ATTACHMENT III

State of California
California Environmental Protection Agency
AIR RESOURCES BOARD

Procedures for Using the California Model for California Reformulated Gasoline Blendstocks for Oxygenate Blending (CARBOB)

Adopted:

Note: This is a new document proposed for adoption. The originally proposed text is shown in normal type. Proposed modifications are shown in underline to indicate additions and ~~strikeout~~ to show deletions. Only the portion being modified is shown. Commentaries explaining the rationale for the modifications are shown in bracketed italics; they are not part of the proposed Procedures document.

15-Day Notice Version, released 3/30/01
Supplemental Comment Deadline: 4/16/01
Board Hearing: 11/16/00

* * * *

4. DETAILED APPLICATION OF THE CARBOB MODEL EQUATIONS

This section will provide a step-by-step explanation of the how the CARBOB model equations are used and how the outputs from the CARBOB model are input into the Predictive Model equations.

The first step in the process is for the user to decide if he is interested in using the evaporative emissions model element of the Phase 3 predictive model (If he is complying with the Phase 3 regulations). If the Phase 2 regulations are applicable, this step is not applicable because there is no evaporative emissions element associated with the Phase 2 predictive model. The user generally will not be interested in using the evaporative emissions model element of the Phase 3 predictive model if he is interested in complying with a flat 7.0 psi RVP limit instead of a limit less than 6.9 psi, or greater than 7.0 psi.

The next step in the use of the CARBOB model is for the user to specify the properties of the ethanol that is to blended into the CARBOB. The ethanol properties to be specified are: 1) the aromatic content (vol.%), 2) the olefin content (vol.%), 3) the sulfur content (wt. ppm), and 4) the benzene content (vol.%). If the user does not specify values for the ethanol properties, the CARBOB model uses default property values. The default property values are shown in Table 1 below. If the user specifies values for the ethanol properties, they are to be specified to the same number of decimal places as is shown for the default properties.

Table 1
Default Ethanol Properties Values Used in the CARBOB Model

Property	Default Property
Aromatic content	1.7 vol.%
Olefin content	0.5 vol.%
Sulfur content	10 ppmw
Benzene content	0.06 vol.%

After the user specifies the ethanol properties (or elects to use the default ethanol property values), he specifies the values of the properties of the CARBOB and the ethanol content (including the denaturant) of the finished gasoline. The values of the CARBOB properties and ethanol content are specified to the number of decimal places shown in Table 2.

Table 2
Fuel Properties Specified in CARBOB Model

Fuel Property	Units	Decimal Places
Reid vapor pressure (RVP)	psi, max.	0.01
T50 Distillation Temperature (T50)	deg. F, max.	1.0
T90 Distillation Temperature (T90)	deg. F, max.	1.0
Aromatics Content	vol.%, max.	0.1
Olefin Content	vol.%, max.	0.1
Ethanol Content	vol.%, max.	0.1
Sulfur Content	ppmw, max.	1.0
Benzene Content	vol.%, max.	0.01

The user then uses the CARBOB model equations shown in Section 3 above and the values for each CARBOB property, ethanol property, and the ethanol content of the finished gasoline, to compute, for each property for which there is a CARBOB model, the corresponding property for the finished gasoline. The value for each property of the finished gasoline is then input into either the Phase 2 or Phase 3 predictive model as the predictive model candidate gasoline. The use of the Phase 2 or Phase 3 predictive model is dictated by which regulations are in effect or applicable to the user at the time. The applicable Predictive Model then evaluates the emissions equivalency of the predictive model candidate gasoline in accordance with the process described in the Phase 2 and Phase 3 Predictive Model Procedures.

If the user intends to produce gasoline in which at least one property will comply with the predictive model averaging compliance option, and the user is establishing a DAL for the CARBOB in accordance with section 2266.5(a)(5)(B), the CARBOB model must be used to calculate the designated alternative limit (DAL) for the final blend of oxygenated gasoline.

For the gasoline aromatic content, olefin content, benzene content, and sulfur content, the DAL for the final blend of oxygenated gasoline is calculated directly from the CARBOB models for these properties by inputting into the CARBOB models for these properties the DAL for the CARBOB. The CARBOB model prediction is the DAL for the final blend of oxygenated gasoline.

The methodology described above is also used in calculating the T50 and T90 DALs for final blends of oxygenated gasoline, with one exception. This exception occurs if a producer is producing gasoline in which the T50 will comply with a predictive model flat limit and the T90 will comply with a predictive model averaging limit, or the T50 will comply with a predictive model averaging limit and the T90 will comply with a predictive model flat limit. In these cases, the DAL for the final blend of oxygenated gasoline is calculated by inputting into the CARBOB model the value of the CARBOB DAL for the property (either T50 or T90) which is being produced to the predictive model averaging limit, and inputting into the CARBOB model the flat limit of the CARBOB property (T50 or T90) that is being produced to the predictive model flat limit. The

CARBOB model prediction is the DAL for the final blend of oxygenated gasoline for the property being produced under the predictive model averaging compliance option.

> *[**Commentary**: These modifications parallel the language being added in section 2266.5(a)(5). They are necessary to address how DALs are assigned for the CARBOB determined for the final oxygenated CaRFG blend.]*

A minimum RVP requirement for CARBOB would be in effect during the non-RVP control period (i.e., the time in which the RVP limits specified in Section 2262 are not in effect). The purpose of this "wintertime" RVP specification is different from the purpose of the summertime RVP requirement for CARBOB or final blend of oxygenated gasoline. The purpose of the non-RVP control period minimum RVP requirement is to ensure that the T50 of a final blend of oxygenated gasoline is not greater than the value predicted by the CARBOB model. The minimum RVP requirement for the non-RVP control period arises as a consequence of the RVP term in the T50 CARBOB model. The T50 CARBOB model predicts that the T50 of a final blend of oxygenated gasoline decreases as the RVP of the CARBOB increases. Thus, while there are no basic flat or average RVP limits for CARBOB or gasoline that is not subject to the maximum RVP standards in section 2262, it is still necessary to specify the RVP of the CARBOB during the non-RVP control period in order to make a prediction for the T50 of the final blend of oxygenated gasoline. The RVP value that is used in making this prediction becomes a minimum allowable RVP for the particular blend of CARBOB during the non-RVP control period. That is, during the non-RVP control period, the CARBOB produced by the refiner is required to have an RVP greater than or equal to the value used in the T50 CARBOB model. This ensures that the final blend of oxygenated gasoline has a T50 less than or equal to that predicted by the T50 CARBOB model.

> ***[Commentary**: This additional language makes clear that, when the CARBOB model is being used during the period in which the RVP standards in section 2262 are not in effect, the CARBOB is subject to a minimum RVP requirement to ensure that the T50 of a final blend of finished gasoline is not greater than the value predicted by the CARBOB model. This clarifies and validates WSPA's understanding of how RVP would be treated in the T50 CARBOB model during the non-RVP control period. It does not change the actual operation of the model.]*

Shown in Table 3 on the next page is a worksheet which includes a step-by-step process to illustrate the use of the CARBOB procedures and to assist the user in using the CARBOB model. The worksheet in Table 3 assumes that the user is complying with the Phase 3 regulations, but the same process would be used if the user were complying with the Phase 2 regulations. Only Step 5 in the process shown in Table 3 would be different if the user were complying with the Phase 2 gasoline regulations. In that case, the user would compare his predictive model candidate gasoline to the applicable Phase 2 limits instead of the Phase 3 limits.

* * * *