06	4.21E+06	4.21E+06	16,700
Chromium	1.40E+03	3.53E+06	3.53E+06	5.36E+06	5.36E+06	5.36E+06	5.36E+06	100
Cobalt	8.40E+05	2.12E+07	2.12E+07	3.22E+07	3.22E+07	3.22E+07	3.22E+07	3.34E+01
Copper	8.50E+04	2.15E+06	2.15E+06	3.26E+06	3.26E+06	3.26E+06	3.26E+06	3.51E+01
Dichlorobenzene	1.20E+03	3.03E+06	3.03E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	2.00E+03
Formaldehyde	7.50E+02	1.89E+04	1.89E+04	2.87E+04	2.87E+04	2.87E+04	2.87E+04	1.84E+01
Hexane	1.80E+00	4.54E+03	4.54E+03	7.23E+03	7.23E+03	7.23E+03	7.23E+03	1.40E+02
Lead	5.00E+04	1.26E+06	1.26E+06	1.92E+06	1.92E+06	1.92E+06	1.92E+06	8.35E+04
Manganese	3.80E+04	9.59E+07	9.59E+07	1.46E+08	1.46E+08	1.46E+08	1.46E+08	1.42E+01
Mercury	2.60E+04	6.56E+07	6.56E+07	9.96E+07	9.96E+07	9.96E+07	9.96E+07	2.00E+01
Naphthalene	6.10E+04	1.54E+06	1.54E+06	2.34E+06	2.34E+06	2.34E+06	2.34E+06	1.25E+01
Nickel	2.10E+03	5.30E+06	5.30E+06	8.04E+06	8.04E+06	8.04E+06	8.04E+06	3.01E+01
Selenium	2.40E+05	6.06E+08	6.06E+08	9.19E+08	9.19E+08	9.19E+08	9.19E+08	8.35E+04
Toluene	3.40E+03	8.58E+06	8.58E+06	1.30E+07	1.30E+07	1.30E+07	1.30E+07	6.35E+02
Vanadium	2.30E+03	5.81E+06	5.81E+06	8.81E+06	8.81E+06	8.81E+06	8.81E+06	4.34E+02
Acenaphthene	1.80E+06	4.54E+09	4.54E+09	6.89E+09	6.89E+09	6.89E+09	6.89E+09	1.02E+01
Acenaphthylene	1.80E+06	4.54E+09	4.54E+09	6.89E+09	6.89E+09	6.89E+09	6.89E+09	3.51E+01
Anthracene	2.40E+06	6.06E+09	6.06E+09	9.19E+09	9.19E+09	9.19E+09	9.19E+09	4.01E+03
Benz(a)anthracene	1.80E+06	4.54E+09	4.54E+09	6.89E+09	6.89E+09	6.89E+09	6.89E+09	5.68E+01
Benzo(a)pyrene	1.20E+06	3.03E+09	3.03E+09	4.60E+09	4.60E+09	4.60E+09	4.60E+09	3.84E+01
Benzo(b)fluoranthene	1.80E+06	4.54E+09	4.54E+09	6.89E+09	6.89E+09	6.89E+09	6.89E+09	3.01E+04
Benzo(k)fluoranthene	1.80E+06	4.54E+09	4.54E+09	6.89E+09	6.89E+09	6.89E+09	6.89E+09	4.01E+04
Chrysene	1.80E+06	4.54E+09	4.54E+09	6.89E+09	6.89E+09	6.89E+09	6.89E+09	3.01E+04
Dibenz(a,h)anthracene	1.20E+06	3.03E+09	3.03E+09	4.60E+09	4.60E+09	4.60E+09	4.60E+09	2.00E+04
Fluoranthene	3.00E+06	7.57E+09	7.57E+09	1.15E+10	1.15E+10	1.15E+10	1.15E+10	5.01E+04
Fluorene	2.80E+06	7.07E+09	7.07E+09	1.07E+10	1.07E+10	1.07E+10	1.07E+10	4.68E+04
Indeno[1,2,3-cd]pyrene	1.80E+06	4.54E+09	4.54E+09	6.89E+09	6.89E+09	6.89E+09	6.89E+09	3.01E+04
2-Methylnaphthalene	2.40E+05	6.06E+08	6.06E+08	9.19E+08	9.19E+08	9.19E+08	9.19E+08	4.01E+03
3-Methylcholanthrene	1.80E+06	4.54E+09	4.54E+09	6.89E+09	6.89E+09	6.89E+09	6.89E+09	3.01E+04
7,12-Dimethylbenz(a)anthracene	1.60E+05	4.04E+08	4.04E+08	6.13E+08	6.13E+08	6.13E+08	6.13E+08	2.67E+03
Phenanthrene	1.70E+05	4.29E+08	4.29E+08	6.51E+08	6.51E+08	6.51E+08	6.51E+08	2.84E+03
Pyrene	5.00E+06	1.26E+08	1.26E+08	1.92E+08	1.92E+08	1.92E+08	1.92E+08	8.35E+04
Total HAP								0.04
								0.86
								315.38

^a Natural gas combustion emissions are based on emission factors obtained from vendor data (NOx) and AP-42 Chapter 1.4, Table 1.4-2.

^b Maximum potential hourly emissions are based on operation of all natural gas combustion sources (ovens, and dryers). Maximum daily emissions are calculated based on the maximum hourly emission rate and continuous emissions are conservatively based on continuous operation (8,760 hours per year).

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YEAR

112-25-4

TOXICS CON

	INSIDE SPRAY	LBS VOC/GAL (WATER)	Lb VOC/ Gal solids	kg VOC/ L solids	DENSITY LBS/GAL	VOLUME % SOLIDS	Wt % Solid	XYLENE	GLY ETH	CH2O
	9823-001	2.93	4.99	0.6	8.46	18.00%	21.10%		0.200%	0.000%
x	40Q60AA	3.2	5.8	0.7	8.35	18.50%	21.10%	0.00%	0.50%	0.00%
x	V70Q11AA	3.3	6.1	0.73	8.43	18.00%	21.10%	0.00%	0.50%	0.00%
x	V70Q38AA	3.4	6.5	0.78	8.44	17.80%	21.10%	0.00%	0.10%	0.00%
	2012825	3.6	7.2	0.863	8.43	17.30%	20.70%	0.00%	0.00%	0.00%
	2012823				8.4			0.00%	0.00%	0.00%
	Worst-Case L3	3.4	6.5	0.78	8.46	18.5%	21.1%	0.00%	0.50%	0.00%
	Worst-Case L1-L2	3.6	7.2	0.863	8.46	18.50%	21.10%	0.00%	0.50%	0.00%

	EGHE	Form

111-76-2 71-36-3 108-01-0 71-41-0

CENTRATIONS (% by total weight)

Phenol	EGBE	N-butanol	dimethylethanolamine	Amyl Alcohol	PGME
0.00%	4.100%	5.200%	0.90%	0.00%	
0.00%	4.50%	4.50%	1.10%	2.80%	
0.00%	6.10%	2.80%	0.90%	2.70%	
0.00%	6.80%	3.10%	0.60%	3.20%	
0.10%	4.00%	4.20%	0.80%	4.40%	0.20%
0.20%	4.90%	6.60%	0.20%	1.80%	0.00%
0.00%	6.80%	5.20%	1.10%	3.20%	0.00%
0.20%	6.80%	6.60%	1.10%	4.40%	0.20%
	EGBE	DMEA			

YEAR

TOX

Ovenvarnish	LBS VOC/GAL (- WATER)	Lb VOC/ Gal solids	kg VOC/L solids	DENSITY LBS/GAL	VOLUME % SOLIDS	Wt % Solid	XYLENE	GLY ETH	CH2O
22Q05AW	2.1	2.6	0.31	8.9	34.30%	39.50%		0.00%	0.000%
22Q14AG		2.3		8.9	34.50%	39.90%			0.010%
385802	1.9	2.6	0.31	8.9	34.30%	39.50%		0.00%	0.00%
CT 4891	2.1	2.9	0.35	8.9	35.40%	41.00%			
9201811	2.1	2.9	0.35	9.15	32.20%	39.50%			
9201807	2.1	2.94	0.35	8.95	31.50%	37.50%			
Worst-Case	2.1	2.9	0.35	8.9	35.4%	41.0%	0.00%	0.00%	0.01%

111-76-2 71-36-3 108-01-0

ICS CONCENTRATIONS

Methanol	EGBE	N-butano	dimethyleth anolamine	Amy l Alcohol	Tridecy
0.000%	3.300%	0.200%	2.70%		0.30%
	6.300%		1.60%		
0.00%	5.00%	1.60%	2.60%		
	7.40%	2.20%	2.00%		
	5.90%	1.80%	2.50%		
	6.10%	1.80%	2.40%		
0.00%	7.40%	2.20%	2.70%		0.30%
	DMEA	Not Listed	Not Listed		

VOC/HAP CONCENTRATIONS (BY WEIGHT)										
	Lbs VOC /GAL	Lb VOC/ Gal (WATER)	kg VOC/L solids	DENSITY LBS/GAL SOLIDS	VOLUME % Wt % Solid	XYLENE	EGHE	CH2O	DBEA	DGHE
BOTTOM VARNISH 980-5005		0.01	0.01	0.002	9.51	96.35%	96.24%		0.00%	
INX	B VOC LB INX									
AVG	0.1232	1.52		9.78	83.9%				5.00%	
SOLVENT	Retention									
IPA	6.559484			6.559484	0%					

Ink Density
 Ink VOC (wt)%
 Ink VOC Content
 VOC Density (DGHE)
 VOC Density (DGHE)
 Ink VOC (vol%)
 Ink Volume Solids

9.78 lb ctg/gal ctg
 0.1303 lb VOC/lb ctg
 1.27 lb VOC/gal ctg
 0.95 kg/l
 7.92 lb VOC/gal VOC
 0.161 gal VOC/gal ctg
 83.9% gal solids/gal ctg

Ink VOC Content **1.52 lb VOC/gal solids**

Common Name	CAS #	Averaging Period	ASIL ($\mu\text{g}/\text{m}^3$)	SQER (lb/averaging period)	De Minimis (lb/averaging period)
Acetaldehyde	75-07-0	year	3.70E-01	6.00E+01	3.00E+00
Acetamide	60-35-5	year	5.00E-02	8.10E+00	4.10E-01
Acetonitrile	75-05-8	24-hr	6.00E+01	4.40E+00	2.20E-01
2-Acetylaminofluorene	53-96-3	year	4.60E-04	7.50E-02	3.80E-03
Acrolein	107-02-8	24-hr	3.50E-01	2.60E-02	1.30E-03
Acrylamide	79-06-1	year	6.00E-03	9.80E-01	4.90E-02
Acrylic acid	79-10-7	24-hr	1.00E+00	7.40E-02	3.70E-03
Acrylonitrile	107-13-1	year	3.40E-03	5.60E-01	2.80E-02
Actinomycin D	50-76-0	year	4.00E-07	6.50E-05	3.20E-06
Alar (daminsozide)	1596-84-5	year	2.00E-01	3.20E+01	1.60E+00
Aldrin	309-00-2	year	2.00E-04	3.30E-02	1.70E-03
Allyl chloride	107-05-1	year	1.70E-01	2.70E+01	1.40E+00
3-Amino-9-ethylcarbazole hydrochloride	6109-97-3	year	4.50E-02	7.40E+00	3.70E-01
2-Amino-3-methyl-9H-pyrido[2,3-b]indole	68006-83-7	year	2.90E-03	4.80E-01	2.40E-02
1-Amino-2-methylantraquinone	82-28-0	year	2.30E-02	3.80E+00	1.90E-01
2-Amino-3-methylimidazo-[4,5-f]quinoline	76180-96-6	year	2.50E-03	4.10E-01	2.00E-02
2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazol	712-68-5	year	2.20E-04	3.50E-02	1.80E-03
A-alpha-c(2-amino-9h-pyrido[2,3-b]indole)	26148-68-5	year	8.70E-03	1.40E+00	7.10E-02
2-Aminoanthraquinone	117-79-3	year	6.40E-02	1.00E+01	5.20E-01
o-Aminoazotoluene	97-56-3	year	9.10E-04	1.50E-01	7.40E-03
4-Aminobiphenyl	92-67-1	year	1.70E-04	2.70E-02	1.40E-03
Amitrole	61-82-5	year	3.70E-03	6.00E-01	3.00E-02
Ammonia	7664-41-7	24-hr	5.00E+02	3.70E+01	1.90E+00
Ammonium bisulfate	7803-63-6	1-hr	1.20E+02	2.20E-01	1.10E-02
Aniline	62-53-3	year	6.30E-01	1.00E+02	5.10E+00
o-Anisidine	90-04-0	year	2.50E-02	4.10E+00	2.00E-01
o-Anisidine hydrochloride	134-29-2	year	3.20E-02	5.20E+00	2.60E-01
Antimony trioxide	1309-64-4	24-hr	2.00E-01	1.50E-02	7.40E-04
Aramite	140-57-8	year	1.20E-01	1.90E+01	9.40E-01
Tris(1-aziridinyl)phosphine sulfide	52-24-4	year	2.90E-04	4.80E-02	2.40E-03
Arsenic & inorganic arsenic compounds, NOS	7440-38-2	year	3.00E-04	4.90E-02	2.50E-03
Arsine	7784-42-1	24-hr	1.50E-02	1.10E-03	5.60E-05
Asbestos (fibers/cubic centimeter)	1332-21-4	year	4.30E-06	7.10E-04	3.50E-05
Actinolite asbestos (fibers/cubic centimeter)	12172-67-7	year	4.30E-06	7.10E-04	3.50E-05
Amosite asbestos (fibers/cubic centimeter)	12172-73-5	year	4.30E-06	7.10E-04	3.50E-05
Anthophyllite asbestos (fibers/cubic centimeter)	17068-78-9	year	4.30E-06	7.10E-04	3.50E-05
Chrysotile asbestos (fibers/cubic centimeter)	12001-29-5	year	4.30E-06	7.10E-04	3.50E-05

Crocidolite asbestos (fibers/cubic centimeter)	12001-28-4	year	4.30E-06	7.10E-04	3.50E-05
Libby amphibole asbestos and amphiboles, NOS (fibers/cubic centimeter)	—	year	5.90E-06	9.60E-04	4.80E-05
Tremolite asbestos (fibers/cubic centimeter)	14567-73-8	year	4.30E-06	7.10E-04	3.50E-05
Auramine	492-80-8	year	4.00E-03	6.50E-01	3.20E-02
Azaserine	115-02-6	year	3.20E-04	5.20E-02	2.60E-03
Azathioprine	446-86-6	year	2.00E-03	3.20E-01	1.60E-02
Azobenzene	103-33-3	year	3.20E-02	5.20E+00	2.60E-01
Barium chromate	10294-40-3	year	2.00E-05	3.20E-03	1.60E-04
Benz[a]anthracene	56-55-3	year	5.50E-03	8.90E-01	4.50E-02
Benzene	71-43-2	year	1.30E-01	2.10E+01	1.00E+00
Benzidine	92-87-5	year	4.30E-06	7.00E-04	3.50E-05
Benzo[a]pyrene	50-32-8	year	1.00E-03	1.60E-01	8.20E-03
Benzo[b]fluoranthene	205-99-2	year	5.50E-03	8.90E-01	4.50E-02
Benzo[j]fluoranthene	205-82-3	year	5.50E-03	8.90E-01	4.50E-02
Benzo[k]fluoranthene	207-08-9	year	5.50E-03	8.90E-01	4.50E-02
Benzyl chloride	100-44-7	year	2.00E-02	3.30E+00	1.70E-01
Benzyl violet 4B	1694-09-3	year	1.80E-01	2.80E+01	1.40E+00
Beryllium & compounds, NOS	7440-41-7	year	4.20E-04	6.80E-02	3.40E-03
Beryllium oxide	1304-56-9	year	4.20E-04	6.80E-02	3.40E-03
Beryllium sulfate	13510-49-1	year	1.20E-06	1.90E-04	9.40E-06
beta-Butyrolactone	3068-88-0	year	3.40E-03	5.60E-01	2.80E-02
beta-Propiolactone	57-57-8	year	2.50E-04	4.10E-02	2.00E-03
Bis(2-chloroethyl) ether	111-44-4	year	1.40E-03	2.30E-01	1.10E-02
Bis(chloromethyl) ether	542-88-1	year	7.70E-05	1.20E-02	6.20E-04
Boron & compounds, NOS	—	24-hr	3.00E+02	2.20E+01	1.10E+00
Bromobenzene	108-86-1	24-hr	6.00E+01	4.40E+00	2.20E-01
Bromodichloromethane	75-27-4	year	2.70E-02	4.40E+00	2.20E-01
Bromoform	75-25-2	year	9.10E-01	1.50E+02	7.40E+00
Bromomethane (methyl bromide)	74-83-9	24-hr	5.00E+00	3.70E-01	1.90E-02
1-Bromopropane	106-94-5	24-hr	1.00E+02	7.40E+00	3.70E-01
1,3-Butadiene	106-99-0	year	3.30E-02	5.40E+00	2.70E-01
Butylated hydroxyanisole	25013-16-5	year	1.80E+01	2.80E+03	1.40E+02
C.I. basic red 9 monohydrochloride	569-61-9	year	1.40E-02	2.30E+00	1.10E-01
Cadmium & compounds, NOS	7440-43-9	year	2.40E-04	3.90E-02	1.90E-03
Caprolactam	105-60-2	24-hr	2.20E+00	1.60E-01	8.20E-03
Captfol	61/2425	year	2.30E-02	3.80E+00	1.90E-01
Captan	133-06-2	year	1.50E+00	2.50E+02	1.20E+01
Carbon disulfide	75-15-0	24-hr	8.00E+02	5.90E+01	3.00E+00
Carbon monoxide	630-08-0	1-hr	2.30E+04	4.30E+01	1.10E+00
Carbon tetrachloride	56-23-5	year	1.70E-01	2.70E+01	1.40E+00
Carbonyl sulfide	463-58-1	24-hr	1.00E+01	7.40E-01	3.70E-02
Cerium oxide	1306-38-3	24-hr	9.00E-01	6.70E-02	3.30E-03
Chlorambucil	305-03-3	year	7.70E-06	1.20E-03	6.20E-05
Chlordane	57-74-9	year	1.00E-02	1.60E+00	8.10E-02

Chlordecone	143-50-0	year	2.20E-04	3.50E-02	1.80E-03
Chlorendic acid	115-28-6	year	3.80E-02	6.20E+00	3.10E-01
Chlorinated paraffins	108171-26-2	year	4.00E-02	6.50E+00	3.20E-01
Chlorine	7782-50-5	24-hr	1.50E-01	1.10E-02	5.60E-04
Chlorine dioxide	10049-04-4	24-hr	6.00E-01	4.40E-02	2.20E-03
1-Chloro-1,1-difluoroethane	75-68-3	24-hr	5.00E+04	3.70E+03	1.90E+02
3-Chloro-2-methyl-1-propene	563-47-3	year	2.50E-02	4.10E+00	2.00E-01
2-Chloroacetophenone	532-27-4	24-hr	3.00E-02	2.20E-03	1.10E-04
Chloroalkanes C10-13 (chlorinated paraffins)	85535-84-8	year	4.00E-02	6.50E+00	3.20E-01
Chlorobenzene	108-90-7	24-hr	1.00E+03	7.40E+01	3.70E+00
Chlorobenzilate	510-15-6	year	3.20E-02	5.20E+00	2.60E-01
Chlorodifluoromethane (Freon 22)	75-45-6	24-hr	5.00E+04	3.70E+03	1.90E+02
Chloroethane (ethyl chloride)	75-00-3	24-hr	3.00E+04	2.20E+03	1.10E+02
Chloroform	67-66-3	year	4.30E-02	7.10E+00	3.50E-01
Chloromethane (methyl chloride)	74-87-3	24-hr	9.00E+01	6.70E+00	3.30E-01
Chloromethyl methyl ether	107-30-2	year	1.40E-03	2.40E-01	1.20E-02
4-Chloro-o-phenylenediamine	95-83-0	year	2.20E-01	3.50E+01	1.80E+00
p-Chloro-o-toluidine	95-69-2	year	1.30E-02	2.10E+00	1.10E-01
Chloropicrin	76-06-2	24-hr	4.00E-01	3.00E-02	1.50E-03
Chloroprene	126-99-8	year	2.00E-03	3.30E-01	1.60E-02
Chlorothalonil	1897-45-6	year	1.10E+00	1.80E+02	9.10E+00
Chlorozotocin	54749-90-5	year	1.40E-05	2.40E-03	1.20E-04
Chromic trioxide	1333-82-0	year	7.70E-06	1.30E-03	6.30E-05
Chromic(VI) acid	7738-94-5	year	9.10E-06	1.50E-03	7.40E-05
Chromium(III), insoluble particulates, NOS	—	24-hr	5.00E+00	3.70E-01	1.90E-02
Chromium(III), soluble particulates, NOS	—	24-hr	1.00E-01	7.40E-03	3.70E-04
Chromium(VI) & compounds, NOS	7440-47-:	year	4.00E-06	6.50E-04	3.30E-05
Chrysene	218-01-9	year	5.50E-02	8.90E+00	4.50E-01
Cinnamyl anthranilate	87-29-6	year	7.70E-01	1.20E+02	6.20E+00
Cobalt and compounds, NOS	7440-48-4	24-hr	1.00E-01	7.40E-03	3.70E-04
Coke oven emissions	—	year	9.70E-04	1.60E-01	7.90E-03
Copper & compounds	7440-50-8	1-hr	1.00E+02	1.90E-01	9.30E-03
p-Cresidine	120-71-8	year	2.30E-02	3.80E+00	1.90E-01
Cresols (mixture), including m-cresol, o-cresol, p-cresol	1319-77-3	24-hr	6.00E+02	4.40E+01	2.20E+00
m-Cresol (3-methylphenol)	108-39-4	24-hr	6.00E+02	4.40E+01	2.20E+00
o-Cresol (2-methylphenol)	95-48-7	24-hr	6.00E+02	4.40E+01	2.20E+00
p-Cresol (4-methylphenol)	106-44-5	24-hr	6.00E+02	4.40E+01	2.20E+00
Cumene	98-82-8	24-hr	4.00E+02	3.00E+01	1.50E+00
Cupferron	135-20-6	year	1.60E-02	2.60E+00	1.30E-01
Cyclohexane	110-82-7	24-hr	6.00E+03	4.40E+02	2.20E+01
Cyclophosphamide (anhydrous)	50-18-0	year	5.90E-03	9.60E-01	4.80E-02
Cyclophosphamide (hydrated)	6055-19-2	year	6.30E-03	1.00E+00	5.10E-02
D & C red no. 9	2/1/5160	year	6.70E-01	1.10E+02	5.40E+00
Dacarbazine	3/4/4342	year	7.10E-05	1.20E-02	5.80E-04

Dantron	117-10-2	year	4.50E-02	7.40E+00	3.70E-01
Di(2-ethylhexyl)phthalate	117-81-7	year	4.20E-01	6.80E+01	3.40E+00
2,4-Diaminoanisole	615-05-4	year	1.50E-01	2.50E+01	1.20E+00
2,4-Diaminoanisole sulfate	39156-41-7	year	2.70E-01	4.40E+01	2.20E+00
4,4'-Diaminodiphenyl ether	101-80-4	year	2.50E-02	4.10E+00	2.00E-01
2,4-Diaminotoluene (2,4-toluene diamine)	95-80-7	year	9.10E-04	1.50E-01	7.40E-03
Diazinon	333-41-5	24-hr	1.00E+01	7.40E-01	3.70E-02
Dibenz[a,h]acridine	226-36-8	year	5.50E-03	8.90E-01	4.50E-02
Dibenz[a,h]anthracene	53-70-3	year	5.00E-04	8.20E-02	4.10E-03
Dibenz[a,j]acridine	224-42-0	year	5.50E-03	8.90E-01	4.50E-02
Dibenzo[a,e]pyrene	192-65-4	year	5.50E-04	8.90E-02	4.50E-03
Dibenzo[a,h]pyrene	189-64-0	year	5.50E-05	8.90E-03	4.50E-04
Dibenzo[a,i]pyrene	189-55-9	year	5.50E-05	8.90E-03	4.50E-04
Dibenzo[a,l]pyrene	191-30-0	year	5.50E-05	8.90E-03	4.50E-04
7H-Dibenzo[c,g]carbazole	194-59-2	year	5.50E-04	8.90E-02	4.50E-03
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	year	3.20E-04	5.20E-02	2.60E-03
Tris(2,3-dibromopropyl)phosphate	126-72-7	year	1.50E-03	2.50E-01	1.20E-02
1,4-Dichlorobenzene	106-46-7	year	9.10E-02	1.50E+01	7.40E-01
3,3'-Dichlorobenzidine	91-94-1	year	2.90E-03	4.80E-01	2.40E-02
DDD (dichlorodiphenyldichloroethane)	72-54-8	year	1.40E-02	2.40E+00	1.20E-01
DDE (dichlorodiphenyldichloroethylene)	72-55-9	year	1.00E-02	1.70E+00	8.40E-02
DDT(dichlorodiphenyltrichloroethane)	50-29-3	year	1.00E-02	1.70E+00	8.40E-02
1,1-Dichloroethane (ethylidene dichloride)	75-34-3	year	6.30E-01	1.00E+02	5.10E+00
trans-1,2-Dichloroethene	156-60-5	24-hr	8.10E+02	6.00E+01	3.00E+00
1,1-Dichloroethylene (1,1-DCE)	75-35-4	24-hr	2.00E+02	1.50E+01	7.40E-01
Dichloromethane	75-09-2	year	6.00E+01	9.80E+03	4.90E+02
1,2-Dichloropropane (propylene dichloride)	78-87-5	year	1.00E-01	1.60E+01	8.10E-01
1,3-Dichloropropene	542-75-6	year	2.50E-01	4.10E+01	2.00E+00
2,3-Dichloropropene	78-88-6	24-hr	9.20E+00	6.80E-01	3.40E-02
Dichlorvos (DDVP)	62-73-7	year	1.20E-02	2.00E+00	9.80E-02
Dieldrin	60-57-1	year	2.20E-04	3.50E-02	1.80E-03
Diesel engine exhaust, particulate	—	year	3.30E-03	5.40E-01	2.70E-02
Diethanolamine	111-42-2	24-hr	3.00E+00	2.20E-01	1.10E-02
Diethylstilbestrol	56-53-1	year	1.00E-05	1.60E-03	8.10E-05
1,1-Difluoroethane	75-37-6	24-hr	4.00E+04	3.00E+03	1.50E+02
Diglycidyl resorcinol ether	101-90-6	year	2.00E-03	3.30E-01	1.70E-02
Dihydrosafrole	94-58-6	year	7.70E-02	1.20E+01	6.20E-01
4-Dimethylaminoazobenzene	60-11-7	year	7.70E-04	1.20E-01	6.20E-03
trans-2[(dimethylamino)-methylimino]-5-[2-(5-nitro-2-furyl)-vinyl]-1,3,4-oxadiazole	55738-54-0	year	7.70E-03	1.20E+00	6.20E-02
7,12-Dimethylbenz[a]anthracene	57-97-6	year	8.50E-06	1.40E-03	6.90E-05
Dimethyl carbamoyl chloride	79-44-7	year	2.70E-04	4.40E-02	2.20E-03
1,1-Dimethylhydrazine	57-14-7	24-hr	5.00E-01	3.70E-02	1.90E-03
1,2-Dimethylhydrazine	540-73-8	year	6.30E-06	1.00E-03	5.10E-05
Dimethylvinylchloride	513-37-1	year	7.70E-02	1.20E+01	6.20E-01
1,6-Dinitropyrene	42397-64-8	year	5.50E-05	8.90E-03	4.50E-04

1,8-Dinitropyrene	42397-65-9	year	5.50E-04	8.90E-02	4.50E-03
2,4-Dinitrotoluene	121-14-2	year	1.10E-02	1.80E+00	9.10E-02
1,4-Dioxane	123-91-1	year	2.00E-01	3.20E+01	1.60E+00
1,2-Diphenylhydrazine (hydrazobenzene)	122-66-7	year	4.00E-03	6.50E-01	3.20E-02
Direct black 38	1937-37-7	year	4.80E-04	7.70E-02	3.90E-03
Direct blue 6	2602-46-2	year	4.80E-04	7.70E-02	3.90E-03
Direct brown 95	16071-86-6	year	5.30E-04	8.50E-02	4.30E-03
Disperse blue 1	2475-45-8	year	7.70E-01	1.20E+02	6.20E+00
Disulfoton	298-04-4	24-hr	2.00E-01	1.50E-02	7.40E-04
Epichlorohydrin	106-89-8	year	4.30E-02	7.10E+00	3.50E-01
1,2-Epoxybutane	106-88-7	24-hr	2.00E+01	1.50E+00	7.40E-02
Estradiol 17B	50-28-2	year	9.10E-05	1.50E-02	7.40E-04
Ethyl benzene	100-41-4	year	4.00E-01	6.50E+01	3.20E+00
Ethyl carbamate (urethane)	51-79-6	year	2.10E-03	3.40E-01	1.70E-02
Ethylene dibromide (EDB, 1,2-dibromoethane)	106-93-4	year	1.70E-03	2.70E-01	1.40E-02
Ethylene dichloride (EDC, 1,2-dichloroethane)	107-06-2	year	3.80E-02	6.20E+00	3.10E-01
Ethylene glycol	107-21-1	24-hr	4.00E+02	3.00E+01	1.50E+00
Ethylene glycol monobutyl ether	111-76-2	24-hr	8.20E+01	6.10E+00	3.00E-01
Ethylene glycol monoethyl ether (2-ethoxyethanol)	110-80-5	24-hr	7.00E+01	5.20E+00	2.60E-01
Ethylene glycol monoethyl ether acetate	111-15-9	24-hr	3.00E+02	2.20E+01	1.10E+00
Ethylene glycol monomethyl ether (2-methoxyethanol)	109-86-4	24-hr	6.00E+01	4.40E+00	2.20E-01
Ethylene glycol monomethyl ether acetate	110-49-6	24-hr	9.00E+01	6.70E+00	3.30E-01
Ethylene oxide	75-21-8	year	2.00E-04	3.30E-02	1.60E-03
Ethylene thiourea	96-45-7	year	7.70E-02	1.20E+01	6.20E-01
Ethyleneimine	151-56-4	year	5.30E-05	8.50E-03	4.30E-04
Ferric sulfate	10028-22-5	1-hr	1.20E+02	2.20E-01	1.10E-02
Fluorides (fluoride containing chemicals), NOS	—	24-hr	1.30E+01	9.60E-01	4.80E-02
Fluorine gas F ₂	7782-41-4	24-hr	1.60E+01	1.20E+00	5.90E-02
Formaldehyde	50-00-0	year	1.70E-01	2.70E+01	1.40E+00
Furmecyclox	60568-05-0	year	1.20E-01	1.90E+01	9.40E-01
Furylfuramide	3688-53-7	year	1.40E-02	2.40E+00	1.20E-01
Glu-P-1	67730-11-4	year	7.10E-04	1.20E-01	5.80E-03
Glu-P-2	67730-10-3	year	2.50E-03	4.10E-01	2.00E-02
Glutaraldehyde	111-30-8	24-hr	8.00E-02	5.90E-03	3.00E-04
Guthion (azinphos-methyl)	86-50-0	24-hr	1.00E+01	7.40E-01	3.70E-02
Gyromitrin	16568-02-8	year	3.40E-04	5.60E-02	2.80E-03
HC blue 1	2784-94-3	year	6.70E-02	1.10E+01	5.40E-01
Heptachlor	76-44-8	year	7.70E-04	1.20E-01	6.20E-03
Heptachlor epoxide	1024-57-3	year	3.80E-04	6.20E-02	3.10E-03
Heptachlorodibenzo-p-dioxin, NOS	37871-00-4	year	2.60E-06	4.30E-04	2.10E-05
Hexachlorobenzene	118-74-1	year	2.20E-03	3.50E-01	1.80E-02

Hexachlorobutadiene	87-68-3	year	4.50E-02	7.40E+00	3.70E-01
Hexachlorocyclohexane	608-73-1	year	9.10E-04	1.50E-01	7.40E-03
alpha-Hexachlorocyclohexane	319-84-6	year	1.30E-03	2.10E-01	1.10E-02
beta-Hexachlorocyclohexane	319-85-7	year	2.30E-03	3.80E-01	1.90E-02
gamma-Hexachlorocyclohexane (lindane)	58-89-9	year	3.20E-03	5.20E-01	2.60E-02
Hexachlorocyclopentadiene	77-47-4	24-hr	2.00E-01	1.50E-02	7.40E-04
Hexachlorodibenzo-p-dioxins, NOS	34465-46-8	year	2.60E-07	4.30E-05	2.10E-06
Hexachloroethane	67-72-1	year	9.10E-02	1.50E+01	7.40E-01
Hexamethylene diisocyanate	822-06-0	24-hr	7.00E-02	5.20E-03	2.60E-04
n-Hexane	110-54-3	24-hr	7.00E+02	5.20E+01	2.60E+00
2-Hexanone	591-78-6	24-hr	3.00E+01	2.20E+00	1.10E-01
Hydrazine	302-01-2	year	2.00E-04	3.30E-02	1.70E-03
Hydrazine sulfate	10034-93-2	year	1.20E-03	1.90E-01	9.40E-03
Hydrogen chloride	7647-01-0	24-hr	9.00E+00	6.70E-01	3.30E-02
Hydrogen cyanide	74-90-8	24-hr	8.00E-01	5.90E-02	3.00E-03
Hydrogen fluoride	7664-39-3	24-hr	1.40E+01	1.00E+00	5.20E-02
Hydrogen sulfide	6/4/7783	24-hr	2.00E+00	1.50E-01	7.40E-03
Indeno[1,2,3-cd]pyrene	193-39-5	year	5.50E-03	8.90E-01	4.50E-02
Isophorone	78-59-1	24-hr	2.00E+03	1.50E+02	7.40E+00
Isopropyl alcohol	67-63-0	1-hr	3.20E+03	5.90E+00	3.00E-01
Lasiocarpine	303-34-4	year	4.50E-04	7.40E-02	3.70E-03
Lead & compounds, NOS	7439-92-1	year	8.30E-02	1.40E+01	1.00E+01
Lead acetate	301-04-2	year	1.30E-02	2.00E+00	1.00E-01
Lead chromate oxide	18454-12-1	year	4.20E-05	6.90E-03	3.40E-04
Lead chromate	7758-97-6	year	2.50E-05	4.10E-03	2.00E-04
Lead phosphate	7446-27-7	year	8.30E-02	1.40E+01	6.80E-01
Lead subacetate	1335-32-6	year	9.10E-02	1.50E+01	7.40E-01
Malathion	121-75-5	24-hr	2.00E+01	1.50E+00	7.40E-02
Maleic anhydride	108-31-6	24-hr	7.00E-01	5.20E-02	2.60E-03
Manganese & compounds	7439-96-5	24-hr	3.00E-01	2.20E-02	1.10E-03
Melphalan	148-82-3	year	2.70E-05	4.40E-03	2.20E-04
Mercury, elemental	7439-97-6	24-hr	3.00E-02	2.20E-03	1.10E-04
Diethyl mercury	627-44-1	24-hr	1.40E-01	1.00E-02	5.20E-04
Dimethyl mercury	593-74-8	24-hr	1.40E-01	1.00E-02	5.20E-04
Methyl alcohol (methanol)	67-56-1	24-hr	2.00E+04	1.50E+03	7.40E+01
3-Methylcholanthrene	56-49-5	year	9.60E-05	1.60E-02	7.80E-04
5-Methylchrysene	3697-24-3	year	5.50E-04	8.90E-02	4.50E-03
4,4'-Methylenebis(2-chloroaniline) (MOCA)	101-14-4	year	1.40E-03	2.30E-01	1.10E-02
4,4'-Methylenebis(2-methylaniline)	838-88-0	year	3.80E-03	6.20E-01	3.10E-02
4,4'-Methylenebis(N,N'-dimethyl)aniline	101-61-1	year	7.70E-02	1.20E+01	6.20E-01
4,4'-Methylenedianiline	101-77-9	year	2.20E-03	3.50E-01	1.80E-02
4,4'-Methylenedianiline dihydrochloride	13552-44-8	year	2.20E-03	3.50E-01	1.80E-02
Methylene diphenyl diisocyanate (MDI)	101-68-8	24-hr	8.00E-02	5.90E-03	3.00E-04
Methyl ethyl ketone	78-93-3	24-hr	5.00E+03	3.70E+02	1.90E+01
Methyl isobutyl ketone (MIBK, hexone)	108-10-1	24-hr	3.00E+03	2.20E+02	1.10E+01

Methyl isocyanate	624-83-9	24-hr	1.00E+00	7.40E-02	3.70E-03
Methyl methacrylate	80-62-6	24-hr	7.00E+02	5.20E+01	2.60E+00
Methyl methanesulfonate	66-27-3	year	3.60E-02	5.80E+00	2.90E-01
2-Methyl-1-nitroanthraquinone	129-15-7	year	8.30E-04	1.40E-01	6.80E-03
N-Methyl-N-nitro-N-nitrosoguanidine	70-25-7	year	4.20E-04	6.80E-02	3.40E-03
Methyl tert-butyl ether	1634-04-4	year	3.80E+00	6.20E+02	3.10E+01
Methylthiouracil	56-04-2	year	9.10E-03	1.50E+00	7.40E-02
Michler's ketone	90-94-8	year	4.00E-03	6.50E-01	3.20E-02
Mirex	2385-85-5	year	2.00E-04	3.20E-02	1.60E-03
Mitomycin C	50-07-7	year	4.30E-07	7.10E-05	3.50E-06
Monocrotaline	315-22-0	year	3.40E-04	5.60E-02	2.80E-03
N,N-Dimethylformamide	68-12-2	24-hr	8.00E+01	5.90E+00	3.00E-01
Naphthalene	91-20-3	year	2.90E-02	4.80E+00	2.40E-01
2-Naphthylamine	91-59-8	year	2.00E-03	3.20E-01	1.60E-02
Nickel & compounds, NOS	7440-02-1	year	3.80E-03	6.20E-01	3.10E-02
Nickel acetate	373-02-4	year	1.20E-02	1.90E+00	9.40E-02
Nickel carbonate	3333-67-3	year	7.80E-03	1.30E+00	6.30E-02
Nickel carbonate hydroxide	12607-70-4	year	6.60E-03	1.10E+00	5.40E-02
Nickel carbonyl	13463-39-3	year	1.10E-02	1.80E+00	9.10E-02
Nickel chloride	7718-54-9	year	8.50E-03	1.40E+00	6.90E-02
Nickel hydroxide	12054-48-7	year	6.10E-03	9.90E-01	4.90E-02
Nickel nitrate hexahydrate	13478-00-7	year	1.90E-02	3.10E+00	1.50E-01
Nickel oxide (nickel monoxide, nickel(II) oxide)	1313-99-1	year	4.90E-03	7.90E-01	4.00E-02
Nickel oxide black (nickel sesquioxide, nickel(III) oxide)	1314-06-3	year	5.40E-03	8.80E-01	4.40E-02
Nickel refinery dust	—	year	4.20E-03	6.80E-01	3.40E-02
Nickel subsulfide	12035-72-2	year	2.10E-03	3.40E-01	1.70E-02
Nickel sulfate	7786-81-4	year	1.00E-02	1.60E+00	8.20E-02
Nickel sulfate hexahydrate	10101-97-0	year	1.70E-02	2.80E+00	1.40E-01
Nickel sulfide	11113-75-0	year	6.00E-03	9.70E-01	4.80E-02
Nickelocene	1271-28-9	year	1.20E-02	2.00E+00	1.00E-01
Nifurthiazole	3570-75-0	year	1.50E-03	2.50E-01	1.20E-02
Nitric acid	7697-37-2	1-hr	8.60E+01	1.60E-01	8.00E-03
Nitrilotriacetic acid	139-13-9	year	6.70E-01	1.10E+02	5.40E+00
Nitrilotriacetic acid, trisodium salt monohydrate	18662-53-8	year	3.40E-01	5.60E+01	2.80E+00
Nitrobenzene	98-95-3	year	2.50E-02	4.10E+00	2.00E-01
Nitrofen	1836-75-5	year	4.30E-02	7.10E+00	3.50E-01
2-Nitrofluorene	607-57-8	year	5.50E-02	8.90E+00	4.50E-01
Nitrofurazone	59-87-0	year	2.70E-03	4.40E-01	2.20E-02
1-[(5-Nitrofurylidene)-amino]-2-imidazolidinone	555-84-0	year	2.00E-03	3.20E-01	1.60E-02
N-[4-(5-nitro-2-furyl)-2-thiazolyl]-acetamide	531-82-8	year	2.30E-03	3.80E-01	1.90E-02
Nitrogen dioxide	10102-44-0	1-hr	4.70E+02	8.70E-01	4.60E-01

2-Nitropropane	79-46-9	24-hr	2.00E+01	1.50E+00	7.40E-02
1-Nitropyrene	5522-43-0	year	5.50E-03	8.90E-01	4.50E-02
4-Nitropyrene	57835-92-4	year	5.50E-03	8.90E-01	4.50E-02
5-Nitroacenaphthene	602-87-9	year	1.60E-02	2.60E+00	1.30E-01
6-Nitrochrysene	2/8/7496	year	5.50E-05	8.90E-03	4.50E-04
N-Nitrosodiethanolamine	1116-54-7	year	1.30E-03	2.00E-01	1.00E-02
N-Nitrosodiethylamine	55-18-5	year	6.00E-05	1.00E-02	4.90E-04
N-Nitrosodimethylamine	62-75-9	year	1.30E-04	2.10E-02	1.10E-03
N-Nitrosodi-N-butylamine	924-16-3	year	3.20E-04	5.20E-02	2.60E-03
N-Nitrosodi-N-propylamine	621-64-7	year	5.00E-04	8.10E-02	4.10E-03
N-Nitrosodiphenylamine	86-30-6	year	3.80E-01	6.20E+01	3.10E+00
p-Nitrosodiphenylamine	156-10-5	year	1.60E-01	2.60E+01	1.30E+00
N-Nitrosomorpholine	59-89-2	year	5.30E-04	8.50E-02	4.30E-03
N-Nitroso-N-ethylurea	759-73-9	year	7.80E-05	1.30E-02	6.40E-04
N-Nitroso-N-methylethylamine	10595-95-6	year	1.60E-04	2.60E-02	1.30E-03
N-Nitroso-N-methylurea	684-93-5	year	1.80E-05	2.90E-03	1.40E-04
N-Nitroso-N-methylurethane	615-53-2	year	3.20E-05	5.20E-03	2.60E-04
N-Nitrosonornicotine	16543-55-8	year	2.50E-03	4.10E-01	2.00E-02
N-Nitrosopiperidine	100-75-4	year	3.70E-04	6.00E-02	3.00E-03
N-Nitrosopyrrolidine	930-55-2	year	1.70E-03	2.70E-01	1.40E-02
Oleum	8014-95-7	1-hr	1.20E+02	2.20E-01	1.10E-02
Ozone	10028-15-6	1-hr	1.80E+02	3.30E-01	2.00E-02
Parathion	56-38-2	24-hr	2.00E-05	1.50E-06	7.40E-08
Pentachlorophenol	87-86-5	year	2.20E-01	3.50E+01	1.80E+00
Perchloroethylene	127-18-4	year	1.60E-01	2.70E+01	1.30E+00
Phenacetin	62-44-2	year	1.60E+00	2.60E+02	1.30E+01
Phenazopyridine	94-78-0	year	2.00E-02	3.30E+00	1.70E-01
Phenazopyridine hydrochloride	136-40-3	year	2.30E-02	3.80E+00	1.90E-01
Phenesterin	10/9/3546	year	2.30E-05	3.80E-03	1.90E-04
Phenobarbital	50-06-6	year	7.70E-03	1.20E+00	6.20E-02
Phenol	108-95-2	24-hr	2.00E+02	1.50E+01	7.40E-01
Phenoxybenzamine	59-96-1	year	1.10E-03	1.80E-01	9.10E-03
Phenoxybenzamine hydrochloride	63-92-3	year	1.30E-03	2.10E-01	1.10E-02
o-Phenylphenate, sodium	132-27-4	year	1.20E+00	1.90E+02	9.40E+00
Phosgene	75-44-5	24-hr	3.00E-01	2.20E-02	1.10E-03
Phosphine	7803-51-2	24-hr	8.00E-01	5.90E-02	3.00E-03
Phosphoric acid	7664-38-2	24-hr	7.00E+00	5.20E-01	2.60E-02
Phosphorus	7723-14-0	24-hr	2.00E+01	1.50E+00	7.40E-02
Phosphorus, white	12185-10-3	24-hr	2.00E+01	1.50E+00	7.40E-02
Phthalic anhydride	85-44-9	24-hr	2.00E+01	1.50E+00	7.40E-02
Polybrominated biphenyls	—	year	1.20E-04	1.90E-02	9.40E-04
Polybrominated diphenyl ethers (PBDEs) [containing less than 10 bromine atoms]	—	24-hr	6.00E+00	4.40E-01	2.20E-02
Polychlorinated biphenyls (PCBs), NOS	1336-36-3	year	1.80E-03	2.80E-01	1.40E-02

PCB 77 (3,3',4,4'-tetrachlorobiphenyl)	32598-13-3	year	2.60E-04	4.30E-02	2.10E-03
PCB 81 (3,4,4',5-tetrachlorobiphenyl)	70362-50-4	year	9.10E-05	1.50E-02	7.40E-04
PCB 105 (2,3,3',4,4'-pentachlorobiphenyl)	32598-14-4	year	9.10E-04	1.50E-01	7.40E-03
PCB 114 (2,3,4,4',5-pentachlorobiphenyl)	74472-37-0	year	9.10E-04	1.50E-01	7.40E-03
PCB 118 (2,3',4,4',5-pentachlorobiphenyl)	31508-00-6	year	9.10E-04	1.50E-01	7.40E-03
PCB 123 (2,3',4,4',5'-pentachlorobiphenyl)	65510-44-3	year	9.10E-04	1.50E-01	7.40E-03
PCB 126 (3,3',4,4',5-pentachlorobiphenyl)	57465-28-8	year	2.60E-07	4.30E-05	2.10E-06
PCB 156 (2,3,3',4,4',5-hexachlorobiphenyl)	38380-08-4	year	9.10E-04	1.50E-01	7.40E-03
PCB 157 (2,3,3',4,4',5'-hexachlorobiphenyl)	69782-90-7	year	9.10E-04	1.50E-01	7.40E-03
PCB 167 (2,3',4,4',5,5'-hexachlorobiphenyl)	52663-72-6	year	9.10E-04	1.50E-01	7.40E-03
PCB 169 (3,3',4,4',5,5'-hexachlorobiphenyl)	32774-16-6	year	9.10E-07	1.50E-04	7.40E-06
PCB 189 (2,3,3',4,4',5,5'-heptachlorobiphenyl)	39635-31-9	year	9.10E-04	1.50E-01	7.40E-03
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	year	2.60E-06	4.30E-04	2.10E-05
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	year	2.60E-07	4.30E-05	2.10E-06
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	year	2.60E-07	4.30E-05	2.10E-06
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	year	2.60E-07	4.30E-05	2.10E-06
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	year	9.10E-05	1.50E-02	7.40E-04
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	year	2.60E-08	4.30E-06	2.10E-07
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	year	2.60E-08	4.30E-06	2.10E-07
2,3,7,8-Tetrachlorodibenzo-p-dioxin & related compounds, NOS	—	year	2.60E-08	4.30E-06	2.10E-07
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	year	2.60E-06	4.30E-04	2.10E-05
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	year	2.60E-06	4.30E-04	2.10E-05
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	year	2.60E-07	4.30E-05	2.10E-06
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	year	2.60E-07	4.30E-05	2.10E-06
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	year	2.60E-07	4.30E-05	2.10E-06
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	year	2.60E-07	4.30E-05	2.10E-06
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	39001-02-0	year	9.10E-05	1.50E-02	7.40E-04
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	year	9.10E-07	1.50E-04	7.40E-06
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	year	9.10E-08	1.50E-05	7.40E-07
2,3,7,8-Tetrachlorodibenzofuran (TcDF)	51207-31-9	year	2.60E-07	4.30E-05	2.10E-06
Ponceau 3R	9/8/3564	year	2.20E-01	3.50E+01	1.80E+00
Ponceau MX	3761-53-3	year	7.70E-01	1.20E+02	6.20E+00

Potassium bromate	1/2/7758	year	7.10E-03	1.20E+00	5.80E-02
Procarbazine	671-16-9	year	2.50E-04	4.10E-02	2.00E-03
Procarbazine hydrochloride	366-70-1	year	2.90E-04	4.80E-02	2.40E-03
1,3-Propane sultone	1120-71-4	year	1.40E-03	2.40E-01	1.20E-02
Propionaldehyde	123-38-6	24-hr	8.00E+00	5.90E-01	3.00E-02
Propylene	115-07-1	24-hr	3.00E+03	2.20E+02	1.10E+01
Propylene glycol	57-55-6	24-hr	2.80E+01	2.10E+00	1.10E-01
Propylene glycol dinitrate	6423-43-4	24-hr	2.80E-01	2.10E-02	1.00E-03
Propylene glycol monomethyl ether	107-98-2	24-hr	7.00E+03	5.20E+02	2.60E+01
Propylene oxide	75-56-9	year	2.70E-01	4.40E+01	2.20E+00
Propylthiouracil	51-52-5	year	3.40E-03	5.60E-01	2.80E-02
Refractory ceramic fibers (fibers/cubic centimeter)	—	24-hr	3.00E-02	2.20E-03	1.10E-04
Reserpine	50-55-5	year	3.20E-04	5.20E-02	2.60E-03
Safrole	94-59-7	year	9.60E-03	1.60E+00	7.80E-02
Selenide, hydrogen	7/5/7783	1-hr	5.00E+00	9.30E-03	4.60E-04
Selenium & selenium compounds (other than hydrogen selenide)	7782-49-2	24-hr	2.00E+01	1.50E+00	7.40E-02
Silica, crystalline (respirable)	7631-86-9	24-hr	3.00E+00	2.20E-01	1.10E-02
Sodium hydroxide	1310-73-2	1-hr	8.00E+00	1.50E-02	7.40E-04
Sodium sulfate	7757-82-6	1-hr	1.20E+02	2.20E-01	1.10E-02
Sterigmatocystin	10048-13-2	year	1.00E-04	1.60E-02	8.10E-04
Streptozotocin	18883-66-4	year	3.20E-05	5.20E-03	2.60E-04
Styrene	100-42-5	24-hr	8.70E+02	6.50E+01	3.20E+00
Styrene oxide	96-09-3	year	2.20E-02	3.50E+00	1.80E-01
Sulfallate	95-06-7	year	1.90E-02	3.00E+00	1.50E-01
Sulfur dioxide	9/5/7446	1-hr	6.60E+02	1.20E+00	4.60E-01
Sulfur mustard	505-60-2	24-hr	2.00E-02	1.50E-03	7.40E-05
Sulfur trioxide	11/9/7446	1-hr	1.20E+02	2.20E-01	1.10E-02
Sulfuric acid	7664-93-9	24-hr	1.00E+00	7.40E-02	3.70E-03
Tertiary-butyl acetate	540-88-5	year	7.70E-01	1.20E+02	6.20E+00
1,1,1,2-Tetrachloroethane	630-20-6	year	1.40E-01	2.20E+01	1.10E+00
1,1,2,2-Tetrachloroethane	79-34-5	year	1.70E-02	2.80E+00	1.40E-01
1,1,1,2-Tetrafluoroethane	811-97-2	24-hr	8.00E+04	5.90E+03	3.00E+02
Tetrahydrofuran	109-99-9	24-hr	2.00E+03	1.50E+02	7.40E+00
Thioacetamide	62-55-5	year	5.90E-04	1.00E-01	4.80E-03
4,4-Thiodianiline	139-65-1	year	2.30E-04	3.80E-02	1.90E-03
Thiourea	62-56-6	year	4.80E-02	7.70E+00	3.90E-01
Titanium tetrachloride	7550-45-0	24-hr	1.00E-01	7.40E-03	3.70E-04
Toluene	108-88-3	24-hr	5.00E+03	3.70E+02	1.90E+01
Toluene diisocyanates (2,4- and 2,6-)	26471-62-5	24-hr	8.00E-03	5.90E-04	3.00E-05
Toluene-2,4-diisocyanate	584-84-9	24-hr	8.00E-03	5.90E-04	3.00E-05
Toluene-2,6-diisocyanate	91-08-7	24-hr	8.00E-03	5.90E-04	3.00E-05
o-Toluidine	95-53-4	year	2.00E-02	3.20E+00	1.60E-01
o-Toluidine hydrochloride	636-21-5	year	2.70E-02	4.40E+00	2.20E-01
Toxaphene (polychlorinated camphenes)	8001-35-2	year	2.90E-03	4.80E-01	2.40E-02

1,1,1-Trichloroethane (methyl chloroform)	71-55-6	24-hr	5.00E+03	3.70E+02	1.90E+01
1,1,2-Trichloroethane (vinyl trichloride)	79-00-5	year	6.30E-02	1.00E+01	5.10E-01
Trichloroethylene (TCE)	79-01-6	year	2.10E-01	3.40E+01	1.70E+00
2,4,6-Trichlorophenol	88-06-2	year	3.20E-01	5.20E+01	2.60E+00
1,2,3-Trichloropropane	96-18-4	24-hr	3.00E-01	2.20E-02	1.10E-03
Triethylamine	121-44-8	24-hr	2.00E+02	1.50E+01	7.40E-01
1,2,3-Trimethylbenzene	526-73-8	24-hr	6.00E+01	4.40E+00	2.20E-01
1,2,4-Trimethylbenzene	95-63-6	24-hr	6.00E+01	4.40E+00	2.20E-01
1,3,5-Trimethylbenzene	108-67-8	24-hr	6.00E+01	4.40E+00	2.20E-01
Tryptophan-P-1	62450-06-0	year	1.40E-04	2.20E-02	1.10E-03
Tryptophan-P-2	62450-07-1	year	1.10E-03	1.80E-01	8.90E-03
Uranium, insoluble compounds, NOS	—	24-hr	8.00E-01	5.90E-02	3.00E-03
Uranium, soluble salts, NOS	—	24-hr	4.00E-02	3.00E-03	1.50E-04
Vanadium (fume or dust)	7440-62-2	24-hr	1.00E-01	7.40E-03	3.70E-04
Vanadium pentoxide	1314-62-1	1-hr	3.00E+01	5.60E-02	2.80E-03
Vinyl acetate	108-05-4	24-hr	2.00E+02	1.50E+01	7.40E-01
Vinyl bromide	593-60-2	24-hr	3.00E+00	2.20E-01	1.10E-02
Vinyl chloride	75-01-4	year	1.10E-01	1.80E+01	9.20E-01
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	24-hr	2.20E+02	1.60E+01	8.20E-01
m-Xylene	108-38-3	24-hr	2.20E+02	1.60E+01	8.20E-01
o-Xylene	95-47-6	24-hr	2.20E+02	1.60E+01	8.20E-01
p-Xylene	106-42-3	24-hr	2.20E+02	1.60E+01	8.20E-01

NOS - Not otherwise specified. This applies to situations where emission factors for a group of pollutants is reported, but specific isomers, congeners, or chemicals are not reported.

[Statutory Authority: Chapter 70.94 RCW. WSR 19-24-025 (Order 18-07), § 173-460-150, filed 11/22/19, effective 12/23/19. Statutory Authority: Washington Clean Air Act, RCW 70.94.152. WSR 09-11-131 (Order 05-19), § 173-460-150, filed 5/20/09, effective 6/20/09. Statutory Authority: Chapter 70.94 RCW. WSR 94-03-072 (Order 93-19), § 173-460-150, filed 1/14/94, effective 2/14/94. Statutory Authority: RCW 70.94.331. WSR 91-13-079 (Order 90-62), § 173-460-150, filed 6/18/91, effective 9/18/91.]

Reviser's note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency.

Table 1. Facility-Wide Emissions Summary - Maximum Rates
 Crown Cork & Seal Company, Inc.
 Olympia, WA

Criteria Pollutants	Total Combustion Source Emissions	Total Process Line Emissions	Total Facility-wide Emissions	Title V Major Source Thresholds (tpy)	PTE Above Title V Thresholds?
CO	lb/hr tpy	3.89 17.04	-	3.89 17.04	No
CO₂	lb/hr tpy	6,276 27,488	-	6,276 27,488	
CH₄	lb/hr tpy	0.12 0.52	-	0.12 0.52	
N₂O	lb/hr tpy	0.01 0.05	-	0.01 0.05	
NO_x	lb/hr tpy	4.12 18.05	-	4.12 18.05	No
PM	lb/hr tpy	0.40 1.74	0.108 0.474	0.51 2.21	No
PM₁₀	lb/hr tpy	0.40 1.74	0.108 0.474	0.51 2.21	No
PM_{2.5}	lb/hr tpy	0.40 1.74	0.108 0.474	0.51 2.21	No
Pb	lb/hr tpy	0.000026 0.000050	-	0.00 0.00	No
SO_x	lb/hr tpy	0.03 0.60	-	0.03 0.60	No
VOC Emissions	lb/hr tpy	0.29 1.26	47.720 209.02	48.01 210.28	Yes
Sulfuric Acid Mist	lb/hr tpy	0.03 0.14	-	0.03 0.14	No
CO_{2e} Emissions	lb/hr tpy	6,282 27,516	-	6,282 27,516	No
Hazardous Air Pollutants (HAP)	Total Combustion Source Emissions	Total Process Line Emissions	Total Facility-wide Emissions	Title V Major Source Thresholds	PTE Above Title V Thresholds?
Glycol Ethers	lb/hr tpy	-	0.81	0.81	No
Formaldehyde	lb/hr tpy	-	3.56 0.15	3.56 0.15	No
Unidentifiable Area	lb/hr	-	0.03	0.03	No

	tpy	-	0.14	0.14	No
	lb/hr	0.07	0.99	1.06	No
Total HAP	tpy	0.32	4.34	4.66	

Table 2. Combustion Source Emissions
Crown Cork & Seal Company, Inc.
Olympia, WA

Summary:

Emission Source	Future Potential Pollutant Emissions (tpy)										
	CO	CO ₂	CH ₄	N ₂ O	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO ₂ e
Existing Combustion Sources											
New Project Combustion Sources	17.04	27,487.86	0.52	0.05	18.05	1.74	1.74	0.00	0.14	1.26	27,516.25
PTE - All Combustion Sources											

Detail:

Emission Source	Heat Input Rating (MMBtu/hr)	Hourly Fuel Flow (MMcf/hr)	Max. Operating Hours	Annual Fuel Flow (MMcf/yr)
Washer - Dyer Oven Line 1&2	8.8	8.58E-03	8760	75.13
Washer - Dyer Oven Line 3	2.59	2.52E-03	8760	22.11
Hot Water Heater #3a	3.25	3.17E-03	8760	27.75
Hot Water Heater #3b	3.25	3.17E-03	8760	27.75
Pin Oven 1	5.0	4.87E-03	8760	42.69
Pin Oven 2 (single burner)	2.6	2.52E-03	8760	22.11
Pin Oven 3a (single burner)	2.59	2.52E-03	8760	22.11
Pin Oven 3b (single burner)	2.59	2.52E-03	8760	22.11
IBO 1 (three burners)	3.93	3.63E-03	8760	33.55
IBO 2 (three burners)	3.93	3.63E-03	8760	33.55
IBO 3 (three burners)	3.93	3.63E-03	8760	33.55
RTO	11.2	1.09E-02	8760	95.63

Pollutant	CO	CO ₂	CH ₄	N ₂ O	NO _x	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO ₂ e
AP-42 Emission Factors (lb/MMscf) ^{a,b}	84	120.017	2.3	0.2	100	7.6	7.6	7.60	0.0005	0.6	5.50	see below
New Burner (Ovens) NOx Emission Factors ^c	84	120.017	2.3	0.2	99	7.6	7.6	7.60	0.0005	0.6	5.50	see below
New Burner (Water Heater) NOx Emission Factors ^d	84	120.017	2.3	0.2	37	7.6	7.6	7.60	0.0005	0.6	5.50	see below
New Burner (RTO) NOx Emission Factors ^e	38	120.017	2.3	0.2	37	7.6	7.6	7.60	0.0005	0.6	5.50	see below

a Emission factors obtained from AP-42 Chapter 1-4, Table 1-4.2.

b Greenhouse gas emission factors obtained from 40 CFR Part 98 Subpart C, Tables C-1 and C-2 for natural gas.

c NO_x emission factor for oven burners based on the manufacturer guarantee (80 ppm NO_x at 3% O₂), vendor data indicates NO_x concentrations range from 9 - 50 ppm @ 3% O₂ during normal operation.

d NO_x emission factor for hot water burners provided by the vendor (Vessman). Assume higher of two emission factors.

e Typical NO_x and CO emission factors for RTO Maxon Kinetic LE burner is 30 ppm NO_x @ 3% O₂ (0.036 lb/MMBtu) and 50 ppm CO @ 3% O₂ (0.037 lb/MMBtu).

CO ₂ Global Warming Potentials
1 CO ₂
25 CH ₄
298 N ₂ O

Conversion Factors
1,026 Btu/scf, NG LHV
100% percent of burner rating;
max. sustained firing rate
24 Daily Operating hours
8760 Annual Operating hours

Replacement Equipment (highlighted)

Emission Source	CO	CO ₂	CH ₄	N ₂ O	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO ₂ e
Washer - Dyer Oven Line 1&2	0.72	1.029	1.94E-02	1.94E-03	0.86	6.52E-02	6.52E-02	4.29E-06	0.0051	0.047	1,030
Washer - Dyer Oven Line 3	0.21	0.303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
Hot Water Heater #3a	0.27	0.380	7.16E-03	7.16E-04	0.12	2.41E-02	2.41E-02	1.58E-06	0.0019	0.017	381
Hot Water Heater #3b	0.27	0.380	7.16E-03	7.16E-04	0.12	2.41E-02	2.41E-02	1.58E-06	0.0019	0.017	381
Pin Oven 1	0.41	0.585	1.10E-02	1.10E-03	0.49	3.70E-02	3.70E-02	2.44E-06	0.0029	0.027	585
Pin Oven 2 (single burner)	0.21	0.303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
Pin Oven 3a (single burner)	0.21	0.303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
Pin Oven 3b (single burner)	0.21	0.303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
IBO 1 (three burners)	0.32	0.460	8.66E-03	8.66E-04	0.33	2.91E-02	2.91E-02	1.92E-06	0.0023	0.021	460
IBO 2 (three burners)	0.32	0.460	8.66E-03	8.66E-04	0.33	2.91E-02	2.91E-02	1.92E-06	0.0023	0.021	460
IBO 3 (three burners)	0.32	0.460	8.66E-03	8.66E-04	0.33	2.91E-02	2.91E-02	1.92E-06	0.0023	0.021	460
RTO	0.41	1.310	2.47E-02	2.47E-03	0.40	8.30E-02	8.30E-02	5.46E-06	0.0055	0.050	1,311
Facility-Wide Total	3.89	6,276	0.12	0.01	4.12	0.40	0.40	0.00026	0.031	0.29	6,292
New Equipment (non-exempt) Total	1.60	2,288	0.04	0.00	1.89	0.14	0.14	0.000010	0.011	0.10	2,290

- Non-exempt new equipment includes Pin Ovens 2, 3a, and 3b; and IBO 1, 2, and 3.

Line 1&2 Process Lines - PM Emissions
Normal Operation - Baghouse to RTO stack, RTO By-pass /BO Oven stack, and fugitives

Detail:

Operating Parameters	
Normal Production (hrs/yr)	8,560
RTO Bypass (hrs/yr)	200
Combined Lines 1 & 2 Rated Capacity (cans/min)	3,800
Lines 1 & 2 RTO Bypass Rate (cans/min)	1,900
Line 1&2 Efficiency	90%
Inside Spray Capture Efficiency	75%
Inside Spray Destruction Efficiency	98.0%
Varnish/Ink Capture Efficiency	75%
Varnish/Ink Destruction Efficiency	98.0%
UV Varnish Capture and Control	0.0%
IPA Retention in Shop Towels (Waste)	0.0%

VOC Emissions

Material	Use	Application Rate (gal/1,000 cans)	Voi % Solids	lb VOC/gal solids	RTO Bypass		Annual Usage (gall/yr)	VOC Emissions (tpy)	RTO Bypass Annual Usage (gall/yr)	VOC Emissions (tpy)
					Normal Operation	VOC Fugitive				
Various	Inside Spray	0.18	18.5%	6.5	324,076	2,92	48.71	3,786	2,28	

Overspray (LSM) PM

- 21.1% solids content by weight
- 94% material transfer efficiency
- 95% baghouse collection efficiency
- 90% deposition of PM escaping capture
- 99.0% combined removal efficiency of baghouse/LSM filters
- 99.0% removal efficiency of LSM filters (RTO Bypass)

PM Emissions	Solids Applied (lbs/yr)	Solids in Overspray (lbs/yr)	Overspray to wok area (lb/yr)	PM Emissions Baghouse (lbs/yr)	PM Emissions - Baghouse (lbs/hr)	PM Emission to Plant Vent (lb/hr)	PM Emission to Plant Vent (tpy)	Total PM Emissions (tpy)
Normal Operation	578,496	34,710	1,735	330	0.043	0.1649	0.023	0.252
RTO Bypass	6,758	405	20	4	0.02	0.0019	0.0113	0.001

Model Setup for TAP Emission Increases from Project

EGBE
RTO Bypass
lb/day
IBOs 40.96
POs 23.94

		EGBE			H2SO4		
		Air Flow					
	<u>Description</u>	SRC ID	(m^3/min)	lb/day	g/s		Can Washing
Ink & Varnish (75% to IBO and	Roof Vent RVENT1 Line 3 Pin PO311 Line 3 Pin PO312 Line 3 LSM LSM331 Line 3 LSM LSM332 Line 3 IBO IBO321 Line 3 IBO IBO322	RVENT1 PO311 PO312 LSM331 LSM332 IBO321 IBO322	120 141.58 141.58 145.27 227 84.95 169.9	5.984303 8.976455 8.976455 3.996373 6.244762 10.24113 20.48227	0.031418 0.047126 0.047126 0.020981 0.032785 0.053766 0.107532	WSH361	SRC ID lb/hr g/s
QA				64.90175	64.90175		0.05 0.005896
				64.90175			

IPA

Decorator Cleaning

SRC ID	lb/hr	g/s
RVENT1	8.527329	1.074443
RVENT2	8.527329	1.074443

April 22, 2021

Jennifer DeMay
 Olympic Region Clean Air Agency
 2940 Limited Lane
 Olympia, Washington 98502

Re: NOC Application #21NOC1451 Addendum
 Crown Cork & Seal Company, Inc.
 Olympia, Washington

Ms. DeMay:

This letter is in response to the February 18, 2021 ORCAA letter requesting additional information to process NOC application 21NOC1451 to modify existing equipment and construct a new production line (Line 3) at the Crown Cork & Seal Company (Crown) metal beverage can manufacturing facility located in Olympia, Washington. Responses to each of your questions are provided below. ORCAA Form 5b, updated emission inventory, and an expanded modeling analysis report are enclosed.

1. Provide Best Available Control Technology (BACT) analysis for Lines 1 and 2 replacement curing ovens.

Crown provided a separate BACT analysis for the Lines 1 and 2 replacement curing ovens in 21NOC1483. ORCAA has reviewed that BACT analysis and prepared a final determination for 21NOC1483 with the following BACT determination for the replacement ovens:

BACT and T-BACT Summary as proposed in NOC# 21NOC1483

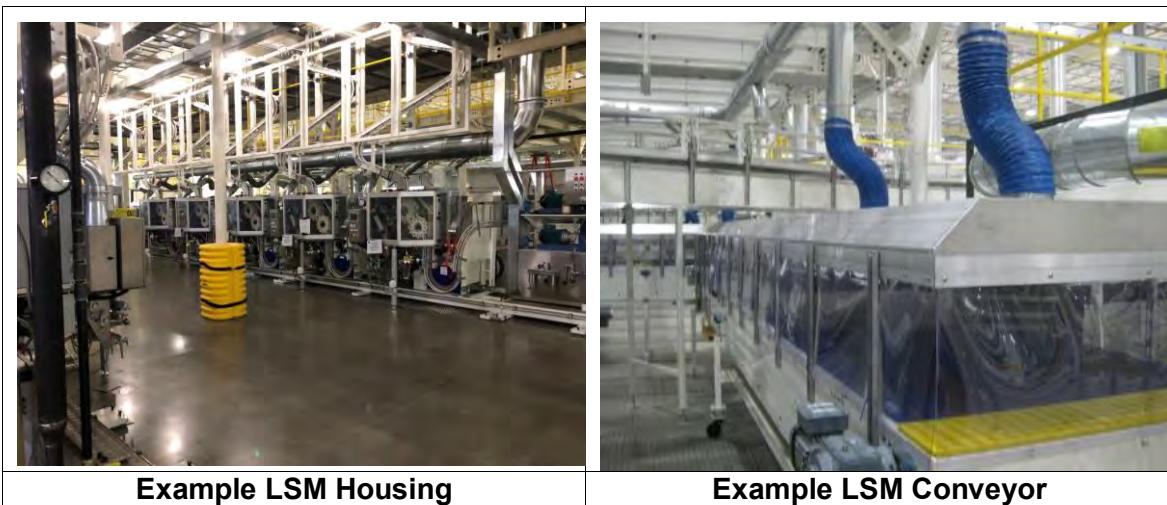
Emission Unit	BACT Applicable?	BACT & T-BACT Description
Line 2 PIN Oven	VOC, TAP (including cure TAP)	<ul style="list-style-type: none"> -Use of waterborne low-VOC coatings (inks and overvarnish) that are 40 CFR Part 60 Subpart WW-compliant. -Permanent total enclosure (100% capture efficiency) -Exhaust controlled by regenerative thermal oxidizer with minimum 98% control efficiency for VOC
	PM, NOx, CO, SO2, VOC, HAPs/TAPs	<ul style="list-style-type: none"> -Use of low sulfur fuel (natural gas) -80 ppm NOx at 3% oxygen -Proper operation and maintenance, tune-ups every 61 months
Inside Bake Ovens (Lines 1 and 2)	VOC, TAP (including cure TAP)	<ul style="list-style-type: none"> -Use of waterborne low-VOC coatings (inside spray lacquer) that are 40 CFR Part 60 Subpart WW-compliant. -Permanent total enclosure (100% capture efficiency) -Exhaust controlled by regenerative thermal oxidizer with minimum 98% control efficiency for VOC
	PM, NOx, CO, SO2, VOC, HAPs/TAPs	<ul style="list-style-type: none"> -Use of low sulfur fuel (natural gas) -80 ppm NOx at 3% oxygen - Proper operation and maintenance, tune-ups every 61 months

Emission Unit	BACT Applicable?	BACT & T-BACT Description
RTO	PM, NOx, CO, SO2, VOC, HAPs/TAPs	<ul style="list-style-type: none"> -Use of low sulfur fuel (natural gas) -60 ppm NOx at 3% oxygen -Low NOx burner, use of supplemental fuel injection (SFI) mode during normal operation. SFI injects natural gas directly into the VOC laden airstream to provide ultralow NOx emissions with flameless operation. - Proper operation and maintenance, tune-ups every 61 months

2. Provide additional information on Line 3 capture systems and expected overall capture efficiency.

The overall capture efficiency for Line 3 is designed to be at least 84 percent with the following VOC capture systems.

- Line 3 Decorators: Ink and over vanish are roll-applied to cans with a very high transfer efficiency. A minor amount of ink mist, and some VOC evaporative losses, generated by the Line 3 decorators is collected by a close capture system that vents to the new baghouse and RTO.
- Line 3 Pin Ovens: The VOCs driven off in the Line 3 pin ovens will be fully captured and directed to the RTO during normal operation.
- Line 3 Inside Spray LSMs and Conveyor: Crown will install housings around the LSMs and install a hood with sides around the LSM conveyor to minimize fugitive emissions during transfer to the IBOs. Both LSM housings and conveyor hood will have ducting that vents a significant portion of the inside spray VOC that evaporates before the cans enter the IBO to the new baghouse and RTO. Pictures of similar LSM capture equipment from other Crown facilities are provided below.



- Line 3 IBOs: The VOCs driven off in the Line 3 IBOs will be fully captured and directed to RTO during normal operation.

The proposed capture system for Line 3 will achieve 84 percent capture of VOC emissions from the decorators and LSMs, and the RTO has a VOC destruction efficiency of 98 percent. The proposed Line 3 capture and control efficiencies meets and/or exceed the BACT and LAER determinations presented in Table 5-1 of the NOC application.

3. Provide additional information on capture systems for the Lines 1 and 2 replacement curing ovens.

As described in 21NOC1483, the replacement Line 2 Pin Oven and Lines 1 and 2 IBOs will be fully controlled by the RTO, and the Lines 1 and 2 LSM housings will also vent to the new baghouse and RTO.

4. Confirm if there are missing pages (64-66) in Addendum #3.

There are no missing pages in Addendum #3, and for completeness an updated project emission inventory is enclosed with this NOC addendum.

5. Confirm there will be no new storage tanks or modifications to existing storage tanks as part of this project.

Crown has confirmed there are no new storage tanks or modifications to existing storage tanks as part of the Project.

6. Confirms the Line 3 isopropanol usage and provide documentation on how the isopropanol rate was determined.

Addendum #3 (January 2021, Response to Question 8) described the methodology used to determine IPA usage associated with cleaning the proposed Line 3 decorators based on estimates of IPA usage for Lines 1 and 2. IPA is used only during changeover of the decorators, and Crown estimated maximum IPA usage for Line 3 decorator cleaning at 2.6 gallons per hour. Ramboll updated the 1-hour IPA modeling analysis in Addendum #3 and confirmed model-predicted IPA concentrations from cleaning the Line 3 decorators are less than the applicable acceptable source impact level (ASIL).

7. Include TAP emissions from natural gas combustion.

The table below presents TAP emission increases associated with the Project (Lines 2 and 3 Pin Ovens, Lines 1 – 3 IBOs, and RTO burner) and compares potential TAP emissions attributable to the Project with the Small Quantity Emission Rates (SQERs). Five TAPs exceed their respective SQERs (NO₂, arsenic, cadmium, chromium vi, and 7,12-

Dimethylbenz[a]anthracene). These five TAPs are addressed in the enclosed modeling analysis, and model-predicted TAP concentrations are less than the applicable ASILs.

Project Potential TAP Emissions – Natural Gas Combustion

Pollutant	Avg. Period ¹	NG Combustion Increase ² (lb/avg. period)	Total Increase (lb/avg. period)	SQER ¹ (lb/avg. period)	Model (Y/N)?
NO ₂	1-hr	2.97	2.97	0.87	Y
CO	1-hr	2.2	2.2	43	N
SO ₂	1-hr	0.02	0.02	1.2	N
Formaldehyde	year	16.3	16.3	27.00	N
Arsenic	year	0.04	0.04	0.05	Y
Benzene	year	0.46	0.46	21.00	N
Beryllium	year	2.6E-03	2.6E-03	0.07	N
Cadmium	year	0.24	0.24	0.04	Y
Chromium VI	year	1.2E-02	1.2E-02	0.00065	Y
Cobalt	24-hr	5.0E-05	5.0E-05	0.01	N
Dichlorobenzene	year	0.26	0.26	15.00	N
Hexane	24-hr	1.07	1.07	52.00	N
Lead	year	0.109	0.109	14.00	N
Manganese	24-hr	2.3E-04	2.3E-04	0.02	N
Mercury	24-hr	1.5E-04	1.5E-04	0.00	N
Naphthalene	year	0.133	0.133	4.80	N
Nickel	year	0.46	0.46	0.62	N
Selenium	24-hr	1.4E-05	1.4E-05	1.50	N
Toluene	24-hr	2.0E-03	2.0E-03	370.00	N
Benz(a)anthracene	year	3.9E-04	3.9E-04	0.89	N
Benzo(a)pyrene	year	2.6E-04	2.6E-04	0.16	N
Benzo(b)fluoranthene	year	3.9E-04	3.9E-04	0.89	N
Benzo(k)fluoranthene	year	3.9E-04	3.9E-04	0.89	N
Chrysene	year	3.9E-04	3.9E-04	8.90	N
Dibenzo(a,h)anthracene	year	2.6E-04	2.6E-04	0.08	N
Indeno(1,2,3-cd)pyrene	year	3.9E-04	3.9E-04	0.89	N
3-Methylcholanthrene	year	3.9E-04	3.9E-04	0.02	N
7,12-Dimethylbenz[a]anthracene	year	3.5E-03	3.5E-03	0.0014	Y

¹ TAP-specific averaging periods and small quantity emission rates (SQERs) from WAC 173-460-150.

² TAP emission increase for new natural gas burners (Line 1 according to TAP averaging period).

³ TAP emission decrease from new RTO controlling emissions from Lines 1 & 2.

8. Confirm the RTO maximum heat input rate.

As described in 21NOC1483, the RTO burner maximum heat input rate is 15 MMBtu/hr. However, during normal VOC loading of the RTO, the supplemental heat input will be less

than 5 MMBtu/hr, and will be accomplished with a natural gas injection system (versus combustion in the burner) and this operating configuration will greatly reduce NOx emissions.

9. Confirm the TAP dimethylethanolamine (DMEA, CAS 108-01-0) is in the ink coating, and if there are any other TAPs or HAPs not identified in the generic ink coating.

The previous version of the Crown emission inventory spreadsheet inadvertently listed dibutylaminoethanol (DBEA, CAS 102-81-8) as DMEA. DBEA is not considered a TAP. The referencing error is corrected in the enclosed emission inventory, and a new electronic version of the spreadsheet will be provided to ORCAA.

10. Confirm if any of the proprietary ingredients listed in the UV Bottom coating contain TAPs.

There are no known TAPs in the UV Bottom coating and ORCAA Form 5B is enclosed.

11. Total VOC emission calculations should include the formaldehyde emissions created during the curing process.

The updated Project emission inventory includes formaldehyde from the curing process in the total VOC emissions summary.

12. Please address formaldehyde emissions from the Line 3 curing ovens.

Formaldehyde is created during the curing process and will be fully captured from the curing ovens and directed to RTO during normal operation. Formaldehyde emission factors from previous Line 1 and Line 2 curing oven testing at Olympia are presented int the table below along with proposed formaldehyde emission factors for Line 3 (normal operation and bypass operation).

Formaldehyde Emissions from Curing

Olympia Line	Formaldehyde (lb/mm cans)
Line 1	11.41
Line 2	7.92
Proposed Line 3 – Normal Operation	14.82
Proposed Line 3 – Bypass Operation	8.9

Crown's proposes to conservatively increase the highest formaldehyde emission factor from previous testing (11.41 lb/mm cans) by 30 percent to account for Line 3 handing larger cans (16oz can size compared to 12oz can) for the enclosed emission inventory. However, Crown expects a much lower formaldehyde emission factor from the more efficient curing ovens and experience at other Crown facilities.

Crown proposes to evaluate formaldehyde emissions from Line 3 curing operations after 20NOC1451 issuance, and Crown proposes the ability to bypass Line 3 from the RTO if the Line 3 formaldehyde emissions from curing are less than 8.9 lb/mm cans. The enclosed modeling analysis evaluates facility-wide 1-hour formaldehyde emissions from two additional scenarios (normal RTO operation and Line 3 bypass.)

13. Please address the RTO destruction efficiency for formaldehyde emissions from the Line 3 curing ovens.

The RTO will achieve 98 percent control of VOC emissions. The formaldehyde concentrations in the RTO inlet gas stream are very low, which results in a lower destruction efficiency compared to overall VOC. Crown believes the RTO control efficiency of formaldehyde emissions will be at least 90 percent. The emission inventory and modeling analysis have been updated to include the 90 percent formaldehyde control efficiency.

14. Request to model NO₂ NAAQS from the project.

The enclosed modeling analysis report evaluated NO_x emissions for normal operations (all three lines operating) and the Line 3 RTO bypass scenario. One update from the original NOC application, is that only one of the three lines will operate during the RTO bypass scenario (similar to 21NOC1483). Model-predicted 1-hour and annual NO₂ concentrations, with representative background concentrations, are less than the applicable NO₂ NAAQS.

15. All model receptors should be set to a flagpole height of 1.5 meters.

The enclosed modeling analysis report addresses this comment.

16. Request to model facility-wide formaldehyde emissions.

The enclosed modeling analysis report evaluated formaldehyde emissions for two different scenarios (normal operations when the RTO controls all three lines, and Line 3 bypassing the RTO). Model-predicted 1-hour formaldehyde concentrations for both operating scenarios are less than the ORCAA 1-hour formaldehyde standard.

17. Update model receptor grid spacing.

The enclosed modeling analysis report addresses this comment.

18. Update TAP model analysis for RTO bypass to include emission increases from new emission units and emission decreases from can line shutdown during bypass scenario.

This comment is relevant to RTO bypass modeling conducted in the initial NOC application, where Crown proposed the ability to bypass the RTO with Line 3 and one of the existing lines operating. This proposed RTO bypass scenario resulted in an ethylene glycol monobutyl

ether (EGBE, CAS 111-76-2) emission increase above the applicable SQER, requiring a TAP modeling analysis for EGBE.

With this NOC addendum, Crown is confirming that only one of the three lines will operate during the RTO bypass scenario. Therefore, the increase in EGBE emissions with only one line operating during RTO bypass is no longer above the SQER and a TAP modeling analysis is no longer required for EGBE.

The table below summarizes the updated EGBE emissions from the Project, and the enclosed emission inventory provides the updated calculation methodology.

Updated EGBE Emission Summary for the Project

Pollutant	Avg. Period ¹	Line 3 Increase ² (lb/avg. period)	Lines 1-2 Reduction ³ (lb/avg. period)	Total Increase (lb/avg. period)	SQER ¹ (lb/avg. period)	Model (Y/N)?
EGBE	24-hr	464.1	-798.5	-334.3	6.10	Y

¹ TAP-specific averaging periods and SQERs from WAC 173-460-150.
² TAP emission increase for new emission units according to TAP averaging period.
³ TAP emission decrease from RTO bypass scenario (limited production rate for Lines 1 & 2).

19. Provide documentation of how emissions are attributed to each stack/vent for modeling purposes.

Similar to ORCAA question 18 above, this comment is relevant to RTO bypass modeling conducted in the initial NOC application for the EGBE TAP modeling analysis, where Crown proposed the ability to bypass the RTO with Line 3 and one of the existing lines operating.

With this NOC addendum, Crown is confirming that only one of the three lines will operate during the RTO bypass scenario. Therefore, the increase in EGBE emissions with only one line operating during RTO bypass is no longer above the SQER and no TAP modeling analysis is required for EGBE.

Please do not hesitate to contact me at 425.412.1803, if you have any questions about this NOC application addendum.

Sincerely,

Kyle Heitkamp
Senior Managing Consultant

cc: Mike Antry, Crown Cork and Seal Company
Mike Herron, Crown Cork and Seal Company

Enclosure

FORM 5B
NO TOXIC AIR POLLUTANTS
IN PROPRIETARY INGREDIENTS

This form must be completed for any material used in your proposed operation that includes proprietary ingredients not identified in Safety Data Sheets (SDS) or other literature used to characterize air emissions from your proposed operations. By completing and signing this form you certify that the proprietary portions of the materials listed on the form do not contain any Toxic Air Pollutants (TAP). This information is necessary to meet the criteria for approval under Washington's requirements for new stationary sources of TAP (Chapter 173-460 WAC: CONTROLS FOR NEW SOURCES OF TOXIC AIR POLLUTANTS). All fields must be completed for materials listed with proprietary ingredients.

1. Facility/Source Name: CROWN CORK & SEAL CO, INC
2. Company Name (if different): _____
3. Facility Address: 1202 FONES RD
OLYMPIA, WA
4. Mailing Address: 1202 FONES RD
OLYMPIA, WA
5. Materials Proposed with proprietary ingredients:

Product Name and Identification #	Manufacturer	Description ¹	Proprietary Content ² (% by wt or vol.)	TAP in Proprietary Content? ³ (yes/no)
980-5005	Watson Standard	UV Rimcoat (bottomvarnish)	41-66% by wt	NO

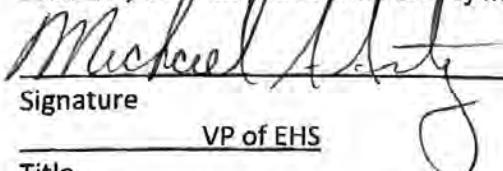
¹ For "Description," describe the general use category of the product with proprietary ingredients. Examples include, but are not limited to: solvent, catalyst, autobody paint, marine bottom paint, epoxy resin.

² List the percent by weight or volume of the proprietary content claimed of the material used.

³ Disclose whether the proprietary content of the material used contains any TAP listed in WAC 173-460-150 (list attached to this form) by a "yes" or "no".

Certification:

By my signature below, I certify that all information and statements in this form are true, accurate, and complete to the best of my knowledge.

Michael Antry
Signature

4/22/21
Date

VP of EHS

Title

Michael Antry

Printed Name

Crown Cork & Seal Company, Inc.
Olympia, WA

Project Emissions Summary - Maximum Rates

Criteria Pollutants

Pollutant	Line 3 Normal		Line 3 Normal Fugitive		Line 3 RTO Bypass		Project Combustion		Total Project	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
NO _x	--	--	--	--	--	--	2.97	13.01	3.0	13.0
CO	--	--	--	--	--	--	2.16	9.45	2.2	9.4
PM	0.037	0.14	0.02	0.07	0.04	0.006	0.26	1.12	0.3	1.3
PM10	0.037	0.14	0.02	0.07	0.04	0.006	0.26	1.12	0.3	1.3
PM2.5	0.037	0.14	0.02	0.07	0.04	0.006	0.26	1.12	0.3	1.3
VOC	1.25	4.80	17.5	67.5	50.73	4.6	0.19	0.81	69.7	77.7
Sulfuric Acid Mist	0.05	0.18	--	--	--	--	--	--	0.05	0.2

Toxic Air Pollutants (Maximum Emission Increase from Project) - Normal Operation

Pollutant	Avg. Period	Line 3	Lines 1-2	Total	SQER	Model (Y/N)?
Hydrofluoric Acid	24-hr	0.38	0	0.38	1.00	N
Sulfuric Acid	24-hr	1.12	0	1.12	0.07	Y
EGBE	24-hr	123	-586.9	-463.8	6.10	N
IPA	1-hr	17.1	0	17.1	5.90	Y
PGME	24-hr	0.0	0.0	0.0	520.00	N
Formaldehyde	year	2079.1	-13275.9	-11196.8	27.00	N

Toxic Air Pollutants (Maximum Emission Increase from Project) - RTO Bypass Operation (Only Line 3 Operating)

Pollutant	Avg. Period	Line 3	Lines 1-2	Total	SQER	Model (Y/N)?
Hydrofluoric Acid	24-hr	0.38	-0.5	-0.10	1.00	N
Sulfuric Acid	24-hr	1.12	-1.4	-0.30	0.07	N
EGBE	24-hr	464.1	-798.5	-334.3	6.10	N
IPA	1-hr	17.1	-9.8	7.2	5.90	Y
PGME	24-hr	0.0	0.0	0.0	520.00	N
Formaldehyde	year	2294.4	-15550.6	-13256	27.00	N

Crown Cork & Seal Company, Inc.
Olympia, WA

Project Emissions Summary - Maximum Rates

Toxic Air Pollutants - From Combustion

Pollutant	Line 3 Project Combustion		Total Project	
	lb/hr	tpy	lb/hr	tpy
NOx	3.0E+00	1.3E+01	3.0	13.0
CO	2.2E+00	9.4E+00	2.2	9.4
SO2	2.0E-02	8.9E-02	0.0	0.1
Formaldehyde	2.5E-03	1.1E-02	2.5E-03	1.1E-02
Arsenic	6.7E-06	3.0E-05	6.7E-06	3.0E-05
Benzene	7.1E-05	3.1E-04	7.1E-05	3.1E-04
Beryllium	4.0E-07	1.8E-06	4.0E-07	1.8E-06
Cadmium	3.7E-05	1.6E-04	3.7E-05	1.6E-04
Chromium VI	1.9E-06	8.3E-06	1.9E-06	8.3E-06
Cobalt	2.8E-06	1.2E-05	2.8E-06	1.2E-05
Dichlorobenzene	4.0E-05	1.8E-04	4.0E-05	1.8E-04
Hexane	6.1E-02	2.7E-01	6.1E-02	2.7E-01
Lead	1.7E-05	7.4E-05	1.7E-05	7.4E-05
Manganese	1.3E-05	5.6E-05	1.3E-05	5.6E-05
Mercury	8.8E-06	3.8E-05	8.8E-06	3.8E-05
Naphthalene	2.1E-05	9.0E-05	2.1E-05	9.0E-05
Nickel	7.1E-05	3.1E-04	7.1E-05	3.1E-04
Selenium	8.1E-07	3.5E-06	8.1E-07	3.5E-06
Toluene	1.1E-04	5.0E-04	1.1E-04	5.0E-04
Benz(a)anthracene	6.1E-08	2.7E-07	6.1E-08	2.7E-07
Benzo(a)pyrene	4.0E-08	1.8E-07	4.0E-08	1.8E-07
Benzo(b)fluoranthene	6.1E-08	2.7E-07	6.1E-08	2.7E-07
Benzo(k)fluoranthene	6.1E-08	2.7E-07	6.1E-08	2.7E-07
Chrysene	6.1E-08	2.7E-07	6.1E-08	2.7E-07
benzo(a,h)anthrancene	4.0E-08	1.8E-07	4.0E-08	1.8E-07
deno(1,2,3-cd)pyrene	6.1E-08	2.7E-07	6.1E-08	2.7E-07
β -Methylcholanthrene	6.1E-08	2.7E-07	6.1E-08	2.7E-07
α -dimethylbenz[a]anthracene	5.4E-07	2.4E-06	5.4E-07	2.4E-06

Avg. Period	Project Increase (lb/year)	SQER	Model (Y/N)?
1-hr	2.97	0.87	Y
1-hr	2.2	43.00	N
1-hr	0.02	1.20	N
year	22.1	27.00	N
year	0.06	0.05	Y
year	0.62	21.00	N
year	3.5E-03	0.07	N
year	0.32	0.04	Y
year	1.7E-02	0.00065	Y
24-hr	6.8E-05	0.01	N
year	0.35	15.00	N
24-hr	1.46	52.00	N
year	0.148	14.00	N
24-hr	3.1E-04	0.02	N
24-hr	2.1E-04	0.002	N
year	0.180	4.80	N
year	0.62	0.62	N
24-hr	1.9E-05	1.50	N
24-hr	2.7E-03	370.00	N
year	5.3E-04	0.89	N
year	3.5E-04	0.16	N
year	5.3E-04	0.89	N
year	5.3E-04	0.89	N
year	5.3E-04	8.90	N
year	3.5E-04	0.08	N
year	5.3E-04	0.89	N
year	5.3E-04	0.02	N
year	4.7E-03	0.0014	Y

**Crown Cork & Seal Company, Inc.
Olympia, WA**

**Line 3 Can Washing
Can Washer Stack**

Detail:

Operating Parameters

Normal Production (hrs/yr)	8,560
RTO Bypass (hrs/yr)	200
Line 3 Rated Capacity (cans/min)	3,000
Line 3 Efficiency	90%
Line 3 Normal Production Rate (cans/min)	2,700
Capture Efficiency	100.0%

Pollutant	Emission Factor ¹	Emissions ²				
		Ib/MM can	Ib/hr	Ib/day	Ib/yr	tons/yr
Hydrofluoric Acid	0.089	0.016		0.38	126.30	0.063
Sulfuric Acid	0.26	0.047		1.12	368.97	0.18

¹ Emission factors are based on past studies conducted at Crown Cork facilities.

² Hourly emissions based on Line 3 rated throughput of 2,800 cpm. Daily emissions based on the maximum hourly rate and continuous operation for 24 hours. Annual emissions based on the maximum hourly rate, the 90% line efficiency, and continuous operation for 8,760 hours per year.

Crown Cork & Seal Company, Inc.
Olympia, WA

Line 3 Process Line - VOC Emissions, including RTO Bypass Scenario

Detail:

Operating Parameters

Normal Production (hrs/yr)	8,560
RTO Bypass (hrs/yr)	200
Line 3 Rated Capacity - Normal (cans/min)	3,000
Line 3 RTO Bypass Rate (cans/min)	2,000
Line 3 Production Efficiency	90%
Inside Spray Capture Efficiency	84%
Inside Spray Destruction Efficiency	98.0%
Varnish/Ink Capture Efficiency	84%
Varnish/Ink Destruction Efficiency	98.0%
Varnish/Ink Formaldehyde Destruction Efficiency	90.0%
UV Varnish Capture and Control	0%

VOC Emissions

Material	Use	Application Rate (gal/1,000 cans)	Vol % Solids ¹	lb VOC/gal solids ¹	Normal Operation ³		RTO Bypass ⁴		
					Annual Usage (gal/yr)	VOC Controlled Emissions (tpy)	VOC Fugitive Emissions (tpy)	Annual Usage (gal/yr)	VOC Emissions (tpy)
Various	Inside Spray	0.20	18.5%	6.5	277,344	2.80	26.68	4,800	2.89
Various	Varnish	0.070	35.4%	2.9	97,070	0.84	7.97	1,680	0.86
Various	Ink	0.0089	83.9%	1.52	12,332	0.13	1.26	213	0.14
UV Varnish	Rim Coat	0.0019	96.4%	0.010	2,565	--	0.012	44	0.0002
IPA ²	Cleanup IPA	--	--	6.6	9,630	--	31.58	153	0.50
Curing Oven Formaldehyde ⁵	Curing Ovens	--	--	--	--	1.03	--	--	0.18

¹ The solids percentage and VOC content for each material is based on the worst case formulation out of the possible coatings/inks, based on information provided in manufacturer SDSs.

² IPA usage is calculated using a 1.125 gallon per hour rate for production of 3,000 cans per hour. IPA usage rate was provided by Crown Cork personnel. Annual usage of IPA does not include the 90% line efficiency factor.

³ Annual usage of each material during normal operation is based on the Line 3 rated capacity of 3,000 cpm, 90% line efficiency, 8,560 hr/year of normal operation, and the respective application rate. Annual emissions during normal operation assume that 100% of the VOC content will be emitted, and are based on the annual usage, and the respective capture efficiency and destruction efficiencies for each application (Inside spray 75% CE and 98% DRE, Varnish and Ink 75% CE and 98% DRE, and no control for Rim Coat or Cleanup IPA).

⁴ Annual usage of each material during RTO bypass is based on the reduced Line 3 capacity of 2,000 cpm, 200 hr/year of RTO bypass operation, and the respective application rate. Annual emissions during normal operation assume that 100% of the VOC content will be emitted, and are based on the annual usage, and no control.

⁵ Resin curing in the oven forms formaldehyde. It is captured 100% in the oven and routed to the RTO. The formation rate is from 2009 stack test at Crown's Olympia Washington plant with a 30% increase for 16oz can size compared to 12oz can.

Crown Cork & Seal Company, Inc.
Olympia, WA

Material	Use	Density (lb/gal)	Speciated VOC (% By Weight) ¹								
			n-Butanol	Ethylene Glycol Monobutyl Ether (EGBE)	Dimethyl ethanolamine (DMEA)	n-Amyl Alcohol (n-AmOH)	Isopropyl Alcohol (IPA)	Propylene Glycol Methyl Ether (PGME)	Tricdecyl alcohol (TDA)	Ethyleneglycol Monohexyl Ether (EGHE)	Formaldehyde
		CAS No. :	71-36-3	111-76-2	108-01-0	71-41-0	67-63-0	107-98-2	112-70-9	112-25-4	50-00-0
		TAP?		TAP			TAP	TAP			TAP
		HAP?								HAP	HAP
Various	Inside spray	8.46	5.20%	6.80%	1.10%	3.20%	0.00%	0.00%	0.00%	0.50%	0.00%
Various	Varnish	8.90	2.20%	7.40%	2.70%	0.00%	0.00%	0.00%	0.30%	0.00%	0.01%
Various ²	Ink	9.78	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
IPA	Cleanup	6.56	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%

¹ Material content based on the worst case formulation of the possible coating/ink, based on manufacturer SDSs.

² More than 500 types of ink products are used, this calculation uses a reasonable worst-case density (9.78 lb/gal) and VOC content (5%)

Material	Use	Application (gal/hr)	Speciated VOC Emissions (lb/hr) ¹								
			n-Butanol	EGBE	DMEA	n-AmOH	IPA	PGME	TDA	EGHE	Formaldehyde ²
		CAS No. :	71-36-3	111-76-2	108-01-0	71-41-0	67-63-0	107-98-2	112-70-9	112-25-4	50-00-0
		TAP?		TAP			TAP	TAP			TAP
		HAP?								HAP	HAP
Various	Inside spray	36.0	15.84	20.71	3.35	9.75	0.00	0.00	0.00	1.52	0.00
Various	Varnish	12.6	2.47	8.30	3.03	0.00	0.00	0.00	0.34	0.00	0.01
Various	Ink	1.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.002
IPA	Cleanup	2.6	0.00	0.00	0.00	0.00	17.05	0.00	0.00	0.00	0.00
Total Uncontrolled Emission Factor		18.30	29.01	6.38	9.75	17.05	0.00	0.34	1.52	2.68	
Total Fugitive Emissions		2.93	4.64	1.02	1.56	17.05	0.00	0.05	0.24	0.00	
Total Controlled Speciated VOC Emissions		0.31	0.49	0.11	0.16	0.00	0.00	0.01	0.03	0.27	

¹ Hourly emissions are based on the Line 3 rated capacity of 3,000 cpm, the material application rate, speciated VOC content, and respective capture efficiency and destruction efficiency for the application.

² Resin curing in the oven forms formaldehyde. It is captured 100% in the oven and routed to the RTO. The formation rate is from 2009 stack test at Crown's Olympia Washington plant with a 30% increase for 16oz can size compared to 12oz can. Crown proposes to evaluate formaldehyde emissions from curing operations after permit issuance, and if the formaldehyde emissions from curing is less than 8.9 lb/MM cans from Line 3, Crown will be able to operate Line 3 while bypassing the RTO.

Formaldehyde Emissions ²											
Normal Line Operation			Bypass Line Operation								
14.82	lbs formed/MM can		8.9	lbs formed/MM can							
100%	Capture Efficiency		100%	Capture Efficiency							
2.67	Uncontrolled Emissions, lb/hr		1.07	Uncontrolled Emissions, lb/hr							

Speciated VOC Emissions

Pollutant	CAS	Normal Operation ¹			RTO Bypass ²			Maximum Emissions			
		Ib/hr	Ib/day	Ib/yr	Ib/hr	Ib/day	Ib/yr	Ib/hr	Ib/day	Ib/yr	tpy
n-Butanol	71-36-3	3.2	77.7	24932	12.2	292.9	2440.6	12.2	292.9	27372	13.7
EGBE	111-76-2	5.1	123.1	39511	19.3	464.1	3867.8	19.3	464.1	43379	21.7
DMEA	108-01-0	1.1	27.1	8687	4.3	102.0	850.4	4.3	102.0	9538	4.8
n-AmOH	71-41-0	1.7	41.4	13275	6.5	155.9	1299.5	6.5	155.9	14574	7.3
IPA	67-63-0	17.1	175.8	64174	11.4	272.9	2274.0	17.1	272.9	66448	33.2
PGME	107-98-2	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0	0.0
TDA	112-70-9	0.1	1.4	458	0.2	5.4	44.9	0.2	5.4	503	0.3
EGHE	112-25-4	0.3	6.5	2074	1.0	24.4	203.0	1.0	24.4	2277	1.1
Formaldehyde	50-00-0	0.27	6.5	2079	1.1	25.8	215.3	1.1	25.8	2294	1.1

¹ Hourly emissions during normal operation are based on Line 3 rated throughput of 3,000 cpm. Daily emissions based on the maximum hourly rate operated for 24 hours continuously. Annual emissions based on the maximum hourly rate, the 90% line efficiency, and continuous operation for 8,560 hours per year. IPA annual emissions based on annual decorator changeovers.

² Hourly emissions during RTO bypass operation are based on the reduce Line 3 throughput of 2,000 cpm. Daily emissions based on the maximum hourly rate operated for 24 hours continuously. Annual emissions based on the maximum hourly rate and operation for 200 hours per year.

Crown Cork & Seal Company, Inc.
Olympia, WA

Line 3 Process Line - PM Emissions, including RTO Bypass Scenario

Detail:

Operating Parameters

Normal Production (hrs/yr)	8,560
RTO Bypass (hrs/yr)	200
Line 3 Rated Capacity (cans/min)	3,000
Line 3 RTO Bypass Rate (cans/min)	2,000
Line 3 Efficiency	90%

VOC Emissions

Material	Use	Application Rate (gal/1,000 cans)	Vol % Solids	Ib VOC/gal solids	Normal Annual Usage (gal/yr)	RTO Bypass Annual Usage (gal/yr)
Various	Inside Spray	0.20	18.5%	6.5	277,344	4,800

Crown Cork & Seal Company, Inc.
Olympia, WA

Overspray (LSM) PM

21.1% solids content by weight
 94% material transfer efficiency
 95% capture efficiency
 90% deposition of PM escaping capture
 99.0% removal efficiency of LSM filters
 99.0% removal efficiency of LSM filters (RTO Bypass)

PM Emissions	Solids Applied	Solids in Overspray	Overspray to work area	Controlled Emissions ³	Controlled Emissions	Controlled Emissions	Plant Vent Fugitives ⁴	Plant Vent Fugitives	Plant Vent Fugitives	Total PM Emissions
	(lbs/yr)	(lbs/yr)	(lb/yr)	(lbs/hr)	(lbs/yr)	(tpy)	(lb/hr)	(lb/yr)	(tpy)	(tpy)
Normal Operation ¹	495,076	29,705	1,485	0.037	282	0.14	0.02	149	0.074	0.22
RTO Bypass ²	8,568	514	26	0.02	5	0.0024	0.01	3	0.001	0.004

¹ Hourly emissions during normal operation are based on Line 3 rated throughput of 3,000 cpm. Annual emissions based on the maximum hourly rate, the 90% line efficiency, and continuous operation for 8,560 hours per year.

² Hourly emissions during RTO bypass operation are based on the reduce Line 3 throughput of 2,000 cpm. Annual emissions based on the maximum hourly rate and continuous operation for 200 hours per year.

³ Controlled emissions are based on a 94% material transfer efficiency, 95% capture efficiency. During normal operation, the LSM exhaust vents through the LSM fabric filters, then to the RTO for a combined destruction efficiency of 99%. During RTO bypass, the LSM exhaust vents through the LSM fabric filters which have a removal efficiency of 99% and then atmosphere.

⁴ Uncontrolled emissions that are emitted as fugitives through the plant vents are calculated based on the 94% material transfer efficiency and the 5% of the overspray that is not captured by the PM control system. Uncontrolled emissions are calculated based on 90% of the overspray particulates being deposited in the plant and 10% of the overspray exhausting through plant vents.

Lines 1 & 2 Process Lines - Normal Control Operating Scenario

Crown Cork & Seal Company, Inc.
Olympia, WA

Detail:

Operating Parameters

Normal Production (hrs/yr)	8,560
RTO Bypass (hrs/yr)	200
Combined Lines 1 & 2 Rated Capacity (cans/min)	3,800
Line 1 / Line 2 RTO Bypass Rate (cans/min)	1,900
Line 1 and Line 2 Production Efficiency	90%
Inside Spray Capture Efficiency	75%
Inside Spray Destruction Efficiency	98.0%
Varnish/Ink Capture Efficiency	75%
Varnish/Ink Destruction Efficiency	98.0%
Varnish/Ink Formaldehyde Destruction Efficiency	90.0%
UV Varnish Capture and Control	0.0%
IPA Retention in Shop Towels (Waste)	0.0%

- Lines 1 & 2 will be shutdown if Line 3 bypasses the RTO

Material	Use	Application Rate (gal/1,000 cans)	Vol % Solids ¹	lb VOC/gal solids ¹	Normal Operation ³		RTO Bypass ⁴		
					Annual Usage (gal/yr)	VOC Controlled Emissions (tpy)	VOC Fugitive Emissions (tpy)	Annual Usage (gal/yr)	VOC Emissions (tpy)
Various	Inside Spray	0.18	18.5%	6.5	297,000	2.68	44.64	4,207	2.53
Various	Varnish	0.060	35.4%	2.90	90,000	0.69	11.55	1,377	0.71
Various	Ink	0.0089	83.9%	1.52	15,621	0.15	2.49	203	0.13
UV Varnish	Rim Coat	0.00185	96.4%	0.01	3,250	--	0.016	42	0.0002
IPA ²	Cleanup IPA	--	--	6.56	12,840	--	42.11	150	0.49
Curing Oven Formaldehyde ⁵	Curing Ovens	--	--	--	--	1.00	--	--	0.13

¹ The solids percentage and VOC content for each material is based on the worst case formulation out of the possible coatings/inks, based on information provided in manufacturer SDSs.

² IPA usage is calculated using a 1.5 gallon per hour rate for production of 3,800 cans per hour. IPA usage rate was provided by Crown Cork personnel. Annual usage of IPA does not include the 90% line efficiency factor.

³ Annual usage of each material during normal operation is based on the combined Line 1 and 2 rated capacity of 3,800 cpm, 90% line efficiency, 8,560 hr/year of normal operation, and the respective application rate. Annual emissions during normal operation assume that 100% of the VOC content will be emitted, and are based on the annual usage, and the respect capture efficiency and destruction efficiencies for each application (Inside spray 75% CE and 98% DRE, Varnish and Ink 75% CE and 98% DRE, no control for Rim Coat and IPA).

⁴ Annual usage of each material during RTO bypass is based on only one Lines 1 & 2 shutdown if Line 3 is operating during bypass. Line 1 and Line 2 currently limited to 1,900 cpm, 200 hr/year of RTO bypass operation, and the respective application rate. Annual emissions during normal operation assume that 100% of the VOC content will be emitted, and are based on the annual usage, and no control.

⁵ Resin curing in the oven forms formaldehyde. It is captured 100% in the oven and routed to the RTO. The formation rate is from 2009 stack test at Crown's Olympia Washington plant.

Lines 1 & 2 Process Lines - Normal Control Operating Scenario

Crown Cork & Seal Company, Inc.
Olympia, WA

Material	Use	Density (lb/gal)	Speciated VOC (% By Weight) ¹				
			Ethylene Glycol Monobutyl Ether (EGBE)	Isopropyl Alcohol (IPA)	Propylene Glycol Methyl Ether (PGME)	Ethylene Glycol Monohexyl Ether (EGHE)	Formaldehyde
	CAS No. :		111-76-2	67-63-0	107-98-2	112-25-4	50-00-0
	TAP?		TAP	TAP	TAP		TAP
	HAP?					HAP	HAP
Various	Inside spray	8.46	6.80%	0.00%	0.00%	0.50%	0.00%
Various	Varnish	8.90	7.40%	0.00%	0.00%	0.00%	0.01%
Various ²	Ink	9.78	0.00%	0.00%	0.00%	0.00%	0.01%
IPA	Cleanup	6.56	0.00%	100.00%	0.00%	0.00%	0.00%

¹ Material content based on the worst case formulation of the possible coating/ink, based on manufacturer SDSs.

² More than 500 types of ink products are used, this calculation uses a reasonable worst-case density (9.78 lb/gal) and VOC content (5%)

Material	Use	Application (gal/hr)	Speciated VOC Emissions (lb/hr) ¹				
			EGBE	IPA	PGME	EGHE	Formaldehyde ²
	CAS No. :		111-76-2	67-63-0	107-98-2	112-25-4	50-00-0
	TAP?		TAP	TAP	TAP		TAP
	HAP?					HAP	HAP
Various	Inside spray	42.1	24.20	0.00	0.00	1.78	0.00
Various	Varnish	13.8	9.07	0.00	0.00	0.00	0.01
Various	Ink	2.0	0.00	0.00	0.00	0.00	0.002
IPA	Cleanup	1.50	0.00	9.84	0.00	0.00	0.00
Total Uncontrolled Emission Factor		33.27	9.84	0.00	1.78	2.61	
Fugitive Emissions		8.32	9.84	0.00	0.44	0.00	
Total Controlled Speciated VOC Emissions		0.50	0.00	0.00	0.03	0.26	

Formaldehyde Emissions ²	
11.4	lbs formed/MM can
100%	Capture Efficiency
2.60	Uncontrolled Emissions, lb/hr

Can Washer Hydrofluoric Acid Emissions ³	
0.089	lbs formed/MM can
100%	Capture Efficiency
0.02	Normal Emissions, lb/hr
0.01	RTO Bypass Emissions, lb/hr

Can Washer Sulfuric Acid Emissions ³	
0.26	lbs formed/MM can
100%	Capture Efficiency
0.06	Normal Emissions, lb/hr
0.03	RTO Bypass Emissions, lb/h

¹ Hourly emissions are based on the Line 3 rated capacity of 2,800 cpm, the material application rate, speciated VOC content, and respective capture efficiency and destruction efficiency for the application.

² Resin curing in the oven forms formaldehyde. It is captured 100% in the oven and routed to the RTO. The formation rate is from 2009 stack test at Crown's Olympia Washington plant.

³ Emission factors are based on past studies conducted at Crown Cork facilities.

Potential TAP Emissions

Pollutant	CAS	Normal Operation ¹			RTO Bypass ²			Total Annual	
		Ib/hr	Ib/day	Ib/yr	Ib/hr	Ib/day	Ib/yr	Ib/yr	tons/yr
EGBE	111-76-2	8.8	211.6	67922	16.6	399.2	3326.9	71249	35.6
IPA	67-63-0	9.8	236.1	75801	4.9	118.1	983.9	76785	38.4
PGME	107-98-2	0.0	0.0	0	0.0	0.0	0.0	0	0.0
EGHE	112-25-4	0.5	11.3	3633	0.9	21.4	177.9	3811	1.9
Formaldehyde	50-00-0	0.26	6.3	2013	1.3	31.4	261.3	2275	1.1
Hydrofluoric Acid	7664-39-3	0.02	0.5	156	0.01	0.2	2.0	158	0.1
Sulfuric Acid	7664-93-9	0.06	1.4	457	0.03	0.7	5.9	463	0.2

¹ Hourly emissions during normal operation are based on the combined Line 1 and 2 rated throughput of 3,800 cpm. Daily emissions based on the maximum hourly rate and continuous operation for 24 hours. Annual emissions based on the maximum hourly rate, the 90% line efficiency, and continuous operation for 8,560 hours per year.

² Hourly emissions during RTO bypass operation are based on only Line 2 operating at its rated capacity of 1,900 cpm. Daily emissions based on the maximum hourly rate and continuous operation for 24 hours. Annual emissions based on the maximum hourly rate and continuous operation for 200 hours per year.

Lines 1 & 2 Process Lines - Normal Control Operating Scenario

Crown Cork & Seal Company, Inc.
Olympia, WA

TAP Emissions Netting

Pollutant	CAS	Past Actual ¹			Future Potential - Normal Operation				Avg. Period	Net Change (lb/avg. period)
		lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	Avg. Period		
EGBE	111-76-2	33.3	798.5	101,201	8.8	211.6	71,249	24-hr	-587	
IPA	67-63-0	9.8	236.1	68,301	9.8	236.1	76,785	1-hr	0	
PGME	107-98-2	0.0	0.0	--	0.0	0.0	0	24-hr	0.0	
Formaldehyde	50-00-0	2.6	62.7	15,551	0.3	6.3	2,275	year	-13,276	
Hydrofluoric Acid	7664-39-3	0.02	0.5	143	0.02	0.5	158	24-hr	0	
Sulfuric Acid	7664-93-9	0.06	1.4	418	0.06	1.4	463	24-hr	0	

¹ Annual baseline emissions are based on the average of actual emissions over the previous two year period. Short-term baseline emissions are calculated based on emission factors and Lines 1 and 2 operating at full capacity.

TAP Emissions Netting

Pollutant	CAS	Past Actual ¹			Future Potential - RTO Bypass (Line 3 Only)				Avg. Period	Net Change (lb/avg. period)
		lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	Avg. Period		
EGBE	111-76-2	33.3	798.5	101,201	0.0	0.0	0.0	24-hr	-798	
IPA	67-63-0	9.8	236.1	68,301	0.0	0.0	0.0	1-hr	-9.8	
PGME	107-98-2	0.0	0.0	--	0.0	0.0	0.0	24-hr	0.0	
Formaldehyde	50-00-0	2.6	62.7	15,551	0.0	0.0	0.0	year	-15,551	
Hydrofluoric Acid	7664-39-3	0.0	0.5	143	0.0	0.0	0.0	24-hr	-0.5	
Sulfuric Acid	7664-93-9	0.1	1.4	418	0.0	0.0	0.0	24-hr	-1.4	

¹ Annual baseline emissions are based on the average of actual emissions over the previous two year period. Short-term baseline emissions are calculated based on emission factors and Lines 1 and 2 operating at full capacity.

² RTO Bypass from Lines 1 & 2 will be zero if Line 3 is operational and bypassing the RTO.

Lines 1 & 2 Process Lines - Baseline Emissions Data

Crown Cork & Seal Company, Inc.

Olympia, WA

Annual Emissions (tpy)

Year	Month	VOC	HF	EGHE	Formaldehyde	EGBE	n-Butanol	DMEA	Amyl Alcohol	IPA	PGME	Sulfuric Acid
	CAS:	VOC	7664-39-3	112-25-4	50-00-0	111-76-2	71-36-3	108-01-0	71-41-0	67-63-0	107-98-2	7664-93-9
	HAP?		HAP	HAP	HAP							
	TAP?		TAP		TAP	TAP				TAP	TAP	TAP
2018	JANUARY	17.82	0.01	0.48	0.63	4.40	4.42	1.07	2.67	1.97	0.00	0.02
2018	FEBRUARY	14.99	0.01	0.38	0.57	3.51	3.56	0.85	2.09	1.97	0.00	0.02
2018	MARCH	15.24	0.01	0.37	0.55	3.37	3.40	0.82	2.02	2.87	0.00	0.01
2018	APRIL	16.66	0.01	0.40	0.58	3.71	3.74	0.90	2.23	3.12	0.00	0.02
2018	MAY	22.13	0.01	0.55	0.75	5.22	5.12	1.27	3.05	3.61	0.00	0.02
2018	JUNE	20.40	0.01	0.49	0.72	4.56	4.53	1.10	2.68	3.92	0.00	0.02
2018	JULY	20.99	0.01	0.52	0.76	4.85	4.84	1.19	2.87	3.30	0.00	0.02
2018	AUGUST	20.86	0.01	0.50	0.75	4.73	4.73	1.16	2.74	3.79	0.00	0.02
2018	SEPTEMBER	19.77	0.01	0.49	0.72	4.62	4.62	1.14	2.67	3.30	0.00	0.02
2018	OCTOBER	18.99	0.01	0.46	0.70	4.39	4.46	1.07	2.45	3.02	0.00	0.02
2018	NOVEMBER	18.61	0.01	0.46	0.67	4.37	4.30	1.09	2.54	2.89	0.00	0.02
2018	DECEMBER	15.06	0.01	0.38	0.55	3.47	3.47	0.85	2.11	2.53	0.00	0.01
2019	JANUARY	18.54	0.01	0.48	0.71	4.43	4.41	1.09	2.67	2.69	0.00	0.02
2019	FEBRUARY	15.28	0.00	0.40	0.54	3.85	3.74	0.94	2.18	2.26	0.00	0.01
2019	MARCH	15.00	0.01	0.37	0.56	3.60	3.63	0.89	2.00	2.39	0.00	0.01
2019	APRIL	13.04	0.00	0.29	0.50	3.01	3.04	0.74	1.51	2.48	0.00	0.01
2019	MAY	16.41	0.01	0.37	0.62	3.87	3.95	0.95	1.86	2.80	0.00	0.02
2019	JUNE	19.03	0.01	0.46	0.74	4.46	4.59	1.08	2.41	3.01	0.00	0.02
2019	JULY	19.61	0.01	0.49	0.74	4.60	4.56	1.14	2.67	3.19	0.00	0.02
2019	AUGUST	18.86	0.01	0.42	0.71	4.40	4.57	1.07	2.13	3.36	0.00	0.02
2019	SEPTEMBER	12.32	0.00	0.27	0.45	2.83	2.98	0.68	1.34	2.16	0.00	0.01
2019	OCTOBER	17.34	0.01	0.42	0.66	4.14	4.16	1.03	2.27	2.53	0.00	0.02
2019	NOVEMBER	23.53	0.01	0.70	0.66	6.44	6.53	1.57	3.81	1.80	0.00	0.02
2019	DECEMBER	18.79	0.01	0.44	0.69	4.37	4.32	1.10	2.34	3.36	0.00	0.02
2-Year Average (tpy)		214.64	0.07	5.30	7.78	50.60	50.84	12.39	28.66	34.15	0.00	0.21
2 Year Average (lb/yr)		429,278	143	10,592	15,551	101,201	101,675	24,787	57,316	68,301	0.00	418

Project Combustion Source Emissions

Crown Cork & Seal Company, Inc.
Olympia, WA

Summary:

Emission Source	Future Potential Pollutant Emissions (tpy)											
	CO	CO ₂	CH ₄	N ₂ O	NO _x	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO _{2e}
Project Combustion Sources	9.45	17,707.00	0.33	0.03	13.01	1.12	1.12	1.12	0.00	0.09	0.81	17,725.28

Detail:

Emission Source	Heat Input Rating (MMBTU/hr)	Hourly Fuel Flow (MMcf/hr)	Max. Operating Hours	Annual Fuel Flow (MMcf/yr)
Pin Oven 2 (single burner)	2.6	2.52E-03	8760	22.11
Pin Oven 3a (single burner)	2.59	2.52E-03	8760	22.11
Pin Oven 3b (single burner)	2.59	2.52E-03	8760	22.11
IBO 1 (three burners)	3.93	3.83E-03	8760	33.55
IBO 2 (three burners)	3.93	3.83E-03	8760	33.55
IBO 3 (three burners)	3.93	3.83E-03	8760	33.55
RTO Burner (single burner)	15	1.46E-02	8760	128.07

Removed Emission Source	Heat Input Rating (MMBTU/hr)	Hourly Fuel Flow (MMcf/hr)	Max. Operating Hours	Annual Fuel Flow (MMcf/yr)
Pin Oven 2	3.0	2.92E-03	8760	25.61
IBO 1	5.2	5.07E-03	8760	44.40
IBO 2	5.2	5.07E-03	8760	44.40

Pollutant	CO	CO ₂	CH ₄	N ₂ O	NO _x	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO _{2e}
AP-42 Emission Factors (lb/MMscf) ^{a,b}	84	120,017	2.3	0.2	100	7.6	7.6	7.60	0.0005	0.6	5.50	see below
New Burner (Ovens) NOx Emission Factors (lb/MMscf) ^c	84	120,017	2.3	0.2	99	7.6	7.6	7.60	0.0005	0.6	5.50	see below
New Burner (RTO) NOx Emission Factors ^d	38	120,017	2.3	0.2	74	7.6	7.6	7.60	0.0005	0.6	5.50	see below

a Emission factors obtained from AP-42 Chapter 1.4, Table 1.4-2.

b Greenhouse gas emission factors obtained from 40 CFR Part 98 Subpart C, Tables C-1 and C-2 for natural gas. CO_{2e} calculated based on global warming potential (GWP) for each Greenhouse gas: CO₂ = 1; CH₄ = 25; and N₂O = 298 (40 CFR Part 98, Subpart A).

c NOx emission factor for oven burners based on the manufacturer guarantee (80 ppm NOx at 3% O₂), vendor data indicates NOx concentrations range from 9 - 50 ppm @ 3% O₂ during normal operation.

d NOx and CO emission factors for RTO Eclipse ThermJet burner is 60 ppm NOx @ 3% O₂ (0.072 lb/MMBtu) and 50 ppm CO @ 3% O₂ (0.037 lb/MMBtu).

GWP	GHG
1	CO ₂
25	CH ₄
298	N ₂ O

1,026	Btu/scf, NG HHV
100%	percent of burner rating; max. sustained firing rate
24	Daily Operating hours
8760	Annual Operating hours

Project Combustion Source Emissions

Crown Cork & Seal Company, Inc.
Olympia, WA

Emission Source	Pollutant Emissions (lb/hr)											
	CO	CO ₂	CH ₄	N ₂ O	NO _x	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO _{2e}
Pin Oven 2 (single burner)	0.21	303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
Pin Oven 3a (single burner)	0.21	303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
Pin Oven 3b (single burner)	0.21	303	5.71E-03	5.71E-04	0.25	1.92E-02	1.92E-02	1.92E-02	1.26E-06	0.0015	0.014	303
IBO 1 (three burners)	0.32	460	8.66E-03	8.66E-04	0.38	2.91E-02	2.91E-02	2.91E-02	1.92E-06	0.0023	0.021	460
IBO 2 (three burners)	0.32	460	8.66E-03	8.66E-04	0.38	2.91E-02	2.91E-02	2.91E-02	1.92E-06	0.0023	0.021	460
IBO 3 (three burners)	0.32	460	8.66E-03	8.66E-04	0.38	2.91E-02	2.91E-02	2.91E-02	1.92E-06	0.0023	0.021	460
RTO Burner (single burner)	0.56	1,755	3.31E-02	3.31E-03	1.08	1.11E-01	1.11E-01	1.11E-01	7.31E-06	0.0088	0.080	4,047
New Equipment (non-exempt) Total	2.16	4,042.69	0.08	7.62E-03	2.97	0.26	0.26	0.26	1.68E-05	0.02	0.19	6,337

- Non-exempt new equipment includes Pin Ovens 2, 3a, and 3b; and IBO 1, 2, and 3.

Emission Source	Pollutant Emissions (tpy)											
	CO	CO ₂	CH ₄	N ₂ O	NO _x	PM	PM ₁₀	PM _{2.5}	Pb	SO _x	VOC	CO _{2e}
Pin Oven 2 (single burner)	0.93	1,327	0.03	0.003	1.1	0.08	0.08	0.08	5.53E-06	0.007	0.061	1,328
Pin Oven 3a (single burner)	0.93	1,327	0.03	0.003	1.1	0.08	0.08	0.08	5.53E-06	0.007	0.061	1,328
Pin Oven 3b (single burner)	0.93	1,327	0.03	0.003	1.1	0.08	0.08	0.08	5.53E-06	0.007	0.061	1,328
IBO 1 (three burners)	1.4	2,014	0.04	0.004	1.7	0.13	0.13	0.13	8.39E-06	0.010	0.092	2,016
IBO 2 (three burners)	1.4	2,014	0.04	0.004	1.7	0.13	0.13	0.13	8.39E-06	0.010	0.092	2,016
IBO 3 (three burners)	1.4	2,014	0.04	0.004	1.7	0.13	0.13	0.13	8.39E-06	0.010	0.092	2,016
RTO Burner (single burner)	2.4	7,685	0.14	0.014	4.7	0.49	0.49	0.49	3.20E-05	0.038	0.35	7,693
New Equipment (non-exempt) Total	9.4	17,707.00	0.33	0.033	13.0	1.12	1.12	1.12	7.38E-05	0.089	0.81	17,725

- Non-exempt new equipment includes Pin Ovens 2, 3a, and 3b; and IBO 1, 2, and 3.

Project Combustion Source Emissions

Crown Cork & Seal Company, Inc.

Olympia, WA

Toxic Air Pollutants

Pollutant ^a	Emission Factor	Pin Oven 2	Pin Oven 3a	Pin Oven 3b	IBO 1	IBO 2	IBO 3	RTO	Project Emissions ^c			Removed Equipment
	(lb/MMscf)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)
NOx		0.25	0.25	0.25	0.38	0.38	0.38	1.08	2.97	71.3	26,011	-1.31E+00
CO	8.40E+01	0.21	0.21	0.21	0.32	0.32	0.32	0.56	2.16	51.8	18,890	-1.10E+00
SO ₂	6.00E-01	1.51E-03	1.51E-03	1.51E-03	2.30E-03	2.30E-03	2.30E-03	0.01	0.02	0.5	177	-7.84E-03
Arsenic	2.00E-04	5.05E-07	5.05E-07	5.05E-07	7.66E-07	7.66E-07	7.66E-07	2.92E-06	6.74E-06	1.62E-04	5.90E-02	-2.61E-06
Benzene	2.10E-03	5.30E-06	5.30E-06	5.30E-06	8.04E-06	8.04E-06	8.04E-06	3.07E-05	7.07E-05	1.70E-03	6.20E-01	-2.74E-05
Beryllium	1.20E-05	3.03E-08	3.03E-08	3.03E-08	4.60E-08	4.60E-08	4.60E-08	1.75E-07	4.04E-07	9.70E-06	3.54E-03	-1.57E-07
Cadmium	1.10E-03	2.78E-06	2.78E-06	2.78E-06	4.21E-06	4.21E-06	4.21E-06	1.61E-05	3.71E-05	8.89E-04	3.25E-01	-1.44E-05
Chromium VI ^b	5.60E-05	1.41E-07	1.41E-07	1.41E-07	2.15E-07	2.15E-07	2.15E-07	8.19E-07	1.89E-06	4.53E-05	1.65E-02	-7.31E-07
Cobalt	8.40E-05	2.12E-07	2.12E-07	2.12E-07	3.22E-07	3.22E-07	3.22E-07	1.23E-06	2.83E-06	6.79E-05	2.48E-02	-1.10E-06
Copper	8.50E-04	2.15E-06	2.15E-06	2.15E-06	3.26E-06	3.26E-06	3.26E-06	1.24E-05	2.86E-05	6.87E-04	2.51E-01	-1.11E-05
Dichlorobenzene	1.20E-03	3.03E-06	3.03E-06	3.03E-06	4.60E-06	4.60E-06	4.60E-06	1.75E-05	4.04E-05	9.70E-04	3.54E-01	-1.57E-05
Formaldehyde	7.50E-02	1.89E-04	1.89E-04	1.89E-04	2.87E-04	2.87E-04	2.87E-04	1.10E-03	2.53E-03	6.06E-02	2.21E+01	-9.80E-04
Hexane	1.80E+00	4.54E-03	4.54E-03	4.54E-03	0.007	0.007	0.01	0.03	0.06	1.5	531	-2.35E-02
Lead	5.00E-04	1.26E-06	1.26E-06	1.26E-06	1.92E-06	1.92E-06	1.92E-06	7.31E-06	1.68E-05	4.04E-04	1.48E-01	-6.53E-06
Manganese	3.80E-04	9.59E-07	9.59E-07	9.59E-07	1.46E-06	1.46E-06	1.46E-06	5.56E-06	1.28E-05	3.07E-04	1.12E-01	-4.96E-06
Mercury	2.60E-04	6.56E-07	6.56E-07	6.56E-07	9.96E-07	9.96E-07	9.96E-07	3.80E-06	8.76E-06	2.10E-04	7.67E-02	-3.40E-06
Naphthalene	6.10E-04	1.54E-06	1.54E-06	1.54E-06	2.34E-06	2.34E-06	2.34E-06	8.92E-06	2.05E-05	4.93E-04	1.80E-01	-7.97E-06
Nickel	2.10E-03	5.30E-06	5.30E-06	5.30E-06	8.04E-06	8.04E-06	8.04E-06	3.07E-05	7.07E-05	1.70E-03	6.20E-01	-2.74E-05
Selenium	2.40E-05	6.06E-08	6.06E-08	6.06E-08	9.19E-08	9.19E-08	9.19E-08	3.51E-07	8.08E-07	1.94E-05	7.08E-03	-3.13E-07
Toluene	3.40E-03	8.58E-06	8.58E-06	8.58E-06	1.30E-05	1.30E-05	1.30E-05	4.97E-05	1.15E-04	2.75E-03	1.00E+00	-4.44E-05
Vanadium	2.30E-03	5.81E-06	5.81E-06	5.81E-06	8.81E-06	8.81E-06	8.81E-06	3.36E-05	7.75E-05	1.86E-03	6.79E-01	-3.00E-05
Acenaphthene	1.80E-06	4.54E-09	4.54E-09	4.54E-09	6.89E-09	6.89E-09	6.89E-09	2.63E-08	6.06E-08	1.46E-06	5.31E-04	-2.35E-08
Acenaphthylene	1.80E-06	4.54E-09	4.54E-09	4.54E-09	6.89E-09	6.89E-09	6.89E-09	2.63E-08	6.06E-08	1.46E-06	5.31E-04	-2.35E-08
Anthracene	2.40E-06	6.06E-09	6.06E-09	6.06E-09	9.19E-09	9.19E-09	9.19E-09	3.51E-08	8.08E-08	1.94E-06	7.08E-04	-3.13E-08
Benz(a)anthracene	1.80E-06	4.54E-09	4.54E-09	4.54E-09	6.89E-09	6.89E-09	6.89E-09	2.63E-08	6.06E-08	1.46E-06	5.31E-04	-2.35E-08
Benzo(a)pyrene	1.20E-06	3.03E-09	3.03E-09	3.03E-09	4.60E-09	4.60E-09	4.60E-09	1.75E-08	4.04E-08	9.70E-07	3.54E-04	-1.57E-08
Benzo(b)fluoranthene	1.80E-06	4.54E-09	4.54E-09	4.54E-09	6.89E-09	6.89E-09	6.89E-09	2.63E-08	6.06E-08	1.46E-06	5.31E-04	-2.35E-08
Benzo(k)fluoranthene	1.80E-06	4.54E-09	4.54E-09	4.54E-09	6.89E-09	6.89E-09	6.89E-09	2.63E-08	6.06E-08	1.46E-06	5.31E-04	-2.35E-08
Chrysene	1.80E-06	4.54E-09	4.54E-09	4.54E-09	6.89E-09	6.89E-09	6.89E-09	2.63E-08	6.06E-08	1.46E-06	5.31E-04	-2.35E-08
Dibenzo(a,h)anthrancene	1.20E-06	3.03E-09	3.03E-09	3.03E-09	4.60E-09	4.60E-09	4.60E-09	1.75E-08	4.04E-08	9.70E-07	3.54E-04	-1.57E-08
Fluoranthene	3.00E-06	7.57E-09	7.57E-09	7.57E-09	1.15E-08	1.15E-08	1.15E-08	4.39E-08	1.01E-07	2.43E-06	8.85E-04	-3.92E-08
Fluorene	2.80E-06	7.07E-09	7.07E-09	7.07E-09	1.07E-08	1.07E-08	1.07E-08	4.09E-08	9.43E-08	2.26E-06	8.26E-04	-3.66E-08
Indeno(1,2,3-cd)pyrene	1.80E-06	4.54E-09	4.54E-09	4.54E-09	6.89E-09	6.89E-09	6.89E-09	2.63E-08	6.06E-08	1.46E-06	5.31E-04	-2.35E-08
2-Methylnaphthalene	2.40E-05	6.06E-08	6.06E-08	6.06E-08	9.19E-08	9.19E-08	9.19E-08	3.51E-07	8.08E-07	1.94E-05	7.08E-03	-3.13E-07
3-Methylcholanthrene	1.80E-06	4.54E-09	4.54E-09	4.54E-09	6.89E-09	6.89E-09	6.89E-09	2.63E-08	6.06E-08	1.46E-06	5.31E-04	-2.35E-08
7,12-Dimethylbenz[a]anthracene	1.60E-05	4.04E-08	4.04E-08	4.04E-08	6.13E-08	6.13E-08	6.13E-08	2.34E-07	5.39E-07	1.29E-05	4.72E-03	-2.09E-07
Phenanthrene	1.70E-05	4.29E-08	4.29E-08	4.29E-08	6.51E-08	6.51E-08	6.51E-08	2.49E-07	5.73E-07	1.37E-05	5.02E-03	-2.22E-07
Pyrene	5.00E-06	1.26E-08	1.26E-08	1.26E-08	1.92E-08	1.92E-08	1.92E-08	7.31E-08	1.68E-07	4.04E-06	1.48E-03	-6.53E-08
Total HAP									0.06	1.53	556.84	

^a Natural gas combustion emissions are based on emission factors obtained from vendor data (NOx) and AP-42 Chapter 1.4, Table 1.4-2.

^b AP-42 provides a chromium emission factor for natural gas fired external combustion, but does not include guidance for partitioning emissions between the carcinogenic chromium VI (hexavalent chromium) and the chromium III (trivalent chromium). EPA's 2002 National-Scale Air Toxics Assessment (NATA) released June 2009 includes a chromium speciation profile for gas-fired process heaters, which indicates 4 percent of total chromium is chromium VI and 96 percent is chromium III. Ramholl assumed 4 percent of total chromium emissions were emitted as chromium VI.

^c Maximum potential hourly emissions are based on operation of all natural gas combustion sources (ovens, and dryers). Maximum daily emissions are calculated based on the maximum hourly emission rate and

Crown Cork & Seal Company, Inc.
Olympia, WA

Line 1&2 Process Lines - PM Emissions

Normal Operation - Baghouse to RTO stack, RTO Bypass IBO Oven stack, and fugitives

Detail:

Operating Parameters

Normal Production (hrs/yr)	8,560
RTO Bypass (hrs/yr)	200
Combined Lines 1 & 2 Rated Capacity (cans/min)	3,800
Lines 1 & 2 RTO Bypass Rate (cans/min)	1,900
Line 1&2 Efficiency	90%
Inside Spray Capture Efficiency	75%
Inside Spray Destruction Efficiency	98.0%
Varnish/Ink Capture Efficiency	75%
Varnish/Ink Destruction Efficiency	98.0%
UV Varnish Capture and Control	0.0%
IPA Retention in Shop Towels (Waste)	0.0%

VOC Emissions

Material	Use	Application Rate (gal/1,000 cans)	Vol % Solids	lb VOC/gal solids	Normal Operation			RTO Bypass	
					Annual Usage (gal/yr)	VOC Emissions (tpy)	VOC Fugitive Emissions (tpy)	Annual Usage (gal/yr)	VOC Emissions (tpy)
Various	Inside Spray	0.18	18.5%	6.5	324,076	2.92	48.71	3,786	2.28

Crown Cork & Seal Company, Inc.
Olympia, WA

Overspray (LSM) PM

21.1% solids content by weight
 94% material transfer efficiency
 95% baghouse collection efficiency
 90% deposition of PM escaping capture
 99.0% combined removal efficiency of baghouse/LSM filters
 99.0% removal efficiency of LSM filters (RTO Bypass)

PM Emissions	Solids Applied (lbs/yr)	Solids in Overspray (lbs/yr)	Overspray to wok area (lb/yr)	PM Emissions Baghouse (lbs/yr)	PM Emissions - Baghouse (lbs/hr)	PM Emissions Baghouse (tpy)	PM Emisison to Plant Vent (lb/hr)	PM Emisison to Plant Vent (tpy)	Total PM Emissions (tpy)
Normal Operation	578,496	34,710	1,735	330	0.043	0.1649	0.023	0.087	0.252
RTO Bypass	6,758	405	20	4	0.02	0.0019	0.0113	0.001	0.003