



Statement of Basis

Air Quality Construction Permit

Boyds' Gunstock Industries, Inc.

Mitchell, South Dakota

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1.0 Background

Boyd's Gunstock Industries, Inc. (Boyd's) manufactures wood gunstock components from walnut and laminate. The primary standard industrial classification (SIC) code for the facility is 2426 – Hardwood Dimension and Flooring Mills.

Boyd's was issued its first minor air quality operating permit on October 5, 2006. On December 29, 2011, the South Dakota Department of Environment and Natural Resources renewed the minor air quality operating permit.

On May 7, 2015, Boyd's submitted a construction permit for their operation in Mitchell. The application was considered complete on June 24, 2015.

1.1 Equipment

Table 1-1 provides a description of the permitted units, which was derived from the existing permit.

Table 1-1 Permitted Units

Unit	Description	Maximum Operating Rate	Control Device
#1	1995 custom built spray booth. The spray booth uses an air-atomized spraying method.	-	Particulate emissions are controlled using dry filter pads;
#2	1995 custom built spray booth. The spray booth uses an air-atomized spraying method.	-	Particulate emissions are controlled using dry filter pads;
#3	1995 custom built spray booth. The spray booth uses an air-atomized spraying method.	-	Particulate emissions are controlled using dry filter pads
#4	1995 custom built spray booth. The spray booth uses an air-atomized spraying method.	-	Particulate emissions are controlled using dry filter pads;
#5	Carter Day Bag House, model 144RJ84 containing 144 bags, and Murphy Rogers, model RJ72 containing 72 bags, reverse air baghouses operated in series. The baghouses control particulate emissions from two 8-spindle turning centers, four 60-inch belt sanders, twenty 6-inch round/drop-sanding stations, one 12-inch round/drop-molder, and one 8-inch round/drop-gang rip saw.	-	

1.2 Proposed Construction

Boyd's is proposing to replace the four existing spray booths with four new spray booths and addition of two new spray booths to their operation. The four spray booths that are being replaced will be removed from the current minor air quality operating permit when the permit is renewed.

2.0 New Source Performance Standards (NSPS)

DENR reviewed the federal new source performance standards (NSPS) in 40 CFR Part 60 and determined that the proposed construction is not applicable to the NSPS regulations.

3.0 New Source Review (NSR)

ARSD 74:36:10:01 states that New Source Review (NSR) regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. Boyd's is located in Mitchell, South Dakota, and is in attainment or unclassifiable for all the pollutants regulated under the Clean Air Act. Therefore, Boyd's is not subject to NSR review.

4.0 Prevention of Significant Deterioration

A prevention of significant deterioration (PSD) review applies to new major stationary sources and major modifications to existing major stationary sources in areas designated as attainment under Section 107 of the Clean Air Act for any regulated pollutant. The following is a list of regulated pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate with a diameter less than or equal to 10 microns (PM₁₀);
3. Particulate matter with a diameter less than or equal to 2.5 microns (PM_{2.5});
4. Sulfur dioxide (SO₂);
5. Nitrogen oxides (NO_x);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOCs);
8. Lead;
9. Fluorides;
10. Sulfuric acid mist;
11. Hydrogen sulfide;
12. Reduced sulfur compounds
13. Total reduced sulfur; and
14. Greenhouse gases (carbon dioxide, methane, nitrous oxide, etc.).

If the source is considered one of the 28 named PSD source categories listed in Section 169 of

the federal Clean Air Act, the major source threshold is 100 tons per year of any regulated pollutant. The major source threshold for all other sources is 250 tons per year of any regulated pollutant.

On June 24, 2014, the US Supreme Court ruled that greenhouse gases may not be regulated under the PSD program unless the facility requires a PSD permit for a regulated air pollutant.

4.1 Potential Emissions

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

Potential emissions for each applicable pollutant are calculated from the maximum design capacity listed in the application and assume the unit operates every hour of every day of the year, while using the fuel that will emit the greatest emissions. Potential emissions are not realistic of the actual emissions and are used only to identify which type of air quality operating permit and potential regulations Boyds' may be required to meet.

The potential emissions are calculated assuming that the facility operates 24 hours a day, 365 days per year. The emission factors were derived from the material safety data sheets for the products used in the spray booths. The potential emission rate will be estimated from the amount of stain and solvent used and the amount of time the spray booths are operated. Boyds' stated in the application that the hours the spray booths operate vary. Unit #6 would operate approximately 3 hours per day, 250 days per year (750 hours per year). Units #7, #8, and #11 would operate approximately 7 hours per day, 250 days per year (1,750 hours per year). Units #9 and #10 would operate approximately 4 hours per day, 250 days per year (1,000 hours per year). Potential emissions are calculated assuming that the facility operates 24 hours per day, 365 days per year (8,760 hours per year). The potential emissions for the spray booth units will be calculated by using the ratios in Equation 4-1, 4-2, and 4-3:

Equation 4-1: Multiplying Factor Unit #6

$$\frac{8,760 \text{ potential operating hours / year}}{750 \text{ actual operating hours / year}} = 11.68$$

Equation 4-2; Multiplying Factor for Units #7, #8, and #11

$$\frac{8,760 \text{ potential operating hours / year}}{1,750 \text{ actual operating hours / year}} = 5.01$$

Equation 4-3: Multiplying Factor for Units #9 and #10

$$\frac{8,760 \text{ potential operating hours / year}}{1,000 \text{ actual operating hours / year}} = 8.76$$

These ratios will be used to adjust the emissions to represent 8,760 hours per year of operation.

Uncontrolled potential emissions are those that would occur with no emission controls. There is no pollution control equipment for volatile organic compounds associated with the spray booth operations. Therefore, the potential uncontrolled and controlled volatile organic compound emissions are equal. Tables 4.1 and 4.2 summarize the estimated product used in the spray booths from the application.

Table 4.1 – Estimated Product Usage

Description	Walnut Sap Stain	Walnut Stain Boyds	Maple Walnut Dye Stain
Unit #6	15	85	15

Table 4.2 – Potential Product Usage

Description	Care Seal HS	Catalyst 309	Thinner 219	InnoVat Clear 7
Unit #7	700	87	87	-
Unit #8	-	150	150	950
Unit #9	300	23	23	-
Unit #10	-	75	75	475
Unit #11	-	150	150	950

Table 4.3 and 4.3 summarizes the potential products used in the spray booths by multiplying by the multiplying factors in Equations 4-1, 4-2, and 4-3.

Table 4.3 – Potential Product Usage

Description	Walnut Sap Stain	Walnut Stain Boyds	Maple Walnut Dye Stain
Unit #6	175.2	992.8	175.2

¹ Multiplied estimated amount in by 11.68 multiplying factor

Table 4.4 – Potential Product Usage

Description	Care Seal HS	Catalyst 309	Thinner 219	InnoVat Clear 7
Unit #7	3,507 ¹	435.87 ¹	435.87 ¹	0
Unit #8	0	751.5 ¹	751.5 ¹	4,759.5 ¹
Unit #9	2,628 ²	201.48 ²	201.48 ²	0
Unit #10	0	657 ²	657 ²	4,161 ²
Unit #11	0	751.5 ¹	751.5 ¹	4,759.5 ¹
Total	6,135.0	2,797.4	2,797.4	13,680.0

¹ Multiplied estimated amount in by 5.01 multiplying factor

² Multiplied estimated amount in by 8.76 multiplying factor

Table 4.5 displays the potential product use and the volatile organic compound weight from the products used in the spray booths.

Table 4.5 – Product Information

Description	Potential Used	VOC (pounds/gallon)
Walnut Sap Stain	175.2	3.52
Walnut Stain Boyds	992.8	5.96
Maple Walnut Dye Stain	175.2	3.27
Care Seal HS	6,135	5.11
Catalyst 309	485	6.09
Thinner 219	485	7.15
InnoVat Clear 7	2,375	3.8

Equation 4-4, the potential product used from Table 4.5, volatile organic compound weight in pounds per gallon and 2000 pounds per gallon were used to calculate the potential hazardous air pollutant emissions.

Equation 4-4 – Potential Hazardous Air Pollutant Emissions

$$Potential\ Emissions = \frac{Potential\ Used \left(\frac{Gallons}{year} \right) \times VOC\ Weight \left(\frac{pounds}{gallon} \right)}{2000 \left(\frac{pounds}{gallon} \right)}$$

Table 4.6 summaries the potential volatile organic compounds emissions by the proposed construction.

Table 4.6 - Summary of Potential Uncontrolled Emissions

Description	VOC (tons/year)
Walnut Sap Stain	0.3
Walnut Stain Boyds	3.0
Maple Walnut Dye Stain	0.3
Care Seal HS	15.7
Catalyst 309	1.5
Thinner 219	1.7
InnoVat Clear 7	4.5
Total	27

The existing spray booths emit 37.54 tons per year of volatile organic compounds based on the previous review. The replacement of the four spray booths and addition of two spray booths will result in lower potential volatile organic compound emissions.

4.2 PSD Summary

Boyds’ does not meet the 250 tons per year threshold and is not one of the 28 named PSD source categories. Therefore, Boyds’ is considered a minor source under the PSD program and is not subject to PSD requirements. Since Boyds’ does not require a PSD permit, a review of the

greenhouse gases will not be required.

5.0 National Emission Standards for Hazardous Air Pollutants

DENR reviewed the national emission standards for hazardous standards and determined that there are no applicable subparts to the proposed change.

6.0 Maximum Achievable Control Technology Standards

The federal Maximum Achievable Control Technology Standards (MACT) is applicable to both major and area sources of hazardous air pollutants. A major source of hazardous air pollutants is defined as having the potential to emit 10 tons or more per year of a single hazardous air pollutant or 25 tons per year or more of a combination of hazardous air pollutants. An area source is a source that is not a major source of hazardous air pollutants.

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

6.1 Potential HAP Emissions

The potential emissions are calculated assuming that the facility operates 24 hours a day, 365 days per year. Uncontrolled potential emissions are those that would occur with no emission controls. There is no pollution control equipment for hazardous air pollutants associated with the spray booth operations. Therefore, the potential uncontrolled and controlled hazardous air pollutants emissions are equal. The potential hazardous air pollutants emissions from the spray booths will be based on the estimated amount of products submitted in the air quality construction permit application.

Table 6.1 displays the potential product use and the hazardous air pollutants from the products used in the spray booths.

Table 6.1 – Product Information

Description	Potential Used	HAP Weight (pounds/gallon)
Walnut Sap Stain	175.2	3.52
Walnut Stain Boyds ¹	992.8	0.0
Maple Walnut Dye Stain	175.2	1.97
Care Seal HS	6,135	5.11
Catalyst 309 ¹	485	0

Thinner 219	485	7.15
InnoVat Clear 7	2,375	3.8

¹Material Safety Data Sheet indicates no hazardous air pollutants contained in product.

Table 6.2 displays the percentage of hazardous air pollutants in each product.

Table 6.2 – Hazardous Air Pollutants Weight Percentage

Hazardous Air Pollutant	Walnut Sap Stain	Maple Walnut Dye Stain	Care Seal HS	Thinner 219	InnoVat Clear 7
Propylene Glycol	-	1.0%	-	-	-
Diethylene Glycol Monobutyl Ether	-	1.0%	-	-	-
ethylene Glycol Monopropyl Ether	-	1.0%	-	-	-
dipropylene glycol monomethyl ether	-	1.0%	-	-	-
formaldehyde	-	-	0.1%	-	-
Ethyl Benzene	-	-	-	13.0%	5.0%
Toluene	5.0%	-	-	-	-
Xylene	-	-	-	60.0%	13.0%
Chromium (CR3)	0.5%	-	-	-	-
Chromium (III)	0.5%	-	-	-	-

Equation 6-1, the potential product used from Table 6.1, HAP weight in pounds per gallon, HAP weight percent, and 2000 pounds per gallon were used to calculate the potential hazardous air pollutant emissions.

Equation 6-1 – Potential Hazardous Air Pollutant Emissions

$$Potential\ Emissions = \frac{Potential\ Used\ \left(\frac{Gallons}{year}\right) \times HAP\ Weight\ \left(\frac{pounds}{gallon}\right) \times HAP\ weight\ \%}{2000\ \left(\frac{pounds}{gallon}\right)}$$

Table 6.1 summaries the potential hazardous air pollutants emissions by the proposed construction.

Table 6.1 - Summary of Potential Uncontrolled Emissions

Unit Description	HAPs
Propylene Glycol	0.0
Diethylene Glycol Monobutyl Ether	0.0
ethylene Glycol Monopropyl Ether	0.0
dipropylene glycol monomethyl ether	0.0
formaldehyde	0.02
Ethyl Benzene	0.45

Unit Description	HAPs
Toluene	0.02
xylene	1.63
Chromium (CR3)	0.0
Chromium (III)	0.0
Propylene Glycol	0.0
Total	2.12

The existing spray booths emit 15.16 tons per year combined hazardous air pollutants and 7.99 tons per year of xylene for a single hazardous air pollutant based on the previous review. The replacement of the four spray booths and addition of two spray booths will result in lower potential hazardous air pollutants.

6.2 MACT Standards

Based on the potential hazardous air pollutant emissions, Boyds' is still considered an area source. DENR reviewed the Maximum Achievable Control Technology standards under 40 CFR Part 63 and determined the following may be applicable:

6.2.1 ARSD 74:36:08:108 - 40 CFR Part 63, Subpart HHHHHH

DENR reviewed the national emission standards and determined that Boyds' spray booths may be applicable to 40 CFR Part 63, Subpart HHHHHH. This subpart is applicable to owners or operators of paint stripping operations, miscellaneous surface coating area sources and the spray application of coatings containing compounds of chromium (Cr) lead (Pb), manganese (Mn), nickel (Ni), or cadmium (Cd), to any part or product made of metal or plastic, or combinations of metal and plastic that are not motor vehicles or mobile equipment.

Boyds' uses spray coatings that contain chromium; however the facility does not apply this coating to any part or product made of metal or plastic; rather they apply it to wood. Therefore the proposed construction is not subject to this subpart.

6.3 Other MACT Standards

DENR reviewed the Maximum Achievable Control Technology and determined there are no other applicable standards.

7.0 State Requirements

Any source operating in South Dakota that meets the requirements of the Administrative Rules of South Dakota (ARSD) 74:36:05:03 (emit more than 100 tons per year of a criteria pollutant) is required to obtain a Title V air quality operating permit. Boyds' potential particulate matter, sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compound (VOCs) emissions are less than 100 tons per year, carbon dioxide equivalent (CO₂) emissions are less than 100,000 tons per year, and hazardous air pollutant emissions are less than

10 tons per year for a single hazardous air pollutant and 25 tons per year of a combination of hazardous air pollutant. In addition, Boyds' is not subject to a New Source Performance Standard or a Maximum Achievable Control Technology Standard. Therefore, Boyds' is not required to obtain a Title V air quality operating permit.

Boyds' potential volatile organic compound emissions are greater than 25 tons per year. Therefore, Boyds' is required to obtain a minor air quality operating permit once the new paint booths are installed and operational.

In accordance with ARSD 74:36:20:02, an air quality construction permit is required of a proposed project unless it meets the exemption requirements in ARSD 74:36:20:03. ARSD 74:36:20:03, exempts a proposed project if it requires a New Source Review or Prevention of Significant Deterioration preconstruction permit, the proposed project qualifies for a general permit, or meets the exemptions under the Title V and minor air quality operating permit programs. Based on the review, the proposed project requires a minor air quality operating permit; therefore, an air quality construction permit is required. Boyds' is required to obtain a construction permit and 12 months from beginning operations submit an application for a minor air quality operating permit.

7.1 State Emission Limits

The spray booths do not generate particulate matter or sulfur dioxide emissions. Therefore, the state's particulate matter and sulfur dioxide emissions do not apply.

Visible emissions are applicable to units that discharge into the ambient air. In accordance with ARSD 74:36:12:01 a facility may not discharge into the ambient air more than 20 percent opacity for all units. Boyds' must control the opacity at less than 20 percent for all units.

8.0 Recommendation

Boyds' is required to obtain an air quality construction permit for the installation of the six spray booths. Boyds' will be required to construct and operate within the requirements stipulated in the following regulations:

1. ARSD 74:36:12 – Control of Visible Emissions; and
2. ARSD 74:36:20 – Construction Permits for New Sources or Modifications.

Based on the information in the air quality permit application, DENR recommends conditional approval of an air quality construction permit for the construction of six spray booths at Boyds' facility in Mitchell. Any questions on this review should be directed to Earl Berg, Engineer I, Department of Environment and Natural Resources – Air Quality Program.