

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE DIVISION</b> Coating, Printing, Aerospace and Chemical Operations Team <b>APPLICATION PROCESSING AND CALCULATIONS</b>	PAGE	1 of 9
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	REVIEWED BY	
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**PERMIT TO OPERATE (MODIFICATION) EVALUATION  
PLASMA CUTTERS**

<b>Applicant's Name</b>	AMERICAN SECURITY PRODUCTS, INC.
<b>Company I.D.</b>	059237
<b>Mailing Address</b>	11925 PACIFIC AVE., FONTANA, CA 92337
<b>Equipment Address</b>	11925 PACIFIC AVE., FONTANA, CA 92337

**EQUIPMENT DESCRIPTION**

APPLICATION NO. 480171 (Modification, Previous P/N F90727, A/N 466753)

MODIFICATION OF PLASMA CUTTING SYSTEM BY REPLACING SUBMERGED CUTTING METHOD WITH SEMI-DRY CUTTING METHOD WITH THE FOLLOWING EQUIPMENT DETAILS:

PLASMA ARC CUTTING SYSTEM, CONSISTING OF:

1. PLASMA CUTTER, SYSTEM # 1, HYPER THERM, MODEL NO. HT2000, ELECTRICALLY POWERED, 30 KW.
2. PLASMA CUTTING TABLE, 5' – 11.75" W. X 13'-1" L. X 2' - 6" H., CONTAINING 775 GALLONS OF COOLANT.

APPLICATION NO. 480172 (Modification, Previous P/N F75019, A/N 435709)

MODIFICATION OF PLASMA CUTTING SYSTEM BY REPLACING POWER SUPPLY MODEL HT-400 (80 KW) WITH MODEL HPR260 (45.5 KW) AND FROM SUBMERGED CUTTING METHOD TO SEMI-DRY CUTTING METHOD WITH THE FOLLOWING EQUIPMENT DETAILS:

PLASMA ARC CUTTING SYSTEM, CONSISTING OF:

1. PLASMA CUTTER, SYSTEM #2, HYPER THERM, MODEL NO. HPR260, ELECTRICALLY POWERED, 45.5 KW.
2. PLASMA CUTTING TABLE, TWO SECTIONS, EACH 5' – 11.5" W. X 13' - 0.75" L. X 2' - 10" H., CONTAINING 715 GALLONS OF COOLANT IN EACH SECTION.

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APPLICATION NO. 482269

TITLE V REVISION

<b>HISTORY</b>
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American Security Products, Inc. submitted the above applications to modify existing plasma cutting systems. Currently plasma cutting is performed such that the plasma arc is fully submerged in the liquid. The applicant requested to change the cutting method so that the cutting is performed semi-dry (liquid is 50 mm under the plate/table). The applicant is also requesting to change the drive unit and controller in the system # 2 to improve the general quality of the plasma arc cutting and in the process use a significantly lower amount of electric power. The new cutter will have only 45.5 KW power rating to the existing 80 KW. The new cutter unit has a capacity to cut very finely, in comparison to current unit and as a result generate lesser emissions.

The facility already has a number of active permits from the District to operate spray booths, abrasive blasting, plasma arc cutters, baghouse and cement mixing equipment. This company manufactures security safes for residential and business uses. The manufacturing process involves metal fabrication, assembly, coating application, and cement mixing. The spray booths are used to apply adhesives and coatings to the metal security safes. The District rules 1107, 1168 and 1171 apply to this facility.

Under this project, there will be an increase (<1 lb/day) in the particulate emissions less than 10 microns aerodynamic diameter. Thus, this equipment will comply with the AQMD BACT requirements. With submerged plasma arc cutting in these systems, the particulate emissions are negligible. However, after the modification there will be particulate emissions potential ten times higher than the current almost negligible emissions. The facility is currently operating under a facility-wide VOC emission cap of 4080 lbs/month (NSR emission cap). In addition to the NSR cap, this facility has opted to take a 20 ton/year VOC cap to exempt them from Rule 1132 requirements.

The applicant has operated this equipment on this location for a number of years. The equipment has some particulate emissions including some toxic air contaminants. The plasma cutting procedure, performed semi-dry, is expected to provide at least 99.5% metal cut (dust) collection efficiency per manufacturer's literature. This is consistent with District data and emission factors.

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The District database shows no records of any complaints by the public against this facility. Also, the records show no notice of violation or notice to comply issued to this facility in last two years.

American Security is a Title V facility. A Title V renewal permit was issued to this facility in June 2006. This is the second revision to the renewed Title V permit. The proposed permit revision is considered as a “de-minimis permit revision”, as described in Regulation XXX evaluation.

**PROCESS DESCRIPTION**

American Security is a metal safe manufacturing company. During the fabrication, this company uses plasma arc for metal cutting. The plasma beam moves above a layer of coolant along a programmed path on the flat metal sheet to obtain a desired cut. The arc is concentrated on the work-piece by a lens. The work-piece remains stationary while the narrow strip metal, approximately 0.125 inch width, is removed along the path made by the concentrated plasma beam. The metal is melted by the energy of the arc. The molten metal is removed in the solution below the plate with the help of an assist gas flow. An assist gas flows through the nozzle in the cutting head. Oxygen is used for cutting metals and has an added benefit of increasing the energy concentration at the cutting point by reacting (oxidation) with the molten metal.

The plasma arc is capable of cutting any metal. The power supply provides a variable current output, which allows variations in the cutting speeds. Contouring accuracy is a function of the feed-rate and the curvature of the path. The mirrors and lens are positioned to produce the programmed work-piece geometry. The program specifies the feed-rate, laser power and assist gas supply. This equipment is used to cut mild steel.

**OPERATING HOURS**

Average: 10 hrs/day, 4 days/week, 52 weeks/year  
 Maximum: 24 hrs/day, 7 days/week, 52 weeks/year

**EMISSION CALCULATIONS**

Steel Density = 0.25 lb/cu. in.

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Metal Thickness	=	0.5 in
Maximum Cut Width	=	0.125 in
Maximum Metal Cut Speed	=	80 in/min
Usage Factor	=	0.75
Carcinogenic Metal Content:	=	0.11% Cr, 0.07% Ni, 0.24% Cu, 0.93%Mn
Metal Cut	=	Carbon Steel

The District performed a source test to derive the emission factors for Hexavalent Chromium during the evaluation of the plasma arc cutting system under application no. 184446. It should be noted here that trivalent chromium in the alloy metal converts to hexavalent chromium at higher temperature during cutting operation. Also, some of the molten metal re-solidifies on the cut edges.

Hex. Cr emission factor* for plasma arc cutting	0.00022 lb hex. Cr/total Cr in metal cut
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\* Source test data, Appendix B, 4-24-90, P/C report, A/N 184446

American Security Products is requesting to modify two plasma arc cutting systems. The following analysis is for each system.

**PM/PM10 Emissions:**

Particulates will be the only major air contaminant generated by this operation.

Amount of emissions in fumes expressed as % of the total amount of material cut in semidry cutting method is 0.5%, per manufacturer's test data information.

**Maximum steel cut in one hour.**

$$\begin{aligned} \text{Volume of metal removed} &= 0.5'' \text{ deep} \times 0.125'' \text{ wide} \times 80 \text{ in/min} \times 60 \text{ min/hr} \times 0.75 \\ &= 225 \text{ cu. in/hr} \end{aligned}$$

$$\text{Total weight of the metal removed by the cut} = 225 \text{ cu in/hr} \times 0.25 \text{ lbs/cu. in.} = 56.25 \text{ lbs/hr}$$

$$\text{Total weight of PM emissions} = 56.25 \times 0.005 \text{ lb/lb} = 0.28 \text{ lbs/hr}$$

$$\text{Total weight of PM10 emissions} = 0.28 \times 0.5 \text{ lb/lb} = 0.14 \text{ lbs/hr}$$

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Current Operation/Permit Conditions

Total weight of PM emissions = 0.28 lbs/hr X 24 hrs/day = 6.72 lbs/day  
 Total weight of PM10 emissions = 0.14 lbs/hr X 24 hrs/day = 3.36 lbs/day

Proposed Operation/Permit Conditions

PM10 BACT limiting operating condition = 3.36 lbs/day - 1 lb/day  
 = 2.36 lbs/day / 0.14 lbs/hr  
 = 17 hrs/day

**Hexavalent Chromium Emissions:**

Total weight of PM emissions = 0.28 lbs/hr  
 Total weight of Chromium (0.11%) in metal cut = 0.28 X 0.0011 = 0.00031 lbs/hr  
 Total weight of Hex. Chromium emissions = 0.00031 X 0.00022 = 0.000000068 lbs/hr  
 Annual Hex. Chromium Emissions = 0.000000068 lb/hr X 17 hr/day X 365 day/yr  
 = 0.00042 lbs

**Nickel Emissions:**

Total weight of PM emissions = 0.28 lbs/hr  
 Total weight of Nickel (0.07%) in metal cut = 0.28 X 0.0007 = 0.00020 lbs/hr  
 Annual Nickel Emissions = 0.00020 lbs/hr X 17 hrs/day X 365 days/yr = 1.2 lbs

**Copper Emissions:**

Total weight of PM emissions = 0.28 lbs/hr  
 Total weight of Copper (0.24%) in metal cut = 0.28 X 0.0024 = 0.00067 lbs/hr  
 Annual Copper Emissions = 0.00067 lbs/hr X 17 hrs/day X 365 days/yr = 4.17 lbs

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**Manganese Emissions:**

Total weight of PM emissions = 0.28 lbs/hr

Total weight of Manganese (0.93%) in metal cut =  $0.28 \times 0.0093 = 0.0026$  lbs/hr

Annual Manganese Emissions =  $0.0026 \text{ lbs/hr} \times 17 \text{ hrs/day} \times 365 \text{ days/yr} = 16.2 \text{ lbs}$

The calculations for Tier 2 health risk assessment on MICR, HIA and HIC from toxic emissions indicated less than 1 in a million cancer risk and acute and chronic hazard index risks to be below 1 from this equipment. Please see attached calculations. This will comply with the Rule 1401 requirements.

**VOC Emissions:**

The applicant adds about 6 gallons of coolant in a full tank of bath per month. The coolant contains 4.46 lbs. of ethylene glycol/VOC. Thus, the VOC and ethylene glycol emissions are  $4.46 \times 6 = 26.76/30 = 0.9$  lbs/day, which is  $0.9/24 = 0.04$  lbs/hr.

The annual ethylene glycol emissions are  $26.76 \times 12 = 321.2$  lbs/year.

The ethylene glycol emissions are well below the Tier 1 level (103,000 lbs/year) for a 100 meter receptor. Thus, compliance with the Rule 1401 is expected.

VOC emissions are also below 1 lbs/day. Thus, it complies with the BACT requirements. The facility has VOC emission cap of 4080 lbs/month. The applicant has not requested to increase the VOC facility-wide emission cap for this project. Thus, offsets are not required for this project.

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<b>RULES EVALUATION</b>
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⊙ **RULE 212, PUBLIC NOTIFICATION**

❖ **SECTION 212(c)(1):**

This section requires a public notice for all new or modified permit units that may emit air contaminants located within 1,000 feet from the outer boundary of a school. This source is not located within 1,000 feet from the outer boundary of a school. Therefore, public notice will not be required by this section.

❖ **SECTION 212(c)(2):**

This section requires a public notice for all new or modified facilities which have on-site emission increases exceeding any of the daily maximums as specified by Rule 212 (g). As shown in the following table, the emission increases are below the daily maximum limits specified by Rule 212(g). Therefore, these applications will not be subject to this section.

LB/DAY	CO	NOX	PM <sub>10</sub>	ROG	SOX	Lead
<b>MAX. LIMIT</b>	220	40	30	30	60	3
<b>INCREASES</b>	0	0	2	0	0	0

❖ **SECTION 212(c)(3):**

Please, see Rule 1401 evaluation section. Public notice not required under this section.

❖ **SECTION 212(g):**

This section requires a public notice for all new or modified sources which have on-site emission increases exceeding any of the daily maximums as specified by Rule 212 (g). As shown in the following table, the emission increases are below the daily maximum limits specified by Rule 212(g). Therefore, these applications will not be subject to this section.

LB/DAY	CO	NOX	PM <sub>10</sub>	ROG	SOX	Lead
<b>MAX. LIMIT</b>	220	40	30	30	60	3
<b>INCREASES</b>	0	0	1	0	0	0

⊙ **RULES 401 & 402, VISIBLE EMISSIONS & NUISANCE**

Compliance with these rules is expected with the proper operation of the equipment. Also, there are no records of any complaints by the public against this facility.

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**REGULATION XIII**

▣ **RULE 1303(a), BEST AVAILABLE CONTROL TECHNOLOGY (BACT)**

(a) PM10 EMISSIONS

The PM10 emissions are expected to be <1 lb/day. BACT is not triggered.

▣ **RULE 1303(b)(1), MODELING**

PM10 emission increases are less than 0.41 lb/hr. No detailed modeling is required.

▣ **RULE 1303 (b)(2), EMISSION OFFSETS**

PM10 emission increases are just below 2.0 lbs/day. The facilities PM10 post-modification potential to emit less is less than 4 tons/year and therefore is exempt from Rule 1303 (b)(2).

▣ **RULE 1401, NEW SOURCE REVIEW OF CARCINOGENIC AIR CONTAMINANTS**

As described above a Tier 2 Risk Assessment calculation indicated cancer risk to be less than 1 in a million and acute and chronic hazard index risks to be below 1 from this equipment (please see attached spreadsheets). Thus, this project will comply with the requirements of this rule.

**REGULATION XXX**

This facility is not in the RECLAIM program. The proposed project is considered as a “de minimis significant permit revision” to the Title V permit for this facility.

Rule 3000(b)(6) defines a “de minimis significant permit revision” as any Title V permit revision where the cumulative emission increases of non-RECLAIM pollutants or hazardous air pollutants (HAPs) 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

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To determine if a project is considered as a “de minimis significant permit revision” for non-RECLAIM pollutants or HAPs, emission increases for non-RECLAIM pollutants or HAPs resulting from all permit revisions that are made after the issuance of the Title V renewal permit shall be accumulated and compared to the above threshold levels. This proposed project is the 2<sup>nd</sup> permit revision to the Title V renewal permit issued to this facility on June 2006. The following table summarizes the cumulative emission increases resulting from all permit revisions since the Title V renewal permit was issued:

<b>Revision</b>	<b>HAP</b>	<b>VOC</b>	<b>NO<sub>x</sub></b>	<b>PM<sub>10</sub></b>	<b>SO<sub>x</sub></b>	<b>CO</b>
1 <sup>st</sup> Revision (Administrative) (A/N 466753)	0	0	0	0	0	0
2 <sup>nd</sup> Revision Modification (A/N 480171, 480172)	0	0	0	2	0	0
Cumulative Totals	0	0	0	2	0	0
Maximum Daily	30	30	40	30	60	220

Since the cumulative emission increases resulting from all permit revisions are not greater than any of the emission threshold levels, this proposed project is considered as a “de minimis significant permit revision”.

### **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 have any objections within the review period, a revised Title V permit will be issued to this facility.