D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

2600 Bull Street, Columbia, S.C. 29201
Phone: 803-734-4750 Fax: 803-734-3581

ENGINEERING CALCULATION SHEET
BAQ Engineering Services Division

PROJECT/PROPOSAL NAME: BMW Manufacturing Corporation
Plant wide Applicability Limit PSD Construction Permit
2060-0230-CY

ENGINEER: Diana Zakrzwski, Kevin Clark

DATE: 02/14/02 **Page 1 of** 16

Date Application Received: 02/02/2001

FACILITY DESCRIPTION

The facility is an automobile manufacturing facility. The existing facility (Plant 10.1) consists of a body shop, a paint shop, assembly area, energy center, import car preparation area and other associated equipment that can produce up to 31.25 cars/hr and 180,000 cars per year. A detailed process description is written in the preliminary determination associated with this project. The facility is broken up into several main areas. The body shop is where the metal parts of the car (the chassis) are constructed using brazing, welding, grinding and sanding operations. The chassis then goes to the paint shop where paint is applied to the unit. The paint shop includes three main areas – E-coat, guidecoat and topcoat. The e-coat area uses electrostatic applicators to apply the paint to the body, and the VOC emissions from the oven portion are controlled by an RTO. The primer/surfacer area (or guidecoat) consists of the application of several different underbody sealers and a color matched water based primer. The ovens in this area are vented to the RTO also. The topcoat area consists of the basecoat and clearcoat, blackout and cavity wax. The waterborne basecoat and solvent borne clearcoat are applied in separate booths. The emissions from the booths are controlled by a carbon adsorber (KCR) system and then sent to the RTO. The emissions from the ovens are sent directly to the RTO. In other booths, blackout and cavity wax are applied with no add on controls. The facility is also currently permitted to install a combi-line painting operation that will be a paint line that can apply basecoat and topcoat or primer. This unit will have the emissions sent to the RTO for the ovens and the KCR/RTO for the booth. Also in this area are the major and spot repair booths; these booths process units that need to have the paint repaired. After the paint shop, the unit goes to the assembly area where the chassis becomes a fully operational automobile. In the assembly shop emissions are found in the multifunction testing, cosmoline application, fluid fill and the operation of the vehicles. The current energy center consists of three boilers and four turbines that are fired on natural gas only. The facility also has an import car preparation area for cars received from overseas. These cars must have a protective wax (cosmoline) removed by a Hohmeir system, and small repairs may also be necessary. The facility also contains a tank farm and Transpack equipment for cars that will be shipped long distances.

PROJECT DESCRIPTION

The facility has submitted a PSD permit application for several reasons:

1. To request permission to construct another complete sister facility considered Plant 10.2. This facility will include all of the areas included in Plant 10.1 listed above except for Transpack and the import car preparation area (ICP). The new facility will be permitted to produce up to 50 cars per hour at 5760 hours per year or 468,000 cars per year.
2. To request permission to burn landfill gas in the existing boilers and turbines in Plant 10.1 and also the new units in 10.2.
3. To request permission to construct a new plastic parts manufacturing facility consisting of injection molding, surface preparation, surface coating (including primer, basecoat and clearcoat which will operate like the paint shop for the vehicles). The emissions will be vented to an RTO from the ovens and to the KCR/RTO system for the clearcoat booth.
4. To request permission to construct a new metal stamping operation.
5. To request plant-wide applicability limits for the five criteria pollutants (PM/PM-10, SO2, NOx, CO and VOCs).
6. To debottleneck the existing facility so that full production can be reached.

SOURCE DESCRIPTION

Unit ID	Unit Description	Control Device Description
01	Energy Center 10.1 - Cogeneration Turbines	Selective Catalytic Reduction (natural gas only)
02	Energy Center 10.2 - Cogeneration Turbines	Dry Low NOx burners
03	Energy Center 10.1 - Auxiliary Boilers	Flue Gas Recirculation (FGR) with low-NO_X burners or equivalent
04	Energy Center 10.2 - Auxiliary Boilers	Flue Gas Recirculation (FGR) with low-NO_X burners or equivalent
05	Plant 10.1 - Paint Shop Combustion Sources	Low NO_X burners
06	Plant 10.2 - Paint Shop Combustion Sources	Low NO_X burners

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

2600 Bull Street, Columbia, S.C. 29201
Phone: 803-734-4750 Fax: 803-734-3581

ENGINEERING CALCULATION SHEET
BAQ Engineering Services Division

PROJECT/PROPOSAL NAME: BMW Manufacturing Corporation
Plant wide Applicability Limit PSD Construction Permit
2060-0230-CY

ENGINEER: Diana Zakrzwski, Kevin Clark

DATE: 02/14/02 **Page 2 of** 16

Unit ID	Unit Description	Control Device Description
07	Plant 10.1 - Paint Shop Primecoat (E-coat) Operations	Regenerative Thermal Oxidation (RTO)
08	Plant 10.2 - Paint Shop Primecoat (E-coat) Operations	Regenerative Thermal Oxidation (RTO)
09	Plant 10.1 - Paint Shop Guidecoat Operations	RTO, Water Curtain, Dry Filtration
10	Plant 10.2 - Paint Shop Guidecoat Operations	RTO, Water Curtain, Dry Filtration
11	Plant 10.1 - Paint Shop Topcoat Operations	RTO, Water Curtain, Dry Filtration, Rotary Carbon Adsorption
12	Plant 10.2 - Paint Shop Topcoat Operations	RTO, Water Curtain, Dry Filtration, Rotary Carbon Adsorption
13	Plant 10.1 - Paint Shop Purge Solvent Operations	N/A
14	Plant 10.2 - Paint Shop Purge Solvent Operations	N/A
15	Plant 10.1 - Multi-Function Testing / Cosmoline Application	Water Curtain
16	Plant 10.2 - Multi-Function Testing / Cosmoline Application	Water Curtain
17	Transpack Operations	N/A
18	ICP Dewax Unit	Hohmeier process equipment
19	Plastic Parts Combustion Sources	Low NO_x Burners
20	Plastic Parts Guidecoat Operations	RTO, Water Curtain, Dry Filtration
21	Plastic Parts Topcoat Operations	RTO, Water Curtain, Dry Filtration, Rotary Carbon Adsorption
22	Plastic Parts Paint Shop Purge Solvent Operations	N/A
23	Plant 10.1 - Body Shop Welding Areas	ESP
24	Plant 10.2 - Body Shop Welding Areas	ESP

Control Device ID	Unit ID	Control Device Description	Installation Date	Control Efficiency	Pollutant(s) Controlled
SCR	01	Selective Catalytic Reduction (natural gas only)	7/1994	70%	NO_X
DLN	02	Dry Low NOx Burners	2002*	---	NOx
FGR	03,04	Flue Gas Recirculation	7/1994, 2002*	---	NO_X CO
LNB	03-06,19	Low NO_X Burners	7/1994, 2002*	---	NO_X
RTO1	07,09,11	Regenerative Thermal Oxidizer	7/1994	95%	VOC
RTO2	08,10,12,20,21	Regenerative Thermal Oxidizer	2002*	95%	VOC
KCR01	11	Rotary Carbon Adsorber Units #1 and #2, with desorb to RTO1	7/1994	95%	VOC
KCR02	12,21	Rotary Carbon Adsorber Units #3 and #4, with desorb to RTO2	2002*	95%	VOC
WV	09-12,20-21	Water Curtain System	7/1994, 2002*	98%	PM

Control Device ID	Unit ID	Control Device Description	Installation Date	Control Efficiency	Pollutant(s) Controlled
DF01	09-12,20-21	Dry Filters	7/1994, 2002*	98%	PM
DF02	09, 11	Dry Filters	7/1994	90%	PM
H1	18	Hohmeier Scrubber/Boiler System	7/1994	96.3%	VOC
S1,S2	15,16	Water Curtain System	7/1994, 2002*	98%	PM
ESP	23,24	Electrostatic Precipitators	7/1994, 2002*	95%	PM

EXEMPT SOURCES

These items have been reviewed for BACT issues for the PSD permit, but they will be listed as insignificant activities in the Title V. As such, they are not listed in the PSD permit. BACT for these sources is discussed in the preliminary determination. The bases for their exemptions are listed below.

ID	General Description	Basis
SS	Stamping Operations	Emissions total to < 5 TPY of VOC
BB, BG	Body Shop Brazing Areas, Grinding Sanding Booths – Plant 10.1 and 10.2	Emissions total to < 5 TPY of PM and VOC
PC	Phosphate Cleaning Operations	Emissions total to < 5 TPY of PM
	Wet Sand, Sealer, Tack-off & Polish Operations	Emissions total to < 5 TPY of PM
PMR	Paint Mixing Operations	Emissions total to < 5 TPY of VOC and < 1000 lb/year of HAP
AB	Assembly Shops (Windshield Installation)	Emissions total to < 5 TPY of VOC
IP09	ICP Polishing	Emissions total to < 5 TPY of PM
TK-202	10,000 gallon Gasoline Storage Tank	Emissions total to< 5 TPY of VOC
TK-203	10,000 gallon Differential Fluid Storage Tank	Emissions total to < 5 TPY of VOC
TK-204	2,000 gallon Power Steering Fluid Storage Tank	Insignificant Activity B.3
TK-206	5,000 gallon Brake Fluid Storage Tank	Insignificant Activity B.3
TK-209	10,000 gallon Gasoline Storage Tank	Emissions total to < 5 TPY of VOC
TK-210	20,000 gallon Gasoline Storage Tank	Emissions total to < 5 TPY of VOC
TK-211	8,000 gallon Power Steering Storage Tank	Insignificant Activity B.3
TK-212	10,000 gallon Ethanol Storage Tank	Emissions total to < 5 TPY of VOC
TK-213	10,000 gallon Ethylene Glycol Storage tank	Emissions total to < 5 TPY of VOC
TK-214	10,000 gallon Diesel Storage Tank	Emissions total to < 5 TPY of VOC
TK-Exxsol	8,000 gallon Exxsol Storage Tank	Insignificant Activity B.3
TK-2-202	10,000 gallon Gasoline Storage Tank	Emissions total to < 5 TPY of VOC

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

2600 Bull Street, Columbia, S.C. 29201
Phone: 803-734-4750 Fax: 803-734-3581

ENGINEERING CALCULATION SHEET
BAQ Engineering Services Division

ID	General Description	Basis
TK-2-203	10,000 gallon Differential Fluid Storage Tank	Emissions total to < 5 TPY of VOC
TK-2-204	2,000 gallon Power Steering Fluid Storage Tank	Insignificant Activity B.3
TK-2-206	5,000 gallon Brake Fluid Storage Tank	Insignificant Activity B.3
TK-2-209	10,000 gallon Gasoline Storage Tank	Emissions total to < 5 TPY of VOC
TK-2-210	20,000 Gasoline Storage Tank	Emissions total to < 5 TPY of VOC
TK-2-211	8,000 gallon Power Steering Storage Tank	Insignificant Activity B.3
TK-2-212	10,000 gallon Ethanol Storage Tank	Emissions total to < 5 TPY of VOC
TK-2-213	10,000 gallon Ethylene Glycol Storage tank	Emissions total to < 5 TPY of VOC
TK-2-214	10,000 gallon Diesel Storage Tank	Emissions total to < 5 TPY of VOC
TK-2-Exxsol	8,000 gallon Exxsol Storage Tank	Insignificant Activity B.3
EG	Emergency Generators at both 10.1 and 10.2	< 150 KW (Insignificant Activity B.2) or Operate < 250 hours/year
FF-1	Fluid Fill at 10.1	Emissions total to < 5 TPY of VOC
FF-2	Fluid Fill at 10.2	Emissions total to < 5 TPY of VOC

ACTUAL AND POTENTIAL EMISSIONS AND PAL DETERMINATION

(See attached spreadsheets for detail on PM and VOC emissions for the painting operations (auto and plastic) and all pollutants from the energy center.)

Below is the how the Plant wide applicability Limit was calculated. The PALs were based on actual emissions from the existing facility for those types of units already installed and in operation. The actual emissions using tested booth/oven splits, transfer and capture efficiencies were scaled up for a larger sized vehicle (X5) and then scaled up for more production. For units that used the actual efficiencies (paint shop), a 15% safety factor is included to give the facility a little flexibility from the actual efficiency numbers. For units where the actual efficiencies were not used no safety factor was used. For the energy center and plastic parts, the potential emissions were used since actual emissions were not available (for the energy center on landfill gas this is true). The permit may be written based on production levels with an in-between value for 10.2 – the current proposed levels are 180,000 units or less, 180,001 to 324,000 units, 324,001 to 468,000 units which corresponds to 10.1 only, 10.1 and half of 10.2 production and 10.1 and 10.2 at full production. These different production levels will have to have whether plastic parts is a part of the limit or not also.

	PM10	SO2	NOX	CO	VOC
Current Actuals for scale-up	6.51	0.00	0.16	1.78	127.81
Current production rate - 19.1 units/hr and 3840 hrs/yr = 73,344 unit/yr					
Current emissions (tons/unit)	8.88E-05	0.00E+00	2.18E-06	2.43E-05	1.74E-03
Future production rate - 81.25 units/hr and 5760 hrs/yr = 468,000 unit/yr					
Future emissions (based on production)	41.57	0.00	1.02	11.36	815.55
Future production rate - 324,001 unit/yr - for VOCs only					
Future emissions (based on production)					564.61
Plant 10.1 Emissions Sources not scaled up	6.65	0.81	37.06	56.32	23.08

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

2600 Bull Street, Columbia, S.C. 29201
Phone: 803-734-4750 Fax: 803-734-3581

ENGINEERING CALCULATION SHEET
BAQ Engineering Services Division

Plant 10.2 Emissions Sources not scaled up	10.97	0.97	68.19	103.48	11.30
Plastic Parts	5.81	0.09	7.44	12.50	128.54
Combined Energy Center	43.32	18.20	260.83	430.01	21.18
Exempt Equipment (subtract)	6.05	0.37	11.08	2.79	15.93
Total PAL for 10.1/10.2/Plastic Parts (>324,000 units, plastic parts)	**102**	**20**	**363**	**611**	**984**
Total PAL for 10.1/Half of 10.2/Plastic Parts (< 324,000 units and >180,000 units, plastic parts)					**733**
Total PAL for 10.1/10.2 (>324,000 units)	**96**	**20**	**356**	**598**	**855**
Total PAL for 10.1/Half of 10.2 (<324,000 units and >180,000 units)					**604**
Energy Center 10.1only	20.70	16.11	90.66	168.61	10.67
Exempt Equipment 10.1 only (subtract)	2.77	0.14	4.36	2.58	7.07
Future production rate 10.1 only - 31.25 units/hr and 5760 hrs/yr = 180,000 unit/yr					
Future Emissions (based on production 10.1)	15.99	0.00	0.39	4.37	313.67
Total PAL for 10.1/Plastic Parts (<180,000 units, plastic parts)	**46**	**17**	**131**	**239**	**469**
Total PAL for 10.1 (<180,000 units)	**41**	**17**	**124**	**227**	**340**

The final PAL levels from the permit are as follows. These tables are located in section 9 of the permit.

PLANT WIDE APPLICABILITY LIMITS (VOC)

Unit ID	Limit	Production Level	Regulation	State Only	Condition Number
Facility wide	984 TPY	> 324,000 units and the plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	855 TPY	> 324,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	733 TPY	Between 324,000 and 180,000 units and the plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	604 TPY	Between 324,000 and 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	469 TPY	< 180,000 units and plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	340 TPY	< 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2

PLANT WIDE APPLICABILITY LIMITS (SO2)

Unit ID	Limit	Production Level	Regulation	State Only	Condition Number
Facility wide	20 TPY	> 180,000 units and the plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	20 TPY	> 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2

Unit ID	Limit	Production Level	Regulation	State Only	Condition Number
	17TPY	< 180,000 units and plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	17 TPY	< 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2

PLANT WIDE APPLICABILITY LIMITS (NOx)

Unit ID	Limit	Production Level	Regulation	State Only	Condition Number
Facility wide	363 TPY	> 180,000 units and the plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	356 TPY	> 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	131 TPY	< 180,000 units and plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	124 TPY	< 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2

PLANT WIDE APPLICABILITY LIMITS (CO)

Unit ID	Limit	Production Level	Regulation	State Only	Condition Number
Facility wide	611 TPY	> 180,000 units and the plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	598 TPY	> 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	239 TPY	< 180,000 units and plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	227 TPY	< 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2

PLANT WIDE APPLICABILITY LIMITS (PM/PM-10)

Unit ID	Limit	Production Level	Regulation	State Only	Condition Number
Facility wide	102 TPY	> 180,000 units and the plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	96 TPY	> 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	46 TPY	< 180,000 units and plastic parts shop	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2
	41 TPY	< 180,000 units	SC Regulation 62.5 Std 7	No	9.B.1, 9.B.2

OTHER EMISSION LIMITATIONS

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

2600 Bull Street, Columbia, S.C. 29201
Phone: 803-734-4750 Fax: 803-734-3581

ENGINEERING CALCULATION SHEET
BAQ Engineering Services Division

These limits are located in section 10 of the permit.

EMISSION LIMITS AND STANDARDS

Unit ID	Pollutant/ Standard	Limit	Reference Method	Regulation	State Only	Condition Number
01-02	NO_X	< 0.015% by volume at 15% oxygen and on a dry basis per turbine	20	40CFR60 Subpart GG; Stationary Gas Turbines	No	10.B.2, 10.B.3, 10.B.6
01-02	Fuel Sulfur Content	< 0.8 percent by weight	N/A	40CFR60 Subpart GG; Stationary Gas Turbines	No	10.B.2, 10.B.4, 10.B.6
01-02	Opacity	20% per source	9	S.C. Regulation 61-62.5, Std. 4.0, Section IX.(B)	No	10.B.5
01-04	Waste Combustion	As Specified Below	As Approved by BAQ	S.C. Regulation 61-62.5, Std. 3.0, Section J (Boilers) and I (Turbines)	Yes	10.B.7
03-04	NSPS	As Specified	N/A	40CFR60 NSPS Subpart A & Subpart Dc	No	10.B.8, 10.B.9
03-06, 19	Opacity	20% per fuel burning operation	9	S.C. Regulation 61-62.5, Std. 1, Section I.(B)	No	10.B.10
05-06, 19	Opacity	20% per source	9	S.C. Regulation 61-62.5, Std. 4.0, Section IX.(B)	No	10.B.11
07-08	VOC	1.42 lb/gallon ACS, total	As Approved by BAQ	40CFR60 NSPS Subpart A & Subpart MM	No	10.B.12, 10.B.13
08, 10, 12	VOHAP	1.605 lb/gallon ACS, total	As Approved by BAQ	S.C. Regulation 62.63.40-44, NESHAP	No	10.B.14
09-10	VOC	11.67 lb/gallon ACS, total	As Approved by BAQ	40CFR60 NSPS Subpart A & Subpart MM	No	10.B.12, 10.B.15
11-12	VOC	12.25 lb/gallon ACS, total	As Approved by BAQ	40CFR60 NSPS Subpart A & Subpart MM	No	10.B.12, 10.B.16
07-12, 20-21	Opacity	20%	9	S.C. Regulation 61-62.5, Standard 3.0, Section III, Part H.(1)	Yes	10.B.17
07-18, 20-24	Opacity	20% per source	9	S.C. Regulation 61-62.5, Std. 4.0, Section IX.(B)	No	10.B.18
14, 22	VOHAP	Work Practices	As Approved by BAQ	S.C. Regulation 62.63.40-44, NESHAP	No	10.B.19
18	Waste Combustion	As Specified Below	As Approved by BAQ	S.C. Regulation 61-62.5, Std. 3.0, Section I	Yes	10.B.20

Unit ID	Pollutant/ Standard	Limit	Reference Method	Regulation	State Only	Condition Number
20, 21	VOHAP	2.556 lb/gallon ACS, total	As Approved by BAQ	S.C. Regulation 62.63.40-44, NESHAP	No	10.B.21
07,08	Combined Capture and Destruction Efficiency	76%	As Approved by BAQ	S.C. Regulation 61-62.5, Std. 7	No	10.B.22
09,10	Combined Capture and Destruction Efficiency	9.5%	As Approved by BAQ	S.C. Regulation 61-62.5, Std. 7	No	10.B.23
11,12	Combined Capture and Destruction Efficiency	9.5%	As Approved by BAQ	S.C. Regulation 61-62.5, Std. 7	No	10.B.24

N/A = Not Applicable
ACS = Applied Coating Solids

Compliance with SC Regulation 61-62.5, Standard 1, 3 and 4 PM and SO_2 emission limitations is determined solely by compliance with the PALs specified in Part 9.0 of this permit.

The maximum allowable emission limits above are derived from the various Federal and State regulations that govern the operation of this type of source. All applicable facility wide emission limits and corresponding regulations are listed above. Additional operating requirements which may be more stringent than those above are contained in Part 7.0, Part 9.0 and Part 11.0 of the permit.

APPLICABLE REGULATIONS

A. State Air Regulations

Std 1	Std 2	Std 3	Std 3.1	Std 4	Std 5.1	Std 7	Std 8	Other
X	X	X		X	X	X	X	X

Standard 1 - Fuel Burning
The boilers and indirect fired air heaters throughout the facility are subject to this regulation with a PM limit of 0.6 lb/million BTU, a SO2 limit of 3.5 lb/million BTU and an opacity limit of 20%. The PM and SO2 emission limitation are not listed in the Emission Limitations portion of this permit, because compliance with the PAL limit for PM and SO2 will demonstrate compliance with the specific standard emission limitations.

Standard 2 - AAQS
Modeling has demonstrated compliance with this regulation.

Standard 3 - Waste Combustion and Reduction
The RTO systems are subject to Std 3 as industrial incinerators since the units are combusting the VOC emissions from the painting operations. The Hohmeier system is subject to Std 3 as an industrial boiler since it burns recovered kerosene and the removed cosmoline wax. The boilers and turbines in the energy centers will be subject to Std 3 since they will be burning landfill

gas. The turbines will be subject to the industrial incinerator portion and the boilers will be subject as an industrial boiler. The RTO system and turbines PM emission limitations as required by Std 3 (0.5 lb/MMBtu) are not listed in the emission limitations since compliance with the PAL has been determined to also show compliance with the Std 3 limit. The RTO, turbines, boilers and hohmeier systems have been exempted from the required source testing due to the fact that the combustion of the associated items will have minimal PM emissions or metal emissions. The operator training required by Std 3 has also been waived due to the nature of the process and emissions. An initial waste analysis is required for the recovered kerosene, cosmoline wax, paint, solvents, and landfill gas – after that if the facility can use the waste analysis exemptions as listed in the regulation – no waste analysis will be required in the future as long as the streams remain consistent.

One issue that has been brought up is whether landfill gas should be considered a waste. The definition of waste in SC Regulation 62.1 states that a waste is a discarded material. The landfill currently discards this material as a waste by burning the gas in the flares on site. The landfill gas is a waste product of the decomposition of municipal waste. This stream is therefore considered a waste for the landfill. When a facility either sells or gives its waste to another facility this action does not negate the fact that the substance was originally a waste and therefore must be treated as a waste fuel for whatever facility receives the fuel. This determination is consistent with the other permits relating to landfill gas and with other projects where a waste from one facility is sold to another to be used as fuel.

The PM emission limitation for the industrial incinerators is not listed in the Emission Limitations portion of this permit, because compliance with the PAL limit for PM will demonstrate compliance with the specific standard emission limitations.

Standard 3.1 - Medical Waste Incineration
No medical waste incineration

.

Standard 4 - Emissions from Process Industries
The facility is subject to the opacity limitations and PM limitations from this regulation. The PM emission limitations are not listed in the Emission Limitations portion of this permit, because compliance with the PAL limit for PM will demonstrate compliance with the specific standard emission limitations.

Standard 5 - VOC
The facility was not in existence in 1979 or 1980

Standard 5.1 - LAER
This construction permit incorporates LAER for all sources at the facility that emit VOCs. The PAL incorporates the LAER limits therefore separate emission unit limits are not necessary. Compliance with the PAL will ensure compliance with the LAER limits set for the equipment. Details on the LAER limits are included in the preliminary determination and in the Std 7 portion of this greensheet.

Standard 7 - PSD
The facility is an existing major source for PSD. This permit is a PAL permit which will contain limits for the entire facility allowing flexibility for the company. As long as the facility remains under the PAL limits then the facility shall be deemed in compliance with PSD. The previous BACT and LAER determinations for this facility were revisited and the new operations had new BACT and LAER determinations done. Since the PAL levels are based on the actual emissions from the existing facility a source-by-source determination was done for the controls not emission limits except for the plastic parts area. The following tables have the appropriate controls for different parts of the process. For more detailed information please refer to the Preliminary Determination. The biggest difference between the previously permitted parameters (for capture/destruction/and transfer efficiencies) and the values used in determining the PAL limits are the capture efficiencies and booth/oven splits.

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

2600 Bull Street, Columbia, S.C. 29201
Phone: 803-734-4750 Fax: 803-734-3581

ENGINEERING CALCULATION SHEET
BAQ Engineering Services Division

PROJECT/PROPOSAL NAME: BMW Manufacturing Corporation
Plant wide Applicability Limit PSD Construction Permit
2060-0230-CY

ENGINEER: Diana Zakrzwski, Kevin Clark

DATE: 02/14/02

Unit ID	Unit Description	Control Device Description
01	Energy Center 10.1 - Cogeneration Turbines	Selective Catalytic Reduction while burning natural gas; SCR will be bypassed while burning landfill gas due to the cost associated and the questionable technical feasibility
02	Energy Center 10.2 - Cogeneration Turbines	Dry Low NOx burners while burning both natural gas and landfill gas – while burning landfill gas no control efficiency is expected for NOx
03	Energy Center 10.1 - Auxiliary Boilers	Flue Gas Recirculation (FGR) with low-NO_X burners or equivalent while burning both natural and landfill gas
04	Energy Center 10.2 - Auxiliary Boilers	Flue Gas Recirculation (FGR) with low-NO_X burners or equivalent while burning both natural and landfill gas
05	Plant 10.1 - Paint Shop Combustion Sources	Low NO_X burners
06	Plant 10.2 - Paint Shop Combustion Sources	Low NO_X burners
07	Plant 10.1 - Paint Shop Primecoat (E-coat) Operations	Regenerative Thermal Oxidation (RTO) for the ovens with 95% destruction of VOCs
08	Plant 10.2 - Paint Shop Primecoat (E-coat) Operations	Regenerative Thermal Oxidation (RTO) for the ovens with 95% destruction of VOCs
09	Plant 10.1 - Paint Shop Guidecoat Operations	RTO for the ovens with 95% destruction of VOCs, Water Curtain on primer/surfacer operations with 98% control of particulate and Dry Filtration on the Underbody sealer booths with 98% control of particulate
10	Plant 10.2 - Paint Shop Guidecoat Operations	RTO for the ovens with 95% destruction of VOCs, Water Curtain on primer/surfacer operations with 98% control of particulate and Dry Filtration on the Underbody sealer booths with 98% control of particulate
11	Plant 10.1 - Paint Shop Topcoat Operations	VOC Concentrator using a carbon adsorber for the clearcoat booths (also in the Combi-Line when using clearcoat) with a 95% control efficiency for VOCs and then routed to the RTO, RTO for the ovens with 95% destruction of VOCs, Water Curtain on basecoat and clearcoat operations, Combi-Line, spot repair in paint shop and major repair (both in paint shop and assembly) with 98% control of particulate and Dry Filtration on the blackout/cavity wax/spot repair booths with 98% control of particulate and on the Assembly Spot Repair with 90% control of particulate

Unit ID	Unit Description	Control Device Description
12	Plant 10.2 - Paint Shop Topcoat Operations	VOC Concentrator using a carbon adsorber for the clearcoat booths (also in the Combi-Line when using clearcoat) with a 95% control efficiency for VOCs and then routed to the RTO, RTO for the ovens with 95% destruction of VOCs, Water Curtain on basecoat and clearcoat operations, Combi-Line, spot repair in paint shop and major repair (both in paint shop and assembly) with 98% control of particulate and Dry Filtration on the blackout/cavity wax/spot repair booths with 98% control of particulate and on the Assembly Spot Repair with 90% control of particulate
13	Plant 10.1 - Paint Shop Purge Solvent Operations	Best Management Practices
14	Plant 10.2 - Paint Shop Purge Solvent Operations	Best Management Practices
15	Plant 10.1 - Multi-Function Testing / Cosmoline Application	Emissions from the cosmoline operation are vented to a Water Curtain with a 98% efficiency for particulate
16	Plant 10.2 - Multi-Function Testing / Cosmoline Application	Emissions from the cosmoline operation are vented to a Water Curtain with a 98% efficiency for particulate
17	Transpack Operations	N/A
18	ICP Dewax Unit	Emissions are sent through the Hohmeier scrubber/boiler system which has 96.3% efficiency for VOCs
19	Plastic Parts Combustion Sources	Low NO_x Burners
20	Plastic Parts Guidecoat Operations	RTO for the ovens with 95% destruction of VOCs, Water Curtain on primer/surfacer operations with 98% control of particulate
21	Plastic Parts Topcoat Operations	VOC Concentrator using a carbon adsorber for the clearcoat booth with a 95% control efficiency for VOCs and then routed to the RTO, RTO for the ovens with 95% destruction of VOCs, Water Curtain on basecoat and clearcoat operations, spot repair in paint shop and major repair (both in paint shop) with 98% control of particulate
22	Plastic Parts Paint Shop Purge Solvent Operations	Best Management Practices
23	Plant 10.1 - Body Shop Welding Areas	Electrostatic Precipitator with 95% efficiency for particulate
24	Plant 10.2 - Body Shop Welding Areas	Electrostatic Precipitator with 95% efficiency for particulate

Standard 8 - TAP
Modeling has demonstrated compliance with this regulation.

B. Title V

This facility is a major source and the original Title V permit will be processed concurrently with this permit.

C. NESHAP (40 CFR 61)

No operations at the facility are regulated by NESHAP.

D. MACT (40 CFR 63)

No operations at this facility are currently regulated under a MACT standard. The automobile and light truck surface coating MACT and the plastic parts surface coating MACT have not yet been proposed. When these MACT standards become final the facility will need to determine applicability of these regulations and comply as appropriate.

E. NSPS (40 CFR 60)

Different emission units at this facility are subject to several NSPS regulations.
Boilers – NSPS Subparts A and Dc – boilers are greater than 10 million BTU/hr and installed after the applicability date
Turbines – NSPS Subparts A and GG – the facility has an approved alternative monitoring plan for sulfur and nitrogen content for the existing boilers. The facility has submitted an alternative monitoring plan for the sulfur and nitrogen content for the landfill gas for both facilities and has submitted an alternative monitoring plan for the new turbines while burning natural gas. EPA and the Bureau have approved the alternative monitoring plan for the landfill gas on 26 November 2001.
Automobile Surface Coating – NSPS Subparts A and MM – the E-coat, guidecoat and topcoat areas are subject to this regulation. The NSPS limits are listed in the permit for the appropriate areas.

Other NSPS regulations and relation to the facility:
Tanks – NSPS Subparts A and Kb – not subject because tanks are sized below the applicability limit except for the gasoline storage tank – which is not subject because it is a gasoline storage tank that fills up car fuel tanks.

F. 112 (g)

The facility has submitted a 112(g) determination for two distinct processes at the new facility – the plastic parts shop and the new paint line for the cars in 10.2. Both of these items are considered new process units per the definition in SC Regulation 62.63. Both of these sources do not currently have proposed MACTs although both of them are to be proposed within the next few years. The majority of the discussion on these MACTs is included in the preliminary determination – but some further detail is listed here.

Automobile surface coating – there have been several 112(g) determinations done within the last few years for these types of sources. Relating the limits to each other is difficult due to the different units (lb/GACS, lb/ft2 surface area, or lb/gal) used in the limit. The other difficulty has been the determination of exactly what types of processes are included in each limit. Some limits include repair when in the paint shop or repair outside of the paint shop or sealers or blackout or adhesives or none of the above or a different combinations of the above. Additionally, different manufacturers call different areas different names.

Diana has spoken to Dave Salamon at EPA – RTP who is working on the MACT Standard for the Automobile and Light Duty Truck surface coating MACT. No regulation has been proposed, and the workgroup is currently working on the limits. He gave Diana some idea of where the limits may be – but not definitely what the proposed MACT will have. For all three processes (E-coat, guidecoat, and topcoat) together (including repair operations – but not sealers or adhesives or underbody coatings) the level will be around 0.5 lbHAP/GACS. Sealers and underbody coating will be limited to 1% by weight HAP.

Diana has also reviewed several permits issued or noticed by the Michigan Department of Environmental Quality that contain 112(g) determinations for three GM facilities. These permits have limits in lb/GACS for the separate areas. There are some differences in the setup at BMW versus these plants. For example, the GM – Lansing facility uses a solvent-borne primer.

Diana also spoke with Larry Brown of the Alabama Department of Environmental Management on two determinations made for Mercedes and Honda. The units of the limit in AL are in lb/ft2 surface area painted as determined by a Canadian method. The limit includes only the main booths with no repair, blackout or underbody sealers included.

BMW has proposed to use the limits set by Nissan in a recent 112(g) determination as their limits for the paint shop in plant 10.2 and plastic parts. The limits are area wide. For the paint shop, the limit will be 1.605 lb HAP/GACS excluding purge operations, and the limit for the plastic parts area will be 2.556 lb HAP/GACS, also excluding purge operations. BMW will follow work practices as listed in the Mercedes 112(g) determination to minimize emissions from purge operations.

G. CAM

Barrett Parker of EPA has indicated that CAM would not apply to this 112(g) determination.

CONSTRUCTION PERMIT PROCESS

This construction permit specifies the construction permit process for this facility while operating under the PAL. This information is located in section 6 of the permit.

A. "Existing emission unit" is defined in this permit as any equipment (or process) listed herein in Tables 8.1-8.26 or approved by the Bureau via the implementation of the processes outlined in Part 6. Any existing emission unit that is constructed, altered, modified and/or undergoes a physical change or change in method of operation where emissions are maintained within the PAL limits specified in Part 9.0 of this permit shall not trigger major modification applicability requirements of the South Carolina and federal New Source Review programs. Provided compliance with the PALs specified in Part 9.0 is demonstrated, BMW is in compliance with all South Carolina and federal major new source review requirements.

B. For existing emission units, BMW is authorized to alter, modify and/or undertake any physical change or change in the method of operation (collectively referred to as "changes") with reference to such units, provided that the emissions from the facility do not exceed emissions limitations in Part 9.0 of this permit and BMW continues to use the control technology (including pollution prevention) agreed to by the Bureau either in this permit or as alternatives with written Bureau approval. The level of performance and emission unit control technologies in the application dated February 2, 2001 and identified in Tables 8.1-8.26 of this permit are inherent in the PALs specified in Part 9.0 of this permit. Provided changes to existing emission units meet the following requirements, no new construction permits are required:

1. The level of performance required by a Bureau approved alternative must be at least equal to the prior approved technology for that source.

2. Any written Bureau approved changes either in alternative technologies or new BACT or LAER determinations will become an enforceable requirement for the facility.

3. Any applicable Title V operating permit notification and revision procedures shall be followed as specified in SC Regulation 61-62.70. Any required notification shall be submitted to the Director of Engineering Services, EPA Region IV and the Appalachia III EQC District Office.

4. Upon compliance with the above requirements, BMW may proceed with the changes without a requirement to revise the PSD/PAL construction permit or obtain a new construction permit. Changes made under this section are allowed as permitted items under the facility's PSD/PAL construction permit and the Title V operating permit.

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

2600 Bull Street, Columbia, S.C. 29201
Phone: 803-734-4750 Fax: 803-734-3581

ENGINEERING CALCULATION SHEET
BAQ Engineering Services Division

Note: Any changes to the equipment listed in the permit are included in the following section. This section allows, for example, a small burner size change or configuration change to the original permit, to be made. If major changes are made to the permitted sources, such as changing a paint booth to a powder booth, then the facility shall follow D.

C. BMW can undertake the addition of new "small" emission units (not covered as existing emission units) without obtaining a new construction permit, provided that PAL emission levels are not exceeded and the following conditions are met:

1. The additions will not result in emissions that will exceed any limit in this permit and any existing emission unit associated with the addition will not become subject to regulation under 40 CFR Part 60 (Standards of Performance for New Stationary Sources), Part 61 (National Emission Standards for Hazardous Air Pollutants) or 63 (National Emission Standards for Hazardous Air Pollutants, also known as MACT Standards) unless the application of those regulations have already been addressed in this permit.

2. Potential emissions, taking into account controls, restrictions on hours of operation or on the type or amount of material combusted, stored, or processed , from the new emissions unit of each criteria pollutant will not exceed 1.0 lbs/hour and each toxic air pollutant will not exceed 1000 lbs/month, unless the Bureau determines that no such limits or control equipment are required under any granted exemption. Any associated control equipment shall be operated as proposed by BMW. Failure to operate, maintain, and appropriately monitor the control equipment may result in the retraction of this exemption and referral for enforcement action. Information shall be submitted to the Director of Engineering Services describing any control device, including engineering specifics and control/capture efficiencies.

3. The added new "small" emissions unit is not part of a project involving the addition of multiple units which should comply collectively with condition 6.D. To this end BMW will address this issue in its "small" emission unit submittals to the Bureau for its review.

4. Emissions from any new emission unit shall not cause or contribute to an exceedance of any National Ambient Air Quality Standard (NAAQS) - SC Regulation 61-62.5, Std 2, Prevention of Significant Deterioration (PSD) increment - SC Regulation 61-62.5, Std 7 or Toxic Air Pollutants (TAP) - SC Regulation 61-62.5, Std 8.

5. Any applicable Title V operating permit notification and revision procedures shall be followed as specified in SC Regulation 61-62.70. Any required notification shall be submitted to the Director of Engineering Services, EPA Region IV and the Appalachia III EQC District Office.

6. Upon compliance with the above requirements, BMW may proceed with the addition without a requirement to obtain a new construction permit or revise the PSD/PAL construction permit. Additions made under this condition are allowed as permitted items under the PSD/PAL construction permit and Title V operating permit.

7. After new "small" emission units are added consistent with the conditions of 6.C.1 – 6.C.4, these sources shall be treated as "existing emission units" covered under Part 6.0.

8. The owner/operator must cease implementation of any addition if it is found to be inconsistent with conditions 6.B.1 - 6.B.6 and may be subject to possible enforcement action(s). The permittee assumes the risk of any financial loss resulting from implementing the addition(s).

The following section is for projects where potential emissions are less than PAL levels above. Potential emissions are based on controlled emissions and operation at the maximum amount of hours the source can run.

D. BMW can undertake the addition of new "large" emission units (not covered as existing emission units) provided that PAL emission levels are not exceeded and the following additional conditions are met:

1. New emission units with potential emissions, taking into account controls, restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, of any criteria pollutant exceeding 1.0 lbs/hr and/or potential emissions, taking into account controls, restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, of any toxic air pollutant exceeding 1000 lbs/month shall:
   a. include descriptions of control device reductions and limitations on operation or material usage and apply any level of emission control as required under applicable South Carolina air quality regulations as required for sources of pollutants that exceed 1.0 lbs/hour and each toxic air pollutant will exceed 1000 lbs/month, but do not exceed major NSR significance thresholds, unless the Bureau determines that alternative requirements apply pursuant to any available exemption. (LAER for VOC emissions may be required under SC Regulation 61-62.5, Standard 5.1.); and
   b. apply best available control technology (BACT) to the criteria pollutants (including any HAP emissions that are also included as VOCs) above the major NSR significance thresholds, unless the Bureau determines that alternative requirements apply pursuant to any available exemption. (LAER for VOC emissions may be required under SC Regulation 61-62.5, Standard 5.1.)

2. BACT/LAER shall be proposed by BMW and the Bureau will approve or deny the BACT/LAER analysis.

3. The Bureau issues a State minor new source review construction permit for the new "large" emission unit, or the Bureau determines that no such construction permit is required under any exemption. If a construction permit is required for the new "large" emission unit, the Bureau will approve or reject the application within a targeted time frame of 60 days from the date the complete application is submitted. The application must include the appropriate application forms, a brief process description, emission calculations, documentation of BACT/LAER as required, the VOC count as required by 11.D.15 and periodic monitoring parameters for any control equipment. BMW will place in a newspaper of local general circulation (at the time of the application submittal), a public notice that it has applied to the Bureau for a construction permit for a new large unit that requires BACT/LAER control. Once a construction permit has been issued (or a determination made that the emission unit does not require such permit), the facility may begin construction as allowed by SC Regulations.

4. Emissions from any new "large" emission unit shall not cause or contribute to an exceedance of any National Ambient Air Quality Standard (NAAQS) - SC Regulation 61-62.5, Std 2, Prevention of Significant Deterioration (PSD) increment - SC Regulation 61-62.5, Std 7 or Toxic Air Pollutants (TAP) - SC Regulation 61-62.5, Std 8.

5. Any applicable Title V operating permit notification and revision procedures shall be followed as specified in SC Regulation 61-62.70. Any required notification shall be submitted to the Director of Engineering Services, EPA Region IV and the Appalachia III EQC District Office.

6. After new "large" emission units are added consistent with the conditions 6.D.1 – 6.D.4, these units shall be treated as "existing emission units" covered Part 6.0.

E. In addition to the previous limitations in conditions 6.B - 6.D, BMW can undertake the addition of new emission units emitting HAPs provided that PAL emission levels are not exceeded and if the new emission unit has a potential to emit of greater than 10 TPY of a single HAP or 25 TPY of a combination of all HAPS, the facility must determine whether the unit is subject to SC Regulation 61-62.63 as a new process or production unit. If the facility is subject to SC Regulation 61-62.63, then the owner/operator shall follow the requirements of the regulation. If the facility wishes to take federally enforceable limitations, then the owner/operator must comply with the requirements of SC Regulation 61-62.1 Section II, Part H.

F. Any construction or modification not covered in conditions 6.B - 6.E will require BMW to follow existing South Carolina major and minor new source review requirements and Title V operating permit requirements.

POLLUTION PREVENTION OPPORTUNITIES
N/A

SUMMARY AND CONCLUSIONS
This facility can operate as described in compliance with all state and federal air requirements.