

NTRD Program Disclaimers

1. Disclaimer of Endorsement:

The posting herein of progress reports and final reports provided to TCEQ by its NTRD Grant Agreement recipients does not necessarily constitute or imply an endorsement, recommendation, or favoring by TCEQ or the State of Texas. The views and opinions expressed in said reports do not necessarily state or reflect those of TCEQ or the State of Texas, and shall not be used for advertising or product endorsement purposes.

2. Disclaimer of Liability:

The posting herein of progress reports and final reports provided to TCEQ by its NTRD Grant Agreement recipients does not constitute by TCEQ or the State of Texas the making of any warranty, express or implied, including the warranties of merchantability and fitness for a particular purpose, and such entities do not assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represent that its use would not infringe privately owned rights.

**Texas Commission on Environmental Quality
New Technology Research & Development (NTRD) Program
Monthly Project Status Report**

Contract Number: 592-5-70807-0004

Grantee: Baytech Corporation

Date Submitted: 17 July 2005

Report for the **Monthly** period:

Starting Date: 1 June 2005

Ending Date: 30 June 2005

Section I. Accomplishments *(Please provide a bulleted list of project accomplishments as well as a description of their importance to the project.)*

1) Baytech received U.S. Environmental Protection Agency Certificates of Conformity for Baytech's 8.1L propane, CNG and dual fuel (propane or gasoline and CNG or gasoline) engines for 2005 and 2006 Model Years. The following table summarizes the certificates:

EPA Certificates of Conformity

Baytech Engine Family (Fuel)	Certification No.	Service class	NOx test level (g/bhp-hr)	End-of-life cert level -- NMHC+NOx (g/bhp-hr)	Status
5BYTH08.1C11 (Natural Gas)	BYT-ONHWY-05-01	CA medium duty	0.23	0.3	Complete
5BYTH08.1P11 (propane)	BYT-ONHWY-05-02	CA medium duty	0.21	0.4	Complete
6BYTH08.1C13 (natural gas)	BYT-ONHWY-06-01.1	HDG1, HDG2	0.23	0.3	Complete
6BYTH08.1P13 (propane)	BYT-ONHWY-06-02.1	HDG1, HDG2	0.21	0.3	Complete
6BYTH08.1C23 (CNG or gasoline)	BYT-ONHWY-06-03	HDG1, HDG2	0.23	0.3	Complete
6BYTH08.1P23 (propane or gasoline)	BYT-ONHWY-06-04	HDG1, HDG2	0.21	0.4	Complete
6BYT08.1C12 (natural gas)	BYT-ONHWY-06-05	HDG2	0.21	0.5	Complete
6BYT08.1C22 (CNG or gasoline)	BYT-ONHWY-06-06	HDG2	0.21	0.5	Complete
6BYTH08.1P12 (propane)	BYT-ONHWY-06-07	HDG2	0.25	0.9	Complete
6BYT08.1P22 (propane or gasoline)	BYT-ONHWY-06-08	HDG2	0.25	0.9	Complete

2) Baytech has received California Air Resources Board Executive Orders for the dedicated CNG and Propane HD Otto cycle (HDO) engine families listed in Item 1) above. The right hand column indicates those Baytech engine families currently pending with CARB.

CARB Executive Orders

Baytech Engine Family (Fuel)	Executive Order No.	Service class	NOx test level (g/bhp-hr)	End-of-life cert level -- NMHC+NOx (g/bhp-hr)	Status
5BYTH08.1C11 (Natural Gas)		CA medium duty	0.23	0.3	In-process
5BYTH08.1P11 (propane)		CA medium duty	0.21	0.4	In-process
6BYTH08.1C13 (CNG)	A-330-0126	HDO	0.23	0.3	Complete
6BYTH08.1P13 (propane)	A-330-0129	HDO	0.21	0.3	Complete
6BYTH08.1C23 (CNG or gasoline)		HDO	0.23	0.3	In-process
6BYTH08.1P23 (propane or gasoline)		HDO	0.21	0.4	In-process
6BYT08.1C12 (natural gas)	A-330-0139	HDO	0.21	0.5	Complete
6BYT08.1C22 (CNG or gasoline)		HDO	0.21	0.5	In-process
6BYTH08.1P12 (propane)	A-330-0140	HDO	0.25	0.9	Complete
6BYT08.1P22 (propane or gasoline)		HDO	0.25	0.9	In-process

3) Baytech continued preliminary preparations for the 6.0L propane engine prototype development and testing. This included further definition of: required hardware for the propane MPFI system, including evaluation of a propane vapor filter; and materials required for engine dynamometer testing.

4) Baytech began 8.1L heavy duty propane and CNG engine commercialization efforts. A press release announcing that Baytech received the EPA and CARB certifications was distributed to hundreds of recipients in the propane and natural gas vehicles and fuels sectors on 21 June 2005. (A copy of the press release is attached).

Indicate which part of the Grant Activities as defined in the grant agreement, the above accomplishments are related to:

Items 1, and 2 are related to the activities in SOW Task 2 for the 8.1L propane and CNG engines.
 Item 3 is related to the activities in SOW Tasks 1 and 3 for the 6.0L propane and CNG engines.
 Item 4 is related to commercialization of the 8.1L propane and CNG heavy duty engines funded in part by this grant.

Section II: Problems/Solutions

<p>Problem(s) Identified</p> <p><i>(Please report anticipated or unanticipated problem(s) encountered and its effect on the progress of the project)</i></p>	<p>No problems are anticipated that will affect progress toward successful completion of the project.</p>
<p>Proposed Solution(s)</p> <p><i>(Please report any possible solution(s) to the problem(s) that were considered/encountered)</i></p>	

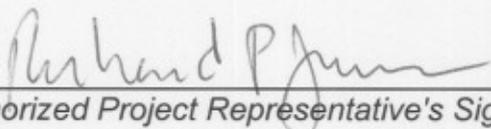
Action(s) Conducted and Results

(Please describe the action(s) taken to resolve the problem(s) and its effect)

Section III. Goals and Issues for Succeeding Period: *(Please provide a brief description of the goal(s) you hope to realize in the coming period and identify any notable challenges that can be foreseen)*

Baytech will continue to market the propane and CNG 8.1L engine as part of our commercialization efforts. Baytech has already received orders for both propane and CNG versions of the engine for shuttle buses.

Baytech currently plans to conduct the 6.0L Heavy Duty propane engine prototype evaluation and testing beginning in September 2005. This work will be conducted using a 2006 Model Year vehicle/engine. Preliminary preparations and hardware component evaluation are underway.



Authorized Project Representative's Signature

Date: 7/17/05

NOTE: *Please attach any additional information that you feel should be a part of your report or that may be required to meet the deliverable requirements for tasks completed during this reporting period.*

The following documents are attached:

- 1) A copy of Baytech's press release announcing that Baytech received EPA and CARB certifications for the 8.1L heavy duty engine is attached.
- 2) Copies of EPA Certificates of Conformity for the 8.1L dedicated propane, dedicated CNG, and dual fuel (propane or gasoline and CNG or gasoline) engines received in June 2005 are attached.
- 3) Copies of California Air Resources Board Executive Orders for the 8.1L propane and CNG received in June 2005 are attached.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

2005 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **5BYTH08.1C11**
Certificate Number: **BYT-ONHWY-05-01**
Intended Service Class: **CA MEDIUM DUTY**
Fuel Type: **NATURAL GAS**
FELs: g/bHp-hr NMHC+NOx: N/A NOx: N/A PM: N/A
Effective Date: **6/2/2005**
Date Issued: **JUN 03 2005**



Merrylin Zaw-Mon, Director
Certification and Compliance Division
Office of Transportation and Air Quality

Pursuant to Section 206 of the Clean Air Act (42 U.S.C. section 7525), 40 CFR Part 86, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which represent the following motor vehicle engines, by engine family, and is subject to the terms and conditions prescribed in those provisions.

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This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

2005 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **5BYTH08.1P11**
Certificate Number: **BYT-ONHWY-05-02**
Intended Service Class: **CA MEDIUM DUTY**
Fuel Type: **PROPANE**
FELs: **g/bHp-hr** NMHC+NOx: **N/A** NOx: **N/A** PM: **N/A**
Effective Date: **6/2/2005**
Date Issued: **JUN 03 2005**



Merrylin Zaw-Mon, Director
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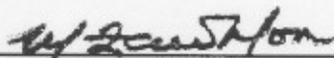
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

2006 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **6BYTH08.1C13**
Certificate Number: **BYT-ONHWY-06-01.1**
Intended Service Class: **HDG 1 (<=14K LBS), HDG 2 (>14K LBS) (CFF/ILEV)**
Fuel Type: **NATURAL GAS**
FELs: **g/bHp-hr** NMHC+NOx: N/A NOx: N/A PM: N/A
Effective Date: **5/26/2005**
Date Issued: **JUN 03 2005**



Merrylyn Zaw-Mon, Director
Certification and Compliance Division
Office of Transportation and Air Quality

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

2006 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **6BYTH08.1P13**
Certificate Number: **BYT-ONHWY-06-02.1**
Intended Service Class: **HDG 1 (<=14K LBS), HDG 2 (>14K LBS) (CFF/ILEV)**
Fuel Type: **PROPANE**
FELs: **g/bHp-hr** NMHC+NOx: **N/A** NOx: **N/A** PM: **N/A**
Effective Date: **5/26/2005**
Date Issued: **JUN 03 2005**


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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

2006 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **6BYTH08.1C23**
Certificate Number: **BYT-ONHWY-06-03**
Intended Service Class: **HDG 1 (<=14K LBS), HDG 2 (>14K LBS) (CFF/ULEV)**
Fuel Type: **DUAL-FUEL 1(CNG OR GASOLINE)**
FELs: g/bHp-hr **NMHC+NOx: N/A NOx: N/A PM: N/A**
Effective Date: **5/31/2005**
Date Issued: **JUN 03 2005**


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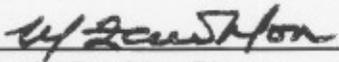
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WASHINGTON, DC 20460

2006 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **6BYTH08.1P23**
Certificate Number: **BYT-ONHWY-06-04**
Intended Service Class: **HDG 1 (<=14K LBS), HDG 2 (>14K LBS) (CFF/ULEV)**
Fuel Type: **DUAL-FUEL 3(PROPANE OR GASOLINE)**
FELs: g/bHp-hr **NMHC+NOx: N/A NOx: N/A PM: N/A**
Effective Date: **6/1/2005**
Date Issued: **JUN 03 2005**


Merrylin Zaw-Mon, Director
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Office of Transportation and Air Quality

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WASHINGTON, DC 20460

2006 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **6BYTH08.1C12**
Certificate Number: **BYT-ONHWY-06-O5**
Intended Service Class: **HDG 2 (>14K LBS) (CFF/ILEV)**
Fuel Type: **NATURAL GAS**
FELs: **g/bHp-hr** NMHC+NOx: **N/A** NOx: **N/A** PM: **N/A**
Effective Date: **6/1/2005**
Date Issued: **JUN 03 2005**



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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

2006 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **6BYTH08.1C22**
Certificate Number: **BYT-ONHWY-06-06**
Intended Service Class: **HDG 2 (>14K LBS) (CFE/ULEV)**
Fuel Type: **DUAL-FUEL 1(CNG OR GASOLINE)**
FELs: g/bHp-hr NMHC+NOx: N/A NOx: N/A PM: N/A
Effective Date: **6/1/2005**
Date Issued: **JUN 03 2005**


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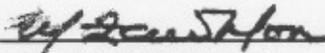
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

2006 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **6BYTH08.1P12**
Certificate Number: **BYT-ONHWY-06-07**
Intended Service Class: **HDG 2 (>14K LBS) (CFF/ILEV)**
Fuel Type: **PROPANE**
FELs: **g/bHp-hr** NMHC+NOx: **N/A** NOx: **N/A** PM: **N/A**
Effective Date: **6/2/2005**
Date Issued: **JUN 03 2005**


Merrylin Zaw-Mon, Director
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WASHINGTON, DC 20460

2006 Model Year Certificate of Conformity

Manufacturer: **BAYTECH CORPORATION**
Engine Family: **6BYTH08.1P22**
Certificate Number: **BYT-ONHWY-06-08**
Intended Service Class: **HDG 2 (>14K LBS) (CFF/ULEV)**
Fuel Type: **DUAL-FUEL 3(PROPANE OR GASOLINE)**
FELs: g/bHp-hr **NMHC+NOx: N/A NOx: N/A PM: N/A**
Effective Date: **6/2/2005**
Date Issued: **JUN 03 2005**



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 AIR RESOURCES BOARD	BAYTECH CORPORATION	EXECUTIVE ORDER A-330-0126 New On-Road Heavy-Duty Engines
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Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE ¹	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS ²	ECS & SPECIAL FEATURES ³
				Otto	HDO	
2006	6BYTH08.1C13	8.1	CNG	Otto	HDO	2TWC, 2HO2S, SFI
ENGINE (L)		ENGINE MODELS / CODES (rated power, in hp)				
8.1		L18 / 10 (195), 20 (283), 30 (283)				
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¹ =not applicable; GVWR=gross vehicle weight rating; 13 CCR xyz=Title 13, California Code of Regulations, Section xyz; 40 CFR 85.abc=Title 40, Code of Federal Regulations, Section 85.abc; L=liter; hp=horsepower; kw=kilowatt;
² CNG/LNG=compressed/liquefied natural gas; LPG=liquefied petroleum gas; E85=85% ethanol fuel; MF=multi fuel a.k.a. BF=bi fuel; DF=dual fuel; FF=flexible fuel;
³ L/M/H HDO=light/medium/heavy duty diesel; UB=urban bus; HDO=heavy duty Otto;
 ECS=emission control system; TWC=three-way/two-way catalyst; WU (prefix) =warm-up catalyst; DPF=diesel particulate filter; HO2S/O2S=heated/oxygen sensor; HAFS/AFS=heated/air-fuel-ratio sensor (a.k.a., universal or line air oxygen sensor); TBI=in-rail body fuel injection; SPI/MFI=sequential/multi port fuel injection; DI=direct gasoline injection; GCARB=gaseous carburetor; IDI/DDI=indirect/direct diesel injection; TC=Turbocharger; CAC=charge air cooler; EGR=exhaust gas recirculation; PAIR/AIR=pulsed/secondary air injection; SPL=smoke puff limiter; ECM/PCM=engine/powertrain control module; EM=engine modification; 2 (prefix)=parallel; (2) (suffix)=in series; (2004may26)

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.1 (urban bus) or 13 CCR 1956.8 (other than urban bus); 2) the EURO and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, in g/bhp-hr, for this engine family. "Diesel" CO, EURO and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.1 or 13 CCR 1956.8 are in parentheses.)

	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
STD	*	*	*	*	1.0	*	37.1	*	*	*	*	*
FEL	*	*	*	*	*	*	*	*	*	*	*	*
CERT	*	*	*	*	0.3	*	2.1	*	*	*	*	*
NTE	*	*	*	*	*	*	*	*	*	*	*	*

⁴ g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; EURO=Euro III European Steady-State Cycle; NTE=Not-to-Exceed; STD=standard or emission test cap; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methane/hydrocarbon; NOx=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde;

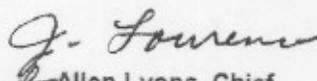
BE IT FURTHER RESOLVED: Certification to the FEL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels) and 13 CCR 2035 et seq. (emission control warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 10th day of June 2005.


 Allen Lyons, Chief
 Mobile Source Operations Division

 AIR RESOURCES BOARD	BAYTECH CORPORATION	EXECUTIVE ORDER A-330-0129 New On-Road Heavy-Duty Engines
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Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE ¹		STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS ²	ECS & SPECIAL FEATURES ³
			LPG		Otto	HDO	
2006	8BYTH08.1P13	8.1	LPG		Otto	HDO	2TWC, 2HO2S, SFI
ENGINE (L)			ENGINE MODELS / CODES (rated power, in hp)				
8.1			L18 / 10 (225), 20 (332), 30 (332)				
.			.				
.			.				
.			.				

¹ not applicable; GVWR=gross vehicle weight ratings; 13 CCR xyz=Title 13, California Code of Regulations, Section xyz; 40 CFR 86,abc=Title 40, Code of Federal Regulations, Section 86,abc; L=filter; hp=horsepower; kw=kilowatt;
² CNG/LNG=compressed/liquefied natural gas; LPG=liquefied petroleum gas; E85=85% ethanol fuel; MF=multi fuel a.k.a. BF=bi fuel; DF=dual fuel; FF=flexible fuel;
³ L/M/H HDO=light/medium/heavy heavy-duty diesel; UB=urban bus; HDO=heavy duty Otto;
 ECS=emission control system; TWC/OC=three-way/oxidizing catalyst; WU (prefix) =warm-up catalyst; DPP=diesel particulate filter; HO2S/O2S=heated/oxygen sensor; HAPS/AFS=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); TBI=throttle body fuel injection; SFI/MPFI=sequential/multi port fuel injection; DGI=direct gasoline injection; GCARB=gaseous carburetor; IDI/DDI=indirect/direct diesel injection; TC/SC=turbo/super charger; CAC=charge air cooler; EGR=exhaust gas recirculation; PAIR/AIR=pulsed/secondary air injection; SPL=smoke puff limiter; ECM/PCM=engine/powertrain control module; EM=engine modification; 2 (prefix)=parallel; (2) (suffix)=in series; (2004may26)

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.1 (urban bus) or 13 CCR 1956.8 (other than urban bus); 2) the EURO and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, in g/bhp-hr, for this engine family. "Diesel" CO, EURO and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.1 or 13 CCR 1956.8 are in parentheses.)⁴

	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
STD	*	*	*	*	1.0	*	37.1	*	*	*	*	*
FEL	*	*	*	*	*	*	*	*	*	*	*	*
CERT	*	*	*	*	0.4	*	4.1	*	*	*	*	*
NTE	*	*	*	*	*	*	*	*	*	*	*	*

⁴ g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; EURO=Euro III European Steady-State Cycle; NTE=Not-to-Exceed; STD=standard or emission test cap; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methane/hydrocarbon; NOx=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde;

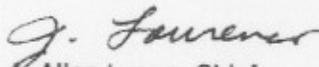
BE IT FURTHER RESOLVED: Certification to the FEL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels) and 13 CCR 2035 et seq. (emission control warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 10th day of June 2005.


 Allen Lyons, Chief
 Mobile Source Operations Division



Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE ¹		STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS ²	ECS & SPECIAL FEATURES ³
2006	6BYTH08.1C12	8.1	CNG		Otto	HDO	2TWC, 2HO2S, SFI
ENGINE (L)		ENGINE MODELS / CODES (rated power, in hp)					
8.1		L18 / 10 (195), L18 / 20 (256)					
.		.					
.		.					
.		.					

¹ =not applicable; GVWR=gross vehicle weight rating; 13 CCR xyz=Title 13, California Code of Regulations, Section xyz; 40 CFR 86.abc=Title 40, Code of Federal Regulations, Section 86.abc; L=liter; hp=horsepower; kw=kilowatt;

² CNG/LNG=compressed/liquefied natural gas; LPG=liquefied petroleum gas; E85=85% ethanol fuel; MF=multi fuel a.k.a. BF=bi fuel; DF=dual fuel; FF=flexible fuel;

³ L/MH HDD=light/medium/heavy heavy-duty diesel; UB=urban bus; HDO=heavy duty Otto;

⁴ ECS=emission control system; TWC/OC=three-way/oxidizing catalyst; WU (prefix)=warm-up catalyst; DPF=diesel particulate filter; HO2S/O2S=heated/oxygen sensor; HAFS/AFS=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); TBI=throttle body fuel injection; SFI/MFI=sequential/multi port fuel injection; DGI=direct gasoline injection; GCARB=gaseous carburetor; ID/DDI=indirect/direct diesel injection; TC/SC=turbo/super charger; CAC=charge air cooler; EGR=exhaust gas recirculation; PAIR/AIR=pulsed/secondary air injection; SPL=smoke puff limiter; ECM/PCM=engine/powertrain control module; EM=engine modification; 2 (prefix)=parallel; (2) (suffix)=in series; (2004may26)

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.1 (urban bus) or 13 CCR 1956.8 (other than urban bus); 2) the EURO and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, in g/bhp-hr, for this engine family. "Diesel" CO, EURO and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.1 or 13 CCR 1956.8 are in parentheses.)⁴

	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
STD	*	*	*	*	1.0	*	37.1	*	*	*	*	*
FEL	*	*	*	*	*	*	*	*	*	*	*	*
CERT	*	*	*	*	0.5	*	5.4	*	*	*	*	*
NTE	*	*	*	*	*	*	*	*	*	*	*	*

⁴ g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; EURO=Euro III European Steady-State Cycle; NTE=Not-to-Exceed; STD=standard or emission test cap; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methane/hydrocarbon; NOx=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde;

BE IT FURTHER RESOLVED: Certification to the FEL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels) and 13 CCR 2035 et seq. (emission control warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 23RD day of June 2005.


Allen Lyons, Chief

Mobile Source Operations Division



Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE ¹		STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS ²	ECS & SPECIAL FEATURES ³
2008	6BYTH08.1P12	8.1	LPG		Otto	HDO	2TWC, 2HO2S, SFI
ENGINE (L)		ENGINE MODELS / CODES (rated power, in hp)					
8.1		L18 / 10 (225), L18 / 20 (279)					
.		.					
.		.					
.		.					

¹ =not applicable; GVWR=gross vehicle weight rating; 13 CCR xyz=Title 13, California Code of Regulations, Section xyz; 40 CFR 86.abc=Title 40, Code of Federal Regulations, Section 86.abc; L=liter; hp=horsepower; kw=kilowatt;
² CNG/LNG=compressed/liquefied natural gas; LPG=liquefied petroleum gas; E85=85% ethanol fuel; MF=multi fuel a.k.a. BF=bi fuel; DF=dual fuel; FF=flexible fuel;
³ L/M/H HDO=light/medium/heavy heavy-duty diesel; UB=urban bus; HDO=heavy duty Otto;
ECS=emission control system; TWC/O2C=three-way/oxidizing catalyst; WU (prefix) =warm-up catalyst; DPF=diesel particulate filter; HO2S/O2S=heated/oxygen sensor; HAFS/AFS=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); TBI=throttle body fuel injection; SFI/MFI=sequential/multi port fuel injection; DGI=direct gasoline injection; GCARB=gaseous carburetor; ID/DDI=indirect/direct diesel injection; TC/SC=turbo/super charger; CAC=charge air cooler; EGR=exhaust gas recirculation; PAIR/AIR=pulsed/secondary air injection; SPL=smoke puff limiter; ECM/PCM=engine/powertrain control module; EM=engine modification; 2 (prefix)=parallel; (2) (suffix)=in series; (2004may26)

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	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
STD	*	*	*	*	1.0	*	37.1	*	*	*	*	*
FEL	*	*	*	*	*	*	*	*	*	*	*	*
CERT	*	*	*	*	0.9	*	8.7	*	*	*	*	*
NTE	*	*	*	*	*	*	*	*	*	*	*	*

⁴ g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; EURO=Euro III European Steady-State Cycle; NTE=Not-to-Exceed; STD=standard or emission test cap; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methane/hydrocarbon; NOx=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde;

BE IT FURTHER RESOLVED: Certification to the FEL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

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Executed at El Monte, California on this 23RD day of June 2005.

Allen Lyons, Chief
Mobile Source Operations Division