

South Coast Air Quality Management District Engineering & Compliance Application Processing & Calculations	Pages 5	Page 1
	Appl. No. 475026-475029	Date 2/27/08
	Processed By MP03	Checked By

**DE MINIMIS SIGNIFICANT TITLE V PERMIT REVISION
PERMIT TO CONSTRUCT EVALUATION**

LEGAL OWNER OR OPERATOR: IPS Corporation

FACILITY ID: 800367

EQUIPMENT LOCATION: 17109 S. Main St
Gardena, CA 90248

MAILING ADDRESS: PO Box 379
Gardena, CA 90248

EQUIPMENT DESCRIPTION:

APPLICATION NO. 475026

DE MINIMIS SIGNIFICANT TITLE V PERMIT REVISION

APPLICATION NO. 475027

STATION NO. 21, CONTAINER-FILLING, IME, SERIES 2400, WITH 12 NOZZLES.

APPLICATION NO. 475028

STATION NO. 22, CONTAINER-FILLING, IME, SERIES 2400, WITH 12 NOZZLES.

APPLICATION NO. 475029

AIR POLLUTION CONTROL SYSTEM CONSISTING OF:

1. REGENERATIVE THERMAL OXIDIZER, ADWEST TECHNOLOGIES, MODEL 8.0 RTO95, WITH A MAXON KINEMAX 3G NATURAL GAS-FIRED BURNER, 2,295,000 BTU PER HOUR, A NATURAL GAS INJECTION SYSTEM, A 7.5-H.P. COMBUSTION AIR BLOWER, TWO COMBUSTION CHAMBERS, 360 CU. FT. TOTAL VOLUME, A FLOW DIVERTER VALVE, AND TWO CERAMIC BEDS, 6'-4" W. X 8'-6" L. X 4'-0" H. EACH.
2. EXHAUST SYSTEM CONSISTING OF:
 - A. FILLING ROOM PERMANENT TOTAL ENCLOSURE (PTE), 49'-0" W. X 55'-0" L. X 23'-0" H. OVERALL, ENCOMPASSING FOUR CONTAINER FILLING STATIONS NOS. 3, 4, 21, AND 22.
 - B. 40-H.P. BLOWER WITH A 2'-0" DIA. X 40'-0" H. EXHAUST STACK.

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BACKGROUND:

IPS Corp. is a Title V (Group B), non-RECLAIM facility. The proposed permitting actions comprise a De Minimis Significant Revision to their Title V permit. IPS is a manufacturer of plastic adhesives and solvent cements.

IPS has submitted this application package for construction of two new container filling stations and a regenerative thermal oxidizer. The applications were received on 10/30/07.

IPS also has a set of 37 applications pending as part of a “Permit Hygiene” action. Those applications do not affect the currently proposed new construction.

IPS has received one NOV within the last five calendar years. The NOV was for failing to vent several mixers to associated air pollution control equipment. The NOV was resolved with the District Prosecutor’s Office. There is no record of any NCs or complaints for this facility within the past five years.

PROCESS DESCRIPTION:

AN 475027, 475028, 475029

IPS is proposing to install two new container filling stations, #21 and #22, and a regenerative thermal oxidizer (RTO) for control of VOC emissions from the filling operation. The new lines will be installed at the Main Street location and will be located adjacent to existing lines #3 and #4. The lines will be used to package most of the facility’s primer material as well as a high volume of plastic cement. The room where stations #3, #4, #21, and #22 will be vented in its entirety to the RTO. The room (enclosure) will meet the PTE requirements of EPA Method 204.

The RTO consists of a reinforced, insulated dual chamber filled with low pressure drop ceramic heat exchanger media (saddles). The gas flow is automatically controlled by a valve mechanism which changes the direction of the gas flow at regular intervals via an integral PLC system. An external burner is used only for rapid initial cold startup, typically 1 hour. Only one RTO fan is needed for normal operations (no purge or combustion air blowers).

The VOC-laden process air enters a porous bed filled with high temperature ceramic heat transfer media. The air is preheated by bed #1 to a maximum temperature, passes through a central combustion chamber where the hydrocarbons are oxidized to carbon dioxide and water vapor, and then exits a second bed where heat is transferred from the hot air back into the bed. To avoid an uneven temperature distribution in the RTO, the gas flow direction is changed automatically at regular intervals by the control mechanism to maintain even temperature profiles between the dual ceramic media chambers. Natural gas may be injected into the combustion chamber to maintain a temperature of 1500 °F; the burner will be used only for initial start-up. NOx emissions due to natural gas injection are not expected to exceed 2 ppm.

The manufacturer provides a 98% destruction guarantee for this equipment.

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EMISSION CALCULATIONS:

A source test (with an approved test protocol) was conducted on line #4 on November 4, 2007. The product tested was a high VOC primer. The source test report resulted in a weighted (for cement and primer production) emission factor of 0.017 lbs VOC emitted per gallon of material (cement OR primer) packaged. This factor will be used for estimating emissions from the new lines.

Control efficiencies of 100% capture and 98% destruction will be used. The permit will be conditioned to require that the Permanent Total Enclosure meet EPA 204 requirements. The destruction efficiency will be confirmed with a source test since it is higher than the standard 95% destruction efficiency for this type of control equipment.

Container filling emissions

Throughput: 417,000 gal/mo (total)
Schedule: 18 hrs/day, 6 days/week
Emission factor: 0.017 lbs VOC/gal
Control efficiency: 98%

$R1 = (417,000 \text{ gal/mo})(0.017 \text{ lbs VOC/gal})(\text{mo}/4.33 \text{ week})(\text{week}/6 \text{ day})(\text{day}/18 \text{ hr})/2 = 7.58 \text{ lbs/hr}$
 $R2 = (7.58 \text{ lbs/hr})(0.02 \text{ lbs/lbs}) = 0.15 \text{ lbs/hr} = 2.73 \text{ lbs/day}$
Annual = 851.33 lbs/yr
30-Day = $(0.15 \text{ lbs/hr})(18 \text{ hrs/day})(6 \text{ day/week})(4.33 \text{ week/mo})(\text{mo}/30 \text{ day}) = 2.34 \text{ lbs/day}$
Offsets = $(2.34 \text{ lbs/day})(1.2) = 2.81 \text{ lbs/day} = 3 \text{ lbs ERC}$ (6 lbs total for two stations with equal throughput)

Combustion Emissions from RTO Burner

The burner will be supplied with natural gas for up to an hour per day for rapid cold-start purposes only. Based on 1 hr/day operation, the burner combustion emissions are as follows:

Substance	lb/mmcf	mmcf/hr	R, lbs/hr	R, lbs/day	R, lbs/yr	30-Day
ROG	7	0.002186	0.015	0.015	4.77	0.01
NOx (60 ppm)	76.8	0.002186	0.168	0.168	52.37	0.15
SOx	0.6	0.002186	0.001	0.001	0.41	0.00
CO	35	0.002186	0.077	0.077	23.87	0.07
PM10	7.5	0.002186	0.016	0.016	5.11	0.01

Afterburner Evaluation

Inlet CFM = 8,000 ft³/min
Inlet Temp = 70 °F
Outlet Temp = 160 °F
Combustion Temp = 1500 °F (min)

Heat Recovery = $(1500 - 160)/(1500 - 70) * 100 = 93.71\%$
Inlet air temp = $(1500 \text{ °F})(0.9371) = 1406 \text{ °F}$

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Enthalpy @ 1500 °F = 28.24 Btu/scf
1400 °F = 26.13 Btu/scf

Heat required = (8,000 ft³/min)(60 min/hr)(28.24 – 26.13)(Btu/scf) = 1,012,800 Btu/hr

The RTO burner is 2,295,000 Btu/hr; hence it will take approximately a half hour to reach temperature from cold start-up.

Retention Time

Combustion chamber: 360 ft³
Natural gas required: (2,295,000 Btu/hr)(ft³/1050 Btu) = 2,186 ft³/hr
Combustion air required: (2,186 ft³/hr)(10.36 ft³ air/ft³ NG) = 22,644 ft³ air/hr
Gas volume: (8,000 ft³/min)(60 min/hr) + 22,644 ft³/hr + 2,186 ft³/hr = 504,830 ft³/hr
Gas volume @ 1500 °F: (504,830 ft³/hr)(hr/60 min)(1960 °R/530 °R) = 31,115 ft³/min = 518.6 ft³/sec

Residence Time

Combustion chamber: 360 ft³
Residence time: (360 ft³)(518.6 ft³/sec) = 0.69 sec

The residence time exceeds the minimum recommended residence time of 0.5 seconds for a thermal oxidizer operating at 1400 °F.

RULE EVALUATION:

Rule 212(c)(1) – There are no schools within 1000 ft. Public notice is not required pursuant to this section.

Rule 212(c)(2) – The emissions from these permitting actions do not specify the thresholds specified by this section of the rule. Public notice is not required.

Rule 212(c)(3) – The MICR is below the levels specified by this section of the rule. Public notice is not required.

Rule 212(g) – The increases do not exceed the levels set by this section of the rule. Public notice is not required.

Rule 401 – No visible emissions are expected from well maintained equipment; compliance with this rule is expected.

Rule 402 – The operation of well maintained equipment is not expected to cause a public nuisance; compliance with this rule is expected.

Rule 442 – The new filling lines will be vented to an RTO with 98% capture and control efficiency; compliance with this rule is expected.

Rule 1168 – Continued compliance with the VOC limits of this rule is expected.

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Rule 1171 – Continued compliance with the solvent requirements of this rule is expected.

Rule 1303(a)(1) – The new filling stations will comply with BACT requirements via venting to the RTO. Continued compliance is expected.

Rule 1303(b)(1), (2) – The emission increase from the change of conditions for Container Filling Stations #10 and #11 is being offset with ERCs currently held by the facility. The increase is for ROG only and there are no modeling requirements for ROG.

Rule 1401 – MEK is a toxic air contaminant as defined by this rule and it is used in several of the materials processed in this equipment. The screening level for MEK for the closest receptor (25 m) is 6.5 lbs/hr.

$$R1 \text{ MEK} = (7.58 \text{ lbs/hr})(0.25 \text{ lbs/lbs}) = 1.90 \text{ lbs/hr}$$

$$R2 \text{ MEK} = (1.90 \text{ lbs/hr})(1 - 0.98) = 0.04 \text{ lbs/hr} \rightarrow \text{Emissions of MEK are well below the screening level.}$$

Toxic emissions from combustion are also present but are well below the screening levels defined by this rule. Compliance with the rule is expected.

Reg. XXX – The above revision was classified a De Minimis Significant permit revision. All necessary monitoring conditions required by this regulation are already in place with the current permit conditions and no relaxation of the requirements is expected. Compliance with this regulation is expected.

Revision No.	AN	Type	PM10 Increase	ROG Increase
1	431302	Minor	0	0
2	454110	Minor	0	0
3	475026	De Minimis	0	+5

RECOMMENDATION:

Issue Permits to Construct for the subject applications after EPA 45-day review period.