

TECHNICAL SUPPORT DOCUMENT
NOTICE OF CONSTRUCTION
FOR PRELIMINARY DETERMINATION
ZODIAC AEROSPACE
ADVANCED COMPOSITES & ENGINEERED MATERIALS
NEWPORT, WASHINGTON
July 26, 2017

1. SUMMARY

The Washington State Department of Ecology (Ecology) has determined that the applicant, Zodiac Aerospace Cabin & Structures Support LLC (Zodiac), has satisfied all of the requirements of New Source Review for its facility in Newport, WA. An air quality analysis was performed to demonstrate that the operation of this facility will not cause or contribute to a violation of any state or federal ambient air quality standard. Ecology finds that the project will have no significant adverse impact on air quality. The following outlines Ecology's technical analysis of this proposed facility.

2. INTRODUCTION (FACILITY BACKGROUND/PROCESS & EMISSION SOURCES)

2.1. Facility Background

On June 30, 2000, Aerocell, Inc. submitted a Notice of Construction (NOC) application to the Department of Ecology Eastern Regional Office in Spokane (Ecology) for the construction of a facility that manufactures resin coated fiberglass products for the aerospace industry to be located at 501 North Newport Avenue in Newport, Washington. The original permit for the facility was issued on December 29, 2000, and addressed emissions from the primary process unit at the facility, referred to in this permit as the "woven prepreg treater" or "treater". Emissions from the treater consist primarily of volatile organic compounds (VOC) some of which are listed as federal Hazardous Air Pollutants (HAP) and Washington State Toxic Air Pollutants (TAP). The original permit required that these emissions be collected and controlled by a thermal oxidizer.

Facility inspections by Ecology on April 13, 2001 and July 10, 2002 identified plant operations which were inconsistent with the provisions of the original permit. Specifically, the treater had been operated at a higher hourly production rate than the maximum allowed in the permit, and emission units were identified which either were new to the facility or had not been addressed in the original permit. On January 7, 2003, Aerocell requested that the permit be amended to address these issues. The first amendment addressed increased production rate on the treater, as well as installation of the non-woven scrim coater, uni-directional pre-preg manufacturing process (UDPPM referred to in the permit as the winder process), multi-opening press, warming ovens, Torit dust collector, adhesive application spray booth, Tedlar application oven, distillation unit, and laboratory solvent usage.

On April 9, 2004, Aerocell notified Ecology of errors that had been discovered within the calculations used to develop the 1st amendment of the Order. These errors caused the resin usage rate for non-woven scrim production to be underestimated. The corrected resin usage rate was determined based on actual operational records, and is reflected within this permit as increased emission rates from the thermal oxidizer. The 2nd amendment also modified the compliance schedule that applied to the facility. Specifically, the schedule was extended by six (6) months so that the treater could be retrofitted to process the non-woven scrim product, thus eliminating use of the scrim coater. While it delayed the compliance date, this approach was determined to be a more environmentally sound long term solution than directly controlling the scrim coater as approved within the 1st amendment.

On May 25, 2005, Aerocell requested a permit modification to allow increased operational flexibility with respect to products processed through the treater. This 3rd Amendment revises the operational limitations that apply to the treater (see condition 1.5) to achieve this goal without compromising environmental standards.

On November 22, 2010, Aerocell, Inc. submitted a Notice of Construction application to increase its permitted production limits, to replace a thermal oxidizer that has reached its life expectancy, and to introduce operational flexibility into its approval. The increased emissions requested in the November submittal for the facility would have resulted in Aerocell being a synthetic minor source relative to the Federal Air Operating Permit program. Synthetic minor sources are subject to enhanced monitoring, recordkeeping and reporting requirements to ensure that they remain below the AOP thresholds. Ecology determined that the November submittal was not complete and provided some suggested approaches to permitting this facility.

On January 27, 2011, Aerocell submitted a WAC 173-400-114 NOC application specifically to replace the thermal oxidizer. No other changes are proposed in the facility Approval Order at this time.

On February 24, 2011 Ecology issued Aerocell Corporation a Notice of Construction (NOC) air permit. The 2011 permit was the latest permit issued for the facility now known as Zodiac Advanced Composites & Engineered Materials (Zodiac or Zodiac Aerospace).

Zodiac submitted a new application to Ecology on June 17, 2013. Ecology issued an incompleteness determination to Zodiac on July 1, 2013. On February 28, 2017 Zodiac provided Ecology with additional application materials that also reflected facility conditions after a 2015 facility explosion involving treater operations. Zodiac again submitted additional application material to Ecology on July 10, 2017. In a July 17, 2017 phone conversation, Zodiac confirmed that annual production for Formulations, Winders, Core Saw, and Panels was not significantly impacted in 2015 or in 2016. All products produced from the Treater were purchased third party and used to meet production demands in the Panel department. Ecology considered the application complete on July 21, 2017.

- 2.1.1 A legal description of this location is the SE corner of Section 18, Township 31 N, Range 46 East; Willamette Meridian. The street address of the facility is 501 North Newport Avenue, Newport, Washington 99156. Newport is located in Pend Oreille County, Washington.
- 2.1.2 A July 2015 incident required updating existing facility conditions, including replacing the previous treater with an improved treater (with refurbished RTO) and locating it in slightly new position at the facility.
- 2.1.3 The air quality program required that emission estimates reflect t-BACT, and that the process include a second tier toxics review if the offsite concentration for the worst-case location exceeds the ASIL in WAC 173-460. For the Newport facility, a second tier toxics review was not required.

2.2. Process Description/Emission Sources

Zodiac specializes in the manufacturer of composites used for structural and cabin components used in the aerospace industry. In its application, Zodiac has identified the following major processes at this facility: formulations room, the treater process, the winder process, and the panel press; as well as the following supporting process and sources of emissions: powder weighing and adding, solvent cleaning, core sawing, cleaning booth, the measuring table, Thermwood trimming, and the thermal oxidizer.

- 2.2.1 The following process description for formulations was presented in the application: The Formulations area consists of 7 mixing vessels where the resins are produced. In addition to the mixing vessels there is a powder weighing station and areas where the powder can be added to the resins. Some of the resins are required to be stored at a slightly elevated temperature so there is an electric oven in the room where some of the resins are stored. Some of the resins that are produced are used on site in the Treater and Winder processes, however some of the resins are also shipped to other locations. Emissions from formulations process equipment such as mixing totes, mixing vats, and mixing barrels include VOC/HAPs/TAPs.
- 2.2.2 The following process description for the treater process was presented in the application: The Treater is an enclosed process that applies resins to a glass substrate which is essentially a thick sheet with a honeycomb structure. After the resin is applied the prepreg material passes through dryer sections to be cured before being rolled and stored in plastic bags until they are used in other processes. All of the emissions from the Treater are captured and vented to the thermal oxidizer. Zodiac tracks resin usage and performs testing that documents the amount of phenol and formaldehyde that remains in the product after being processed by the Treater. Emissions from the treater include VOC/HAPs/TAPs.
- 2.2.3 The following process description for the winder process was presented in the application: The Winder room contains 5 Winder machines where resins are applied to a narrow fiber core strand and wound around a rotating barrel to create

layered sheets. The prepreg product is removed from the barrel and either packaged and sold or stored on racks for a number of days until the prepreg meets the required specifications for processing in the Panel Press. Stack testing has shown that the majority of VOCs from the resin are emitted in the Winder room. There may be some minimal amounts of VOCs that remain on the prepreg material that are emitted during the storage period, however the PTE calculations for the Winder room assume that all VOCs (less formaldehyde and phenol) are emitted in the Winder room. Any emissions of VOCs (not including formaldehyde and phenol) from the product storing or Panel Press would result in a decrease in the PTE from the Winder room. Zodiac adds acetone to the low-VOC resins to maintain the desired resin viscosity and solvent is added to the high-VOC resins. Emissions from winder operations include VOC/HAPs/TAPs.

2.2.4 The following process description for the panel press was presented in the application: Once the layered sheets (prepreg plies) produced by the winders have reached the desired specification they can be applied to a core material and processed in the Panel Press. The panels that are processed in the Panel Press can have up to 8 total plies of Winder or Treater prepreg material placed on the top and/or bottom of the core and then loaded into the Panel Press. The Panel Press can process up to 80 plies on 10 panels during one cycle which takes a minimum of an hour to complete. During the cycle the Panel Press applies pressure and heat to adhere the prepreg to the panels to create the final cured product. Emissions from the panel press include VOC/HAPs/TAPs.

2.2.5 The following process description for the supporting processes was presented in the application (emissions from each is provided in parenthesis): Supporting processes at Zodiac include solvent cleaning (VOC/HAPs/TAPs), a core saw (PM/PM10), cleaning booth (PM/PM10), measuring table (PM/PM10), and Thermwood trimming (PM/PM10). The only combustion source at the Zodiac facility is the thermal oxidizer which burns propane fuel and controls the emissions from the treater process. Emissions from the thermal oxidizer include PM/PM10/PM2.5/SO2/NOx/CO/ VOC/HAPs/TAPs.

3. Applicable Regulations

3.1. WAC 173-400-113, Requirements for projects in attainment or unclassifiable areas, is the State regulation that defines the evaluations for projects such as these. The subsections of WAC 173-400-113 require the following:

3.1.1. WAC 173-400-113(1): “The proposed new source will comply with all applicable new source performance standards (NSPS), national emission standards for hazardous air pollutants (NESHAP)...”. After review of subpart HHH for Synthetic Fiber Production Facilities and VVV for Polymeric Coatings of Supporting Substrates Facilities, the facility is required to monitor VOC.

3.1.2. WAC 173-400-113(2): “The proposed new source or modification will employ BACT for all pollutants not previously emitted or whose emissions would increase as a result of the new source or modification.” Zodiac is required to employ BACT

in the terms and conditions of the Approval Order associated with this Technical Support Document. Specific BACT:

- 3.1.2.1. PM-10 Routing Operations – Canister fabric filter system (Torit). Use of the canister system reduces emissions of PM-10 to levels below the de minimus thresholds.
- 3.1.3. WAC 173-400-113(3): “Allowable emissions from the proposed new source or modification will not delay the attainment date for an area not in attainment, nor cause or contribute to a violation of any air quality standard.” Zodiac’s emission estimates have been used as inputs for ambient air quality modeling for the facility at its proposed maximum operating or emission rates. The modeling likely overestimates the impacts of the facility, but still indicates compliance with this subsection of the regulation (see Section 6.2 of this TSD).
- 3.2. WAC 173-460, Controls for New Sources of Toxic Air Pollutants, is the State regulation that addresses the risk to the public from routine releases of toxic air contaminants from new and modified sources. Zodiac operations emit seven known pollutants that are listed in WAC 173-460 as toxic air pollutants: formaldehyde, methyl alcohol, MTBK, phenol, toluene, trimethylamine, and isopropyl alcohol.
 - 3.2.1. WAC 173-460-050: The applicant must quantify the facility’s emissions of toxic air contaminants. Zodiac has done this in its application.
 - 3.2.2. WAC 173-460-060: The applicant must install and operate t-BACT on each emission point for which there is an increase above de minimus levels in a toxic air pollutant. The Approval Order based on the analyses described in this technical support document contains limitations that reflect t-BACT for toxics emissions from the facility. The measures that Ecology agrees reflect t-BACT are as follows for TAPs/HAPs:
 - 3.2.2.1. Treater – Quadrant Thermal Oxidizer with 2016 rebuilt burner to achieve 99% reduction in organic compounds.
 - 3.2.2.2. Winder Operations – Permittee has requested product usage limitations in order to modify the T-BACT determination to require no additional control equipment. Any request to increase product usage in the future will trigger another T-BACT analysis per condition 8.1.
 - 3.2.2.3. Multi-Opening Press – Cost analyses performed by the permittee established all available control technologies as cost prohibitive. The emissions from the press will be vented to the facility roof and discharged vertically.
 - 3.2.2.4. Warming Ovens – Cost analyses performed by the permittee established all available control technologies as cost prohibitive. Warming oven emissions will be vented to the facility roof and discharged vertically.
 - 3.2.2.5. Laboratory – Dispensing containers used in the lab will be fitted with pressure relief valves and self-closing dispenser valves. Other measures to reduce emissions will be employed including keeping all containers tightly sealed and using the minimum amount of solvent necessary to process product samples.
 - 3.2.2.6. Limiting VOC emissions from the winder operations to 22 tons per year.

3.2.2.7. Routing treater emissions to the thermal oxidizer.

4. The NOC Application:

Ecology received the applicable fee payment from Zodiac, which allowed Ecology to begin reviewing the NOC application for this facility as described in Section 2.1 of this TSD.

5. Determinations of Best Available Control Technology (BACT) and Best Available Control Technology for Toxics (t-BACT)

5.1. As noted in sections 3.1.2 and 3.2.2 above, Ecology has determined BACT and t-BACT for this facility.

6. Ambient Air Quality Analysis

6.1. Modeling Methodology: Based on Ecology discretion, AERMOD was used in a sufficient manner.

6.2. NAAQS Analysis: Pend Oreille County is in attainment for all Criteria Pollutants. Emission estimates used to evaluate this project for its impacts and ambient air quality standards comparison are outlined in the following table. Based on AERMOD modeling results, it is believed this project will not result in exceedance of the NAAQS.

Criteria Pollutant	Standards in $\mu\text{g}/\text{m}^3$		Maximum Ambient Impact Concentration ($\mu\text{g}/\text{m}^3$)	Background Concentrations ($\mu\text{g}/\text{m}^3$) (a)	Maximum Ambient Impact Concentration Added to Background ($\mu\text{g}/\text{m}^3$)
	NAAQS(b)				
	Primary	Secondary			
Particulate Matter (PM_{10})					
24-hour	150	150	21.0	76	97
Particulate Matter ($\text{PM}_{2.5}$)					
Annual	12	15	0.11	4.6	4.7
24-hour	35	35	0.41	14	14.4
Carbon Monoxide (CO)					
8-hour	10,000		8.95	1,255	1,264
1-hour	40,000		20.29	2,110	2,130
Nitrogen Oxides (NO_2)					
Annual	100	100	2.09	1.7	4
1-hour	188	--	32.95	10	43
Sulfur Dioxide (SO_2)					
3-hour	--	1,300	2.47	1.2	4
1-hour	195	--	3.34	1.2	5

Notes:

µg/m³ = Micrograms per cubic meter.

ppm = Parts per million.

ASIL = Acceptable source impact level.

(a) Background concentrations obtained from WSU NW Airquest website.

(b) Ecology interprets compliance with the National Ambient Air Quality Standards (NAAQS) as demonstrating compliance with the Washington Ambient Air Quality Standards (WAAQS).

6.3. WAC 173-460, Toxic Air Pollutant Modeling Results

For emissions of toxic air pollutants listed in WAC 173-460, if the emission point or activity has t-BACT control, the emissions impacts of that pollutant after control may be approved if they are demonstrated to be less than the acceptable source impact levels (ASILs) in WAC 173-460. The pollutants whose emissions were determined to be greater than small quantity emission rates (SQER), must be modeled. For TAPs that needed to be modeled, the following table shows that AERMOD modeling results are less than the applicable ASIL, and therefore no further evaluation is required.

Toxic Air Pollutants ^(a)	ASIL (ug/m ³)	ASIL Averaging Period	Modeling Results (ug/m ³)	Results Less Than ASIL?
Formaldehyde	0.167	Year	0.146	Yes

(a) In a June 6, 2017 conversation with Zodiac, Zodiac confirmed that epichlorohydrin CAS# 106-89-8 is not a component in their epoxy resins.

7. CONCLUSION

Based on the above analysis, Ecology concludes that operation of the Zodiac facility in Newport, WA will not have an adverse impact on air quality. Ecology finds that Zodiac has satisfied all requirements for NOC approval.

****END OF ZODIAC AEROSPACE TSD ****