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	REVIEWED BY	SMKE
	DATE	9/24/08

PERMIT TO CONSTRUCT EVALUATION
Plasma Arc Cutters

Applicant's Name HONEYWELL INTERNATIONAL INC

Company I.D. 800003

Mailing Address 2525 W. 190TH ST.
TORRANCE, CA 90504-6061

Equipment Address 2525 W. 190TH ST.
TORRANCE, CA 90504-6061

EQUIPMENT DESCRIPTION

APPLICATION NO. 475870

Title V deminimis significant permit revision

APPLICATION NO. 475879 (P/C – new construction, Device D213)

PLASMA ARC METAL CUTTING TORCH, HYPER THERM, MODEL NO. POWERMAX 800, PORTABLE, 10.4 KW ELECTRICALLY POWERED.

APPLICATION NO. 475881 (P/C – modification & C/C, prev. A/N 351835, P/O F21456, Device D199)

PLASMA ARC CUTTING SYSTEM CONSISTING OF:

1. PLASMA ARC METAL CUTTING TORCH, HYPER THERM, MODEL NO. MAX 200, SERIAL NO. 200-197, 30 KW ELECTRICALLY POWERED.
2. TORCH CUTTING TABLE, DOWNDRAFT TYPE, 8'-0" W. x 10'-0 L. x 3'-0" H.

BACKGROUND/HISTORY

Appl. No.	Previous		Device No.	Equipment	Reason for Application
	A/N	P/O			
475870	-	-	-		Title V Revision
475879	new	new	D213	Portable Plasma Arc Cutter	P/C – new
475881	351835	F21456	D199	Stationary Plasma Arc Cutter	P/C - Modification & C/C to cut metals with higher Nickel and Chrome content, install timer

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Honeywell International submitted the above permit applications with AQMD on Nov. 20, 2007 for permits to construct a new portable plasma arc cutting torch and to modify/change of conditions on an existing stationary plasma arc metal cutting torch (A/N 351835). The existing plasma arc cutter is vented to a cartridge-type dust collector unit (A/N 351835). The portable arc cutter is not vented to any control.

They are currently limited to cutting stainless steel with up to 18.5% Cr⁺⁶ and 9.5% Ni, and Inconel with up to 21.5% Cr⁺⁶ and 61% Ni. The facility is requesting to cut additional Inconel alloys with a maximum of 30% chrome and 79.5% nickel in various combinations, and stainless steel with up to 25% Cr⁺⁶ and 35.5% Ni. They also requested to cut parts made of aluminum (contains small quantities of chrome, copper, manganese and nickel) and carbon steel (contains chrome, copper, lead, manganese and nickel). The Rule 1401 risk analysis will be done with all the highest possible percentages of toxic air contaminants (Cr, Ni, Cu, Pb and Mn) in the cut metals for the worst case risk analysis.

Honeywell is a RECLAIM Cycle II and Title V Group A facility. The initial Title V permit was issued on September 22, 1999 and the Title V renewal permit was issued on September 22, 2004. This is the second revision since the Title V renewal permit was issued. A/N 475870 was submitted for deminimis significant permit revision. There are several projects under separate evaluation which are part of this revision. Please refer to the separate Reg XXX evaluation for details.

The District's compliance database, for the last two years, for the facility (ID # 800003), shows one NOV no. P79460 which has since been closed according to the supervising inspector Victor Yip (his e-mail is on file). There are no N/Cs issued in the last two years. No records of nuisance complaints were found in the compliance database. During the last inspection on 5-02-08, the facility was found in compliance with all District rules and regulations.

PROCESS DESCRIPTION

Honeywell is a large sized aerospace systems manufacturing company. During the fabrication and maintenance manufacturing stages, this company uses plasma arc torches for metal cutting or gouging. The plasma is a gas which is heated to an extremely high temperature and ionized, so that it becomes electrically conductive. The plasma arc cutting process uses this plasma gas to transfer an electric arc to the work piece. The metal to be cut or gouged (removal of metal to a controlled depth and width) is melted by the intense heat of the arc and then blown away by the flow of the gas.

The stationary arc torch is capable of cutting any metal up to 2 inches thick. The portable arc torch has a smaller power supply, so it can only cut up to 1 inch thick metal. The power supply provides a variable current output, which allows the operator wide variations in

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cutting speeds on the same thickness of the metal. The negative power output is connected to the torch electrode and the positive output connected to the work piece through the work cable. When the torch is activated, there is a gas pre-flow, followed by a pilot arc. The pilot arc creates a path for the main arc. When the main arc is established, the pilot arc shuts off. The pilot automatically restarts when the arc stops, as long as the torch remains activated. This unit will mainly use shop air as the gas for the plasma arc and the secondary gas. It is capable of using other gases such as nitrogen, argon etc.

This equipment will be used on aluminum, carbon steel, stainless steel, and Inconel (Ni alloys). The torch is directed downward into the downdraft exhaust hood, located under the table-top. The torch head is computer controlled. The table is equipped with exhaust slots along both bottom sides of the table. The exhaust is vented to the dust control device. The portable plasma arc cutter will be used on similar metals with the same TACs, but lower concentrations. There is no control on the portable plasma arc cutter.

EMISSIONS

The stationary plasma arc cutter will be used to cut several different metals and alloys that include carbon steel, stainless steel, aluminum and Inconel. The portable plasma arc cutter will be used to cut carbon steel, stainless steel and aluminum. The emission factors used in the calculation are the same for both cutters, however the stationary arc cutter is vented to the dust collector with 99% control efficiency. The portable arc cutter is not vented to any control.

Emission factors for PM and Cr⁺⁶ are from a previous source test at Universal Dust Collector under A/N 184446, P/C evaluation Appendix B, 4-24-90)

Particulate (PM = PM₁₀) = 0.12 lbs PM/lb metal removed
Cr⁺⁶ = 0.00022 lb Cr⁺⁶ /lb total chrome in metal removed

For other Rule 1401 metals (Cu, Pb, Mn & Ni), assume the emissions are the same weight fraction of the PM emissions as contained in the metal

Rule 1401 metals in alloys cut in stationary plasma arc cutter (Max % from applicant):

Alloy	Density Lbs/cu. ft	% total Chrome	% Copper	% Lead	% Manganese	% Nickel
Aluminum	165	0.4	1.2	-	1.1	0.2
Stainless steel	501	26	4	-	2.5	35.5
Inconel	184	30	2.38	-	1	79.5
Carbon steel	437.01	12	0.7	0.35	1	10

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Facility usage of metal alloys cut in arc cutters:

Alloy	% usage of total metal cut in arc cutter	
	Stationary	Portable
Aluminum	45	45
Stainless steel	45	45
Inconel	5	0
Carbon steel	5	10

Since the portable arc cutter and stationary arc cutter use alloys in different percentage ranges, a weighted average density is calculated for each arc cutter by multiplying % alloy cut x density of that alloy.

Weighted Ave. metal density for **Stationary** plasma arc cutter = 330.75 lbs/cu. ft

Weighted Ave. metal density for **Portable** plasma arc cutter = 343.4 lbs/cu. ft

From the above data on the proposed alloy usage, percentages of Rule 1401 metals and other physical properties, a **worst case scenario metal composition** is created for each arc cutter in order to calculate the MICR, HIC and HIA. These maximum weight percents of Rule 1401 metals in the alloys cut will be imposed as a permit condition for each cutter.

Worst case alloy composition

Rule 1401 TAC	Max Wt %	
	Stationary	Portable
Total Chrome	30	23
Copper	4	4
Lead	0.35	0.35
Manganese	2.5	2
Nickel	79.5	13.5

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For stationary plasma arc cutter (A/N 475881):

Maximum length cut in one hour = 96 inches/hr
Maximum thickness of the metal cut = 1 inch (by permit condition)
Maximum cut width = 3/16 inch
Volume of the metal removed by the cut = 18 cu. inches/hr = 0.0104 cu. ft/hr
Weight of metal removed by the cut = 0.0104 x 330.75 lb/cf = 3.445 lbs/hr
Weight of total chrome in metal removed = 0.30 lb Cr/lb metal x 3.445 lb/hr = 1.03 lb/hr
Dust Collector Efficiency 99%

Pollutant	lb/hr metal removed	lb/hr total chrome in metal removed	Emission Factor	Max % Rule 1401 in Metal	Emissions lb/hr	
					R1	R2
PM = PM ₁₀	3.445	-	0.12*	-	0.413	4.13 x 10 ⁻³
Cr ⁺⁶	3.445	1.03	0.00022**	30	2.27 x 10 ⁻⁴	2.27 x 10 ⁻⁶
Cu	3.445	-	PM lb/hr x % in metal	4	0.0165	1.65 x 10 ⁻⁴
Pb	3.445	-		0.35	0.00145	1.45 x 10 ⁻⁵
Mn	3.445	-		2.5	0.0103	1.03 x 10 ⁻⁴
Ni	3.445	-		79.5	0.329	3.29 x 10 ⁻³

* 0.12 lb PM/lb metal removed

** 0.00022 lb Cr⁺⁶/lb total chrome in metal removed

$$\text{Max lb/day PM/ PM}_{10} = 4.13 \times 10^{-3} \times 24 \text{ hr/day} = 0.1 \text{ lb/day}$$

R1 PM lb/hr = 3.445 lb/hr x 0.12 lb PM/lb metal removed = 0.413 lbs / hr
R1 Cr⁺⁶ lb/hr = 1.03 lb/hr x 0.00022 lb Cr⁺⁶ /lb total chrome in metal = 2.27 x 10⁻⁴ lb/hr
R1 Cu lb/hr = 0.41 lb/hr x PM x 0.04 lb Cu/lb metal = 0.0165 lb/hr
R1 Pb lb/hr = 0.41 lb/hr PM x 0.0035 lb Pb/lb metal = 0.00145 lb/hr
R1 Mn lb/hr = 0.41 lb/hr PM x 0.025 lb Mn/lb metal = 0.0103 lb/hr
R1 Ni lb/hr = 0.41 lb/hr PM x 0.795 lb Ni/lb metal = 0.329 lb/hr

The applicant has requested the following operating schedule for the stationary cutter (screening risk assessment and permit conditions will be based on this):

Hour/Day = 6.5 hr/day
Day/Week = 7 day/wk
Week/Year = 52 wk/yr

$$\text{Max allowable hrs/year} = 6.6 \times 7 \times 52 = 2366 \text{ hours per year (permit condition C1.32)}$$

Dust Collector APC, Device C200: The applicant is not modifying this APC equipment that vents the stationary plasma arc cutter. All the specifications for this equipment remain the same. For details, please see folder for A/N 351835.

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For portable plasma arc cutter:

Maximum length cut in one hour = 48 inches/hr
Maximum thickness of the metal cut = 1 inch (by permit condition)
Maximum cut width = 3/16 inch
Volume of the metal removed by the cut = 9 cu. inches/hr = 0.00521 cu. ft/hr
Weight of metal removed by the cut = 0.00521 cu ft/hr x 343.4 lb/cu. ft = 1.789 lbs/hr
Weight of total chrome in metal removed = 0.23 lb Cr/lb metal x 1.789 lb/hr = 0.411 lb/hr

Pollutant	lb/hr metal removed	lb/hr total chrome in metal removed	Emission Factor	Max % Rule 1401 in Metal	Emissions lb/hr R1=R2
PM = PM ₁₀	1.789	-	0.12*	-	0.215
Cr ⁺⁶	1.789	-	0.00022**	23	9.04 x 10 ⁻⁵
Cu	1.789	-	PM lb/hr x % in metal	4	8.59 x 10 ⁻³
Pb	1.789	-		0.35	7.51 x 10 ⁻⁴
Mn	1.789	-		2.0	4.30 x 10 ⁻³
Ni	1.789	-		13.5	0.0290

The applicant has requested the following operating schedule for the portable cutter for screening risk analysis (emission calculations and permit conditions will be based on this):

Hour/Day	1.6	hr/day
Day/Week	3	day/wk
Week/Year	28	wk/yr

To maintain compliance with MICR less than 1 in a million, and HIC less than 1, a permit condition will be added limiting the operation to 134 hours per year. For HIA, the screening risk analysis is based on a max hourly emission (0.215 lb/hr), which shows HIA below 1.

Max allowable hrs/year = 1.6 x 3 x 28 = 134 hours per year (permit condition C1.31)

In addition, for PM BACT determination, the portable cutter will be limited to 4 hrs/day: The max daily PM is below 1 lb/day, therefore add-on control is not required.

$$\text{PM Max lb/day} = 4 \text{ hrs/day} \times 0.215 \text{ lb/hr} = 0.86 \text{ lb/day}$$

For PM offset determination, the portable cutter will be limited to 69 hr/month. The 30-day average is below 0.5 lb/day, therefore PM offsets are not required.

$$\text{30-day average lb/day} = (69 \text{ hr/mo} \times 0.215 \text{ lb/hr}) \div 30 \text{ days/mo} = 0.49 \text{ lb/day}$$

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Rule 1401 TAC Emissions:

The screening risk assessment for these plasma arc cutters was based on the worst case scenario metal composition, with emissions calculated above. With the proposed hours of operation and maximum allowable hours/year operation, the risk for each plasma arc cutter is less than 1 in a million, and the HIA and HIC are less than one. A separate spread sheet was run on to determine HIA and it is less than one.

Permit conditions will be imposed to restrict the maximum hours of operation, maximum concentration of metals in any given alloy and to install non-resettable timers to measure operating time on both the arc cutters.

The following table summarizes the results of Rule 1401 screening risk assessments.

Appl. no.	Equipment	MICR		HIC Worst case	HIA Worst case
		Residential	Commercial		
475879	Portable plasma arc cutter	0.952 x 10 ⁻⁶	0.781 x 10 ⁻⁶	0.0262	0.586
475881	Stationary plasma arc cutter	0.958 x 10 ⁻⁶	0.561 x 10 ⁻⁶	0.0524	0.0656

RULES/REGULATION EVALUATION

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 facility is not located within 1000 feet from a school, therefore, these applications will not be subject to the public notice requirements under this section.

SECTION 212(c)(2):

This section requires a public notice for all new or modified equipment and facilities, which have emission increases exceeding any of the daily maximums as specified in subdivision (g). The emission increase from this project is less than 1 lb/day, therefore public notice will not be required.

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SECTION 212(c)(3):

This section requires a public notice for all new or modified sources, which have on-site emission increases resulting in a cancer risk of more than 1 in a million. Please see Rule 1401 section. MICR is less than 1×10^{-6} and HIA and HIC are below one, public notice is not required.

SECTION 212(g):

This section requires a public notice for all new or modified sources which undergo construction or modification resulting in an emission increase exceeding any of the daily maximum specified in the table below. As shown in the following table, the emission increase of PM₁₀ from these sources is less than 1 lb/day. Public notice will not be required by this section.

LB/DAY	CO	NOX	PM₁₀	ROG	Lead	SOX
MAX. LIMIT	220	40	30	30	3	60
INCREASES	0	0	< 1	0	0	0

RULES 401 & 402, VISIBLE EMISSIONS & NUISANCE

Visible emissions and odors from this equipment are not expected with proper maintenance and operation. There are no complaints or notices for visible emissions, odors or nuisance issued in the last two years for this facility. Compliance is expected.

REGULATION XIII

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

PM₁₀ is the only criteria pollutant expected from this equipment. The PM₁₀ emissions from each plasma arc cutter are below 1 lb/day, therefore BACT is not triggered. However, the stationary plasma arc cutter continues to comply with BACT requirements by use of the dust collector with 99% control efficiency.

□ **RULE 1303(b) (1), MODELING**

The PM₁₀ emissions are less than 0.41 lbs/hr (0.215 lb/hr for the portable cutter and 0.0043 lb/hr for the stationary cutter), therefore no further modeling analysis is required. .

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

The emission increase of PM₁₀ is less than 1 lb/day, therefore offsets are not required.

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

As shown in the emission section, the MICR is less than 1 in a million and HIC and HIA are less than one, this equipment complies with this rule.

REGULATION XXX:

PLEASE REFER TO SEPARATE REG XXX EVALUATION

This is the second revision to the title V renewal permit issued on 9/22/04. This revision consists of several projects which were evaluated separately.

RECOMMENDATION:

The proposed project is expected to comply with all the 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 the EPA does not have any objections within the review period, a revised Title V permit will be issued to this facility with the above equipment in section H (as permits to construct).