Nelson Name Plate
2800 Casitas Ave.
Los Angeles, CA 90039
ID#: 117882

## EQUIPMENT DESCRIPTION

A/N 503471 (New Construction)
LASER CUTTER, IPG, MODEL NO. C-3-1-IPG 750, SERIAL NO. N260, 750 WATT, WITH A 1/3 HP EXHAUST BLOWER.

A/N 503714
TITLE V PERMIT REVISION

## CONDITIONS

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
   [RULE 204]

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
   [RULE 204]

3. THIS EQUIPMENT SHALL NOT BE OPERATED IN EXCESS OF 300 MINUTES IN ANY ONE DAY.
   [RULE 1303(a)(1)-BACT]

4. THE SPEED OF THE LASER CUTTER SHALL NOT EXCEED 100 INCHES PER MINUTE.
   [RULE 1303(a)(1)-BACT]

5. THE TOTAL DEPTH OF LASER CUT SHALL NOT EXCEED 0.06 INCHES.
   [RULE 1303(a)(1)-BACT]

6. THE OPERATOR SHALL KEEP ADEQUATE RECORDS FOR THIS EQUIPMENT TO VERIFY COMPLIANCE WITH CONDITION NOS. 3, 4 AND 5. ALL RECORDS SHALL BE PREPARED IN A FORMAT WHICH IS ACCEPTABLE TO THE DISTRICT, SHALL BE RETAINED ON THE PREMISES FOR AT LEAST FIVE YEARS AND SHALL BE MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.
   [RULE 1303(a)(1)-BACT]

7. MATERIALS CUT IN THIS EQUIPMENT SHALL NOT CONTAIN ANY TOXIC AIR CONTAMINANTS IDENTIFIED IN RULE 1401 TABLE 1, WITH AN EFFECTIVE DATE OF JUNE 5, 2009 OR EARLIER, EXCEPT HEXAVALENT CHROMIUM, COPPER, MANGANESE, NICKEL

AND SELENIUM, WHICH SHALL NOT EXCEED THE FOLLOWING:
[RULE 1401]

| | |
|---|---|
| CHROMIUM | 27% BY WEIGHT |
| COPPER | 4.5% BY WEIGHT |
| MANGANESE | 10% BY WEIGHT |
| NICKEL | 34% BY WEIGHT |
| SELENIUM | 0.3% BY WEIGHT |

8. MATERIAL SAFETY DATA SHEETS FOR ALL MATERIALS USED AT THIS FACILITY AND SUBJECT TO DISTRICT RULES SHALL BE KEPT CURRENT AND MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.
[RULE 109, 1401]

9. THIS PERMIT SHALL EXPIRE IF CONSTRUCTION OF THIS EQUIPMENT IS NOT COMPLETE WITHIN ONE YEAR FROM THE DATE OF ISSUANCE OF THIS PERMIT UNLESS AN EXTENSION IS GRANTED BY THE EXECUTIVE OFFICER.
[RULE 205]

## BACKGROUND

Nelson Name Plate (Nelson) submitted application no. 503471 to permit a new laser cutter. The laser cutter will be used to make small, detailed cuts in sheets of stainless steel and aluminum. Nelson operates two other laser cutters, one which only cuts plastic and another which cuts both plastic and stainless steel.

Nelson Name Plate is a Title V facility. A Title V renewal permit was issued to this facility on April 16, 2006. Nelson Name Plate has proposed to revise their Title V permit by adding a laser cutter (application no. 503471). The proposed project is considered as a "de minimis significant permit revision" to their Title V permit, as described in Regulation XXX evaluation.

## PROCESS DESCRIPTION

Nelson manufactures metal and plastic name plates and membrane switches. The majority of the name plates are produced from metal, while the membrane switches are plastic. The laser cutter will be used to cut designs and patterns in sheets of stainless steel and aluminum from templates entered into the cutter's computer. The nameplates are small, typically only a few square inches and their thickness ranges from 5 to 60 mils, 30 mils average.

The laser cutting speed will not exceed 100 in/min (condition). The actual cutting speed will be a lot less because a slower speed yields a better cut. Nelson will be allowed to operate the cutter up to 300 minutes in any one day (condition), hence the theoretical maximum length of

cut, if the cutter ran non-stop, is 30,000 in/day (100 in/min x 300 min/day). Emission estimates are based on this amount even though Nelson will not cut anywhere close to this figure since the cutter will not run continuously but rather will stop and start as the direction of cut changes.

In addition to the length of cut, emissions are based on the depth and width of cut. The average depth of cut will be 0.026 inches. But emissions are based on the maximum thickness of sheet, 0.06 inches. The cut width (16 - 20 microns) is not adjustable, it is the width of the laser beam itself. Nitrogen will be used as a cutting gas to produce cuts with smooth edges. Nelson will operate the cutter up to 5 hr/day, 6 day/wk and 52 wk/yr.

## EMISSION ESTIMATES

PM10 and toxic air contaminant emissions will result from operating the laser cutter. Emissions are based on the length, width, and thickness of cut and the cutting speed. Emissions are also based on stainless steel since it has higher concentration of toxic air contaminants than aluminum.

PM10 emissions:
Max operating time = 300 min/day (5 hr/day)
Max cutting speed = 100 in/min
Max cut length = 300 min/day x 100 in/min = 30,000 in/day
Max cut depth = 0.06 in
Max cut width = 0.0008 in
Material: Stainless steel (330 and 400 series)
Specific gravity = 8
Density = 8 x 8.345 lb/gal = 66.76 lb/gal (0.289 lb/$in^3$)
Emission factor = 0.12 lb PM per lb of metal cut
PM10 = 50%PM

Amount of metal cut per day = 30,000 in/day x 0.06 in x 0.0008 in x 0.289 lb/$in^3$ = 0.42 lb/day

Daily PM10 emissions = 0.12 lb PM/lb metal cut x 0.42 lb metal cut/day x 0.5 = 0.025 lb/day
Hourly PM10 emissions = 0.025 lb/day ÷ 5 hr/day = 0.005 lb/hr

## RISK ASSESSMENT

Cutting stainless steel and aluminum will result in the emissions of the following toxic air contaminants: hexavalent chromium, copper, manganese, nickel and selenium. According to the MSDS for the stainless steel, the weight percent of these compounds are:

Chromium = 10 - 27% by wt
Copper = 0.18 - 4.5% by wt
Manganese = 2 - 10% by wt
Nickel = 12 - 34% by wt
Selenium = 0.01 - 0.3% by wt

Nelson had the specific stainless steel that they use tested to determine actual weight percent of the metal compounds. The test provided these amounts:

Chromium = 18.16% by wt
Copper = 0.47% by wt
Manganese = 1.77% by wt
Nickel = 8.02% by wt
Selenium = 0.002% by wt

Despite the lower figures ascertained by the test, the risk assessment will be based on the maximum weight percents found on the MSDS (condition). This may potentially allow some flexibility to use different stainless steel as long as the weight percents are not exceeded.

Amount of chromium in metal cut = Pound of metal cut x Cr content
= 0.42 x 27% = 0.11 lb Cr/day

Daily hexavalent chromium emissions = 0.00022 lb $Cr^{6+}$ per lb Cr total in metal cut
= 0.00022 x 0.11 = 2.42E-05 lb $Cr^{6+}$/day
Hourly hexavalent chromium emissions = 2.42E-05 ÷ 5 hr/day = 4.84E-06 lb/hr

Daily copper emissions = 0.12 lb PM per lb of metal cut x % by wt.
= 0.12 x 0.42 x 0.045 = 2.27E-03 lb/day
Hourly copper emissions = 2.27E-03 ÷ 5 hr/day = 4.54E-04 lb/hr

Daily manganese emissions = 0.12 lb PM per lb of metal cut x % by wt.
= 0.12 x 0.42 x 0.1 = 5.04E-03 lb/day
Hourly manganese emissions = 5.04E-03 ÷ 5 hr/day = 1.0E-03 lb/hr

Daily nickel emissions = 0.12 lb PM per lb of metal cut x % by wt.
= 0.12 x 0.42 x 0.34 = 1.7E-02 lb/day
Hourly nickel emissions = 1.7E-02 ÷ 5 hr/day = 3.4E-03 lb/hr

Daily selenium emissions = 0.12 lb PM per lb of metal cut x % by wt.
= 0.12 x 0.42 x 0.003 = 1.5E-04 lb/day
Hourly selenium emissions = 1.5E-04 ÷ 5 hr/day = 3.0E-05 lb/hr

A Tier 2 Risk Assessment was made based on these emission estimates and the cancer risk is below one in a million at both the commercial and residential receptor. The acute and chronic health risks are below one. Risk Assessment sheets are included in the application folder.

## RULE ANALYSIS

RULE 212 (c)(1): A public notice is not required for this project since the emission source is not located within 1,000 feet from the outer boundary of a school.

RULE 212 (c)(2) & 212(g): A public notice is not required for this project since the emissions increase does not exceed any of the daily maximums as specified in Rule 212(g).

| | Maximum Daily Emissions | | | | | |
|---|---|---|---|---|---|---|
| | **ROG** | **$NO_x$** | **$PM_{10}$** | **$SO_2$** | **CO** | **Pb** |
| Emission increase | 0 | 0 | 0 | 0 | 0 | 0 |
| MAX Limit (lb/day) | **30** | **40** | **30** | **60** | **220** | **3** |
| Compliance Status | Yes | Yes | Yes | Yes | Yes | Yes |

RULE 212(c)(3): A public notice is not required for this project since there will not be an increase in emissions of toxic air contaminants listed in Table I of Rule 1401 that will result in a cancer risk equal or greater than one in a million. See RISK ASSESSMENT.

RULES 401 & 402: AQMD database has no records of visible emissions or nuisance complaints against this facility. Compliance with these requirements is expected with the proper operation of the equipment.

RULE 404: The particulate matter concentration emitted from the laser cutter will not exceed the limits of this rule. Calculations are as follows:

$$\text{Concentration} = \frac{0.005 \text{ lb/hr} \times 7000 \text{ gr/lb}}{1050 \text{ cfm} \times 60 \text{ min/hr}} = 0.00055 \text{ gr/ft}^3$$

Allowable limit at 1050 cfm: 0.183 $gr/ft^3$

RULE 1303(a): PM10 emissions do not exceed 1 lb/day, add-on control equipment is not required.

RULE 1303(b)(1): Hourly PM10 emissions are 0.005 lb/hr, below the 0.41 lb/hr limit. Modeling is not required.

RULE 1303(b)(2): PM10 emissions will not exceed 4 ton/yr, emission offsets are not required.

RULE 1303(b)(4): The facility is expected to be in full compliance with all applicable rules and regulations of the District.

RULE 1401: The cutter will be operated in compliance with this rule. There will not be a cancer risk equal or greater than one in a million and the acute and chronic health risks are below one.

## REGULATION XXX:

The proposed project is considered as a "de minimis significant permit revision" to the Title V permit issued to this facility. Rule 3000(b)(6) defines a "de minimis significant permit revision" as any Title V permit revision where the cumulative emission increases on non-RECLAIM pollutants or hazardous air pollutants (HAP) from these permit revisions during the term of the permit are not greater than any of the following emission threshold levels:

| Air Contaminant | Daily Maximum (lbs/day) |
|---|---|
| HAP | 30 |
| VOC | 30 |
| NOx | 40 |
| PM10 | 30 |
| SOx | 60 |
| CO | 220 |

Rule 3003(j) specifies that a proposed permit for the initial Title V permit shall be submitted to EPA for review. To determine if a project qualifies for a "de minimis significant permit revision", emission increases resulting from all permit revisions shall be accumulated and compared to the above threshold levels. The Title V renewal permit was issued to this facility on April 16, 2006. This is the second permit revision since the renewal permit was issued. The cumulative emission increases resulting from this proposed permit revision are summarized as follows:

| Revision | HAP | VOC | NOx | $PM_{10}$ | SOx | CO |
|---|---|---|---|---|---|---|
| 2nd Permit Revision; Add laser cutter | 0 | 0 | 0 | 0 | 0 | 0 |
| Maximum Daily | 30 | 30 | 40 | 30 | 60 | 220 |

## RECOMMENDATION

The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as a "de minimis significant permit revision", it is exempt from the public participation requirements under Rule 3006 (b). A proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review pursuant to Rule 3003(j). If EPA does not raise any objections within the review period, a revised Title V permit will be issued to this facility.

*nelson name plate – laser cutter 503471 3rd rev*