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STUDY OF OXYGEN GAS PRODUCTION PHENOMENON DURING STAND AND DISCHARGE IN SILVER-ZINC BATTERIES

FINAL REPORT

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EAGLE-PICHER INDUSTRIES, INC.

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STUDY OF OXYGEN GAS PRODUCTION PHENOMENON

DURING STAND AND DISCHARGE IN

SILVER-ZINC BATTERIES

FINAL REPORT

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EAGLE-PICHER INDUSTRIES, INC.
Electronics Division
Couples Department
Joplin, Missouri

1.0 INTRODUCTION

In order to establish the effects of a number of cell process and performance variables upon the oxygen evolution rate of silver/silver oxide cathode, the subject contract was initiated. The goal has been to establish by prediction and measurement the conditions which would result in the production of a minimum of oxygen.

Realizing that such a study would be evolutionary in nature, five (5) tasks were designated as follows:

Task I

(a) Design and fabrication of two pilot test cells to be used for electrode testing, measurement of gas volume and rate generated and sampling of the gas for analysis.

(b) Assembly of constant temperature equipment.

Task II

(a) Determination of the sensitivity and accuracy of the test cell using sheet nickel test electrodes by varying the currents to generate gas at known rates.

(b) Fabrication of additional cells of the final design.

Task III

Determination of total volumes and rates of generation by cathodes of standard production procedures under the following test condtions:

(a) During at least 14 days activated stand period at 90°F, followed by discharge rate of C/40 (10 amp for full cell or 1 amp/plate).

(b) Discharge at C/40 following standard "soak" period at 90°F.

Task IV

Set up a sequential test plan to determine the effect of the following factors on production positives (after production drying as applied to dry stand of these positives).

	Factors	Levels
(a)	Temperature	90°F, 140°F
(b)	Vacuum	Atmospheric pressure, 0.5 psia
(c)	Time	10 days
(d)	Flush with He at 140°F for one hour followed by N_2 cooling to R.T.	w/o treatment, w/treatment

Task V

Set up a series of positive formation cells in which formation process factors can be controlled. Set up sequential test plans to determine the effects of factors associated with the formation of the positive plate and the effect on gas quantity and evolution rate.

Discussion and data in this report is presented sequentially according to task number.

1.1 EXPERIMENTAL DESIGN AND DATA ANALYSIS PROCEDURE

This section will be devoted to a general treatment of the basis for the design for the various runs after the completion of those that were part of Tasks I, II and III. These initial tasks consisted of runs that were replicated as closely as possible. With the beginning of Task IV and V, the problem was the determination of the effect of variables on the performance of the positive plates. It was anticipated that Task V would ultimately estimate the effect of up to about twenty (20) variables while Task IV was much less (8 variables). The number of determinations (plate runs) to evaluate all main variable effects and all interactions without any replicates with each variable at two levels (-,+) is 2^N where N is the number of variables. It is evident that a means of reducing the number of runs and still permit the evaluation of important effects is required. The approach to be outlined herein is a result of several years development from a study of O. L. Davies, "Design and Analysis of Industrial Experiments"; N. R. Draper and H. Smith, "Applied Regression Analysis"; much assistance from Dr. Leroy Folks, Department of Statistics, Oklahoma State University, Stillwater, Oklahoma; Statistics Department, Sandia Corporation, Albuquerque, New Mexico and many others.

Some nomenclature and procedures are used that may require definitions. A type of variable used consists of two levels. These levels are a comparison of conditions comprising the variable such as temperature with one level at 140°F versus another level at 100°F or a stand time variable with one level being no stand time and the other a two week stand time. The two levels can then be designated as + or +1 for one of the levels and -, -1 or 0 for the other level. Also used is lower case alphabetic (a,b,etc.) for one level and a blank for the other level. A balanced (equal number of + and -) full factorial single replicated design will include all possible combinations of the two level variables.

Two methods of representing this design for three (3) variables (factors) are shown in Figures 1.1-1 and 1.1-2. Each box in the first figure and each row in the second figure represent corresponding trial combinations. The symbol "(1)" means that all levels are at the minus, i.e. -1,-1,-1. Each column in the second arrangement corresponds to each individual variable. Each box in Figure 1.1-1 and each row in Figure 1.1-2 would have a numerical response value from which the effect of these variables and their interactions can be estimated. In general, the number of trials for a full factorial is 2^N where N is the number of variables. For a full factorial, each variable and appropriate interaction (AB,AC,BC and ABC) corresponds to a column and its designation follows the row order as shown in the second figure arrangement. The columns designated A, B, AB, etc. are used in the estimation or calculation of the effect of each. The sign designation of the levels of the 3 variables, A, B, and C are determined, by convention, by the first column ((1), a, b, ab, etc.). For example the designation "a" sets the level of variable A at the + level while variables B and C are at the - level. The signs under each interaction column are then fully defined by the variable levels since if variables A and B are both at the - level then the interaction must be at the + level. An additional column, not shown, is understood as being available: the response for each trial ((1),a,b,etc.). Each then may be thought of as a vector in a matrix. The correlation coefficient between these columns or vectors is important. The correlation coefficient, R, is calculated for the A and B vectors by: (Σ = sum)

$$R(AB) = \left[\frac{\Sigma(AB) - (\Sigma A)(\Sigma B)/N}{(\Sigma(A^2) - (\Sigma A)(\Sigma A)/N)\ (\Sigma(B^2) - (\Sigma B)(\Sigma B)/N)}\right]^{1/2}$$

An attribute of a full factorial is that all correlation coefficients between all variables and all interactions are equal to zero. The matrix A to ABC or in any size problem, the matrix without the response is termed the X matrix (controlled or independent variable matrix) since these variables are or should be subject to independent control. The

response is termed the dependent variable vector or Y vector. This "plus and minus" variable, although it may be quantitative in nature is really qualitative since it can be used to describe and evaluate, say two types of raw materias in a process (one type = +, the other -). This variable can be considered quantitative with the assumption that the change from the plus level to the minus level will be linear.

A true quantitative variable may be entered into the matrix by using the actual numerical value used in each test as an additional X or independent vector. In order to code this variable so its range will be -1 to +1, computer routines can be called to determine the maximum value and the minimum value, assign a +1 and -1 to these and prorate all values between these two extremes. The vector thus will contain values comparable to the rest of the X matrix but will have the same distribution as the original values. Several advantages come from coding such as the magnitude of the numbers are about the same over the matrix, and predicting responses can be simplier since the range of all the vectors are the same (+1 to -1).

A modification of the qualitative (+,-) variable is termed "Dummy Variable" by Draper and Smith, "Applied Regression Analysis", p. 140, et seq. This type has been utilized in the analysis. Dummy variables may be used to compare more than two qualitative variables by multiple regression, to be discussed shortly. Figure 1.1-3 illustrates the structure of the Dummy variable vectors. Dummy Variable No. 1 compares Qualitative variable condition A with B while Variable 2 compares condition A with C. Thus, if both B and C are compared with A, then B can be compared with C. Thus (N-1) dummy variables can define N qualitative variables. It is obvious that these can not be used in a balanced factorial design since these can not be used in interactions with each other but can interact with other variables.

If the trials could be always designed to follow a full balanced factorial the interpretation would be simple. It may be seen from Figure 1.1-2 that the sum of the corresponding responses for negative and positive within each vector automatically result in cancelling of all other vector effects. So to evaluate the effect (- to +), each is found by obtaining the following difference in mean response:

		Resp. for:		Resp. for:
Eff. of A	=	(a+ab+ac+abc)/4	-	((1)+b+c+bc)/4
Eff. of B	=	(b+ab+bc+abc)/4	-	((1)+a+c+ac)/4
Eff. of C	=	(c+ac+bc+abc)/4	-	((1)+a+b+ab)/4

Other procedures for estimating the variable effects for a full factorial design are a Yates and multiple regression analyses. Yates analysis (O. L. Davies, "Design and Analysis of Industrial Experiments") is limited to balanced design but multiple regression is not so limited and is the method used in this work. Each trial may be represented as a linear equation:

$$b_{11} \text{ Var } 1 + b_{12} \text{ Var } 2 + b_{13} \text{ Var } 3 \text{----------} = Y_1$$

$$b_{21} \text{ Var1} + b_{22} \text{ Var } 2 + b_{23} \text{Var } 3 \text{----------} = Y_2$$

By solving these equations for the coefficients, by the least square calculation a general regression equation may be determined:

$$K + a_I \text{ Var } 1 + a_2 \text{ Var } 2 + a_3 \text{ Var } 3 \text{ ----------} = \hat{y}$$

Where $\hat{y}$ is the predicted response from the regression equation determined. The least square analysis determines the constant and coefficients so that sum of the residuals squared is a minimum. A residual is the difference between the observed response (y) and the predicted response $(\hat{y})$ for an

observation. To illustrate the analysis for a full and fractional factorial with built up responses so the actual can be readily compared with that determined by regression, refer to Figure 1.1-4 and Figure 1.1-5. It should be noted that a close parallel exists between observing if a causative variable creates a "trend" in the response and using regression for analysis. A good "trend", as shown graphically between a causative variable and a response, would be revealed by the regression when the model "predicts" the original data values closely, i.e., the residuals would be relatively small and the SSQ for error as well. Thus, if there were no error and only one causative variable, the graphed curve would fit the points precisely and the regression model would show a "zero" residual SSQ (error). The total SSQ obtained from the responses is thus allocated completely to the one causative X variable. If the causative variable had not caused the response to change over its range and assuming no error, the SSQ would also have been zero and of course the residual SSQ would like-wise be zero. Carrying this line of reasoning on to more than one causative variable and interactions between these, is the job of multiple regression. Graphing the effects is out of the question. Solving the equations defining the design (Y_1, Y_2, etc.) above allocates the SSQ to each variable's (vector) coefficient in the model and the "unaccounted" is left as residual SSQ (error). Obviously, any variable not included in the model will have its SSQ left in the "error" SSQ value. Therefore, the analysis consists of selecting as large a model as possible with the number of variable coefficients less than (N-1), where N is the number of trials. The two computer programs for multiple regression used here "throw-out" variables or vectors which closely correlate other independent variables, and when the amount of SSQ's allocated to a variable is sufficiently small as compared to the residual SSQ. When the number of potential vectors are larger than the program can accomodate, making a preliminary set of

correlation coefficients can often show some high (near 1. or -1.) values and these can be dropped. The use of correlation coefficients will also identify "confounded" vectors in a "partial" factorial design. If a variable is included or added to a design based on full factorial in place of an interaction, this new variable and the interaction will be confounded. By "adding" is meant that each level (+ or -) assigned to the interaction is used for the new variable. The "effect" will obviously be the sum of the original interaction effect plus that due to the added (confounded) variable. Confounding is the price paid for reducing the number of tests.

In the actual analysis of real data, a type of internal coding of the X or controlled variable matrix is used to create the +1 to -1 range. If the variable is quantitative, say, as sintered weight of the plate, the maximum and minimum values are found which will ultimately be used to code each term from +1 (max.) to -1 (min.). This was discussed on page 5. For variables already assigned +1 and -1 (qualitative or 2 level quantitative variables), before the maximum - minimum coding is applied, 2. is added to each so the range is 1 to 3 corresponding to +1 and -1. Next, all interactions are formed by taking the corresponding product for each pair desired. The maximum-minimum coding is then applied to each vector (variables and interactions) so the entire X matrix has each coded to +1 and -1 and the interaction products obey the sign convention (-1x-1=+1, -1 x +1 = -1, +1 x +1 = +1). by using the maximum-minimum coding after the quantizing adjustment (adding 2) above, the product of the two minimum levels results in a -1 code in the interaction and two maximum levels results in a +1 interaction level. It is thus possible to evaluate the interactive direction and effect from the regression coefficient. The effect observed by taking the mean of the factorial predictions is the same regards of the type of coding that is used.

To illustrate the coding and the proficiency of analysing data by multiple regression, several "cases" have been built up before hand using

various criteria. Figures No. 1.1-4 through -7 show the ability of the regular regression program to analyse data and predict under various conditions. These show the buildup of the responses and the actual solution by multiple regression.

To translate the above to what was done in the actual tests, the initial set in TaskV used a fractional factorial design with 16 trials with five qualitative (-1,+1) variables and two quantitative plate variables. Additional variables were sequentially added by testing another set of 16 plates controlled at some, as yet, untested variable level(-1 or +1) with a duplication of the original five + two variable design superimposed. The opposing level of the new variable was always that used in the preceding formations. The original five + two variables were not always duplicated; however, the entries in the matrix were made to correspond to the actual experimental conditions. Also, the two quantitative variables were recomputed to evaluate per cent pick-up(oxygen) rather than oxygen weight. Also, the per cent pick-up was treated as a dependent variable, disregarding the gas volumes, versus the X matrix; obviously without per cent pick-up. If a plate was lost inadvertently, no attempt was made to replace the test since it was thought that sufficient conditions were covered to evaluate the effect. Multiple regression analysis is deemed to be the indicated procedure for data analysis.

1.2 OXYGEN LIBERATION MECHANISMS

A theoretical discussion of possible mechanisms whereby the oxygen gassing rate may be influenced should prove pertinent to the interpretation of the data obtained. Table 1.2-1 is a listing of most probable or most often mentioned mechanisms and reactions that are involved in production or steps leading to production of oxygen gas. Table 1.2-2 is a listing of pertinent available thermodynamic values. The data analysis discussions will allude to which mechanisms might be most likely to be operative under the give circumstances.

The general classes of mechanisms are:

1. Spontaneous decomposition, particulary of the higher oxides, of stoichiometric or non-stoichiometric compounds present in the plate whether as a principal component or as an impurity. The oxygen should be present as a chemically bound species before appearing as a free gas. Reactions listed appling in this case, would be of the type of reaction numbers 1, 8, 10, 13, 14 and 15. The most probable of these are the AgO compounds (8 and 10). The actual presence of Ag_2O_3 (13, 14 and 15) as a discrete compound is suspect.
2. Oxygen that is adsorbed on the surface of the active material would be displaced or dissolved by electrolyte. Oxygen trapped in the oxide layer or crystal lattice would be released on discharge when the active material trapping it, is altered. This oxygen is chemical unbound and is present due to structural restraint and Von der Waal forces.

Other than the obvious release of the gas through electrolyte or discharge, this oxygen could play a partial role in retardation of the spontaneous decomposition rate by presenting, in effect, an oxygen partial pressure greater than that otherwise expected.

3. Solubility of silver oxide compounds in the potassium hydroxide electroltye may produce species capable of reaction or decomposition in solution. Reaction Numbers 2, 3, 4, 5, 6, 7, 11, 12 and 16 are representative of this phase.

   The solubility products produced from any source of silver oxides has been indicated, by other researchers, as being equivalent or nearly so to that for the Ag_2O species alone. The solubility has been indicated as increasing with increasing concentration of potassium hydroxide.

   A decomposition by the effect of light for the solvated silver oxides has also been found.

4. Electrochemical reactions, including the presence of voltage in excess of the oxygen overpotential, can result in the formation of oxygen gas. A distinction is made between "electrochemical" and "chemical" reactions. Electrochemical reaction takes place when cathode and anode sites are distinguished with a free (metallic conduction) transfer of electrons between these along with ionic transfer through an electrolyte. An internal electrochemical reaction, of the type of reaction Number 9, could occur in the positive plate with AgO acting as the cathode andunformed Ag as the anode.

5. Reactions that would be likely only during discharge would be represented by reaction Numbers 5, 6, and 7. The oxygen ions represented would have a very low probability of existence under ordinary conditions. Under discharge some form of ionic oxygen transport is necessary and the probability of a reaction of this type is greatly enhanced.

B

2.0 FACTUAL DATA AND DISCUSSION

2.1 & 2.2 Task I ended with the construction of test cells which allowed for the collection of gas in a calibrated cylinder by displacement of liquid. Three (3) series of runs were made using nickel sheet electrodes which could be caused to generate gas by electrolysis of water in the electrolyte at known rates. The oxygen equivalent was calculated to be 4.02 ml per ampere-minute corrected for local laboratory conditions (26°C and .963 atm).

Calibration data was taken at two rates, .050 amps and .0015 amps. These rates are equivalent to 12.04 ml/hour and 0.378 ml/hour respectively. The volume calibration factor for the collection tube was found to be .323 ml per cm of length. Data for high rate (0.05 amps) for 15 minute time periods were found to be as follows:

Sequence	ml/hour
1	9.69
2	9.82
3	10.85
4	10.47
5	8.59
6	9.04

mean = 9.743 ml/hour

Sample Sigma = 0.847

% of Theoretical = 80.9

Refinements of this basic design included a constant stream of bubbling oxygen to keep the bulk electrolyte saturated at all times,

thereby preventing sample loss to the liquid. Also a shield of "Pellon" was built into the test cell around the test plate to prevent sweeping away of O_2 by bulk current. The final configuration of the test cell is shown by Figure 2.1-1. (Certain construction details are omitted for clarity).

2.3 Task III

Early plots of gas evolution indicated that discharge production might be an exponential, while the open circuit is linear. It was decided to use a fifth degree polynomial equation model to define the gas volume vs. time curve rather than an exponential model. The program for the non-linear exponential regression uses an iteration procedure and frequently the program would diverge. A prediction value for 140 hours for the open circuit gas and a value for 50 hours for discharge gas were decided as responses for the gases produced. The "untreated" (as is) production plates developed a mean and sample sigma of 26.7 cc/hour and 11.76, respectively, for O.C. gas and 12.2 cc/hour and 3.45, respectively, for the discharge gas.

2.4 Task IV

2.4.1 Task IV - Data

Gas analysis, via gas chromatography, has shown that the gas produced by both open circuit and discharge conditions is strictly oxygen. Hydrogen was suspected during the earlier phase of gas analysis but this was resolved when argon carrier gas was substituted for helium. The argon provided better resolution and showed no hydrogen peaks. Nitrogen that was occasionally found is certainly due to air contamination.

The variables studied in this task are listed in Table No. 2.4-1 (1 to 8 inclusive) while 9 through 27 are interactions making up the regression models used in analysing the effect of the variables on the gassing. Table No. 2.4-2A shows the column designations and Table 2.4-2B lists all Task IV data. Table No.'s 2.4-3, 2.4-4 and 2.4-5 show the regressions used to evaluate the effect of the variables in Task IV (Table No. 2.4-1). Also Tables 2.4-6,-7 & -8 show the original data, the prediction of these data using the model shown, the residuals, and standard error of the predicted value. These models were selected by successive deletion from the original complete model until all student "t" values for each variable was >1.

The analytical procedure for evaluation, discussed in paragraph 1.1, of the variable effects is:

1) Build a matrix of the complete 2^8 factorial starting with all positive levels (1-8) and changing each variable successively to -1 to create 256 predictions.

2) Using the models of Tables 2.4-3, 2.4-4 and 2.4-5, compute the 256 corresponding predictions.

3) An analysis is made of each full factorial set of predictions by computing the mean, etc. of all predictions for all positive levels (X1) and negative levels (X2) for each variable and interaction (Var. 1, etc.) disregarding all other variables successively.

Comparing X1 values minus the X2 value yields the variable effect (+1 to -1) successively for each variable. The differences obtained in this manner are listed in Table 2.4-12 (Summary of Effects) by variable and the type of gas. The levels preceding the difference number are the minimum gas levels.

4) Tables 2.4-9, 2.4-10 and 2.4-11 represent the minimum ("A" designator) and maximum ("B" designator) gassing combinations of variables for open circuit, discharge and combined gas respectively. The level columns are in variable number order. The number of each combination is the sequence number in the matrix and the MIN (or MAX) number is the predicted value of the combination.

2.4.2 Task IV - Discussion

Table numbers 2.4-9, 2.4-10, 2.4-11 and 2.4-12 serve as comparisons and means to evaluate the effects of the variables on the three (3) responses.

VARIABLE NO. 1 - Temperature (+) = 140°F; (-) = 75°F (RT)

O/C (-) 34.104; Disc. (-) 63.029; Comb (-) 92.335

This variable compares plate treatment at room temperature versus treatment at 140°F The minimum gassing level is definitely the lower temperature treatment for all cases.

This is consistent with the view that a stabilization of the oxides has been obtained through production procedures. Higher temperatures would tend to promote a more rapid decomposition of the higher oxides and this could in turn weaken the more stable organization of the oxide crystals or layers. If the oxide layers or crystals are expanded or disorganize in the

process this would lend more impetus to the formation of active sites for the discharge gassing mechanism as well as allow more surface area exposed to the electrolyte for open circuit gassing.

Interaction Variable 9 (Var.1)(Var.2) suggests these two variables act in the same manner and with a limiting effect. The resultant interaction of the two shows a lessened effect on reduction of gassing than if the two variables acted independently. Interaction Variable 12 (Var.1)(Var.5) shows an additive effect of the combination. This could tend to indicate that the higher temperature involved in Var. 5 was the primary effect of the variable in lieu of the inert gas treatment. Interaction Variables 10 (Var.1)(Var.3) and 13 (Var.1)(Var.6) are also involved but these are discussed under the Var. 3, Var. 6 section.

VARIABLE NO. 2-Pressure (+)=0.5ATM; (-)=1.0ATM O/C(-)28.714; Disc. (-) 14.918; Comb. (-) 29.971

The effect of pressure is examined in this variable by comparing reduced pressure treatment of one-half atmosphere with room pressure. Minimum gassing was obtained with the less severe treatment of one atmosphere.

The probable causes would be similar to those outlined under Var. 1 as reduction in pressure would have a similar effect as higher temperatures. Lowering pressure would tend to effectively reduce oxygen partial pressure and promote decomposition of the higher oxides disrupting whatever

stabilization processes had occured with similar effects as Var. 1. The reduced pressure would also draw out at an increased rate any trapped or occluded oxygen that might be present, further reducing effective oxygen partial pressure. A major effect from this line is questionable.

Interaction Variable 16 (VAr.2)(Var.4) indicates an additive effect of the two variables in combination. This is most likely due to the inverse effect of longer time at reduced pressure causing more gassing. In view of interaction Variable 9 (discussed under Variable 1) Variable 16 indicates a limiting rate dependent on time for the mechanism producing the increased gassing. While increased time allows the mechanism to continue in effect, possibly increasing with time, the mechanism has a limit since Variable 9 is a decrease from the sum of the individual variables effects that would be the direct cause of the mechanism.

Interaction Variable 17 (Var.2)(Var.5) shows a lessened effect for the combination of the two variables. This, again, indicates Var. 5's main effect lies in the temperature difference imposed.

VARIABLE NO. 4 - TIME

(+) = 10 days; (-) =1 day; O/C (-) 66.229; Disc (-) 40.068; Comb (-) 114.648

The time of treatment of 1 day produces the minimum gassing effect. The nature of the magnitude of this independent variable is somewhat puzzling. The longer time might be thought to allow

rearrangement of the oxide layers or crystals to more stable species, yet this does not seem to be the case. Longer time, obviously, would result in a larger total amount of simple decomposition products formed compared with the shorter time at similar conditions. Apparently, this is the determinant factor in this variable.

Interaction Variable 16 is discussed under its companion variable and Variables 19 and 23 are discussed under Variables 3 and 6.

VARIABLE NO. 5 - INERT GAS TREATMENT

(+) = He flushed at 140°F for 1 hour and cooled to room temperature with N_2; (-) = No treatment; O/C (-) 10.148; Disc (-) 9.176; Comb (-) 17.409

This variable was included to determine if gasses trapped in the plate on formation had an effect on oxygen production. The major effect would have been the removal of unbound or loose bound oxygen effectively reducing oxygen partial pressure for the decomposition of the oxides. In quantity, this effect is, apparently, the least significant of those examined. The minimum gassing level is that of no treatment. The effect that is found is believed to be primarily that of the higher temperature applied concurrently to the inert gas flushing.

Interaction variables are discussed under the companion variables.

VARIABLES NO. 3 AND NO. 6 - COMPARISON OF PRODUCTION LOTS

Number 3 (+) = Lot 25; (-) = Lot 24; (0) = Lot 1
O/C (-) 42.325; Disc. (-) 44.491; Comb (-) 92.444

Number 6 (+) = Lot 1; (-) = Lot 24; (0) = Lot 25
O/C (-) 4.398; Disc. (-) 8.383; Comb (-) 13.619

These two variables compare differences in production lots, through the use of dummy variables. These two variables work in conjunction to determine the lot numbers of a given test.

The major fact determined from this portion of the analysis is that there is indeed a difference from lot to lot of production plates.

Of the lots used, the lot designated "25" appears responsible for increased gassing compared to the other two lots which are not significantly different, though Lot 24 appears as the minimum gassing lot in the main effects. In the MIN gas analysis Lot 1 appears in the majority of combinations, although Lot 24 is present especially for open circuit and to a lesser degree, for combined gas.

Somewhat of a peculiarity is found in Interaction Variable 10 (Var.1)(Var.3). A very large effect with temperature on the plates of Lot 25. The indication is that for Lot 25, the high temperature treatment promotes less gassing in opposition to the expected increase in gassing. Inspection of the MAX levels of gassing strongly support this anomaly. In those instances that Lot 25 is listed in the MAX gas level, the temperature is invariably the lower (room temperature) while in all other cases it is the expected higher temperature (140°F).

The apparent magnitude of this effect is much greater than for any interaction or main effect. A possible explanation would be a particularly large proportion of easily decomposed oxides in Lot 25 as compared to the other two lots. The higher temperature would then dispose of these oxides to a greater degree before the start of the tests.

Variable 13 (Var.1)(Var.6) has the expected direction and is additive indicating that the lower gas mechanism for Lots 1 and 24 are similar or identical and that the lower temperature enhances the lower gas rate in combination with Lot 24. This is further indication that Lots 1 and 24 are quite similar in respect to their gassing. Variable 14 (Var.5)(Var.6) has effects very similar to, but to a much lesser degree than, Variable 13. This is to be expected if Variable 5's main effect is the incidental high temperature.

Interaction Variables 19 (Var.3)(Var.4) and 23 (Var.4)(Var.6) offer another contrast between the lots. Variable 19 is additive as might be expected if Lot 25 is more concentrated in the higher oxides. Variable 23, on the other hand, is less by the interaction than for the sum of the individual main effects.

VARIABLE NO. 8 - OXYGEN PERCENT PICKUP (+)high (-) low
O/C 0, Disch (+) 31.099; Comb. 0

Oxygen percent pickup has significant effect only for discharge gassing. This would seem particularly reasonable if the mechanism for gassing during discharge involved reduction of the lower

valence silver ions by oxygen ions in the transport process. The higher percent oxygen pickup, the lower gas level, would indicate a higher percentange of high valence silver and conversely a lower proportion of monovalent silver.

2.4.3 TASK IV SUMMARY

From the data obtained from production plates just discussed, it is apparent that no further treatment above production procedures is necessary and, indeed, is very undesirable. Increased temperature or reduced pressure contribute to increasing the volume of gassing in both open circuit and discharge conditions. Flushing the plates with inert gas is at best valueless and at worst detrimental to the gassing of the plates. The shortest possible stand time is apparently the lowest gas producing level. The sintered weight of the plate is not critical to gas production but the highest percent oxygen pickup is most desirable. Not only does the higher pickup reduce gassing on discharge but, obviously, increases the capacity available in the plates.

A variation was found among the production lots examined. However, only three lots were involved and two of those appeared to correspond very closely in their responses.

2.5 TASK V

2.5.1 Task V - Data

The variables studied for Task V are indicated in Table 2.5-1. Table 2.5-2A shows the column designations while Table 2.5-2B lists all Task V data.

Tables 2.5-3,-4 and -5 show the regression models used for open circuit, discharge, and combined gas respectively. The criteria for developing the regression model involved deleting all interaction variables having a greater than .999 correlation with any other variable. The "complete" regression model was prepared and refined by backward deletion by successive removal of the lowest "t" value of the ooefficients made until the lowest value was one. The full factorial was prepared using these "best" models to predict the full factorial. The variable analysis was then the same as that used in Task IV.

Tables 2.5-9,-10 and -11 show the maximum and minimum level combinations as was explained in 2.4.1. In the case of Task V, however, not all main effects are interactive and the non-interactive effects (indicated by zeros in their respective columns) are not included in the prediction. To include these in the prediction, it is necessary to sum (by sign) the non-interactive variables effects from Table 2.5-12.

2.5.2 Task V - Discussion

The variables are discussed individually with a brief suggestion as to the causitive effect involved. (As this approach was not designed to investigate mechanisms or structures, the causitive discussion should be interpreted only as possibilities).

Variable #1 - Rinse Rate

(+)=low rate (-) = high rate o/c (+) 3.42, Disc.(+)0.78
Comb. (+) 2.60

In all three cases the (+) or low rate of rinse is the minimum gassing level. The lower rinse rate would dissolve less oxide in the process of rinse than the higher rate. The lower oxides would be the most easily dissolved. If the oxides are arranged in a manner that the higher, more easily decomposed oxides are toward the centers of oxide layers or crystals, then the removal of the surface oxides would expose the subsurface oxides to a faster rate of decomposition. The surface oxide layer could act as a barrier to the loss of oxygen produced by decomposition of oxides beneath it effectively increasing the partial pressure of oxygen inside the oxide crystal, thereby slowing the rate of decomposition. The most effective surface layer would probably be formed during formation and reformation of a "new" surface layer through decomposition of higher oxides to lower oxides would not be as effective.

Variable #2 - Rinse Temperature

(+) = 110-114°F, (-) = 75°F, O/C (-) 2.09, Disc. (+) 3.51
Comb. (+) 2.34

Open circuit gassing is minimal at the lower temperature, probably for a similar reason as discussed in Var. 1. Discharge gassing however, is minimum at the higher rinse temperature. The discharge gas mechanism may depend a great deal on active sites or areas where reaction is more favorable. Crystal protrusions or irregularities would be the most likely sites for this type of

activity and higher temperature rinse would be responsibile for a greater degree of elimination of those areas through solubility.

Another approach would be the greater degree of elimination of the more soluble Ag^+ containing oxides. The most likely mechanism for gassing during discharge (Rxn #5) would be dependent upon Ag^+ concentration or availability.

Variable # 3 - Rinse Time

(+) = 4 hours, (-) = 15 minutes, O/C (-) 3.93; Disch. (-) 4.98
Comb. (-) 5.85

The shorter rinse time of 15 minutes is the definite choice for minimum gassing. The long rinse time probably reduces the protective oxide layer (as discussed under Var. 1.) to such an extent that simple decomposition is the determinant factor and the other, possible beneficial effects are over-ridden.

Variable #4 - Drying Temperature

(+)=140°F; (-) = 100°F; O/C (+)4.78; Disch.(-) 8.98; Comb.(-) 3.68

The drying temperature presents the largest variable difference encountered between open circuit and discharge gassing. The level effects are in direct opposition in minimum gassing.

The higher temperature would cause a greater amount of decomposition, particularly among the higher oxides. The more easily decomposed species would be reduced to silver or a more stable oxide. A relatively substantial effect could be made on the crystal or oxide layers' physical structure by the decomposition and resultant rearrangement.

The open circuit gassing, due primarily to simple decomposition, would be effectively lowered by the higher temperature drying. The most readily decomposible species would have already undergone substantial decomposition prior to the open circuit stand and less active material would, therefore, be present.

The discharge gassing mechanism, however, is presumed to be highly dependent upon the concentration of Ag^{+} ions or their ability to undergo reduction by the oxygen ion transport species, available only during discharge. If the higher valence silver, Ag^{++} or Ag^{+++}, have undergone decomposition the probable products would be elemental silver or the Ag^{+} species. The silver, would in turn, most likely be oxidized in an internal couple with the higher oxides remaining to produce Ag^{+}. The net effect would be an increase in Ag^{+} ions to react during discharge. Also possible in influence is a lattice expansion due to heat expansion and/or decomposition. Such an effect could produce more active sites for Ag^{+} reduction or surface area for solubility.

Variable #5 - Drying Time

(+) = 42.5 hrs; (-) = 18.5 hrs.; o/c (+) 3.22; Disc. (-) 3.14
Comb. (-) 3.14

The relationship of drying time is very similar to drying temperature (Var.4) and for probably similar reasons. The effect of drying temperature would be a rate that is time dependent and increased drying time would enhance the effect.

C

Variable #6 - Charge Current

(+)=2.3 amps; (-) = 3.5 amps; O/C (+) 0.58; Disc.(+)10.24; Comb. (+)12.03

The lower oxide (Ag_2O) has been shown, by other researchers, to be thickest at low current densities, decreasing until around 0.25 MA/cm^2 where it begins to increase logarithmically. Lower current densities should promote larger crystal size of Ag_2O in particular. This would also imply a more regular and uniform crystal growth producing a more stabilized system. Reduction in potential surface area for the decomposition process or solubility could be expected. Higher lattice energies would be more probable. Nucleation sites for the formation of AgO would be more favorable. Production of Ag_2O_3 would be less likely by passing the decomposition of this species and the resultant weakening of crystal structure. A better formed geometry of oxides at low current densities could be responsible, in part, for the pronounced effect on discharge gassing over open circuit. This would be due to a reduction in active sites or conditions available for the oxidation of oxygen species formed during discharge.

Variable #7 - Percent Overcharge (Ampere-Hours)

(+) = 175%; (-) = 125%; O/C (+) 4.40; Disc.(-) 1.35; Comb. NI

This variable examines the amount of charge above the theoretical amount necessary to promote all the material to the AgO state.

The 175% overcharge should promote more complete conversion to the higher oxide levels. This could result in a stabilization of

of crystal structure by eliminating unoxidized silver or incomplete oxidation that would result in defects in the lattice. Stabilization should decrease decomposition and, therefore, open circuit gassing. A greater amount of interstitial oxygen (whether O_2 or O) should be introduced in the oxide layers by the greater overcharge and this could also decrease decomposition by raising the effective oxygen partial pressure.

Discharge gassing is favorable to the lower overcharge. This could be due simply to the increase in the amount of oxygen available or to the expanded oxide layers affording more probability of Ag^+ reduction on discharge.

Variable #8 - Discharge Current

(+)=5.75 amps; (-)=3.8 amps; O/C (+) 4.78; Disc. NI: Comb.(+)3.91

At higher current densities on discharge the lower oxide portions and irregular crystal structures offering a higher resistance than the higher oxides would develop a higher potential and be discharged in a proportionately greater amount such that, on recharging, more stable structures are formed in their place. Discharge would, in general, be to a greater depth level at the higher current densities allowing a shifting of crystal or oxide layer structure to a position of less stress on recharging.

Variable #9 - Discharge Time

(+)=4.5 hours; (-)= 3.0 hrs; O/C(+)2.06; Disc.(-) 7.84; Comb.(-)6.03

The open circuit results could probably be explained in a similar manner as proposed under Variable #8. The longer time of discharge

would be related in effect to higher current densities.

The longer time is, however, definitely detrimental to the discharge gassing. This could be due, in part, to a swelling of the crystal or oxide layer structure as the conversion to the higher oxides progresses. This could give a somewhat wider field for the oxygen ion species to react with Ag^+ ion. The shorter discharge time could also be conducive to leaving a greater portion of Ag^+ species in an active state for discharge.

Variable #10 - Double Charge

(+)=with; (-)=without; O/C (-)3.93; Disc. (+) 3.38; Comb. NI

This variable refers to the application of a high current density "booster" charge during the last hour of formation. If the mechanism presumed for discharge gassing is the primary reaction, then this result would indicate that the double charge would be instrumental in promoting a larger amount of the higher oxides. These oxides would be more prone to decomposition on open circuit and reduce the percentage of Ag^+ ions available on discharge. This process is suspected of providing a greater amount of chemically unbound oxygen dispersed in the plates.

Variable #11 - Formation Temperature

(+)=75°F; (-)=57°F; O/C(+)5.16; Disc.(-) 1.72; Comb. (+) 3.86

The higher oxides should form most readily at lower formation temperatures. This would be due in part to the higher solubility of oxygen in the electrolyte at low temperatures as well as reducing the rate of decompostion of the oxides as they are formed. This would be in agreement with the results obtained for this variable as open circuit is minimum gassing level at the higher temperature (where fewer easily decomposed oxides are formed). and is minimum gassing at the low temperature for discharge (where fewer Ag^+ ions will remain).

Variable #12 - Wash Water

(+) tap water; (-) deionized water; O/C (-)10.18; Disc. (-) 2.02
Comb. (-) 12.83

Deionized wash water contributes greatly to reduced gassing in the positive plates. The most obvious possibility for this effect is the presence of impurities in tap water that could act as catalyst or in some manner contribute to the production of oxygen gas.

Variable #13 - KOH Concentration

(+)=30%; (-)=20%,40%; O/C NI; Disc. NI; Comb. NI

This variable is a dummy variable working in conjunction with Variable 19 and will be discussed under that variable.

Variable #14 - Counter Electrodes

(+)=Ni; (-)=Ag; O/C(+)3.62; Disc. NI; Comb. NI

The use of nickel counter electrodes leads to minimum gassing for open circuit stand. The silver counter electrodes used were the sintered plates which are quite porous. The nickel electrodes were sheet metal and non-porous.

Variable #15 - Addition of K_2CO_3

(+)=0.1%; (-)=4%; O/C (-)5.37; Disc.(-) 3.73; Comb. (-)10.18

Potassium carbonate might prevent the formation of higher oxides to some degree. Stabilization of the oxides, particularly through complex formation, is also quite possible. The former would help open circuit gassing while the latter would be applicable to both open circuit and discharge gassing reduction.

Variable #16 - Sintered Weight

(+)=high; (-)=low; O/C NI; Disc. NI; Comb.NI

Sintered weight effects were not incorporated into the gassing analysis model. This indicates that the sintered weight has no appreciable effect or that a high correlation exists between it and another variable that is entered in the model.

Variable #17 - Percent Oxygen Pickup

(+)=high; (-)=low; O/C (-)21.21; Disc. (-) 8.91; Comb. (-)33.20

It would be reasonable to expect the rate of decomposition especially to be concentration dependent. The high percent pickup level would contain a higher concentration of the most easily decomposed oxide and therefore produce a higher rate of gas. This effect is large enough to expect that the decomposition which would be continuous, to play a major role during discharge

also. Discharge would also be higher gassing for high pickup since a greater amount of oxygen is present to be discharged.

Variable #18 - Dry Stand Time

(+)=13 days; (-) 1.2 days; O/C (+)15.57; Disch (+)12.06
Comb. (+) 27.18

The longer stand time is the minimum gas level in all cases. The longer time would permit decomposition of the most active oxides to proceed to a greater extent before gas measurement is initiated. The longer time would also permit greater rearrangement of the internal structure and oxide layers to a state of equilibrium.

Variable #19 - KOH Concentration

(+)=40%; (-)=20%,30%; O/C(-)24.23; Disc. (-) 31.74; Comb.(-) 54.42

This dummy variable operates in conjunction with Variable #13 in comparing three concentrations of potassium hydroxide used during formation. The 40% concentration produces a large amount of gassing in comparison to the lower concentrations.

The more popular view toward the mechanism of oxide formation involves a high dependence on the presence of hydroxyl ions. The promotion to higher valence oxides, particularly on the surface, by the larger hydroxide concentrations could lead to the results obtained. The open circuit gassing would depend on the availability of the oxide to decomposition as well as the oxide concentration. The discharge gassing would be increased by the presence of the active Ag^+ sites left by the open circuit

decomposition products and resultant structures. The higher solubility of the silver oxides in stronger basic solutions could also play a role in the increased gassing.

Variable #20 - Formation Discharge

(+)=without; (-)=with; O/C(-) 19.09; Disc. (+)0.12; Comb.(-)20.92

This variable compares formations that have no discharge routine included versus those that include some form of discharge process and reforming. The result indicates that low gassing involves the inclusion of a discharge routine. The discharge gassing favored no discharge only slightly. The discharge routine assists in promoting a more stable final crystal or oxide in layer formation. The nucleation of the AgO species should be assisted to the extent that on reformation the crystals should be more uniform.

2.5.3 Task V - Summary

The minimum gassing combination of variables as derived from the data presented is listed in Table 2.5-12. The variables that were consistent for both open circuit and discharge gassing, by interpretation, were variables 1, 2, 5, 6, 8,12, 14, 15, 17, 18, 19 and 20. Variables 13 and 16 were not included in the analysis model and the remainder presented opposing effects for open circuit versus discharge gassing. Of these variables, Var. Number 4 (drying temperature) was the most difficult to resolve. The (-) level was attributed "best" chiefly to its overall effect. The "best" level column of Table 2.5-12 represents, essentially, the level each variable should be, for minimum total gassing under the experimental conditions and measurements. If it is desired to repress gassing for the particular phase of open circuit (or discharge) to the maximum, it would be necessary to alter some variable levels.

The percent oxygen pickup was investigated concurrently with the gassing data. The maximum percent oxygen pickup is the level of interest as this is the criterion of plate capacity. The levels conducive to maximum pickup are designated in Table 2.5-15. Variables 1, 3, 4, 5, 9, 11, 13, 15, 16 and 20 correspond to the minimum gassing levels while Variables 10, 17 and 18 were not included in the analysis model. The remaining variables were in opposition to those desired for minimum gas by varing degree.

2.6 TASK VI - RECOMMENDATIONS FOR VERIFICATION OF WORK

The purpose of this additional task is to verify the results obtained in the previous tasks in the reduction of oxygen gassing. The comparison is to be made between twenty (20) cells of the standard positive plate manufacture and twenty (20) cells plus forty (40) positive plates manufactured utilizing the oxygen reducing techniques.

The following tasks and techniques are proposed to accomplish Task VI:

1. Twenty (20) cells are to be constructed utilizing production methods now in use.
2. The production procedure of the positive plates will be altered to approximate as closely as possible the minimum gas procedure as indicated by the column headed "best-level" on Table 2.5-12. Some items may vary somewhat such as in the formation of plates for Task V; a series connection was used to assure equal and known current for each plate during formation. The quantity of plates and the time scheduled for the formation of Task VI plates precludes this technique and a parallel configuration will be used with the calculated current for each plate being equal to that specified in the series connection. The cells utilizing these plates will be constructed identically to those of the plates produced in the standard method. The plates, and thereby the cells, will be identified by lot such that any variance in performance by lot may be observed. Twenty (20) cells and forty (40) positive plates will be manufactured using low oxygen techniques.

3. Five (5) cells of part (1), five (5) cells of part (2) and ten (10) positive plates of part (2) will be stored and tested under conditions as close as possible to those imposed on the experimental plates of Tasks VI and V. The plates will be tested in an identical manner as described for Tasks VI and V. The gas from the cells will be collected via the cell fill screw hole by displacement of water in a burette (see diagram). Gas samples will be taken daily and analyzed by gas chromatography during both open circuit stand and discharge. Results of previous tests have verified that only oxygen will be generated by the positive plates, however, gas samples from the cells will be rich in hydrogen from the negative plates. This will require calibration and development of techniques of the gas chromatography to reproducably and reliably determine the respective amounts of hydrogen and oxygen evolved by the cells.

4. The remaining cells and plates will be stored under the specified conditions for 11 ± 1 weeks at room temperature followed by three (3) months storage under specified conditions at 40 ± 5°F.

5. After the storage period the cells will be allowed to come to room temperature and then activated, including a seventy-two (72) hour soak period.

6. The cells will be placed on open circuit stand for 10 ± 1 days at room temperature and all gas evolved will be collected and analyized as in part (3).

7. On completion of part (6), the cells will be placed in a cold box at 40 ± 5°F while maintaining gas collection. After equilibrium is reached, the cells will be discharged at ten (10) amperes to an end voltage of 1.0 volts. The time when 1.41 volts is reached will be recorded. Gas collection and analysis will continued for a minimum of four (4) hours after removal of load.

8. After the storage time of part (4), the positive plates will be tested on discharge in a manner equivalent to the plate tests of Tasks VI and V except that the test chambers and the plates will be cooled to 40 ± 5°F in a cooling bath.

   Fifteen (15) plates will be discharged at the C/41.5 rate and fifteen (15) at the C/16 rate. All to the end voltage of 1.0 volt. Gas collection and analysis, as in the cell tests, will be performed.

GAS COLLECTION AND ANALYSIS SOURCE APPARATUS

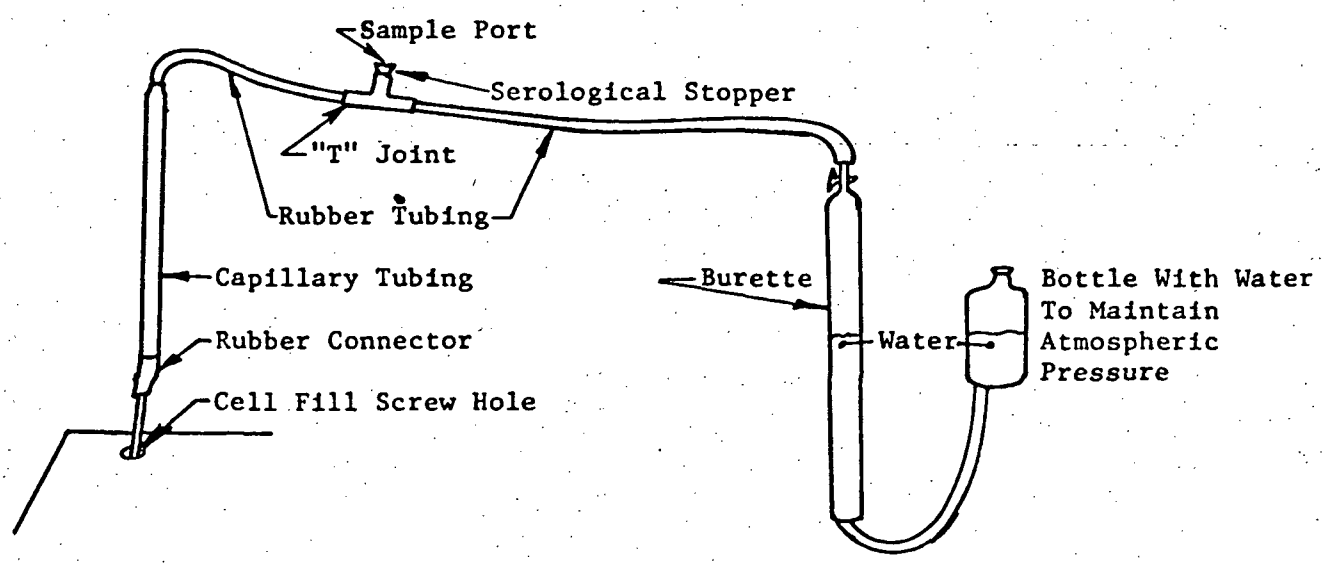


FIGURE 1.1-1

"Two-Way" Table Arrangement of a Full Factorial Design. Each box (b,a,etc.) is a trial.

	A-		A+	
	B-	B+	B-	B+
C-	- - - or -1 -1 -1 or 0 0 0 or (1)	- + - or -1 +1 -1 or 0 1 0 or b	+ - - or +1 -1 -1 or 1 0 0 or a	+ + - or +1 +1 -1 or 1 1 0 or ab
C+	- - + or -1 -1 +1 or 0 0 1 or c	- + + or -1 +1 +1 or 0 1 1 or bc	+ - + or +1 -1 +1 or 1 0 1 or ac	+ + + or +1 +1 +1 or 1 1 1 or abc

FIGURE 1.1-2

Standard Arrangement for Full Factorial Design

	A	B	AB	C	AC	BC	ABC
(1)	-1	-1	+1	-1	+1	+1	-1
a	+1	-1	-1	-1	-1	+1	+1
b	-1	+1	-1	-1	+1	-1	+1
ab	+1	+1	+1	-1	-1	-1	-1
c	-1	-1	+1	+1	-1	-1	+1
ac	+1	-1	-1	+1	+1	-1	-1
bc	-1	+1	-1	+1	-1	+1	-1
abc	+1	+1	+1	+1	+1	+1	+1

FIGURE 1.1-3

DUMMY VARIABLES

Trial	DUMMY Var. 1	Var. 2	Variable Operating
1	-1	-1	A
2	-1	-1	A
3	-1	-1	A
4	+1	-1	B
5	+1	-1	B
6	+1	-1	B
7	-1	+1	C
8	-1	+1	C
9	-1	+1	C

D

FIGURE 1.1-4-a· Complete Balanced Factorial Example - Davies code

Built-up Responses.

Main effects only - no interactions

Var. A= 1.67(-1 to +1)
Var. B= 1.67(-1 to +1)
Var. C= -3.33 (-1 to +1)

TRIAL	BUILD-UP	RESPONSES
(1)	115. + 0.0	115.00
a	115. + 1.67	116.67
b	115. + 1.67	116.67
ab	115.+1.67+1.67	118.34
c	115. - 3.33	111.67
ac	115.+1.67-3.33	113.67
bc	115.+1.67-3.33	113.34
abc	115.+1.67+1.67-3.33	115.01

RESULTS OF ANALYSIS IN FIGURE 1.1-4b -

Print-out shows original matrix entered, averages and standard deviation of each vector in order(8 is response), all combinations of correlation coefficients, the regression model or equation and the predicted ($\hat{y}$) responses. Since these responses are for a full factorial, the analysis can proceed by summing according to sign, obtain means and the differences: (Figure 1.1-4-c).

Var. 1 = A = 1.67 (-1 to +1)
Var. 2 = B = 1.67 "
Var. 3 = C = -3.33 "
Var. 4 to 7 all insignificant

The regression coefficients are half the total effect since the coefficients are from 0 to ±1.

Figure 1.1-4-b

Regression Solution - Davies Code - Main Effects Only - No Interactions

```
NASA EXAMPLE - FULL FACTORIAL REGRESSION  SOLUTION - DAVIES CODE

CONTROL CARD USED FOR THIS REGRESSION
 3 3   0 5 0 0.000 0.000 0 0 20100 00 0 0000 0 0
 TRANSFORMATIONS SPECIFIED FOR THIS REGRESSION
 1 3 7 0 6 4 1 2 6 5 1 3 6 6 2 3 6 7 1 6

        RAW DATA LISTING

OBS NO  VARIABLES IN NUMERICAL ORDER
  1
          -1.000    -1.000    -1.000     1.000     1.000     1.000    -1.000   115.000
  2
           1.000    -1.000    -1.000    -1.000    -1.000     1.000     1.000   116.670
  3
          -1.000     1.000    -1.000    -1.000     1.000    -1.000     1.000   116.670
  4
           1.000     1.000    -1.000     1.000    -1.000    -1.000    -1.000   118.340
  5
          -1.000    -1.000     1.000     1.000    -1.000    -1.000     1.000   111.670
  6
           1.000    -1.000     1.000    -1.000     1.000    -1.000    -1.000   113.340
  7
          -1.000     1.000     1.000    -1.000    -1.000     1.000    -1.000   113.340
  8
           1.000     1.000     1.000     1.000     1.000     1.000     1.000   115.010

AVERAGES
VAR( 1)=      0.0000,VAR( 2)=      0.0000,VAR( 3)=      0.0000,VAR( 4)=      0.0000,
VAR( 5)=      0.0000,VAR( 6)=      0.0000,VAR( 7)=      0.0000,VAR( 8)=    115.0049

STANDARD DEVIATIONS
VAR( 1)=      1.0690,VAR( 2)=      1.0690,VAR( 3)=      1.0690,VAR( 4)=      1.0690,
VAR( 5)=      1.0690,VAR( 6)=      1.0690,VAR( 7)=      1.0690,VAR( 8)=      2.1340

SIMPLE CORRELATION COEFFICIENTS

        FOR ANOVA, TOTAL SUM OF SQUARES=              33.3908

STEP NUMBER  4          ENTER VARIABLE  6
 STANDARD ERROR OF ESTIMATE=      0.13877
 RESIDUAL SSQ(BY ADDN OF VAR. SSQ=      0.577734E-01
 MULTIPLE CORRELATION COEFFICIENT =  0.99913
 GOODNESS OF FIT,F(   4,   3)=        432.6840
 CONSTANT TERM=     115.004974

VAR.       COEFF     STD DEV(COEF)  T VALUE   BETA COEFF    COEF(E)          VAR.SSQ(E)
  1       0.834999      0.0490     17.0130     0.4037    0.834999E 00       0.557778E 01
  2       0.835001      0.0490     17.0130     0.4037    0.835001E 00       0.557781E 01
  3      -1.664987      0.0490    -33.9339    -0.8149   -0.166498E 01       0.221774E 02
  6      -0.000001      0.0490     -0.0000    -0.0000   -0.190734E-05       0.291033E-10

PREDICTION PART OF PROGRAM

PREDICTIONS FROM LAST MODEL IN REGRESSION

OBS NO.     PREDICTION          ACTUAL(IF KNOWN)      DIFFERENCE

  1         114.99992           115.00001             -0.00009
  2         116.66992           116.67001             -0.00009
  3         116.66993           116.67001             -0.00007
  4         118.33993           118.34001             -0.00007
  5         111.66996           111.67001             -0.00004
  6         113.33996           113.34001             -0.00004
  7         113.33995           113.34001             -0.00006
  8         115.00994           115.01000             -0.00006
```

FIGURE 1.1-4-.c

NASA EXAMPLE FULL FACTORIAL DAVIES CODE

Calculation of Main Effects

```
VARIABLE NO.   1
X1 MEAN=    115.837, MEAN SQ1=      4.629, SIG1=      2.151, X2 MEAN=    114.169, MEAN SQ2=      4.622, SIG2=      2.150
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.001 X1-X2=   1.668

VARIABLE NO.   2
X1 MEAN=    115.837, MEAN SQ1=      4.632, SIG1=      2.152, X2 MEAN=    114.169, MEAN SQ2=      4.622, SIG2=      2.150
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.001 X1-X2=   1.668

VARIABLE NO.   3
X1 MEAN=    113.337, MEAN SQ1=      1.854, SIG1=      1.361, X2 MEAN=    116.669, MEAN SQ2=      1.853, SIG2=      1.361
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.000 X1-X2=  -3.331

VARIABLE NO.   4
X1 MEAN=    115.003, MEAN SQ1=      7.411, SIG1=      2.722, X2 MEAN=    115.003, MEAN SQ2=      3.698, SIG2=      1.923
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      2.003 X1-X2=  -0.000

VARIABLE NO.   5
X1 MEAN=    115.003, MEAN SQ1=      1.849, SIG1=      1.359, X2 MEAN=    115.003, MEAN SQ2=      9.258, SIG2=      3.042
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      5.007 X1-X2=  -0.000

VARIABLE NO.   6
X1 MEAN=    115.002, MEAN SQ1=      1.845, SIG1=      1.358, X2 MEAN=    115.004, MEAN SQ2=      9.262, SIG2=      3.043
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      5.019 X1-X2=  -0.001

VARIABLE NO.   7
X1 MEAN=    115.003, MEAN SQ1=      5.553, SIG1=      2.356, X2 MEAN=    115.003, MEAN SQ2=      5.557, SIG2=      2.357
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.000 X1-X2=  -0.000
```

Figure 1.1-5-a

Regression with same buildup as Figure 1.1-4-a,
Full Factorial except solved with the regular code
in place of Davies Code

```
NASA EXAMPLE FULL FACTORIAL CODED - REG.

CONTROL CARD USED FOR THIS REGRESSION
 3 3   0 8 1 0.000 0.000 0 0 21010 00 0 0010 0 0
 TRANSFORMATIONS SPECIFIED FOR THIS REGRESSION
 1 3 7 0 8 1 1 1 3 2 2 1 3 3 3 1 6 4 1 2 6 5 1 3 6 6 2 3 6 7 6 1

 CONSTANT CARDS USED IN THIS REGRESSION
   2.000

CODING MAX., VARIABLES IN NUMERICAL ORDER
     3.000      3.000      3.000      9.000      9.000      9.000     27.000
  CODING MIN., VARIABLES IN NUMERICAL ORDER
     1.000      1.000      1.000      1.000      1.000      1.000      1.000

CODED DATA LISTING

OBS NO     VARIABLES IN NUMERICAL ORDER
   1
            -1.000     -1.000     -1.000     -1.000     -1.000     -1.000     -1.000    115.000
   2
             1.000     -1.000     -1.000     -0.500     -0.500     -1.000     -0.346    116.670
   3
            -1.000      1.000     -1.000     -0.500     -1.000     -0.500     -0.346    116.670
   4
             1.000      1.000     -1.000      1.000     -0.500     -0.500     -0.334    118.340
   5
            -1.000     -1.000      1.000     -1.000     -0.500     -0.500     -0.346    111.670
   6
             1.000     -1.000      1.000     -0.500      1.000     -0.500     -0.334    113.340
   7
            -1.000      1.000      1.000     -0.500     -0.500      1.000     -0.334    113.340
   8
             1.000      1.000      1.000      1.000      1.000      1.000      0.999    115.010

 AVERAGES
 VAR( 1)=      0.0000,VAR( 2)=      0.0000,VAR( 3)=      0.0000,VAR( 4)=     -0.2500,
 VAR( 5)=     -0.2500,VAR( 6)=     -0.2500,VAR( 7)=     -0.4615,VAR( 8)=    115.0049

 STANDARD DEVIATIONS
 VAR( 1)=      1.0690,VAR( 2)=      1.0690,VAR( 3)=      1.0690,VAR( 4)=      0.8017,
 VAR( 5)=      0.8017,VAR( 6)=      0.8017,VAR( 7)=      0.6422,VAR( 8)=      2.1340

 SIMPLE CORRELATION COEFFICIENTS
 VARS( 1, 1)=  1.000000,VARS( 1, 2)=  0.000000,VARS( 1, 3)=  0.000000,VARS( 1, 4)=  0.666667,
 VARS( 1, 5)=  0.666667,VARS( 1, 6)=  0.000000,VARS( 1, 7)=  0.512147,VARS( 1, 8)=  0.403712
 VARS( 2, 2)=  1.000000,VARS( 2, 3)=  0.000000,VARS( 2, 4)=  0.666667,VARS( 2, 5)=  0.000000,
 VARS( 2, 6)=  0.666667,VARS( 2, 7)=  0.512147,VARS( 2, 8)=  0.403713
 VARS( 3, 3)=  1.000000,VARS( 3, 4)=  0.000000,VARS( 3, 5)=  0.666667,VARS( 3, 6)=  0.666667,
 VARS( 3, 7)=  0.512147,VARS( 3, 8)= -0.814971
 VARS( 4, 4)=  1.000000,VARS( 4, 5)=  0.444444,VARS( 4, 6)=  0.444444,VARS( 4, 7)=  0.768221,
 VARS( 4, 8)=  0.544951
 VARS( 5, 5)=  1.000000,VARS( 5, 6)=  0.444444,VARS( 5, 7)=  0.768221,VARS( 5, 8)= -0.270336
 VARS( 6, 6)=  1.000000,VARS( 6, 7)=  0.768221,VARS( 6, 8)= -0.270336
 VARS( 7, 7)=  1.000000,VARS( 7, 8)=  0.001232

          FOR ANOVA, TOTAL SUM OF SQUARES=                    33.3903

  STEP NUMBER  6          ENTER VARIABLE  5
   STANDARD ERROR OF ESTIMATE=      0.24037
    RESIDUAL SSQ(BY ADDN OF VAR. SSQ=      0.577791E-01
   MULTIPLE CORRELATION COEFFICIENT =  0.99913
   GOODNESS OF FIT,F(   6,    1)=          96.1507
   CONSTANT TERM=     115.004791

 VAR.        COEFF     STD DEV(COEF)  T VALUE    BETA COEFF     COEF(E)          VAR.SSQ(E)
   1        0.834582       0.2963     2.8115       0.4035    0.834582E 00       0.456742E 00
   2        0.834979       0.1900     4.3939       0.4037    0.834979E 00       0.111550E 01
   3       -1.665025       0.1900    -3.7618      -0.3149   -0.166502E 01       0.443569E 01
   4        0.000757       0.4560     0.0016       0.0002    0.757765E-03       0.159511E-06
   5        0.000790       0.4560     0.0017       0.0002    0.790291E-03       0.173490E-06
   7       -0.001161       0.4940    -0.0023      -0.0003   -0.116174E-02       0.319448E-06

      PREDICTION PART OF PROGRAM

  PREDICTIONS FROM LAST MODEL IN REGRESSION

 OBS NO.      PREDICTION          ACTUAL(IF KNOWN)      DIFFERENCE

    1          114.99983           115.00001            -0.00018
    2          116.66960           116.67001            -0.00041
    3          116.66999           116.67001            -0.00001
    4          118.34016           118.34001             0.00015
    5          111.66998           111.67001            -0.00003
    6          113.34017           113.34001             0.00016
    7          113.33979           113.34001            -0.00021
    8          115.00965           115.01000            -0.00035
```

Figure 1.1-5-b

Calculation of Main Effect corresponding to Figure 1.1-4-c
This yields same results

```
A EXAMPLE FULL FACTORIAL CODED - REG.

IABLE NO.  1                                                                                                                                  4.622, SIG2=      2.150
MEAN=      115.837, MEAN SQ1=      4.629, SIG1=      2.151, X2 MEAN=      114.169, MEAN SQ2=
OS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.001 X1-X2=      1.668

RIABLE NO.  2                                                                                                                                  4.622, SIG2=      2.150
MEAN=      115.837, MEAN SQ1=      4.632, SIG1=      2.152, X2 MEAN=      114.169, MEAN SQ2=
POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.001 X1-X2=      1.668

ARIABLE NO.  3                                                                                                                                  1.853, SIG2=      1.361
X1 MEAN=      113.337, MEAN SQ1=      1.854, SIG1=      1.361, X2 MEAN=      116.669, MEAN SQ2=
POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.000 X1-X2=      -3.331

VARIABLE NO.  4                                                                                                                                 3.698, SIG2=      1.923
X1 MEAN=      115.003, MEAN SQ1=      7.411, SIG1=      2.722, X2 MEAN=      115.003, MEAN SQ2=
POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      2.003 X1-X2=      -0.000

VARIABLE NO.  5                                                                                                                                 9.258, SIG2=      3.042
X1 MEAN=      115.003, MEAN SQ1=      1.849, SIG1=      1.359, X2 MEAN=      115.003, MEAN SQ2=
POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      5.007 X1-X2=      -0.000

VARIABLE NO.  6                                                                                                                                 9.262, SIG2=      3.043
X1 MEAN=      115.002, MEAN SQ1=      1.845, SIG1=      1.358, X2 MEAN=      115.004, MEAN SQ2=
POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      5.019 X1-X2=      -0.001

VARIABLE NO.  7                                                                                                                                 5.557, SIG2=      2.357
X1 MEAN=      115.003, MEAN SQ1=      5.553, SIG1=      2.356, X2 MEAN=      115.003, MEAN SQ2=
POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.000 X1-X2=      -0.000
```

Figure 1.1-6-a

Factorial Buildup with 2 Interactions Solved with the Regular Code

VAR.	TRIAL	BUILD UP	RESPONSE
	(1)	115. + 0.0 + (0.0)*	115.00
1	a	115. + 1.67 + (0.0)	116.67
2	b	115. + 1.67 + (0.50)	117.17
4	ab	115. + 1.67 + 1.67 - (0.50)	117.84
3	c	115. - 3.33 - (0.50)	111.17
5	ac	115. + 1.67 - 3.33 + (0.50)	113.84
6	bc	115. + 1.67 - 3.33 + (0.0)	113.34
7	abc	115. + 1.67 + 1.67 - 3.33 -(0.50) - (0.50)	115.01

* Numbers in () are interaction contribution: ab = -.50, ac = +.50
Numbers clear are main effect contributions.

RESULTS IN FIGURE 1.1-5-b and -c

Printout information is the same as the previous examples and show the correct estimate of the main effects and interactions. Note should be made that the "b" response has an interactive contribution (-1 x -1 = +1 for ac= 0.50)

Figure No. 1.1-6-b

Regression example, Ful Factorial with interactions solved by Regular Code

```
NASA EXAMPLE FULL FACTORIAL CODED - REG.  W/ INT.

CONTROL CARD USED FOR THIS REGRESSION
 3 8    0 3 1 0.000 0.000 0 0 21010 00 0 0010 0 0
 TRANSFORMATIONS SPECIFIED FOR THIS REGRESSION
 1 3 8 0 8 1 1 1 3 2 2 1 8 3 3 1 6 4 1 2 6 5 1 3 6 6 2 3 6 7 6 1

 CONSTANT CARDS USED IN THIS REGRESSION
   2.000

CODING MAX., VARIABLES IN NUMERICAL ORDER
     3.000      3.000      3.000      9.000      9.000      9.000     27.000
  CODING MIN., VARIABLES IN NUMERICAL ORDER
     1.000      1.000      1.000      1.000      1.000      1.000      1.000

CODED DATA LISTING

OBS NO     VARIABLES IN NUMERICAL ORDER
   1
          -1.000    -1.000    -1.000    -1.000    -1.000    -1.000    -1.000   115.000
   2
           1.000    -1.000    -1.000    -0.500    -0.500    -1.000    -0.846   116.670
   3
          -1.000     1.000    -1.000    -0.500    -1.000    -0.500    -0.846   117.170
   4
           1.000     1.000    -1.000     1.000    -0.500    -0.500    -0.384   117.840
   5
          -1.000    -1.000     1.000    -1.000    -0.500    -0.500    -0.846   111.170
   6
           1.000    -1.000     1.000    -0.500     1.000    -0.500    -0.384   113.840
   7
          -1.000     1.000     1.000    -0.500    -0.500     1.000    -0.384   113.340
   8
           1.000     1.000     1.000     1.000     1.000     1.000     0.999   115.010

AVERAGES
VAR( 1)=      0.0000,VAR( 2)=      0.0000,VAR( 3)=      0.0000,VAR( 4)=     -0.2500,
VAR( 5)=     -0.2500,VAR( 6)=     -0.2500,VAR( 7)=     -0.4615,VAR( 8)=    115.0049

STANDARD DEVIATIONS
VAR( 1)=      1.0690,VAR( 2)=      1.0690,VAR( 3)=      1.0690,VAR( 4)=      0.8017,
VAR( 5)=      0.8017,VAR( 6)=      0.8017,VAR( 7)=      0.6422,VAR( 8)=      2.2155

SIMPLE CORRELATION COEFFICIENTS
VARS( 1, 1)=  1.000000,VARS( 1, 2)=  0.000000,VARS( 1, 3)=  0.000000,VARS( 1, 4)=  0.666667,
VARS( 1, 5)=  0.666667,VARS( 1, 6)=  0.000000,VARS( 1, 7)=  0.512147,VARS( 1, 8)=  0.402909
VARS( 2, 2)=  1.000000,VARS( 2, 3)=  0.000000,VARS( 2, 4)=  0.666667,VARS( 2, 5)=  0.000000,
VARS( 2, 6)=  0.666667,VARS( 2, 7)=  0.512147,VARS( 2, 8)=  0.402910
VARS( 3, 3)=  1.000000,VARS( 3, 4)=  0.000000,VARS( 3, 5)=  0.666667,VARS( 3, 6)=  0.666667,
VARS( 3, 7)=  0.512147,VARS( 3, 8)= -0.803400
VARS( 4, 4)=  1.000000,VARS( 4, 5)=  0.444444,VARS( 4, 6)=  0.444444,VARS( 4, 7)=  0.768221,
VARS( 4, 8)=  0.497004
VARS( 5, 5)=  1.000000,VARS( 5, 6)=  0.444444,VARS( 5, 7)=  0.768221,VARS( 5, 8)= -0.226780
VARS( 6, 6)=  1.000000,VARS( 6, 7)=  0.768221,VARS( 6, 8)= -0.266991
VARS( 7, 7)=  1.000000,VARS( 7, 8)=  0.001227

          FOR ANOVA, TOTAL SUM OF SQUARES=                    34.3596

 STEP NUMBER  6          ENTER VARIABLE  7
  STANDARD ERROR OF ESTIMATE=      0.16236
   RESIDUAL SSQ(BY ADDN OF VAR. SSQ=      0.265262E-01
  MULTIPLE CORRELATION COEFFICIENT =  0.99961
  GOODNESS OF FIT,F(   6,    1)=        215.7177
  CONSTANT TERM=     115.004332

VAR.       COEFF     STD DEV(COEF)  T VALUE   BETA COEFF    COEF(E)          VAR.SSQ(E)
  1       0.834737      0.2011     4.1502      0.4027     0.834737E 00       0.456912E 00
  2       1.334977      0.1287    10.3680      0.6441     0.133497E 01       0.285146E 01
  3      -2.165024      0.1287   -16.8145     -1.0446    -0.216502E 01       0.749972E 01
  4      -0.999552      0.3090    -3.2345     -0.3617    -0.999552E 00       0.277531E 00
  5       1.000475      0.3090     3.2375      0.3620     0.100047E 01       0.278043E 00
  7      -0.000649      0.3347    -0.0019     -0.0001    -0.649640E-03       0.998901E-07


     PREDICTION PART OF PROGRAM

PREDICTIONS FROM LAST MODEL IN REGRESSION

OBS NO.     PREDICTION          ACTUAL(IF KNOWN)       DIFFERENCE

   1          114.99986           115.00001            -0.00015
   2          116.66972           116.67001            -0.00028
   3          117.16996           117.17001            -0.00004
   4          117.84005           117.84001             0.00004
   5          111.16995           111.17001            -0.00006
   6          113.84007           113.84001             0.00006
   7          113.33984           113.34001            -0.00016
   8          115.00981           115.01000            -0.00019
```

Figure 1.1-6-c

NASA EXAMPLE FULL FACTORIAL CODED - REG. W/ INT.

Effects for Example in Figure 1.1-6-a

```
VARIABLE NO.   1
X1 MEAN=    115.839, MEAN SQ1=      3.123, SIG1=      1.767, X2 MEAN=    114.169, MEAN SQ2=      6.461, SIG2=      2.542
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      2.068 X1-X2=   1.670

VARIABLE NO.   2
X1 MEAN=    115.839, MEAN SQ1=      4.235, SIG1=      2.058, X2 MEAN=    114.169, MEAN SQ2=      5.349, SIG2=      2.312
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.263 X1-X2=   1.670

VARIABLE NO.   3
X1 MEAN=    113.339, MEAN SQ1=      2.584, SIG1=      1.607, X2 MEAN=    116.669, MEAN SQ2=      1.467, SIG2=      1.211
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.761 X1-X2=  -3.329

VARIABLE NO.   4
X1 MEAN=    114.754, MEAN SQ1=      7.498, SIG1=      2.738, X2 MEAN=    115.254, MEAN SQ2=      3.777, SIG2=      1.943
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.984 X1-X2=  -0.499

VARIABLE NO.   5
X1 MEAN=    115.254, MEAN SQ1=      1.929, SIG1=      1.389, X2 MEAN=    114.754, MEAN SQ2=      9.345, SIG2=      3.057
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      4.843 X1-X2=   0.500

VARIABLE NO.   6
X1 MEAN=    115.004, MEAN SQ1=      1.847, SIG1=      1.359, X2 MEAN=    115.004, MEAN SQ2=      9.596, SIG2=      3.097
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      5.193 X1-X2=  -0.000

VARIABLE NO.   7
X1 MEAN=    115.004, MEAN SQ1=      7.388, SIG1=      2.718, X2 MEAN=    115.004, MEAN SQ2=      4.056, SIG2=      2.014
 POS. GR.NO.=      4.00 NEG. GR. NO.=      4.00 F=      1.821 X1-X2=  -0.000
```

FIGURE 1.1 - 7-a Fractional Factorial -
Built-up Example, Including Quant. Var.
With one observation omitted - using Regular Code

	TRIAL	BUILD-UP	RESPONSES	
	(1),-1.	115. +0.0+0.0	115.00	
	a,+.8	115.+1.67+.9	117.57	
	b,+1.	115.+1.67+1.	117.67	
OMITTED	ab,?	115.+1.67+1.67+.2	118.54	OMITTED
	bc,.6	115.+1.67-3.33+.8	114.14	
	c, -.4	115.-3.33+.3	111.97	
	ac,+.4	115.+1.67-3.33+.7	114.03	
	abc,-.2	115.+1.67+1.67-3.33+.4	115.40	

RESULTS OF ANALYSIS IN FIGURE 1.1 - 7 - b

The print-out shows the original coded matrix in which Var.1=A, Var. 2=B. Var. 3=C. Var. 4= Quant Var., Var. 5=Interaction of AxB. To unbalance the matrix to show this effect the (ab) trial was omitted from the original data matrix, although its value is shown in the table, above. Again, the averages and standard deviations are listed and the step-wise regression steps, including the last model which is used in the further analysis. The (ab) trial matrix was added to the deck for the print-out under predictions, next, to show the value of the equation derived. The last print-out shows the results of the complete predicted factorial means and differences for the effect of each variable.X1 is the positive mean and X2 is the negative mean.As it shows the value of the quantitative variable (4) is 1. from -1. to +1., which, from the table is correct. The interaction is insignificant, which is also correct, since none was put in.

FIGURE 1.1 - 7 - b Fractional Factorial Regression Analysis

CODED DATA LISTING

OBS NO	VARIABLES IN NUMERICAL ORDER					
1	-1.000	-1.000	-1.000	-1.000	-1.000	115.000
2	1.000	-1.000	-1.000	0.800	-0.500	117.570
3	-1.000	1.000	-1.000	1.000	-0.500	117.670
4	-1.000	1.000	1.000	0.600	-0.500	114.140
5	-1.000	-1.000	1.000	-0.400	-1.000	111.970
6	1.000	-1.000	1.000	0.399	-0.500	114.030
7	1.000	1.000	1.000	-0.200	1.000	115.400

AVERAGES
VAR(1)= -0.1428,VAR(2)= -0.1428,VAR(3)= 0.1428,VAR(4)= 0.1714,
VAR(5)= -0.4285,VAR(6)= 115.1113

STANDARD DEVIATIONS
VAR(1)= 1.0690,VAR(2)= 1.0690,VAR(3)= 1.0690,VAR(4)= 0.7250,
VAR(5)= 0.6725,VAR(6)= 2.0289

SIMPLE CORRELATION COEFFICIENTS
VARS(1, 1)= 1.000000,VARS(1, 2)= -0.166666,VARS(1, 3)= 0.166666,VARS(1, 4)= 0.208876,
VARS(1, 5)= 0.596039,VARS(1, 6)= 0.255979
VARS(2, 2)= 1.000000,VARS(2, 3)= 0.166666,VARS(2, 4)= 0.380891,VARS(2, 5)= 0.596039,
VARS(2, 6)= 0.288252
VARS(3, 3)= 1.000000,VARS(3, 4)= -0.122868,VARS(3, 5)= 0.331133,VARS(3, 6)= -0.753882
VARS(4, 4)= 1.000000,VARS(4, 5)= 0.107410,VARS(4, 6)= 0.546097
VARS(5, 5)= 1.000000,VARS(5, 6)= 0.251500

FOR ANOVA, TOTAL SUM OF SQUARES= 24.7004

STEP NUMBER 5 ENTER VARIABLE 2
STANDARD ERROR OF ESTIMATE= 0.18053
VAR(2) SSQ= 0.1171, RESIDUAL SSQ, BY ADDN OFVAR. SSQ= 0.0325911
MULTIPLE CORRELATION COEFFICIENT = 0.99934
GOODNESS OF FIT,F(5, 1)= 151.3775
CONSTANT TERM= 115.503006

VAR	COEFF	STD DEV COEFF	T VALUE	BETA COEFF	COEFF
1	0.827025	0.4079	2.0270	0.4357	0.827025E 00
2	0.829010	0.4372	1.8957	0.4367	0.829010E 00
3	-1.666478	0.0744	-22.3885	-0.8780	-0.166647E 01
4	0.505164	0.3126	1.6155	0.1805	0.505164E 00
5	0.008412	0.7676	0.0109	0.0027	0.841294E-02

PREDICTIONS FROM LAST MODEL IN REGRESSION

OBS NO.	PREDICTION	ACTUAL(IF KNOWN)	DIFFERENCE
1	114.99983	115.00001	-0.00018
2	117.56738	117.57000	-0.00262
3	117.67240	117.67001	0.00239
4	118.53080	118.54000	-0.00920
5	114.13737	114.14001	-0.00263
6	111.96997	111.97000	-0.00003
7	114.03234	114.03001	0.00233
8	115.39990	115.40000	-0.00010

FIGURE 1.1 - 7 - c

```
VARIABLE NO.    1
X1 MEAN=     116.332, MEAN SQ1=       3.985, SIG1=       1.996, X2 MEAN=     114.669, MEAN SQ2=       3.983, SIG2=       1.995
 POS. GR.NO.=      16.00 NEG. GR. NO.=      16.00 F=       1.000 X1-X2=    1.662

VARIABLE NO.    2
X1 MEAN=     116.333, MEAN SQ1=       3.986, SIG1=       1.996, X2 MEAN=     114.667, MEAN SQ2=       3.976, SIG2=       1.994
 POS. GR.NO.=      16.00 NEG. GR. NO.=      16.00 F=       1.002 X1-X2=    1.666

VARIABLE NO.    3
X1 MEAN=     113.834, MEAN SQ1=       1.759, SIG1=       1.326, X2 MEAN=     117.167, MEAN SQ2=       1.759, SIG2=       1.326
 POS. GR.NO.=      16.00 NEG. GR. NO.=      16.00 F=       1.000 X1-X2=   -3.332

VARIABLE NO.    4
X1 MEAN=     116.005, MEAN SQ1=       4.449, SIG1=       2.109, X2 MEAN=     114.995, MEAN SQ2=       4.446, SIG2=       2.108
 POS. GR.NO.=      16.00 NEG. GR. NO.=      16.00 F=       1.000 X1-X2=    1.010

VARIABLE NO.    5
X1 MEAN=     115.502, MEAN SQ1=       6.197, SIG1=       2.489, X2 MEAN=     115.498, MEAN SQ2=       3.245, SIG2=       1.801
 POS. GR.NO.=      16.00 NEG. GR. NO.=      16.00 F=       1.909 X1-X2=    0.004
```

TABLE NO. 1.2-1

POSSIBLE REACTIONS AND FREE ENERGIES

		ΔF
1.	$Ag_2O_{(c)} = 2Ag_{(c)} + 1/2O_{2(g)}$	2.586
2.	$Ag_2O_{(c)} = AgO^-_{(aq)} + Ag^+_{(aq)}$	15.53
3.	$Ag_2O_{(c)} + H_2O_{(c)} = Ag(OH)^-_{2(aq)} + Ag^+_{(aq)}$	20.64
4.	$2Ag_2O_{(c)} + 2H_2O_{(c)} = Ag_3O(OH)^-_{2(aq)} + Ag^+_{(aq)}$	-----
5.	$2Ag^+_{(aq)} + O^=_{(aq)} = 2Ag_{(c)} + 1/2O_{(g)}$	-----
6.	$2Ag^+_{(aq)} = 2O^-_{(aq)} = 2Ag_{(c)} + O_{2(g)}$	-----
7.	$Ag^+_{(aq)} + O^-_{2(aq)} = Ag_{(c)} + O_{2(g)}$	-31.43
8.	$AgO_{(c)} + 1/2Ag_2O_{(c)} + 1/4O_{2(g)}$	- 3.89
9.	$AgO_{(c)} + Ag_{(c)} = Ag_2O_{(c)}$	- 5.186
10.	$AgO_{(c)} = Ag_{(c)} + 1/2O_{2\ (g)}$	- 2.6
11.	$AgO_{(c)} + H_2O_{(c)} = 1/2Ag(OH)^-_{4(aq)} + 1/2Ag^+_{(aq)}$	-----
12.	$AgO_{(c)} + OH_{(aq)} = Ag^+_{(c)} + HO^-_{2(aq)}$	20.385
13.	$Ag_2O_{3(c)} = 2Ag_{(c)} + 3/2\ O_{2\ (g)}$	-20.8
14.	$Ag_2O_{(c)} = Ag_2O_{(c)} + O_{2\ (g)}$	-23.386
15.	$Ag_2O_{3(c)} = 2AgO_{(c)} + 1/2O_{2\ (g)}$	-15.6
16.	$Ag_2O_{(c)} = 2AgO^+_{(aq)} + 1/2O^-_{2(aq)}$	52.1

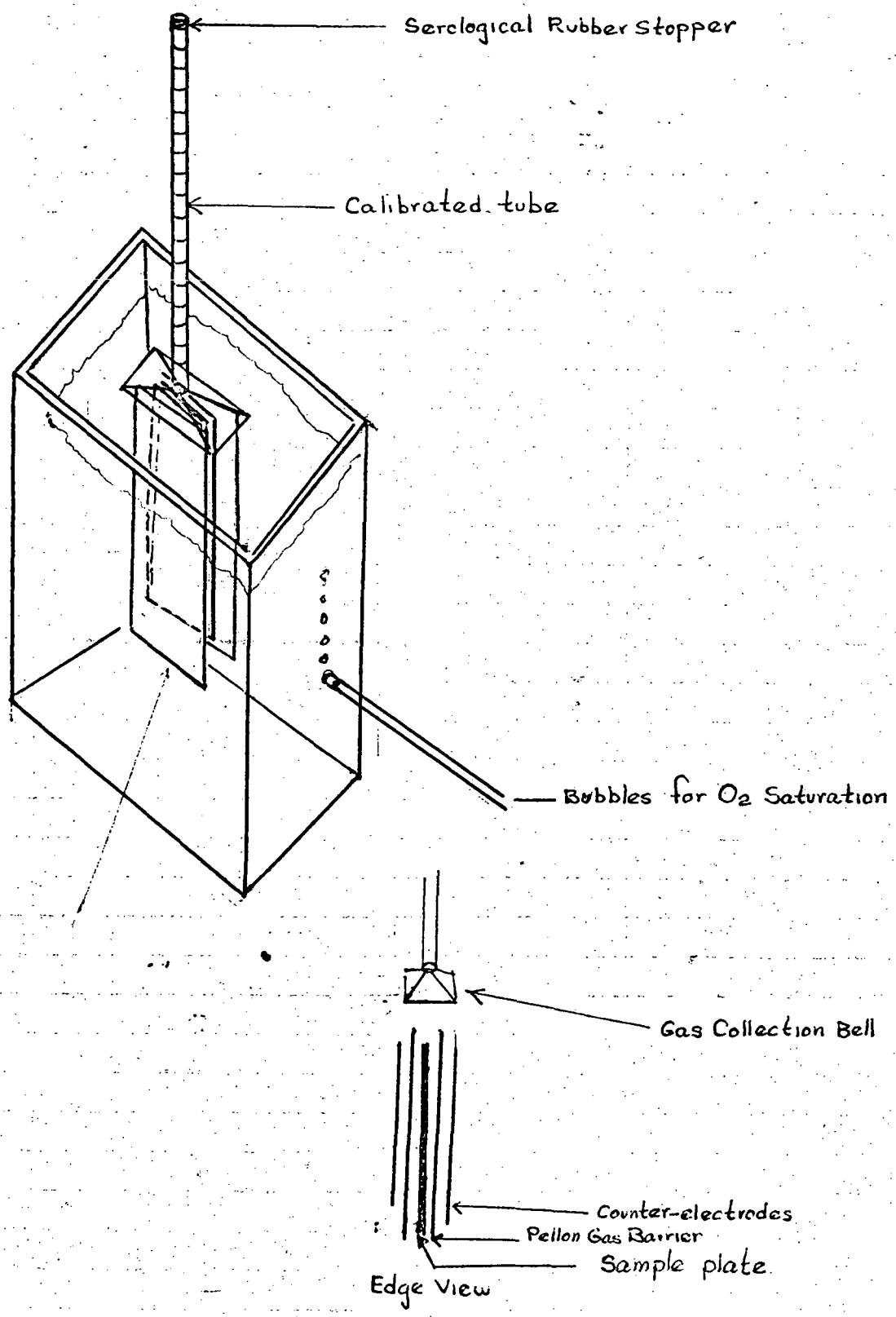
TABLE NO. 1.2-2

THERMODYNAMIC DATA

	$\Delta H°$	$\Delta F°$	$\Delta S°$
$Ag_{(c)}$	0	0	10.206
$Ag^{+}_{(aq)}$	25.31	18.430	17.67
$Ag^{++}_{(aq)}$		64.1	
$AgO^{+}_{(aq)}$		53.9	
$AgO^{-}_{(aq)}$		- 5.49	
$Ag_2O_{(c)}$	- 7.306	- 2.586	29.09
$AgO_{(c)}$	- 6.0 -2.769	2.6 3.463	13.81
$Ag_2O_{3(c)}$		20.8	
$Ag_2CO_{3(c)}$	-120.97	-104.48	40.0
$O_2(^3P_2)_{(g)}$	59.159	54.994	38.469
$O_{2(g)}$	0	0	49.003
$O_{2(aq)}$	-3.8		
$OH_{(aq)}$		8.53	
$OH^{-}_{(aq)}$	-54.957	-37.595	- 2.52
$H_2O_{(liq)}$	-68.317	-56.690	16.716
$H_2O_{2(aq)}$	-45.68	-31.470	
$HO_2^{-}{}_{(aq)}$		-15.610	
$HO_{2(aq)}$		3.0	
$O_{2(aq)}^{-}$		13.0	
$K_2CO_{3(c)}$	-273.93	-255.5	(33.6)
$K^{+}_{(aq)}$	-60.04	-67.46	24.5
$K_2O_{(c)}$	-86.4	-76.2	(20.8)
$K_2O_{2(c)}$	-118	-100.1	(19.4)
$KOH_{(aq)}$	-115.0	-105.061	22.0
$AgOH_{(c)}$		-22.0	
$Ag(OH)_{2(aq)}$		-57.07	

FIGURE NO. 2.1-1

DIAGRAMMATIC SKETCH OF SETUP



E

TABLE NO. 2.4-1

VARIABLE DESIGNATION AND INTERACTIONS
TASK IV

VARIABLE	DESCRIPTION	(+) LEVEL	(-) LEVEL	COMMENT
1	Temperature	140°F	Room Temp. (75°F)	
2	Vacuum Treatment	0.5 Atm.	1. Atm	
3	Lot Comparison	Lot 25	Lot 1, Lot 24	Dummy Var.
4	Time of Treatment	10 days	1 day	
5	Helium Flushing Treatment	He flush for 1 hr. at 140°F and cooled by N_2 gas	No treatment	
6	Lot Comparison	Lot 1	Lot 24,Lot 25	Dummy Var.
7	Plate Sintered Weight			
8	Percent Oxygen Pickup			

VARIABLE NO.	INTERACTION VARS.
9	01/02
10	01/03
11	01/04
12	01/05
13	01/06
14	05/06
15	02/03
16	02/04
17	02/05
18	02/06
19	03/04
20	03/05
21	03/06
22	04/05
23	04/06
24	08
25	09
26	08 + 09

TABLE NO. 2.4-2A

Column Designation for Table No. 2.4-2B
(See Table No. 1 for Variable Designation)

Column	Variable or Description
1	Obs. Number (First row of each)
2	Var. 1
3	Var. 2
4	Var. 3
5	Var. 4
6	Var. 5
7	Var. 6
8	Var. 7
9	Formed Weight
10	Oxygen Weight
11	Var. 8
12 (next row)	O.C. Gas at 140 Hours (Var. 37)
13	Discharge Gas at 50 Hours (Var. 38)
14	Combined OC + Dis.

TABLE NO. 2B - Task 4 Production Plate Data
See Table 2A for Column Designation

NO. 1										
75.00	-1.00	-1.00	1.00	-1.00	-1.00	123.40	139.40	16.00	14.05	
15.62	19.64	35.26								
NO. 2										
75.00	-1.00	-1.00	1.00	-1.00	-1.00	122.80	138.80	16.00	14.12	
31.63	20.82	52.45								
NO. 3										
75.00	-1.00	-1.00	1.00	1.00	-1.00	122.70	138.70	16.00	14.13	
13.63	20.13	33.76								
NO. 4										
75.00	-1.00	-1.00	10.00	-1.00	-1.00	126.30	142.30	16.00	13.70	
18.84	23.99	42.83								
NO. 5										
75.00	-1.00	-1.00	10.00	-1.00	-1.00	125.00	141.00	16.00	13.85	
23.99	19.97	43.96								
NO. 6										
75.00	-1.00	-1.00	10.00	1.00	-1.00	122.80	138.80	16.00	14.12	
43.16	32.95	76.11								
NO. 7										
75.00	-1.00	-1.00	10.00	1.00	-1.00	121.00	137.00	16.00	14.35	
43.55	26.57	70.12								
NO. 8										
75.00	1.00	1.00	1.00	-1.00	0.00	124.70	140.70	16.00	13.89	
29.06	32.12	61.18								
NO. 9										
75.00	1.00	1.00	1.00	1.00	0.00	122.40	138.40	16.00	14.17	
38.72	40.89	79.61								
NO. 10										
75.00	1.00	1.00	10.00	-1.00	0.00	123.40	139.40	16.00	14.05	
168.68	166.83	335.51								
NO. 11										
75.00	1.00	1.00	10.00	1.00	0.00	124.70	141.10	16.40	14.24	
164.42	146.69	311.11								
NO. 12										
140.00	-1.00	1.00	10.00	-1.00	0.00	123.90	139.90	16.00	13.99	
40.09	26.01	66.10								
NO. 13										
140.00	-1.00	1.00	10.00	1.00	0.00	122.30	138.30	16.00	14.18	
43.80	26.89	70.69								
NO. 14										
140.00	1.00	-1.00	1.00	-1.00	-1.00	123.10	139.10	16.00	14.08	
45.82	38.45	84.27								
NO. 15										
140.00	1.00	-1.00	1.00	-1.00	-1.00	125.30	141.30	16.00	13.82	
40.13	62.19	102.32								
NO. 16										
140.00	1.00	-1.00	1.00	1.00	-1.00	123.00	139.00	16.00	14.10	
19.48	47.41	66.89								
NO. 17										
140.00	1.00	-1.00	10.00	-1.00	-1.00	126.00	142.10	16.10	13.82	
181.79	188.24	370.03								
NO. 18										
140.00	1.00	-1.00	10.00	1.00	-1.00	123.60	139.70	16.10	14.11	
154.42	145.07	299.49								
NO. 19										
140.00	1.00	-1.00	10.00	1.00	-1.00	123.30	139.30	16.00	14.06	
170.93	181.23	352.16								
NO. 20										
140.00	-1.00	1.00	1.00	-1.00	0.00	122.80	138.80	16.00	14.12	
30.43	25.58	56.01								

TABLE NO. 2B (Continued)

NO. 21										
140.00	-1.00	1.00	1.00	1.00	0.00	123.70	139.70	16.00	14.01	
25.77	22.55	48.33								
NO. 22										
75.00	-1.00	0.00	1.00	-1.00	1.00	121.70	137.70	16.00	14.26	
35.46	14.21	49.67								
NO. 23										
165.00	1.00	0.00	1.00	-1.00	1.00	124.70	140.79	16.09	13.97	
64.67	65.40	130.07								
NO. 24										
165.00	1.00	0.00	1.00	-1.00	1.00	123.70	139.80	16.10	14.10	
66.26	67.28	133.54								
NO. 25										
75.00	1.00	0.00	5.00	-1.00	1.00	122.90	139.02	16.12	14.21	
42.30	7.07	49.37								
NO. 26										
165.00	-1.00	0.00	5.00	1.00	1.00	123.35	139.43	16.08	14.12	
139.60	171.68	311.28								
NO. 27										
165.00	-1.00	0.00	5.00	1.00	1.00	123.71	140.22	16.51	14.46	
176.90	195.33	372.23								
NO. 28										
75.00	1.00	0.00	1.00	-1.00	1.00	126.70	143.37	16.67	14.22	
43.72	16.29	60.01								
NO. 29										
75.00	-1.00	0.00	5.00	-1.00	1.00	124.40	140.58	16.18	14.08	
37.82	25.31	63.13								
NO. 30										
75.00	-1.00	0.00	1.00	-1.00	1.00	124.70	141.04	16.34	14.18	
41.57	22.68	64.25								
NO. 31										
165.00	-1.00	0.00	1.00	-1.00	1.00	124.50	140.94	16.44	14.29	
46.49	60.38	106.87								
NO. 32										
165.00	1.00	0.00	1.00	-1.00	1.00	122.90	138.99	16.09	14.19	
52.10	58.83	110.93								
NO. 33										
165.00	1.00	0.00	5.00	-1.00	1.00	126.20	142.81	16.61	14.23	
58.00	77.61	135.61								
NO. 34										
165.00	1.00	0.00	5.00	-1.00	1.00	121.80	137.86	16.06	14.30	
63.10	80.33	143.43								
NO. 35										
75.00	1.00	0.00	5.00	1.00	1.00	124.68	141.09	16.41	14.25	
28.82	10.91	39.73								
NO. 36										
165.00	-1.00	0.00	5.00	1.00	1.00	122.40	138.70	16.30	14.44	
145.39	142.50	287.89								
NO. 37										
165.00	1.00	0.00	1.00	1.00	1.00	122.82	138.93	16.11	14.22	
47.71	45.05	92.76								
NO. 38										
165.00	1.00	0.00	1.00	1.00	1.00	123.50	139.51	16.01	14.04	
64.81	52.30	117.11								
NO. 39										
75.00	1.00	0.00	1.00	1.00	1.00	124.06	140.07	16.01	13.97	
58.72	23.55	82.27								
NO. 40										
75.00	-1.00	0.00	1.00	1.00	1.00	121.32	137.27	15.95	14.26	
48.41	14.95	63.36								

TOT NO. OBS= 40

TABLE 2.4-3
REGRESSION MODEL FOR OPEN CIRCUIT

RSQR X	B COEF	SE(B)	T	ANALYSIS OF Y 1
0.9738	96.9338	23.7992	4.07	
0.9599	21.2630	17.1301	1.24	
0.9736	101.0452	29.5567	3.41	
0.9454	-20.7829	16.6182	-1.25	
0.9719	-54.0811	26.9861	-2.00	
0.9859	-191.6491	43.7243	-4.38	
0.9123	22.1138	16.5610	1.33	
0.9711	63.8533	26.8567	2.37	
0.8999	27.0528	15.4963	1.74	
0.7999	79.2879	12.0122	6.60	
0.8884	-39.0183	14.1583	-2.75	
0.9257	31.8845	21.8348	1.46	
0.9242	-44.9422	18.0742	-2.48	

CONSTANT	MULT F	DF1	DF2	RSQR*	RES.SSQ/DF2	*SQUARED CORRELATION COEF.
100.86480	14.98	13	26	0.882	468.46038	

RESIDUAL SSQ(BY DIFF.)= 0.1264842E 05, TOTAL SSQ= 0.1074169E 06
CORRELATION COEF.=0.9392

STANT= 100.86480

TABLE 2.4-4
REGRESSION MODEL FOR DISCHARGE

RSQR X	B COEF	SE(B)	T	ANALYSIS OF Y 2
0.9754	112.4221	24.6855	4.55	
0.9667	158.8044	26.4375	6.00	
0.8454	-20.4433	10.2560	-1.99	
0.9361	-57.0657	15.4462	-3.69	
0.4366	-15.5498	10.7612	-1.44	
0.8976	-43.5068	14.2010	-3.06	
0.9845	-273.1170	41.9045	-6.51	
0.8593	32.2938	13.1422	2.45	
0.9716	122.5154	27.2124	4.50	
0.8668	80.9554	14.8042	5.46	
0.8563	-22.5296	12.5464	-1.79	

CONSTANT	MULT F	DF1	DF2	RSQR*	RES.SSQ/DF2	*SQUARED CORRELATION COEF.
102.11839	21.86	11	28	0.895	473.60046	

RESIDUAL SSQ(BY DIFF.)= 0.1373441E 05, TOTAL SSQ= 0.1317060E 06
CORRELATION COEF.=0.9464

STANT= 102.11839

TABLE 2.4-5
REGRESSION MODEL FOR COMBINED GAS

RSQR X	B COEF	SE(B)	T	ANALYSIS OF Y 3
0.9677	242.4094	42.4157	5.71	
0.9628	292.5802	49.2274	5.94	
0.9368	-94.3503	30.5543	-3.08	
0.8728	-70.3815	25.0718	-2.80	
0.9829	-492.7156	78.5784	-6.27	
0.9710	170.6142	53.0351	3.21	
0.8460	68.5105	24.7270	2.77	
0.7982	151.4534	23.6728	6.39	
0.8473	-51.1008	23.9549	-2.13	
0.7461	-36.8038	19.5393	-1.88	

CONSTANT	MULT F	DF1	DF2	RSQR*	RES.SSQ/DF2	*SQUARED CORRELATION COEF.
193.34356	21.65	10	29	0.881	1835.01294	

RESIDUAL SSQ(BY DIFF.)= 0.5505038E 05, TOTAL SSQ= 0.4661178E 06
CORRELATION COEF.=0.9390

STANT= 193.34356

TABLE 2.4-6
PREDICTIONS BASED ON ORIGINAL DATA (OPEN CIRCUIT)

RESIDUALS AND PREDICTIONS

OBS	Y(OBS)	Y(PRED)	RESIDUAL	S.E.(Y)	NORM DEV	RESIDUALS SSQS
1	15.6200	7.8993	7.7206	8.8915	0.356	59.6083756
2	31.6300	7.8993	23.7306	8.8915	1.096	622.7519545
3	13.6300	17.7122	-4.0822	9.3093	-0.188	639.4163835
4	18.8400	34.3260	-15.4860	8.8334	-0.715	879.2336442
5	23.9900	34.3260	-10.3360	8.8334	-0.477	986.0672621
6	43.1600	44.1388	-0.9788	8.8658	-0.045	987.0253922
7	43.5500	44.1388	-0.5888	8.8658	-0.027	987.3720719
8	29.0600	47.1265	-18.0665	14.5700	-0.834	1313.7724642
9	38.7200	31.4463	7.2736	15.1033	0.336	1366.6777377
10	168.6800	168.9901	-0.3101	15.1036	-0.014	1366.7736849
11	164.4200	153.3099	11.1100	14.5701	0.513	1490.2072787
12	40.0900	28.2227	11.8672	15.4514	0.548	1631.0395536
13	43.8000	65.2564	-21.4564	15.0544	-0.991	2091.4179754
14	45.8200	47.4202	-1.6002	13.0362	-0.073	2093.9785223
15	40.1300	47.4202	-7.2902	13.0362	-0.336	2147.1254940
16	19.4800	31.9025	-12.4225	14.8960	-0.573	2301.4458065
17	181.7900	172.2811	9.5088	14.8959	0.439	2391.8632879
18	154.4200	156.7635	-2.3435	13.0369	-0.108	2397.3549871
19	170.9300	156.7635	14.1664	13.0369	0.654	2598.0439519
20	30.4300	4.7934	25.6365	15.0547	1.184	3255.2768611
21	25.7750	41.8271	-16.0521	15.4514	-0.741	3512.9482479
22	35.4600	35.9242	-0.4642	11.7640	-0.021	3513.1635808
23	64.6700	47.1694	17.5005	9.1320	0.808	3819.4336004
24	66.2600	47.1694	19.0905	9.1320	0.882	4183.8838005
25	42.3000	57.6856	-15.3856	13.8981	-0.710	4420.6015758
26	139.6000	136.7196	2.8803	11.7496	0.133	4428.8974723
27	176.9000	136.7196	40.1803	11.7496	1.856	6043.3584117
28	43.7200	31.2502	12.4697	14.7640	0.576	6198.8525524
29	37.8200	18.6145	19.2054	14.9206	0.887	6567.6992321
30	41.5700	35.9242	5.6457	11.7640	0.260	6599.5732555
31	46.4900	98.2039	-51.7139	17.4791	-2.389	9273.9082298
32	52.1000	47.1694	4.9305	9.1320	0.227	9298.2187767
33	58.0000	73.6047	-15.6047	11.4495	-0.720	9541.7265892
34	63.1000	73.6047	-10.5047	11.4495	-0.485	9652.0761947
35	28.8200	55.5318	-26.7118	14.7643	-1.234	10365.5996322
36	145.3900	136.7196	8.6703	11.7496	0.400	10440.7734603
37	47.7100	63.9725	-16.2625	11.3045	-0.751	10705.2441673
38	64.8100	63.9725	0.8374	11.3045	0.038	10705.9453392
39	58.7200	29.0965	29.6234	13.8982	1.368	11583.4941673
40	48.4100	72.7927	-24.3827	15.9970	-1.126	12178.0097885

TABLE 2.4-7
PREDICTIONS BASED ON ORIGINAL DATA (DISCHARGE)

RESIDUALS AND PREDICTIONS

OBS	Y(OBS)	Y(PRED)	RESIDUAL	S.E.(Y)	NORM DEV.	RESIDUALS SSQS
1	19.6430	13.0095	6.6334	10.9851	0.304	44.0030137
2	20.8230	9.9524	10.8705	11.0791	0.499	162.1710819
3	20.1340	21.2428	-1.1088	11.5578	-0.050	163.4006351
4	23.9880	36.6940	-12.7060	13.2013	-0.583	324.8435066
5	19.9740	30.3614	-10.3874	10.9700	-0.477	432.7423102
6	32.9490	31.1141	1.8348	10.2727	0.084	436.1089485
7	26.5670	21.7508	4.8161	13.2726	0.221	459.3045662
8	32.1150	55.1673	-23.0523	13.9764	-1.059	990.7131364
9	40.8910	32.8143	8.0766	14.3705	0.371	1055.9448270
10	166.8300	158.5201	8.3098	14.1767	0.381	1124.9982943
11	146.6900	140.0393	6.6506	13.6955	0.305	1169.2299833
12	26.0080	17.7148	8.2931	14.4174	0.381	1238.0063505
13	26.8910	41.3620	-14.4710	13.8580	-0.664	1447.4165067
14	38.4480	47.3085	-8.8605	12.5737	-0.407	1525.9252963
15	62.1940	58.2995	3.8944	11.7810	0.178	1541.0915560
16	47.4150	56.0631	-8.6481	12.2740	-0.397	1615.8815946
17	188.2400	168.0489	20.1911	12.9284	0.927	2023.5620150
18	145.0700	165.3725	-20.3025	11.5201	-0.932	2435.7553768
19	181.2300	167.4550	13.7749	11.5374	0.632	2625.5053768
20	25.5790	2.7766	22.8023	13.6535	1.047	3145.4511775
21	22.5520	39.1466	-16.5946	15.0267	-0.762	3420.8330135
22	14.2100	17.6985	-3.4885	9.1108	-0.160	3433.0029354
23	65.4000	53.8362	11.5637	9.6114	0.531	3566.7226629
24	67.2800	48.4515	18.8285	8.7857	0.865	3921.2348699
25	7.0700	37.2006	-30.1306	9.9680	-1.384	4829.0908336
26	171.6800	159.5096	12.1703	12.7544	0.559	4977.2080211
27	195.3300	145.8753	49.4546	11.4308	2.272	7422.9668102
28	16.2900	-11.9694	28.2594	9.3641	1.298	8221.5605697
29	25.3100	29.1877	-3.8777	10.0341	-0.178	8236.5976791
30	22.6800	20.8292	1.8507	8.8727	0.085	8240.0215072
31	60.3800	108.8079	-48.4279	15.8491	-2.225	10585.2832260
32	58.8300	44.7284	14.1015	9.1064	0.647	10784.1367454
33	77.6100	91.7320	-14.1220	9.8633	-0.648	10983.5683822
34	80.3300	88.9432	-8.6132	10.5430	-0.395	11057.7539291
35	10.9100	25.1522	-14.2422	12.0682	-0.654	11260.5937728
36	142.5000	146.6255	-4.1255	11.3047	-0.189	11277.6133041
37	45.0500	60.5458	-15.4958	10.6435	-0.712	11517.7344017
38	52.3000	67.6339	-15.3339	11.7860	-0.704	11752.8633041
39	23.5500	-12.4971	36.0471	13.3112	1.656	13052.2578353
40	14.9500	29.3463	-14.3963	9.4479	-0.661	13259.5136947

RESIDUALS AND PREDICTIONS

OBS	Y(OBS)	Y(PRED)	RESIDUAL	S.E.(Y)	NORM DEV	RESIDUALS SSQS
1	35.2630	13.1193	22.1436	17.3074	0.516	490.3421028
2	52.4530	13.1193	39.3336	17.3074	0.918	2037.4799833
3	33.7640	21.8241	11.9398	17.5902	0.278	2180.0390691
4	42.8280	72.2580	-29.4300	16.9922	-0.687	3046.1645574
5	43.9640	72.2580	-28.2940	16.9922	-0.660	3846.7153377
6	76.1090	80.9628	-4.8538	17.0569	-0.113	3870.2753963
7	70.1170	80.9628	-10.8458	17.0569	-0.253	3987.9082098
8	61.1750	94.7642	-33.5892	25.5718	-0.784	5116.1484489
9	79.6110	86.6253	-7.0143	26.8038	-0.163	5165.3486461
10	335.5100	307.0587	28.4512	26.8039	0.664	5974.8203258
11	311.1099	298.9198	12.1901	25.5720	0.284	6123.4209098
12	66.0980	50.9376	15.1603	26.7138	0.353	6353.2558708
13	70.6910	93.9046	-23.2136	25.6298	-0.541	6892.1289176
14	84.2680	110.1443	-25.8763	24.6079	-0.604	7561.7109508
15	102.3240	110.1443	-7.8202	24.6079	-0.182	7622.8672008
16	66.8950	67.7432	-0.8482	28.1858	-0.019	7623.5859508
17	370.0300	357.3092	12.7208	28.1862	0.296	7785.4052848
18	299.4899	314.9082	-15.4182	24.6081	-0.359	8023.1259880
19	352.1600	314.9082	37.2518	24.6081	0.869	9410.8242416
20	56.0090	26.6694	29.3395	25.6298	0.684	10271.6308860
21	48.3270	69.6364	-21.3094	26.7137	-0.497	10725.7207298
22	49.6700	51.1393	-1.4693	19.2589	-0.034	10727.8789329
23	130.0700	95.7427	34.3272	17.4930	0.801	11906.2402610
24	133.5400	95.7427	37.7972	17.4930	0.882	13334.8750228
25	49.3700	75.0545	-25.6845	19.5985	-0.599	13994.5683822
26	311.2800	283.5191	27.7609	22.2184	0.648	14765.2363548
27	372.2300	283.5191	88.7109	22.2184	2.070	22634.8672409
28	60.0099	-3.7933	63.8033	17.4765	1.489	26705.7383270
29	63.1300	46.4268	16.7031	22.9520	0.389	26984.7305145
30	64.2500	51.1393	13.1106	19.2589	0.306	27156.6172332
31	106.8700	211.0094	-104.1394	30.3234	-2.431	38001.6485443
32	110.9300	95.7427	15.1873	17.4930	0.354	38232.2969665
33	135.6100	174.5906	-38.9806	19.3267	-0.909	39751.7813568
34	143.4299	174.5906	-31.1606	19.3267	-0.727	40722.7657318
35	39.7300	101.1708	-61.4408	22.6533	-1.434	44497.7344818
36	287.8900	283.5191	4.3709	22.2184	0.102	44516.8360443
37	92.7600	121.8589	-29.0989	20.6276	-0.679	45363.5782318
38	117.1100	121.8589	-4.7489	20.6276	-0.110	45386.1250915
39	82.2700	22.3228	59.9471	21.5680	1.399	48979.7813568
40	63.3600	128.3615	-65.0015	27.6954	-1.517	53204.9766693

TABLE 2.4-9A
MINIMUM GASSING COMBINATIONS (OPEN CIRCUIT)

NO.=	216.,	MIN.=	-22.50,	LEV.=	-1	-1	-1	1	-1	1	-1	-1
NO.=	152.,	MIN.=	-22.50,	LEV.=	-1	-1	-1	1	-1	1	1	-1
NO.=	88.,	MIN.=	-22.50,	LEV.=	-1	-1	-1	1	-1	1	-1	1
NO.=	24.,	MIN.=	-22.50,	LEV.=	-1	-1	-1	1	-1	1	1	1
NO.=	224.,	MIN.=	-10.67,	LEV.=	-1	-1	-1	-1	-1	1	-1	-1
NO.=	160.,	MIN.=	-10.67,	LEV.=	-1	-1	-1	-1	-1	1	1	-1
NO.=	96.,	MIN.=	-10.67,	LEV.=	-1	-1	-1	-1	-1	1	-1	1
NO.=	32.,	MIN.=	-10.67,	LEV.=	-1	-1	-1	-1	-1	1	1	1
NO.=	256.,	MIN.=	7.90,	LEV.=	-1	-1	-1	-1	-1	-1	-1	-1
NO.=	192.,	MIN.=	7.90,	LEV.=	-1	-1	-1	-1	-1	-1	1	-1
NO.=	128.,	MIN.=	7.90,	LEV.=	-1	-1	-1	-1	-1	-1	-1	1
NO.=	64.,	MIN.=	7.90,	LEV.=	-1	-1	-1	-1	-1	-1	1	1
NO.=	238.,	MIN.=	9.58,	LEV.=	-1	1	-1	-1	1	-1	-1	-1
NO.=	174.,	MIN.=	9.58,	LEV.=	-1	1	-1	-1	1	-1	1	-1
NO.=	110.,	MIN.=	9.58,	LEV.=	-1	1	-1	-1	1	-1	-1	1
NO.=	46.,	MIN.=	9.58,	LEV.=	-1	1	-1	-1	1	-1	1	1
NO.=	200.,	MIN.=	9.62,	LEV.=	-1	-1	-1	1	1	1	-1	-1
NO.=	136.,	MIN.=	9.62,	LEV.=	-1	-1	-1	1	1	1	1	-1
NO.=	72.,	MIN.=	9.62,	LEV.=	-1	-1	-1	1	1	1	-1	1
NO.=	8.,	MIN.=	9.62,	LEV.=	-1	-1	-1	1	1	1	1	1
NO.=	240.,	MIN.=	12.97,	LEV.=	-1	-1	-1	-1	1	-1	-1	-1
NO.=	176.,	MIN.=	12.97,	LEV.=	-1	-1	-1	-1	1	-1	1	-1
NO.=	112.,	MIN.=	12.97,	LEV.=	-1	-1	-1	-1	1	-1	-1	1
NO.=	48.,	MIN.=	12.97,	LEV.=	-1	-1	-1	-1	1	-1	1	1
NO.=	206.,	MIN.=	18.04,	LEV.=	-1	1	-1	-1	1	1	-1	-1
NO.=	142.,	MIN.=	18.04,	LEV.=	-1	1	-1	-1	1	1	1	-1
NO.=	78.,	MIN.=	18.04,	LEV.=	-1	1	-1	-1	1	1	-1	1

TABLE 2.4-9B
MAXIMUM GASSING COMBINATIONS (OPEN CIRCUIT)

NO.=	242.,	MAX.=	310.01,	LEV.=	-1	1	1	1	-1	-1	-1	-1
NO.=	178.,	MAX.=	310.01,	LEV.=	-1	1	1	1	-1	-1	1	-1
NO.=	114.,	MAX.=	310.01,	LEV.=	-1	1	1	1	-1	-1	-1	1
NO.=	50.,	MAX.=	310.01,	LEV.=	-1	1	1	1	-1	-1	1	1
NO.=	226.,	MAX.=	276.07,	LEV.=	-1	1	1	1	1	-1	-1	-1
NO.=	162.,	MAX.=	276.07,	LEV.=	-1	1	1	1	1	-1	1	-1
NO.=	98.,	MAX.=	276.07,	LEV.=	-1	1	1	1	1	-1	-1	1
NO.=	34.,	MAX.=	276.07,	LEV.=	-1	1	1	1	1	-1	1	1
NO.=	210.,	MAX.=	246.49,	LEV.=	-1	1	1	1	-1	1	-1	-1
NO.=	146.,	MAX.=	246.49,	LEV.=	-1	1	1	1	-1	1	1	-1
NO.=	82.,	MAX.=	246.49,	LEV.=	-1	1	1	1	-1	1	-1	1
NO.=	18.,	MAX.=	246.49,	LEV.=	-1	1	1	1	-1	1	1	1
NO.=	194.,	MAX.=	239.60,	LEV.=	-1	1	1	1	1	1	-1	-1
NO.=	130.,	MAX.=	239.60,	LEV.=	-1	1	1	1	1	1	1	-1
NO.=	66.,	MAX.=	239.60,	LEV.=	-1	1	1	1	1	1	-1	1
NO.=	2.,	MAX.=	239.60,	LEV.=	-1	1	1	1	1	1	1	1
NO.=	197.,	MAX.=	231.38,	LEV.=	1	1	-1	1	-1	1	-1	-1
NO.=	133.,	MAX.=	231.38,	LEV.=	1	1	-1	1	1	1	1	-1
NO.=	69.,	MAX.=	231.38,	LEV.=	1	1	-1	1	1	1	-1	1
NO.=	5.,	MAX.=	231.38,	LEV.=	1	1	-1	1	1	1	1	1
NO.=	207.,	MAX.=	221.40,	LEV.=	1	-1	-1	-1	1	1	-1	-1
NO.=	143.,	MAX.=	221.40,	LEV.=	1	-1	-1	-1	1	1	1	-1
NO.=	79.,	MAX.=	221.40,	LEV.=	1	-1	-1	-1	1	1	-1	1
NO.=	15.,	MAX.=	221.40,	LEV.=	1	-1	-1	-1	1	1	1	1
NO.=	213.,	MAX.=	216.15,	LEV.=	1	1	-1	1	-1	1	-1	-1
NO.=	149.,	MAX.=	216.15,	LEV.=	1	1	-1	1	-1	1	1	-1
NO.=	85.,	MAX.=	216.15,	LEV.=	1	1	-1	1	-1	1	-1	1

TABLE 2.4-10A
MINIMUM GASSING COMBINATIONS (DISCHARGE)

=	78.,	MIN.=	-66.82,	LEV.=	-1	1	-1	-1	1	1	-1	1
=	14.,	MIN.=	-66.82,	LEV.=	-1	1	-1	-1	1	1	1	1
=	88.,	MIN.=	-57.04,	LEV.=	-1	-1	-1	1	-1	1	-1	1
=	24.,	MIN.=	-57.04,	LEV.=	-1	-1	-1	1	-1	1	1	1
=	96.,	MIN.=	-56.63,	LEV.=	-1	-1	-1	-1	-1	1	-1	1
=	32.,	MIN.=	-56.63,	LEV.=	-1	-1	-1	-1	-1	1	1	1
=	72.,	MIN.=	-52.16,	LEV.=	-1	-1	-1	1	1	1	-1	1
=	8.,	MIN.=	-52.16,	LEV.=	-1	-1	-1	1	1	1	1	1
=	80.,	MIN.=	-51.75,	LEV.=	-1	-1	-1	-1	1	1	-1	1
=	16.,	MIN.=	-51.75,	LEV.=	-1	-1	-1	-1	1	1	1	1
=	94.,	MIN.=	-49.17,	LEV.=	-1	1	-1	-1	-1	1	-1	1
=	30.,	MIN.=	-49.17,	LEV.=	-1	1	-1	-1	-1	1	1	1
=	206.,	MIN.=	-35.72,	LEV.=	-1	1	-1	-1	1	1	-1	-1
=	142.,	MIN.=	-35.72,	LEV.=	-1	1	-1	-1	1	1	1	-1
=	216.,	MIN.=	-25.94,	LEV.=	-1	-1	-1	1	-1	1	-1	-1
=	152.,	MIN.=	-25.94,	LEV.=	-1	-1	-1	1	-1	1	1	-1
=	224.,	MIN.=	-25.53,	LEV.=	-1	-1	-1	-1	-1	1	-1	-1
=	160.,	MIN.=	-25.53,	LEV.=	-1	-1	-1	-1	-1	1	1	-1
=	200.,	MIN.=	-21.06,	LEV.=	-1	-1	-1	1	1	1	-1	-1
=	136.,	MIN.=	-21.06,	LEV.=	-1	-1	-1	1	1	1	1	-1
=	208.,	MIN.=	-20.65,	LEV.=	-1	-1	-1	-1	1	1	-1	-1
=	144.,	MIN.=	-20.65,	LEV.=	-1	-1	-1	-1	1	1	1	-1
=	222.,	MIN.=	-18.07,	LEV.=	-1	1	-1	-1	-1	1	-1	-1
=	158.,	MIN.=	-18.07,	LEV.=	-1	1	-1	-1	-1	1	1	-1
=	110.,	MIN.=	-13.94,	LEV.=	-1	1	-1	-1	1	-1	-1	1
=	46.,	MIN.=	-13.94,	LEV.=	-1	1	-1	-1	1	-1	1	1
=	120.,	MIN.=	-4.16,	LEV.=	-1	-1	-1	1	-1	-1	-1	1

TABLE 2.4-10B
MAXIMUM GASSING COMBINATIONS (DISCHARGE)

=	197.,	MAX.=	300.06,	LEV.=	1	1	-1	1	1	1	-1	-1
=	133.,	MAX.=	300.06,	LEV.=	1	1	-1	1	1	1	1	-1
=	242.,	MAX.=	296.39,	LEV.=	-1	1	1	1	-1	-1	-1	-1
=	178.,	MAX.=	296.39,	LEV.=	-1	1	1	1	-1	-1	1	-1
=	213.,	MAX.=	285.41,	LEV.=	1	1	-1	1	-1	1	-1	-1
=	149.,	MAX.=	285.41,	LEV.=	1	1	-1	1	-1	1	1	-1
=	226.,	MAX.=	278.74,	LEV.=	-1	1	1	1	1	-1	-1	-1
=	162.,	MAX.=	278.74,	LEV.=	-1	1	1	1	1	-1	1	-1
=	207.,	MAX.=	278.09,	LEV.=	1	-1	-1	-1	1	1	-1	-1
=	143.,	MAX.=	278.09,	LEV.=	1	-1	-1	-1	1	1	1	-1
=	199.,	MAX.=	277.68,	LEV.=	1	-1	-1	1	1	1	-1	-1
=	135.,	MAX.=	277.68,	LEV.=	1	-1	-1	1	1	1	1	-1
=	69.,	MAX.=	268.96,	LEV.=	1	1	-1	1	1	1	-1	1
=	5.,	MAX.=	268.96,	LEV.=	1	1	-1	1	1	1	1	1
=	114.,	MAX.=	265.29,	LEV.=	-1	1	1	1	-1	-1	-1	1
=	50.,	MAX.=	265.29,	LEV.=	-1	1	1	1	-1	-1	1	1
=	85.,	MAX.=	254.31,	LEV.=	1	1	-1	1	-1	1	-1	1
=	21.,	MAX.=	254.31,	LEV.=	1	1	-1	1	-1	1	1	1
=	98.,	MAX.=	247.64,	LEV.=	-1	1	1	1	1	-1	-1	1
=	34.,	MAX.=	247.64,	LEV.=	-1	1	1	1	1	-1	1	1
=	79.,	MAX.=	246.99,	LEV.=	1	-1	-1	-1	1	1	-1	1
=	15.,	MAX.=	246.99,	LEV.=	1	-1	-1	-1	1	1	1	1
=	71.,	MAX.=	246.58,	LEV.=	1	-1	-1	1	1	1	-1	1
=	7.,	MAX.=	246.58,	LEV.=	1	-1	-1	1	1	1	1	1
=	210.,	MAX.=	243.52,	LEV.=	-1	1	1	1	-1	1	-1	-1
=	146.,	MAX.=	243.52,	LEV.=	-1	1	1	1	-1	1	1	-1
=	223.,	MAX.=	240.91,	LEV.=	1	-1	-1	-1	-1	1	-1	-1

TABLE 2.4-11A
MINIMUM GASSING COMBINATIONS (COMBINED GAS)

NO.=	224.,	MIN.=	-74.41,	LEV.=	-1	-1	-1	-1	-1	1	-1	-1
NO.=	160.,	MIN.=	-74.41,	LEV.=	-1	-1	-1	-1	-1	1	1	-1
NO.=	96.,	MIN.=	-74.41,	LEV.=	-1	-1	-1	-1	-1	1	-1	1
NO.=	32.,	MIN.=	-74.41,	LEV.=	-1	-1	-1	-1	-1	1	1	1
NO.=	222.,	MIN.=	-59.42,	LEV.=	-1	1	-1	-1	-1	1	-1	-1
NO.=	158.,	MIN.=	-59.42,	LEV.=	-1	1	-1	-1	-1	1	1	-1
NO.=	94.,	MIN.=	-59.42,	LEV.=	-1	1	-1	-1	-1	1	-1	1
NO.=	30.,	MIN.=	-59.42,	LEV.=	-1	1	-1	-1	-1	1	1	1
NO.=	216.,	MIN.=	-53.89,	LEV.=	-1	-1	-1	1	-1	1	-1	-1
NO.=	152.,	MIN.=	-53.89,	LEV.=	-1	-1	-1	1	-1	1	1	-1
NO.=	88.,	MIN.=	-53.89,	LEV.=	-1	-1	-1	1	-1	1	-1	1
NO.=	24.,	MIN.=	-53.89,	LEV.=	-1	-1	-1	1	-1	1	1	1
NO.=	206.,	MIN.=	-33.31,	LEV.=	-1	1	-1	-1	1	1	-1	-1
NO.=	142.,	MIN.=	-33.31,	LEV.=	-1	1	-1	-1	1	1	1	-1
NO.=	78.,	MIN.=	-33.31,	LEV.=	-1	1	-1	-1	1	1	-1	1
NO.=	14.,	MIN.=	-33.31,	LEV.=	-1	1	-1	-1	1	1	1	1
NO.=	238.,	MIN.=	-14.28,	LEV.=	-1	1	-1	-1	1	-1	-1	-1
NO.=	174.,	MIN.=	-14.28,	LEV.=	-1	1	-1	-1	1	-1	1	-1
NO.=	110.,	MIN.=	-14.28,	LEV.=	-1	1	-1	-1	1	-1	-1	1
NO.=	46.,	MIN.=	-14.28,	LEV.=	-1	1	-1	-1	1	-1	1	1
NO.=	208.,	MIN.=	2.80,	LEV.=	-1	-1	-1	-1	1	1	-1	-1
NO.=	144.,	MIN.=	2.80,	LEV.=	-1	-1	-1	-1	1	1	1	-1
NO.=	80.,	MIN.=	2.80,	LEV.=	-1	-1	-1	-1	1	1	-1	1
NO.=	16.,	MIN.=	2.80,	LEV.=	-1	-1	-1	-1	1	1	1	1
NO.=	256.,	MIN.=	13.12,	LEV.=	-1	-1	-1	-1	-1	-1	-1	-1
NO.=	192.,	MIN.=	13.12,	LEV.=	-1	-1	-1	-1	-1	-1	1	-1
NO.=	128.,	MIN.=	13.12,	LEV.=	-1	-1	-1	-1	-1	-1	-1	1

TABLE 2.4-11B
MAXIMUM GASSING COMBINATIONS (COMBINED GAS)

NO.=	242.,	MAX.=	575.69,	LEV.=	-1	1	1	1	-1	-1	-1	-1
NO.=	178.,	MAX.=	575.69,	LEV.=	-1	1	1	1	-1	-1	1	-1
NO.=	114.,	MAX.=	575.69,	LEV.=	-1	1	1	1	-1	-1	-1	1
NO.=	50.,	MAX.=	575.69,	LEV.=	-1	1	1	1	-1	-1	1	1
NO.=	226.,	MAX.=	533.29,	LEV.=	-1	1	1	1	1	-1	-1	-1
NO.=	162.,	MAX.=	533.29,	LEV.=	-1	1	1	1	1	-1	1	-1
NO.=	98.,	MAX.=	533.29,	LEV.=	-1	1	1	1	1	-1	-1	1
NO.=	34.,	MAX.=	533.29,	LEV.=	-1	1	1	1	1	-1	1	1
NO.=	197.,	MAX.=	527.47,	LEV.=	1	1	-1	1	1	1	-1	-1
NO.=	133.,	MAX.=	527.47,	LEV.=	1	1	-1	1	1	1	1	-1
NO.=	69.,	MAX.=	527.47,	LEV.=	1	1	-1	1	1	1	-1	1
NO.=	5.,	MAX.=	527.47,	LEV.=	1	1	-1	1	1	1	1	1
NO.=	213.,	MAX.=	501.35,	LEV.=	1	1	-1	1	-1	1	-1	-1
NO.=	149.,	MAX.=	501.35,	LEV.=	1	1	-1	1	-1	1	1	-1
NO.=	85.,	MAX.=	501.35,	LEV.=	1	1	-1	1	-1	1	-1	1
NO.=	21.,	MAX.=	501.35,	LEV.=	1	1	-1	1	-1	1	1	1
NO.=	199.,	MAX.=	482.51,	LEV.=	1	-1	-1	1	1	1	-1	-1
NO.=	135.,	MAX.=	482.51,	LEV.=	1	-1	-1	1	1	1	1	-1
NO.=	71.,	MAX.=	482.51,	LEV.=	1	-1	-1	1	1	1	-1	1
NO.=	7.,	MAX.=	482.51,	LEV.=	1	-1	-1	1	1	1	1	1
NO.=	194.,	MAX.=	477.46,	LEV.=	-1	1	1	1	1	1	-1	-1
NO.=	130.,	MAX.=	477.46,	LEV.=	-1	1	1	1	1	1	1	-1
NO.=	66.,	MAX.=	477.46,	LEV.=	-1	1	1	1	1	1	-1	1
NO.=	2.,	MAX.=	477.46,	LEV.=	-1	1	1	1	1	1	1	1
NO.=	207.,	MAX.=	461.99,	LEV.=	1	-1	-1	-1	1	1	-1	-1
NO.=	143.,	MAX.=	461.99,	LEV.=	1	-1	-1	-1	1	1	1	-1
NO.=	79.,	MAX.=	461.99,	LEV.=	1	-1	-1	-1	1	1	-1	1

TABLE NO. 2.4-12

SUMMARY OF EFFECTS
TASK IV
(MINIMUM DIRECTION SHOWN)

VAR. NO.	IDENTIFICATION	OC	DIS.	COMB.
1	Temperature: 140° = +1, RT = -1	-34.1	-63.0	-92.3
2	Vacuum: 15" = +1, ATM.Press. = -1	-28.7	-14.9	-30.0
3	Lot 24 (-1) vs. Lot 25 (+1)	-42.3	-44.5	-92.4
4	Days: 10 = +1, 1 = -1	-66.2	-40.1	-114.6
5	w/He 1 hour 140°, Cooling N_2 (+1), No Treatment (-1)	-10.1	- 9.8	-17.4
6	Lot 24 (-1) vs. Lot IT (+1)	- 4.4	- 8.4	-13.6
7	Plate Sintered Wt., +1 = high, -1 = low	0.0	0.0	0.0
8	Oxygen Pick-up %: +1 = high, -1 = low	0.0	+31.1	0.0
9	Interaction Var.1 x Var.2	+27.0	+21.8	+35.2
10	Interaction Var.1 x Var.3	+95.8	+136.6	+246.4
11	Interaction Var.1 x Var.4	0.0	0.0	0.0
12	Interaction Var.1 x Var.5	-11.1	-16.1	0.0
13	Interaction Var.1 x Var.6	-31.9	-61.3	-85.3
14	Interaction Var.5 x Var.6	-13.5	0.0	-34.3
15	Interaction Var 2 x Var.3	0.0	0.0	0.0
16	Interaction Var.2 x Var.4	-39.6	-40.5	-75.7
17	Interaction Var.2 x Var.5	+19.5	+11.3	+25.6
18	Interaction Var.2 x Var.6	0.0	0.0	0.0
19	Interaction Var.3 x Var.4	-15.9	0.0	0.0
20	Interaction Var.3 x Var.5	0.0	0.0	0.0
21	Interaction Var.3 x Var.6	0.0	0.0	0.0
22	Interaction Var.4 x Var.5	0.0	0.0	0.0
23	Interaction Var.4 x Var.6	+22.5	0.0	+18.4

TABLE NO. 2.5-1

VARIABLE DESIGNATION AND INTERACTIONS

TASK V

VARIABLE NO.	DESCRIPTION	(+) LEVEL	(-) LEVEL	COMMENT
1	Rinse Rate	Low (1000cc/min)	High(2000cc/min)	16 plates in 2000 cc
2	Rinse Temperature	110-114°F	75°F	
3	Rinse Time	4 hours	15 minutes	
4	Drying Temperature	140°F	100°F	
5	Drying Time	42.5 Hrs.	18.5 Hrs.	
6	Charge Current	2.3 amps	3.5 amps	per plate
7	Percent Overcharge	175%	125%	Theoretical %
8	Formation Discharge Current	5.75 amps	3.8 amps	per plate
9	Formation Discharge Time	4.5 hours	3.0 hours	
10	Double (Booster) Charge	with	without	
11	Formation Temperature	75°F	57°F	
12	Wash Water	Tap	Deionized	
13	KOH Concentration	30%	20%,40%	Dummy Var. A
14	Formation Counterelectrodes	Ni	Ag	
15	Addition of K_2CO_3	None(.1%)	4%	
16	Sintered Weight	High(127.22g)	Low(120.91g)	
17	Percent Oxygen Pickup	High(14.54%)	Low(11.94%)	
18	Dry Stand Time	13 Days	1-2 Days	
19	KOH Concentration	40%	20%,30%	Dummy Var. B
20	Formation Discharge Routine	None	Any current/ time	

VARIABLE NO.	INTERACTION	VARIABLE NO.	INTERACTION	VARIABLE NO.	INTERACTION
21	05 / 12	31	04 / 12	41	01 / 02
22	01 / 08	32	05 / 11	42	01 / 03
23	01 / 09	33	09 / 11	43	02 / 04
24	01 / 11	34	04 / 09	44	04 / 20
25	02 / 05	35	01 / 07	45	03 / 18
26	02 / 06	36	04 / 19	46	03 / 05
27	03 / 11	37	05 / 07	47	03 / 07
28	03 / 12	38	03 / 09	48	03 / 20
29	03 / 19	39	04 / 08		
30	04 / 05	40	05 / 09		

TABLE NO. 2.5-2A

COLUMN DESIGNATIONS FOR TABLE NO. 2.5-2B

COLUMN	VARIABLE OR DESCRIPTION
1	Obs. Number (First row of each)
2	Var. 1
3	Var. 2
4	Var. 3
5	Var. 4
6	Var. 5
7	Var. 6
8	Var. 7
9	Var. 8
10	Var. 9
11	Var. 10
12	Var. 11
13	Var. 12
14	Var. 13
15	Var. 19
16	Var. 14
17	Var. 15
18	Var. 18
19	Var. 16
20	Formed Weight
21	Oxygen Weight
22	Var. 17
23	Capacity (ampere-hours)
24	Var. 20
25	Var. 20
26	Open Circuit Gas
27	Discharge Gas
28	Combined Gas

TABLE 2.5-2B
DATA FOR TASK 5

NO.	1									
	-1.00	-1.00	-1.00	-1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.39	140.76	16.36
	14.24	54.00	-1.00	-1.00	45.02	18.52	63.54			
NO.	2									
	-1.00	-1.00	-1.00	1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.12	140.26	16.13
	14.08	54.10	-1.00	-1.00	14.77	25.04	39.80			
NO.	3									
	-1.00	-1.00	1.00	-1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.40	140.55	16.14
	14.05	54.40	-1.00	-1.00	58.64	12.29	70.93			
NO.	4									
	-1.00	-1.00	1.00	1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.47	140.53	16.11
	14.01	54.10	-1.00	-1.00	32.44	22.52	54.95			
NO.	5									
	-1.00	1.00	-1.00	-1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	121.38	137.25	15.87
	14.13	54.10	-1.00	-1.00	24.99	15.00	39.99			
NO.	6									
	-1.00	1.00	-1.00	1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.65	140.80	16.14
	14.02	54.20	-1.00	-1.00	31.89	23.97	55.86			
NO.	7									
	-1.00	1.00	1.00	-1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	125.14	141.43	16.28
	14.03	55.10	-1.00	-1.00	54.48	13.97	68.44			
NO.	8									
	-1.00	1.00	1.00	1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.91	139.99	16.08
	14.05	54.70	-1.00	-1.00	35.96	19.92	55.88			
NO.	9									
	1.00	-1.00	-1.00	-1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.99	141.44	16.44
	14.24	55.20	-1.00	-1.00	46.57	13.25	59.82			
NO.	10									
	1.00	-1.00	-1.00	1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	121.02	136.82	15.79
	14.16	53.50	-1.00	-1.00	26.74	30.46	57.20			
NO.	11									
	1.00	-1.00	1.00	-1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	126.82	143.39	16.56
	14.12	55.00	-1.00	-1.00	33.94	16.93	50.86			
NO.	12									
	1.00	-1.00	1.00	1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.15	139.18	16.03
	14.10	54.30	-1.00	-1.00	29.40	19.82	49.22			
NO.	13									
	1.00	1.00	-1.00	-1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	125.41	141.99	16.58
	14.30	55.70	-1.00	-1.00	18.47	12.39	30.86			
NO.	14									
	1.00	1.00	-1.00	1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.10	139.38	16.27
	14.33	54.50	-1.00	-1.00	28.87	36.26	65.13			
NO.	15									
	1.00	1.00	1.00	-1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.00	140.22	16.21
	14.16	54.60	-1.00	-1.00	28.07	23.87	51.94			
NO.	16									
	1.00	1.00	1.00	1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.00	140.08	16.07
	14.04	54.50	-1.00	-1.00	27.74	16.42	44.16			
NO.	17									
	-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	125.34	141.60	16.25
	14.03	54.30	-1.00	-1.00	20.55	9.35	29.90			
NO.	18									
	-1.00	-1.00	-1.00	1.00	72.00	1.00	-1.00	-1.00	1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.58	139.79	16.20
	14.20	53.50	-1.00	-1.00	34.99	30.63	65.62			
NO.	19									
	-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.78	138.69	15.90
	14.04	53.00	-1.00	-1.00	20.01	11.09	31.09			
NO.	20									
	-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	121.09	136.69	15.59
	13.97	52.30	-1.00	-1.00	28.58	8.61	37.19			
NO.	21									
	-1.00	1.00	-1.00	1.00	72.00	1.00	-1.00	-1.00	1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.79	140.08	16.28
	14.25	54.10	-1.00	-1.00	32.36	19.14	51.50			
NO.	22									
	-1.00	1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.34	139.89	16.54
	14.53	53.00	-1.00	-1.00	59.63	14.48	74.11			
NO.	23									
	-1.00	1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	126.06	142.36	16.29
	13.98	54.70	-1.00	-1.00	61.79	10.92	72.71			
NO.	24									
	-1.00	1.00	1.00	1.00	72.00	1.00	-1.00	-1.00	1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.49	139.50	16.01
	14.04	53.80	-1.00	-1.00	45.61	26.81	72.41			
NO.	25									
	1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.01	140.17	16.15
	14.11	53.70	-1.00	-1.00	26.11	7.55	33.66			

F

TABLE 2.5-20 (CONT.)

NO. 26									
1.00	-1.00	-1.00	1.00	72.00	1.00	-1.00	-1.00	1.00	1.00
1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.70	138.63	15.92
14.07	53.20	-1.00	-1.00	38.39	27.50	65.89			
NO. 27									
1.00	-1.00	1.00	-1.00	72.00	1.00	-1.00	-1.00	1.00	1.00
1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	126.07	142.48	16.40
14.07	55.00	-1.00	-1.00	23.38	19.52	42.90			
NO. 28									
1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.71	138.58	15.86
14.01	53.40	-1.00	-1.00	20.96	8.04	29.00			
NO. 29									
1.00	1.00	-1.00	1.00	72.00	1.00	-1.00	-1.00	1.00	1.00
1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.29	138.18	15.89
14.08	52.70	-1.00	-1.00	20.85	9.70	30.54			
NO. 30									
1.00	1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.08	139.84	15.76
13.75	53.40	-1.00	-1.00	18.35	7.07	25.42			
NO. 31									
1.00	1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.89	140.90	16.00
13.87	53.80	-1.00	-1.00	39.75	6.54	46.29			
NO. 32									
1.00	1.00	1.00	1.00	72.00	1.00	-1.00	-1.00	1.00	1.00
1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.62	140.82	16.19
14.07	54.10	-1.00	-1.00	22.91	17.11	40.02			
NO. 33									
1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.29	140.25	15.96
13.90	52.50	-1.00	-1.00	20.87	5.20	26.06			
NO. 34									
1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.43	140.69	16.25
14.14	53.70	-1.00	-1.00	12.14	13.85	25.99			
NO. 35									
1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.16	139.27	16.11
14.17	53.20	-1.00	-1.00	48.74	10.88	59.62			
NO. 36									
1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.94	138.96	16.02
14.12	53.30	-1.00	-1.00	20.08	8.58	28.65			
NO. 37									
1.00	1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.66	138.73	16.06
14.20	53.00	-1.00	-1.00	54.72	20.54	75.25			
NO. 38									
1.00	1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.41	140.83	16.42
14.28	54.10	-1.00	-1.00	43.31	11.74	55.05			
NO. 39									
1.00	1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	125.04	141.39	16.34
14.15	54.40	-1.00	-1.00	65.60	14.22	79.81			
NO. 40									
1.00	1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.48	139.48	15.99
14.03	53.30	-1.00	-1.00	24.71	13.91	38.62			
NO. 41									
-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.20	140.55	16.34
14.25	54.00	-1.00	-1.00	40.26	16.04	56.29			
NO. 42									
-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.11	140.44	16.32
14.24	53.90	-1.00	-1.00	49.37	21.68	71.05			
NO. 43									
-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.95	140.14	16.18
14.14	53.50	-1.00	-1.00	41.42	11.03	52.45			
NO. 44									
-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.07	140.28	16.21
14.14	53.80	-1.00	-1.00	60.56	18.64	79.20			
NO. 45									
-1.00	1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.33	139.41	16.07
14.12	53.30	-1.00	-1.00	36.33	8.53	44.86			
NO. 46									
-1.00	1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.21	138.22	16.00
14.20	53.00	-1.00	-1.00	64.76	23.36	88.11			
NO. 47									
-1.00	1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.77	138.74	15.97
14.09	53.20	-1.00	-1.00	34.60	11.47	46.06			
NO. 48									
-1.00	1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.42	140.55	16.12
14.03	53.70	-1.00	-1.00	24.54	15.67	40.20			
NO. 49									
-1.00	-1.00	-1.00	-1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.77	138.95	16.17
14.28	52.80	-1.00	-1.00	39.86	13.22	53.07			
NO. 50									
-1.00	-1.00	-1.00	1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.12	140.44	16.31
14.23	53.50	-1.00	-1.00	24.39	18.83	43.22			

TABLE 2.5-2B (CONT.)

NO.	51									
	-1.00	-1.00	1.00	-1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.62	139.78	16.16
	14.16	53.00	-1.00	-1.00	30.92	14.65	45.56			
NO.	52									
	-1.00	-1.00	1.00	1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.36	138.22	15.85
	14.05	52.40	-1.00	-1.00	34.08	17.84	51.91			
NO.	53									
	-1.00	1.00	-1.00	-1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.04	140.34	16.30
	14.23	53.30	-1.00	-1.00	42.01	12.61	54.61			
NO.	54									
	-1.00	1.00	-1.00	1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.57	139.70	16.12
	14.14	53.20	-1.00	-1.00	28.31	13.85	42.16			
NO.	55									
	-1.00	1.00	1.00	-1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.68	140.92	16.23
	14.09	53.50	-1.00	-1.00	30.11	14.73	44.84			
NO.	56									
	-1.00	1.00	1.00	1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.40	139.42	16.01
	14.06	53.00	-1.00	-1.00	22.73	23.35	46.08			
NO.	57									
	1.00	-1.00	-1.00	-1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.93	139.06	16.13
	14.22	53.00	-1.00	-1.00	43.81	13.44	57.25			
NO.	58									
	1.00	-1.00	-1.00	1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	121.40	137.31	15.91
	14.21	52.20	-1.00	-1.00	29.47	19.80	49.27			
NO.	59									
	1.00	-1.00	1.00	-1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	125.11	141.50	16.39
	14.17	53.70	-1.00	-1.00	27.98	14.74	42.72			
NO.	60									
	1.00	-1.00	1.00	1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.61	139.72	16.10
	14.11	53.10	-1.00	-1.00	25.32	16.48	41.80			
NO.	61									
	1.00	1.00	-1.00	-1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.97	139.08	16.11
	14.19	52.50	-1.00	-1.00	73.71	16.59	90.30			
NO.	62									
	1.00	1.00	-1.00	1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	124.37	140.66	16.28
	14.18	53.20	-1.00	-1.00	29.96	8.56	38.52			
NO.	63									
	1.00	1.00	1.00	-1.00	18.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	123.52	139.50	15.98
	14.01	52.90	-1.00	-1.00	37.39	9.48	46.87			
NO.	64									
	1.00	1.00	1.00	1.00	42.50	-1.00	-1.00	1.00	-1.00	1.00
	-1.00	1.00	1.00	-1.00	1.00	1.00	-1.00	122.56	138.45	15.88
	14.05	52.20	-1.00	-1.00	60.71	13.40	74.11			
NO.	65									
	-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	122.37	138.41	16.03
	14.21	52.50	-1.00	-1.00	23.84	10.17	34.01			
NO.	66									
	-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	124.45	140.84	16.39
	14.25	54.00	-1.00	-1.00	18.74	18.50	37.24			
NO.	67									
	-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	122.62	138.67	16.04
	14.18	53.00	-1.00	-1.00	22.70	11.07	33.77			
NO.	68									
	-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	124.42	140.78	16.36
	14.23	54.00	-1.00	-1.00	19.98	13.45	33.43			
NO.	69									
	-1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	123.02	139.21	16.19
	14.26	53.00	-1.00	-1.00	27.24	18.71	45.95			
NO.	70									
	-1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	121.85	137.81	15.96
	14.20	52.60	-1.00	-1.00	18.67	16.76	35.43			
NO.	71									
	-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	123.97	140.03	16.06
	14.02	54.00	-1.00	-1.00	22.55	10.65	33.20			
NO.	72									
	-1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	124.80	141.13	16.32
	14.16	53.70	-1.00	-1.00	18.76	15.78	34.54			
NO.	73									
	1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	123.62	139.94	16.31
	14.30	53.40	-1.00	-1.00	29.97	10.29	40.26			
NO.	74									
	1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	123.53	139.82	16.28
	14.28	53.40	-1.00	-1.00	25.78	16.56	42.34			
NO.	75									
	1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	123.85	140.00	16.15
	14.12	53.30	-1.00	-1.00	32.25	13.09	45.34			

TABLE 2.5-20 (CONT.)

NO.	76									
	1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	123.72	139.82	16.09
	14.09	53.20	-1.00	-1.00	22.50	10.97	33.47			
NO.	77									
	1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	124.89	141.40	16.50
	14.30	54.10	-1.00	-1.00	19.41	11.02	30.43			
NO.	78									
	1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	123.76	140.00	16.24
	14.21	53.20	-1.00	-1.00	18.15	12.29	30.43			
NO.	79									
	1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	125.86	142.36	16.50
	14.18	54.60	-1.00	-1.00	18.30	11.04	29.34			
NO.	80									
	1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	121.75	137.65	15.89
	14.16	52.40	-1.00	-1.00	28.37	16.64	45.01			
NO.	81									
	1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	124.58	140.48	15.89
	13.81	52.00	-1.00	-1.00	21.72	12.94	34.66			
NO.	82									
	1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	127.22	143.38	16.15
	13.72	52.80	-1.00	-1.00	22.82	17.20	40.02			
NO.	83									
	1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	126.74	143.21	16.47
	14.04	54.10	-1.00	-1.00	18.08	13.61	31.68			
NO.	84									
	1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	124.61	140.82	16.20
	14.08	53.40	-1.00	-1.00	17.18	8.17	25.34			
NO.	85									
	1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	125.37	141.79	16.41
	14.17	53.40	-1.00	-1.00	21.25	16.68	37.93			
NO.	86									
	1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	125.65	141.53	15.88
	13.67	51.90	-1.00	-1.00	18.35	9.22	27.56			
NO.	87									
	1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	126.33	142.28	15.95
	13.65	52.20	-1.00	-1.00	16.64	8.13	24.77			
NO.	88									
	1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	125.19	141.06	15.87
	13.71	52.20	-1.00	-1.00	21.06	11.90	32.95			
NO.	89									
	-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	126.44	142.62	16.18
	13.83	53.10	-1.00	-1.00	20.43	7.15	27.57			
NO.	90									
	-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	126.48	142.70	16.21
	13.86	53.10	-1.00	-1.00	36.47	12.47	48.93			
NO.	91									
	-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	124.49	140.50	16.01
	13.92	52.90	-1.00	-1.00	25.06	9.85	34.91			
NO.	92									
	-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	126.73	143.23	16.49
	14.07	54.20	-1.00	-1.00	29.31	8.06	37.37			
NO.	93									
	-1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	125.10	141.47	16.36
	14.16	53.60	-1.00	-1.00	24.77	14.55	39.31			
NO.	94									
	-1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	126.13	142.50	16.37
	14.03	53.60	-1.00	-1.00	22.10	8.56	30.65			
NO.	95									
	-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	125.94	142.26	16.31
	14.01	53.60	-1.00	-1.00	19.01	8.50	27.51			
NO.	96									
	-1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	1.00	1.00	-1.00	125.08	140.88	15.79
	13.67	52.00	-1.00	-1.00	27.75	11.11	38.86			
NO.	97									
	1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	124.95	141.59	16.64
	14.41	53.80	-1.00	-1.00	34.47	7.24	41.70			
NO.	98									
	1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	124.73	141.38	16.64
	14.44	54.70	-1.00	-1.00	29.31	21.80	51.11			
NO.	99									
	1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	123.98	140.28	16.30
	14.23	53.90	-1.00	-1.00	20.61	15.38	35.98			
NO.	100									
	1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	127.16	143.93	16.77
	14.25	55.40	-1.00	-1.00	23.08	13.11	36.19			

TABLE 2.5-2B (CONT.)

NO. 101									
1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	126.15	142.90	16.75
14.35	54.50	-1.00	-1.00	35.69	17.21	52.90			
NO. 102									
1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	125.03	141.67	16.63
14.40	54.70	-1.00	-1.00	23.99	13.14	37.13			
NO. 103									
1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	124.14	140.67	16.52
14.41	54.60	-1.00	-1.00	19.60	8.60	28.20			
NO. 104									
1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	125.79	142.29	16.49
14.18	54.70	-1.00	-1.00	23.78	20.89	44.67			
NO. 105									
-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	124.22	140.80	16.58
14.45	54.40	-1.00	-1.00	43.46	8.15	51.61			
NO. 106									
-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	126.07	142.83	16.75
14.37	55.00	-1.00	-1.00	39.19	20.56	59.75			
NO. 107									
-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	124.75	141.32	16.56
14.37	54.70	-1.00	-1.00	22.77	9.46	32.23			
NO. 108									
-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	126.68	143.35	16.66
14.22	55.20	-1.00	-1.00	38.37	7.35	45.72			
NO. 109									
-1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	124.57	141.24	16.67
14.48	54.50	-1.00	-1.00	31.99	11.17	43.16			
NO. 110									
-1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	126.64	143.56	16.92
14.44	55.40	-1.00	-1.00	32.06	8.31	40.37			
NO. 111									
-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	125.81	142.38	16.56
14.24	54.70	-1.00	-1.00	22.87	6.99	29.86			
NO. 112									
-1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	1.00	-1.00	-1.00	1.00	-1.00	125.33	141.67	16.34
14.10	54.20	-1.00	-1.00	30.47	9.98	40.45			
NO. 113									
-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.86	138.72	15.85
13.99	52.60	-1.00	-1.00	21.39	6.06	27.45			
NO. 114									
-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.73	138.64	15.90
14.05	52.80	-1.00	-1.00	19.50	12.76	32.26			
NO. 115									
-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	125.47	141.29	15.81
13.64	53.30	-1.00	-1.00	19.35	9.66	29.01			
NO. 116									
-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	127.03	143.07	16.03
13.64	53.80	-1.00	-1.00	19.86	8.85	28.70			
NO. 117									
-1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.18	138.82	15.63
13.75	52.00	-1.00	-1.00	15.15	7.79	22.94			
NO. 118									
-1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.67	139.34	15.67
13.72	52.40	-1.00	-1.00	23.29	11.60	34.88			
NO. 119									
-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.85	140.71	15.86
13.74	53.40	-1.00	-1.00	21.73	9.58	31.31			
NO. 120									
-1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.93	138.45	15.51
13.68	52.20	-1.00	-1.00	20.00	10.14	30.14			
NO. 121									
1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.89	139.60	15.70
13.73	52.20	-1.00	-1.00	22.17	12.05	34.22			
NO. 122									
1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	126.58	142.98	16.39
14.00	54.00	-1.00	-1.00	17.95	11.24	29.18			
NO. 123									
1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	125.50	141.28	15.78
13.60	53.40	-1.00	-1.00	18.74	12.59	31.32			
NO. 124									
1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.42	138.00	15.58
13.79	52.50	-1.00	-1.00	25.05	8.71	33.76			
NO. 125									
1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.19	139.09	15.90
13.98	52.90	-1.00	-1.00	21.07	10.00	31.07			
NO. 126									
1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.10	137.33	15.22
13.52	51.20	-1.00	-1.00	16.77	6.08	22.84			

TABLE 2.5-2B (CONT.)

NO.	127									
	1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.00	139.42	15.41
	13.46	51.80	-1.00	-1.00	20.93	7.83	28.75			
NO.	128									
	1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.00	139.64	15.63
	13.65	52.40	-1.00	-1.00	20.95	7.94	28.88			
NO.	129									
	-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	123.95	140.06	16.11
	14.07	53.80	-1.00	-1.00	21.80	8.22	30.02			
NO.	130									
	-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	123.17	139.02	15.84
	13.94	53.00	-1.00	-1.00	16.89	9.85	26.74			
NO.	131									
	-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	122.83	138.70	15.86
	14.00	53.00	-1.00	-1.00	22.02	5.42	27.43			
NO.	132									
	-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	123.87	139.88	16.00
	13.99	53.50	-1.00	-1.00	14.29	5.85	20.13			
NO.	133									
	-1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	122.29	138.05	15.75
	13.97	53.00	-1.00	-1.00	14.51	5.23	19.74			
NO.	134									
	-1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	124.40	140.43	16.03
	13.95	53.60	-1.00	-1.00	14.70	5.29	19.99			
NO.	135									
	-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	124.01	139.85	15.83
	13.83	53.20	-1.00	-1.00	13.69	4.20	17.88			
NO.	136									
	-1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	121.88	137.59	15.71
	13.97	53.20	-1.00	-1.00	10.89	10.00	20.89			
NO.	137									
	1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	123.56	139.44	15.87
	13.92	53.00	-1.00	-1.00	15.40	4.36	19.76			
NO.	138									
	1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	124.11	140.19	16.07
	14.03	53.70	-1.00	-1.00	11.00	8.92	19.92			
NO.	139									
	1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	122.85	138.64	15.78
	13.93	52.90	-1.00	-1.00	11.31	4.37	15.68			
NO.	140									
	1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	124.77	140.86	16.09
	13.95	53.80	-1.00	-1.00	14.43	5.93	20.36			
NO.	141									
	1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	124.12	140.24	16.11
	14.06	53.30	-1.00	-1.00	14.57	5.52	20.09			
NO.	142									
	1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	122.03	137.78	15.75
	13.99	52.90	-1.00	-1.00	13.77	4.76	18.52			
NO.	143									
	1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	123.10	138.88	15.77
	13.89	52.90	-1.00	-1.00	14.45	4.02	18.47			
NO.	144									
	1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	1.00	-1.00	-1.00	-1.00	1.00	-1.00	-1.00	123.96	139.85	15.88
	13.88	53.40	-1.00	-1.00	12.90	11.76	24.65			
NO.	145									
	1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	126.09	142.76	16.66
	14.29	54.30	-1.00	-1.00	42.25	29.97	72.22			
NO.	146									
	1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	123.10	139.48	16.37
	14.41	53.50	-1.00	-1.00	51.44	53.18	104.61			
NO.	147									
	1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	126.24	142.84	16.60
	14.21	55.00	-1.00	-1.00	63.12	46.95	110.07			
NO.	148									
	1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	126.17	142.83	16.65
	14.27	55.10	-1.00	-1.00	53.42	46.57	99.99			
NO.	149									
	1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	124.11	140.71	16.60
	14.48	54.30	-1.00	-1.00	51.32	42.72	94.04			
NO.	150									
	1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	125.88	142.72	16.83
	14.46	55.10	-1.00	-1.00	39.66	48.73	88.38			
NO.	151									
	1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
	-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	123.52	139.92	16.39
	14.38	54.00	-1.00	-1.00	52.40	41.93	94.41			

TABLE 2.5-20 (CONT.)

NO. 152									
1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	124.42	140.78	16.36
14.23	53.90	-1.00	-1.00	33.17	46.62	79.79			
NO. 153									
-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	125.47	142.10	16.62
14.33	54.60	-1.00	-1.00	41.99	37.86	79.85			
NO. 154									
-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	125.58	142.42	16.84
14.50	54.60	-1.00	-1.00	53.82	59.40	113.22			
NO. 155									
-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	126.24	142.91	16.66
14.27	55.00	-1.00	-1.00	60.85	46.43	107.27			
NO. 156									
-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	125.35	141.85	16.49
14.24	54.20	-1.00	-1.00	56.97	45.54	102.50			
NO. 157									
-1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	127.02	143.83	16.81
14.30	54.90	-1.00	-1.00	47.85	35.60	83.45			
NO. 158									
-1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	126.55	143.49	16.94
14.47	55.10	-1.00	-1.00	56.11	43.56	99.66			
NO. 159									
-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	124.70	141.16	16.45
14.28	54.40	-1.00	-1.00	56.85	41.09	97.94			
NO. 160									
-1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	1.00	1.00
-1.00	-1.00	-1.00	1.00	1.00	1.00	-1.00	126.70	143.39	16.68
14.24	54.90	-1.00	-1.00	40.31	50.22	90.52			
NO. 161									
1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.41	138.36	15.94
14.12	53.70	-1.00	-1.00	35.37	12.95	48.31			
NO. 162									
1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.26	140.29	16.02
13.96	54.40	-1.00	-1.00	9.80	11.03	20.83			
NO. 163									
1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.22	139.29	16.06
14.13	54.10	-1.00	-1.00	17.28	5.52	22.79			
NO. 164									
1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	120.91	136.53	15.62
14.02	53.00	-1.00	-1.00	13.71	7.66	21.37			
NO. 165									
1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.04	136.91	15.86
14.22	53.20	-1.00	-1.00	19.51	7.35	26.86			
NO. 166									
1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.61	139.56	15.95
13.97	54.20	-1.00	-1.00	29.19	16.01	45.20			
NO. 167									
1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.61	137.35	15.73
14.03	53.20	-1.00	-1.00	14.70	4.82	19.52			
NO. 168									
1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.79	140.93	16.14
13.99	55.00	-1.00	-1.00	14.54	26.61	41.15			
NO. 169									
-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.98	137.45	15.46
13.75	52.30	-1.00	-1.00	38.79	17.06	55.84			
NO. 170									
-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.35	136.61	15.25
13.64	51.50	-1.00	-1.00	9.38	14.25	23.63			
NO. 171									
-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.67	137.44	15.76
14.05	53.20	-1.00	-1.00	12.84	5.26	18.09			
NO. 172									
-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.31	139.12	15.80
13.89	53.90	-1.00	-1.00	16.06	10.20	26.25			
NO. 173									
-1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.75	138.66	15.90
14.04	53.30	-1.00	-1.00	19.21	5.83	25.04			
NO. 174									
-1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.91	137.55	15.64
13.91	53.10	-1.00	-1.00	11.36	10.08	21.44			
NO. 175									
-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.65	139.66	16.00
14.02	53.90	-1.00	-1.00	19.11	5.03	24.13			
NO. 176									
1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.20	138.03	15.83
14.04	53.20	-1.00	-1.00	15.57	4.84	20.40			

TABLE 2.5-20 (CONT.)

NO. 177									
1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.99	141.06	16.07
13.91	54.40	-1.00	-1.00	49.08	13.75	62.83			
NO. 178									
1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.54	140.81	16.27
14.14	54.50	-1.00	-1.00	17.75	5.02	22.77			
NO. 179									
1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.42	140.23	15.80
13.75	53.60	-1.00	-1.00	38.60	6.30	44.90			
NO. 180									
1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.28	140.36	16.07
14.00	54.00	-1.00	-1.00	18.96	5.58	24.54			
NO. 181									
1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	120.97	136.36	15.39
13.80	52.90	-1.00	-1.00	17.26	7.57	24.83			
NO. 182									
1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.02	139.95	15.92
13.91	53.60	-1.00	-1.00	25.08	3.70	28.77			
NO. 183									
1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.28	136.90	15.61
13.97	53.00	-1.00	-1.00	26.40	8.43	34.83			
NO. 184									
-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.54	140.80	16.25
14.13	54.60	-1.00	-1.00	17.59	5.19	22.77			
NO. 185									
-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.85	140.80	15.94
13.82	54.00	-1.00	-1.00	19.47	13.56	33.02			
NO. 186									
-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.39	139.45	16.05
14.10	54.00	-1.00	-1.00	21.69	4.45	26.13			
NO. 187									
-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.68	137.09	15.41
13.73	52.90	-1.00	-1.00	13.79	5.16	18.95			
NO. 188									
-1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.76	138.50	15.74
13.89	53.20	-1.00	-1.00	22.88	7.38	30.25			
NO. 189									
-1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.92	139.83	15.90
13.90	53.40	-1.00	-1.00	22.25	5.99	28.24			
NO. 190									
-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.53	137.20	15.66
13.98	52.90	-1.00	-1.00	31.84	9.57	41.41			
NO. 191									
-1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.06	139.06	16.00
14.08	54.30	-1.00	-1.00	13.79	9.91	23.70			
NO. 192									
1.00	-1.00	-1.00	-1.00	18.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.95	140.05	16.09
14.06	53.90	-1.00	-1.00	15.11	3.95	19.06			
NO. 193									
1.00	-1.00	-1.00	1.00	42.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.03	138.88	15.84
13.96	53.20	-1.00	-1.00	11.27	12.62	23.88			
NO. 194									
1.00	-1.00	1.00	-1.00	42.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.67	139.47	15.79
13.83	53.30	-1.00	-1.00	10.21	10.26	20.47			
NO. 195									
1.00	-1.00	1.00	1.00	18.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.05	138.84	15.79
13.90	52.90	-1.00	-1.00	13.76	4.58	18.34			
NO. 196									
1.00	-1.00	-1.00	1.00	18.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.01	138.62	15.61
13.75	52.20	-1.00	-1.00	23.69	7.28	30.97			
NO. 197									
1.00	-1.00	1.00	-1.00	18.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.85	139.73	15.87
13.88	53.80	-1.00	-1.00	27.52	8.03	35.55			
NO. 198									
1.00	-1.00	1.00	1.00	42.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.21	138.80	15.58
13.71	52.80	-1.00	-1.00	6.32	21.89	28.21			
NO. 199									
-1.00	-1.00	-1.00	-1.00	18.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.57	140.54	15.96
13.87	53.60	-1.00	-1.00	23.19	5.61	28.79			
NO. 200									
-1.00	-1.00	-1.00	1.00	42.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.13	140.06	15.93
13.89	53.30	-1.00	-1.00	22.49	14.92	37.41			
NO. 201									
-1.00	-1.00	1.00	-1.00	42.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.32	140.00	15.68
13.65	53.10	-1.00	-1.00	15.45	7.16	22.61			

TABLE 2.5-2B (CONT.)

NO. 202									
-1.00	-1.00	1.00	1.00	18.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.58	138.31	15.73
13.91	52.90	-1.00	-1.00	14.80	3.99	18.79			
NO. 203									
-1.00	-1.00	-1.00	-1.00	42.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.30	137.93	15.63
13.85	52.10	-1.00	-1.00	19.43	4.32	23.75			
NO. 204									
-1.00	-1.00	-1.00	1.00	18.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.26	140.21	15.94
13.89	53.50	-1.00	-1.00	21.65	10.17	31.81			
NO. 205									
-1.00	-1.00	1.00	-1.00	18.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.34	136.90	15.55
13.91	52.10	-1.00	-1.00	13.00	3.54	16.54			
NO. 206									
-1.00	-1.00	1.00	1.00	42.50	1.00	1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.61	140.36	15.75
13.68	53.30	-1.00	-1.00	7.33	17.91	25.24			
NO. 207									
1.00	-1.00	-1.00	-1.00	18.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	122.78	138.58	15.79
13.94	52.25	-1.00	-1.00	16.33	2.92	19.25			
NO. 208									
1.00	-1.00	-1.00	1.00	42.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	124.55	140.56	16.01
13.91	52.80	-1.00	-1.00	12.29	12.68	24.97			
NO. 209									
1.00	-1.00	1.00	-1.00	42.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	121.22	136.85	15.62
13.99	51.63	-1.00	-1.00	13.13	3.92	17.04			
NO. 210									
1.00	-1.00	1.00	1.00	18.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	124.70	140.69	15.98
13.88	53.23	-1.00	-1.00	9.34	4.42	13.75			
NO. 211									
1.00	-1.00	-1.00	-1.00	42.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	126.06	142.39	16.32
14.00	53.87	-1.00	-1.00	12.89	2.37	15.26			
NO. 212									
1.00	-1.00	-1.00	1.00	18.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	124.06	140.04	15.97
13.94	52.97	-1.00	-1.00	15.13	5.88	21.01			
NO. 213									
1.00	-1.00	1.00	-1.00	18.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	121.43	137.06	15.63
13.96	51.82	-1.00	-1.00	14.60	3.51	18.11			
NO. 214									
1.00	-1.00	1.00	1.00	42.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	124.84	140.80	15.95
13.83	53.55	-1.00	-1.00	8.04	13.74	21.78			
NO. 215									
-1.00	-1.00	-1.00	-1.00	18.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	124.16	140.23	16.06
14.01	52.83	-1.00	-1.00	9.66	2.19	11.85			
NO. 216									
-1.00	-1.00	-1.00	1.00	42.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	122.71	138.54	15.82
13.98	52.17	-1.00	-1.00	8.63	7.57	16.20			
NO. 217									
-1.00	-1.00	1.00	-1.00	42.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	124.95	141.12	16.17
14.00	53.58	-1.00	-1.00	10.92	2.50	13.42			
NO. 218									
-1.00	-1.00	1.00	1.00	18.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	125.35	141.41	16.05
13.86	53.53	-1.00	-1.00	11.45	4.66	16.11			
NO. 219									
-1.00	-1.00	-1.00	-1.00	42.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	124.28	140.57	16.28
14.19	53.30	-1.00	-1.00	27.54	2.29	29.82			
NO. 220									
-1.00	-1.00	-1.00	1.00	18.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	123.54	139.51	15.96
14.00	52.67	-1.00	-1.00	16.40	4.61	21.00			
NO. 221									
-1.00	-1.00	1.00	-1.00	18.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	122.15	137.58	15.42
13.69	51.45	-1.00	-1.00	12.77	3.57	16.34			
NO. 222									
-1.00	-1.00	1.00	1.00	42.50	-1.00	-1.00	-1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	1.00	124.48	140.32	15.83
13.77	52.83	-1.00	-1.00	9.23	11.61	20.84			
NO. 223									
1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	126.04	141.81	15.77
13.53	51.25	-1.00	-1.00	14.86	2.71	17.56			
NO. 224									
1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	125.24	140.73	15.48
13.38	50.42	-1.00	-1.00	7.27	11.37	18.63			
NO. 225									
1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	125.68	141.64	15.95
13.73	50.58	-1.00	-1.00	11.95	2.43	14.37			
NO. 226									
1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	125.57	141.01	15.43
13.30	50.42	-1.00	-1.00	9.38	3.89	13.27			

1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	121.08	136.38	15.29
13.71	50.42	-1.00	-1.00	14.47	2.17	16.63			
NO. 228									
1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.93	140.63	15.69
13.60	50.42	-1.00	-1.00	11.84	3.27	15.10			
NO. 229									
1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	127.19	142.87	15.68
13.32	51.13	-1.00	-1.00	14.06	2.37	16.43			
NO. 230									
1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.54	139.93	15.39
13.37	50.42	-1.00	-1.00	9.49	16.05	25.54			
NO. 231									
-1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	125.15	140.59	15.44
13.35	50.75	-1.00	-1.00	14.86	3.20	18.06			
NO. 232									
-1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.87	140.16	15.28
13.25	50.77	-1.00	-1.00	9.74	16.15	25.88			
NO. 233									
-1.00	-1.00	1.00	-1.00	42.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.30	137.51	15.20
13.48	50.74	-1.00	-1.00	14.38	2.54	16.92			
NO. 234									
-1.00	-1.00	1.00	1.00	18.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	124.08	139.52	15.44
13.47	50.92	-1.00	-1.00	13.27	4.83	18.10			
NO. 235									
-1.00	-1.00	-1.00	-1.00	42.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	125.30	141.00	15.70
13.55	50.85	-1.00	-1.00	13.49	3.59	17.08			
NO. 236									
-1.00	-1.00	-1.00	1.00	18.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	126.49	142.35	15.85
13.55	50.58	-1.00	-1.00	11.59	5.68	17.27			
NO. 237									
-1.00	-1.00	1.00	-1.00	18.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	125.01	140.61	15.59
13.50	50.42	-1.00	-1.00	15.42	2.88	18.29			
NO. 238									
-1.00	-1.00	1.00	1.00	42.50	1.00	-1.00	1.00	-1.00	1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	126.01	141.60	15.58
13.38	51.10	-1.00	-1.00	7.52	10.59	18.11			
NO. 239									
1.00	-1.00	-1.00	-1.00	18.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	122.80	137.04	14.23
12.56	46.57	1.00	1.00	17.84	2.62	20.45			
NO. 240									
1.00	-1.00	-1.00	1.00	42.50	1.00	-1.00	-1.00	-1.00	-1.00
1.00	-1.00	-1.00	-1.00	1.00	1.00	-1.00	123.83	138.11	14.28
12.49	46.93	1.00	1.00	20.02	9.76	29.77			

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NO.  241
      1.00     -1.00      1.00     -1.00     42.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    122.98    137.20     14.21
     12.53     46.08      1.00      1.00     23.95      4.20     28.14
NO.  242
      1.00     -1.00      1.00      1.00     18.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    122.77    136.98     14.20
     12.54     47.17      1.00      1.00     22.04      5.01     27.04
NO.  243
      1.00     -1.00     -1.00     -1.00     42.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    123.46    138.27     14.80
     12.99     47.45      1.00      1.00     39.74      4.56     44.30
NO.  244
      1.00     -1.00     -1.00      1.00     18.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    120.99    134.96     13.97
     12.53     45.47      1.00      1.00     27.59      3.80     31.38
NO.  245
      1.00     -1.00      1.00     -1.00     18.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    125.54    139.88     14.33
     12.35     47.08      1.00      1.00     32.45      5.32     37.77
NO.  246
      1.00     -1.00      1.00      1.00     42.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    121.27    135.03     13.76
     12.31     45.88      1.00      1.00     15.75     10.65     26.40
NO.  247
     -1.00     -1.00     -1.00      1.00     42.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    121.59    135.33     13.73
     12.25     44.98      1.00      1.00     28.91      8.69     37.60
NO.  248
     -1.00     -1.00      1.00     -1.00     42.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    124.08    138.30     14.22
     12.41     45.80      1.00      1.00     26.32      5.16     31.48
NO.  249
     -1.00     -1.00      1.00      1.00     18.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    121.11    134.73     13.61
     12.20     45.02      1.00      1.00     26.00      4.73     30.73
NO.  250
     -1.00     -1.00     -1.00     -1.00     42.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    125.77    140.61     14.83
     12.76     46.75      1.00      1.00     25.35      3.12     28.47
NO.  251
     -1.00     -1.00     -1.00      1.00     18.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    122.61    136.64     14.03
     12.40     45.33      1.00      1.00     24.31      4.88     29.18
NO.  252
     -1.00     -1.00      1.00     -1.00     18.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    123.91    137.86     13.94
     12.19     45.67      1.00      1.00     25.28      2.63     27.90
NO.  253
     -1.00     -1.00      1.00      1.00     42.50      1.00     -1.00     -1.00     -1.00     -1.00
      1.00     -1.00     -1.00     -1.00      1.00      1.00     -1.00    125.15    138.96     13.80
     11.94     45.88      1.00      1.00     14.12      7.39     21.51
TOT NO. OBS=  253
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TABLE 2.5-3
REGRESSION MODEL FOR OPEN CIRCUIT

ANALYSIS OF Y 1, 1 DF EACH VAR.

X	RSQR X	B COEF	SE(B)	T	VAR. SSQ	B COEF - E FORMAT
1	0.9391	4.8198	2.1093	2.2849	0.357519E 03	0.481988E 01
3	0.9613	-8.8674	2.6454	-3.3519	0.769351E 03	-0.886745E 01
5	0.8817	4.0566	2.9574	1.3716	0.128835E 03	0.405660E 01
6	0.8702	-6.2825	1.8420	-3.4106	0.796568E 03	-0.628252E 01
10	0.6199	1.9673	1.3051	1.5073	0.155587E 03	0.196730E 01
14	0.3638	-1.8121	1.3399	-1.3524	0.125247E 03	-0.181215E 01
15	0.2994	2.6862	1.2767	2.1039	0.303115E 03	0.268625E 01
17	0.8786	10.6041	4.3120	2.4591	0.414116E 03	0.106041E 02
18	0.6263	-7.7868	1.7483	-4.4538	0.135836E 04	-0.778685E 01
19	0.8356	7.8094	2.6363	2.9621	0.600844E 03	0.780946E 01
20	0.8625	9.5467	2.9706	3.2136	0.707189E 03	0.954676E 01
21	0.8618	5.1987	3.3275	1.5623	0.167142E 03	0.519870E 01
23	0.8786	-5.5957	1.9830	-2.8147	0.542517E 03	-0.559577E 01
24	0.9024	-3.0615	2.1314	-1.4363	0.141277E 03	-0.306154E 01
25	0.8712	-9.8875	4.3417	-2.2773	0.355130E 03	-0.988759E 01
26	0.8057	11.9793	2.8383	4.2206	0.121980E 04	0.119793E 02
27	0.9051	4.5407	2.1621	2.1001	0.302016E 03	0.454074E 01
28	0.8307	4.9796	2.0585	2.4190	0.400700E 03	0.497969E 01
29	0.9148	8.6125	4.5534	1.8914	0.244975E 03	0.861258E 01
32	0.8922	-6.6490	3.3233	-2.0007	0.274105E 03	-0.664904E 01
35	0.6477	-4.4074	2.3252	-1.8954	0.246010E 03	-0.440741E 01
38	0.8730	3.5318	1.9433	1.8174	0.226177E 03	0.353182E 01
39	0.4667	-4.7729	1.2812	-3.7253	0.950331E 03	-0.477295E 01

CONSTANT	MULT F	DF1	DF2	RSQR*	RES.SSQ/DF2
33.07999	19.13	23	229	0.657	68.47633

*SQUARED CORRELATION COEF.

RESIDUAL SSQ(BY DIFF.)= 0.1568107E 05, TOTAL SSQ= 0.4581647E 05
CORRELATION COEF.=0.8110

TABLE 2.5-4
REGRESSION MODEL FOR DISCHARGE

ANALYSIS OF Y 2, 1 DF EACH VAR.

X	RSQR X	B COEF	SE(B)	T	VAR. SSQ	B COEF - E FORMAT
2	0.9120	4.3962	1.0785	4.0763	0.190113E 03	0.439629E 01
3	0.9714	-4.1245	1.2575	-3.2798	0.123080E 03	-0.412452E 01
5	0.9659	-4.6027	2.2519	-2.0439	0.477080E 02	-0.460273E 01
6	0.8260	-5.1181	0.6500	-7.8731	0.709205E 03	-0.511815E 01
7	0.9160	-2.9218	1.5536	-1.8805	0.404637E 02	-0.292185E 01
9	0.9701	6.5855	1.2306	5.3514	0.327661E 03	0.658552E 01
10	0.6004	-1.6855	0.5202	-3.2397	0.120085E 03	-0.168557E 01
11	0.9431	4.1199	0.9188	4.4837	0.230021E 03	0.411996E 01
15	0.3667	1.8656	0.5489	3.3986	0.132159E 03	0.186562E 01
17	0.8250	4.4568	1.4680	3.0359	0.105452E 03	0.445684E 01
18	0.8467	-7.1580	1.1159	-6.4142	0.470727E 03	-0.715802E 01
19	0.8885	10.8989	1.3084	8.3296	0.793845E 03	0.108989E 02
25	0.8943	-7.8320	1.9588	-3.9982	0.182897E 03	-0.783205E 01
29	0.9050	3.1759	1.7626	1.8018	0.371450E 02	0.317594E 01
30	0.9048	8.6580	1.4723	5.8806	0.395664E 03	0.865809E 01
31	0.7976	2.0218	0.7520	2.6883	0.826922E 02	0.202183E 01
33	0.9429	-6.5115	1.4463	-4.5021	0.231908E 03	-0.651159E 01
34	0.8898	-3.5582	0.8442	-4.2144	0.203215E 03	-0.355823E 01
36	0.8929	6.7630	1.6630	4.0666	0.189211E 03	0.676302E 01
37	0.9333	4.5809	2.1355	2.1450	0.526449E 02	0.458095E 01
40	0.9288	4.7456	1.6860	2.8147	0.906465E 02	0.474563E 01
41	0.8002	-1.7357	0.9795	-1.7720	0.359274E 02	-0.173571E 01
42	0.7931	0.9513	0.6212	1.5313	0.268297E 02	0.951318E 00
43	0.9188	-2.7359	1.4742	-1.8558	0.394075E 02	-0.273598E 01
44	0.8390	-2.1586	1.3550	-1.5930	0.290360E 02	-0.215865E 01
45	0.9048	2.2580	1.7615	1.2818	0.188005E 02	0.225806E 01
46	0.9158	2.1905	1.6812	1.3029	0.194227E 02	0.219050E 01
47	0.9113	2.6141	1.8231	1.4338	0.235241E 02	0.261416E 01
48	0.8749	2.0386	1.5351	1.3279	0.201766E 02	0.203861E 01

CONSTANT	MULT F	DF1	DF2	RSQR*	RES.SSQ/DF2
25.56338	73.56	29	223	0.905	11.44140

*SQUARED CORRELATION COEF.

RESIDUAL SSQ(BY DIFF.)= 0.2551434E 04, TOTAL SSQ= 0.2695986E 05
CORRELATION COEF.=0.9515

TABLE 2.5-5
REGRESSION MODEL FOR COMBINED GAS

ANALYSIS OF Y 3, 1 DF EACH VAR.

X	RSQR X	B COEF	SE(B)	T	VAR. SSQ	B COEF - E FORMAT
1	0.9675	7.3630	3.3855	2.1748	0.445062E 03	0.736301E 01
2	0.9221	5.3913	3.2881	1.6396	0.252968E 03	0.539139E 01
3	0.9565	-8.2681	2.9266	-2.8250	0.750986E 03	-0.826817E 01
5	0.9216	7.0117	4.2601	1.6458	0.254901E 03	0.701171E 01
6	0.9367	-11.3031	3.0929	-3.6544	0.125665E 04	-0.113031E 02
9	0.9677	10.6566	3.3972	3.1368	0.925900E 03	0.106566E 02
11	0.9701	5.5799	3.6376	1.5339	0.221397E 03	0.557991E 01
15	0.3830	5.0929	1.5949	3.1932	0.959448E 03	0.509299E 01
17	0.8804	16.5992	5.0939	3.2586	0.999161E 03	0.165992E 02
18	0.7764	-13.5905	2.6494	-5.1295	0.247588E 04	-0.135905E 02
19	0.8336	20.6982	3.0714	6.7390	0.427326E 04	0.206982E 02
20	0.8379	10.4592	3.2070	3.2613	0.100084E 04	0.104592E 02
21	0.8933	11.1654	4.4386	2.5155	0.595418E 03	0.111654E 02
22	0.8164	-3.9064	2.5535	-1.5297	0.220207E 03	-0.390644E 01
23	0.9368	-8.6734	3.2308	-2.6846	0.678155E 03	-0.867345E 01
24	0.9317	-4.7433	2.9884	-1.5872	0.237058E 03	-0.474339E 01
25	0.9160	-23.6970	6.3014	-3.7605	0.133067E 04	-0.236970E 02
26	0.9060	10.5712	4.7837	2.2098	0.459491E 03	0.105712E 02
27	0.9169	4.1601	2.7085	1.5358	0.221968E 03	0.416011E 01
28	0.8420	5.1968	2.4977	2.0806	0.407349E 03	0.519685E 01
29	0.9170	13.0281	5.4093	2.4084	0.545810E 03	0.130281E 02
30	0.8114	7.2093	2.9993	2.4036	0.543621E 03	0.720937E 01
31	0.8138	-3.5334	2.2486	-1.5713	0.232337E 03	-0.353340E 01
32	0.9323	-7.8229	4.9176	-1.5908	0.238122E 03	-0.782290E 01
33	0.9441	-6.6098	4.1931	-1.5763	0.233814E 03	-0.660981E 01

CONSTANT	MULT F	DF1	DF2	RSQR*	RES.SSQ/DF2	*SQUARED CORRELATION COEF.
52.34271	39.09	25	227	0.811	94.09547	

RESIDUAL SSQ(BY DIFF.)= 0.2135967E 05, TOTAL SSQ= 0.1133260E 06

CORRELATION COEF.=0.9008

TABLE 2.5-6
PREDICTIONS BASED ON ORIGINAL DATA (OPEN CIRCUIT)

RESIDUALS AND PREDICTIONS

OBS	Y(OBS)	Y(PRED)	RESIDUAL	S.E.(Y)	NORM DEV	RESIDUALS SSQS
1	45.0200	36.6964	8.3235	2.2528	1.005	69.2820894
2	14.7700	28.3506	-13.5806	2.8077	-1.641	253.7168278
3	58.6400	37.9193	20.7206	2.6192	2.503	683.0615251
4	32.4400	30.2265	2.2134	2.6034	0.267	687.9606947
5	24.9900	33.8342	-8.8442	2.7268	-1.068	766.1805436
6	31.8900	29.9983	1.8916	2.3625	0.228	769.7586686
7	54.4800	40.2796	14.2003	2.5157	1.716	971.4093031
8	35.9600	28.2293	7.7306	2.8421	0.934	1031.1721224
9	46.5700	36.7036	9.8663	2.3844	1.192	1128.5170931
10	26.7400	29.1036	-2.3636	2.8278	-0.285	1134.1037626
11	33.9400	38.5212	-4.5812	2.5631	-0.553	1155.0918002
12	29.4000	31.0268	-1.6268	2.5662	-0.196	1157.7385287
13	18.4700	34.8550	-16.3850	2.8113	-1.980	1426.2070345
14	28.8700	32.5419	-3.6719	2.6384	-0.443	1439.6901884
15	28.0700	40.9716	-12.9016	2.5199	-1.559	1606.1425814
16	27.7400	28.1850	-0.4450	2.7102	-0.053	1606.3405795
17	20.5500	29.7450	-9.1950	1.6742	-1.111	1690.8889188
18	34.9900	29.1687	5.8212	3.7642	0.703	1724.7758822
19	20.0100	35.9623	-15.9523	2.9660	-1.927	1979.2541532
20	28.5800	33.0442	-4.4642	2.9768	-0.539	1999.1835970
21	32.3600	33.0781	-0.7181	3.5674	-0.086	1999.6992216
22	59.6300	45.7188	13.9111	3.3116	1.681	2193.2202215
23	61.7900	49.7328	12.0571	3.2786	1.457	2338.5952215
24	45.6100	37.5284	8.0815	3.6758	0.976	2403.9062557
25	26.1100	24.8130	1.2969	2.3141	0.156	2405.5878963
26	38.3900	22.5002	15.8897	3.8461	1.920	2658.0708065
27	23.3800	31.0772	-7.6972	3.5746	-0.930	2717.3188533
28	20.9600	27.8081	-6.8481	2.9689	-0.827	2764.2153377
29	20.8500	26.1795	-5.3294	3.6945	-0.644	2792.6186590
30	18.3500	33.7706	-15.4206	3.3628	-1.863	3030.4135808
31	39.7500	43.2879	-3.5379	3.2520	-0.427	3042.9306707
32	22.9100	32.1999	-9.2899	3.4693	-1.122	3129.2338933
33	20.8700	27.9225	-7.0525	2.1815	-0.852	3178.9721746
34	12.1400	30.9410	-18.8010	2.6401	-2.272	3532.4497127
35	48.7400	35.1497	13.5902	2.6401	1.642	3717.1435604
36	20.0800	28.9283	-8.8483	2.7429	-1.069	3795.4365301
37	54.7200	43.2220	11.4979	2.7973	1.389	3927.6396541
38	43.3100	42.9524	0.3575	3.1013	0.043	3927.7670955
39	65.6000	45.8166	19.7833	3.0910	2.390	4319.1484439
40	24.7100	41.1083	-16.3983	2.5833	-1.981	4588.0546989
41	40.2600	33.2770	6.9829	1.7679	0.843	4636.8154430
42	49.3700	34.2509	15.1190	2.6341	1.827	4865.3994255
43	41.4200	37.4099	4.0100	2.8229	0.484	4881.4795055
44	60.5600	31.6336	28.9263	2.6836	3.495	5718.2099742
45	36.3300	45.0995	-8.7695	2.8320	-1.059	5795.1142711
46	64.7600	44.7478	20.0121	2.8666	2.418	6195.6005992
47	34.6000	47.8813	-13.2813	3.0830	-1.604	6371.9951335
48	24.5400	43.5329	-19.0429	2.7658	-2.301	6734.6298942
49	39.8600	38.7425	1.1174	2.0962	0.135	6735.8779411
50	24.3900	34.6175	-10.2275	2.9728	-1.235	6840.4795055
51	30.9200	39.2187	-8.2987	3.0840	-1.002	6909.3486461
52	34.0800	27.7673	6.3126	2.9033	0.762	6949.1972789
53	42.0100	39.1940	2.8159	2.9354	0.340	6957.1259880
54	28.3100	32.6913	-4.3813	2.2570	-0.529	6976.3222789
55	30.1100	37.5950	-7.4850	2.9239	-0.904	7032.3476696
56	22.7300	28.7560	-6.0260	3.2993	-0.728	7068.6611442
57	43.8100	41.3259	2.4840	2.8300	0.300	7074.8310680
58	29.4700	37.5597	-8.0897	3.2854	-0.977	7140.2754020
59	27.9800	42.4609	-14.4809	2.9288	-1.749	7349.9736461
60	25.3200	31.4073	-6.0873	2.7921	-0.735	7387.0293083
61	73.7100	42.0303	31.6796	3.3443	3.828	8390.6289329
62	29.9600	36.1324	-6.1724	2.8146	-0.745	8428.7265892
63	37.3900	40.0121	-2.6221	2.9829	-0.316	8435.6015853
64	60.7100	31.7783	28.9317	3.0108	3.496	9272.6445579
65	23.8400	28.4837	-4.6437	1.5091	-0.561	9294.2070579
66	18.7400	27.3680	-8.6280	2.1295	-1.042	9368.6484642
67	22.7000	25.8123	-3.1123	2.1766	-0.376	9378.3340072
68	19.9800	22.9299	-2.9499	2.3128	-0.356	9387.0351791
69	27.2400	29.7825	-2.5425	2.0572	-0.307	9393.4980735
70	18.6700	26.0530	-7.3830	1.5735	-0.892	9448.0078553
71	22.5500	23.6331	-1.0831	2.0512	-0.130	9449.1797142
72	18.7600	23.2182	-4.4582	2.2248	-0.538	9469.0547103
73	29.9700	26.7278	3.2421	2.0480	0.391	9479.5644760
74	25.7800	25.1026	0.6773	2.2871	0.081	9480.0215072
75	32.2500	22.7917	9.4582	1.9478	1.142	9569.4785423
76	22.5000	19.2949	3.2050	2.2000	0.387	9579.7500267
77	19.4100	27.6713	-8.2613	2.2191	-0.998	9647.9980735
78	18.1500	23.6266	-5.4766	2.0137	-0.661	9677.9902610
79	18.3000	22.3717	-4.0717	2.2078	-0.492	9694.5683822
80	28.3700	20.7441	7.6258	2.0648	0.921	9752.7207298
81	21.7200	22.7728	-1.0528	1.9873	-0.127	9753.8281478
82	22.8200	20.5435	2.2764	2.2599	0.275	9759.0097885
83	18.0800	22.1775	-4.0975	1.9227	-0.495	9775.7988510
84	17.1800	19.1852	-2.0052	2.1884	-0.242	9779.8183822
85	21.2500	26.5527	-5.3027	2.1014	-0.640	9807.9375267
86	18.3500	19.2062	-0.8562	2.0676	-0.103	9808.6699485
87	16.6400	18.0610	-1.4210	2.3987	-0.171	9810.6875267
88	21.0600	17.0924	3.9675	2.0916	0.479	9826.4277610
89	20.4300	25.4221	-4.9921	1.4916	-0.603	9851.3476791
90	36.4700	24.1601	12.3098	1.9514	1.487	10002.8789329
91	25.0600	23.6438	1.4161	2.1126	0.171	10004.8828392
92	29.3100	21.6141	7.6958	2.1062	0.930	10064.1074447
93	24.7700	28.9582	-4.1882	1.9695	-0.506	10081.6484642
94	22.1000	24.6665	-2.5665	1.3449	-0.310	10088.2344017
95	19.0100	23.5180	-4.5080	2.0475	-0.544	10108.5566635
96	27.7500	19.1927	8.5572	2.2672	1.034	10181.7812728
97	34.4700	31.2707	3.1992	2.5825	0.386	10192.0156478
98	29.3100	30.0637	-0.7537	2.6672	-0.091	10192.5820541
99	20.6100	27.3553	-6.7453	2.3874	-0.815	10238.0801010
100	23.0800	24.2044	-1.1244	2.6252	-0.135	10239.3437728
101	35.6900	31.7139	3.9760	2.6491	0.480	10255.1523704
102	23.9900	28.8026	-4.8126	2.5922	-0.581	10279.3125228
103	19.6000	27.9474	-8.3474	2.6271	-1.008	10347.9922142
104	23.7800	24.5634	-0.7834	2.3957	-0.094	10348.6054916
105	43.4600	34.0811	9.3788	2.3778	1.133	10436.5664291
106	39.1900	31.9664	7.2235	2.6202	0.872	10488.7441673
107	22.7700	30.9800	-8.2100	2.5764	-0.992	10556.1484642
108	38.3700	26.4725	11.8974	2.6413	1.437	10697.6953392
109	31.9900	35.2449	-3.2548	2.6375	-0.393	10708.2890853
110	32.0600	31.6266	0.4333	2.3890	0.052	10708.4765892
111	22.8700	29.0259	-6.1559	2.6614	-0.743	10746.3711166
112	30.4700	26.3839	4.0860	2.6515	0.493	10763.0664291
113	21.3900	24.9335	-3.5435	1.4215	-0.428	10775.6230697
114	19.5000	20.6903	-1.1903	1.7077	-0.143	10777.0390853
115	19.3500	20.9015	-1.5515	2.3542	-0.187	10779.4453392
116	19.8600	20.9135	-1.0535	2.2089	-0.127	10780.5547103
117	15.1500	20.6447	-5.4947	1.3905	-0.664	10810.7461204

TABLE 2.5-6 (CONT.)

118	23.2900	20.4151	2.8748	1.7867	0.347	10819.0097885
119	21.7300	24.1322	-2.4022	2.2011	-0.290	10824.7793197
120	20.0000	18.8498	1.1501	2.2577	0.138	10826.1015853
121	22.1700	17.2832	4.8867	2.2854	0.590	10849.9804955
122	17.9500	14.7845	3.1654	2.3092	0.382	10860.0000267
123	18.7400	15.0408	3.6991	2.3696	0.447	10873.6836204
124	25.0500	16.5868	8.4631	2.2953	1.022	10945.3066635
125	21.0700	16.9904	4.0795	2.2785	0.492	10961.9472923
126	16.7700	13.1983	3.5716	2.4237	0.431	10974.7031517
127	20.9300	16.2769	4.6530	2.5766	0.562	10996.3535385
128	20.9500	13.1111	7.8388	2.2805	0.947	11057.8008041
129	21.8000	20.2566	1.5433	2.3995	0.186	11060.1816673
130	16.8900	14.4422	2.4477	2.4603	0.295	11066.1719017
131	22.0200	18.4845	3.5354	2.6730	0.427	11078.6699485
132	14.2900	18.4063	-4.1163	2.6863	-0.497	11095.6133041
133	14.5100	17.0276	-2.5176	2.3773	-0.304	11101.9511985
134	14.7000	16.8891	-2.1891	2.5099	-0.264	11106.7422142
135	13.6900	19.4404	-5.7504	2.6988	-0.694	11139.8086166
136	10.8900	15.9021	-5.0121	2.6871	-0.605	11164.9297142
137	15.4000	13.4522	1.9477	2.6986	0.235	11168.7226829
138	11.0000	9.5968	1.4031	2.6694	0.169	11170.6894798
139	11.3100	12.3375	-1.0275	2.3772	-0.124	11171.7441673
140	14.4300	12.5302	1.8997	2.5022	0.229	11175.3515853
141	14.5700	12.2584	2.3115	2.6686	0.279	11180.6933860
142	13.7700	11.6685	2.1014	2.6720	0.253	11185.1093978
143	14.4500	14.3638	0.0861	2.4661	0.010	11185.1152572
144	12.9000	9.5612	3.3387	2.3995	0.403	11196.2617416
145	42.2500	46.6312	-4.3812	3.2216	-0.529	11215.4570579
146	51.4400	46.1174	5.3225	3.1145	0.643	11243.7851791
147	63.1200	52.1178	11.0021	3.1255	1.329	11364.8301010
148	53.4200	49.3369	4.0830	3.1930	0.493	11381.5000267
149	51.3200	49.0340	2.2859	3.1017	0.276	11386.7246360
150	39.6600	45.6485	-5.9885	3.2065	-0.723	11422.5859603
151	52.4900	52.5716	-0.0816	3.1987	-0.009	11422.5918197
152	33.1700	49.8649	-16.6949	3.1151	-2.017	11701.3125228
153	41.9900	49.4623	-7.4723	3.1258	-0.903	11757.1484642
154	53.8200	49.3265	4.4934	3.2132	0.543	11777.3379135
155	60.8500	55.0959	5.7540	3.1904	0.695	11810.4453392
156	56.9700	51.5229	5.4470	3.1040	0.658	11840.1152572
157	47.8500	50.0527	-2.2026	3.2284	-0.266	11844.9668235
158	56.1100	48.1584	7.9515	3.1293	0.960	11908.1933860
159	56.3500	54.2821	2.5679	3.1141	0.310	11914.7871322
160	40.3100	52.3911	-12.0811	3.1867	-1.459	12060.7402610
161	35.3700	23.1832	12.1867	2.4535	1.472	12209.2578353
162	9.8000	17.1575	-7.3575	2.4954	-0.889	12263.3906517
163	17.2800	18.5124	-1.2324	2.4815	-0.148	12264.9082298
164	13.7100	17.5688	-3.8588	2.5032	-0.466	12279.7988510
165	19.5100	21.6658	-2.1558	2.5379	-0.260	12284.4453392
166	29.1900	19.5835	9.6064	2.4591	1.160	12376.7285423
167	14.7000	20.1144	-5.4144	2.4911	-0.654	12406.0429916
168	14.5400	15.0502	-0.5102	2.4193	-0.061	12406.3027572
169	38.7900	20.0928	18.6971	2.6096	2.259	12755.8867454
170	9.3800	14.4570	-5.0770	2.7749	-0.613	12781.6621360
171	12.3400	17.8767	-5.0367	2.5664	-0.608	12807.0293197
172	16.0600	16.4714	-0.4114	2.5476	-0.049	12807.1972923
173	19.2100	20.1535	-0.9435	2.4851	-0.114	12808.0859603
174	11.3600	19.0115	-7.6515	2.4209	-0.924	12866.6308860
175	19.1100	19.9508	-0.8408	2.5450	-0.101	12867.3379135
176	15.5700	26.4634	-10.8934	2.0253	-1.316	12986.0039291
177	49.0800	20.6542	28.4257	1.9340	3.435	13794.0254135
178	17.7500	22.5429	-4.7929	2.3943	-0.579	13816.9980735
179	38.6000	19.3563	19.2436	1.9952	2.325	14187.3164291
180	18.9600	23.8147	-4.8547	2.0951	-0.586	14210.8828392
181	17.2600	22.1189	-4.8589	1.8608	-0.587	14234.4902610
182	25.0800	22.9911	2.0888	2.1802	0.252	14238.8515853
183	26.4000	18.7759	7.6240	2.0996	0.921	14296.9765892
184	17.5900	27.1366	-9.5466	1.6704	-1.153	14388.1152572
185	19.4700	19.8964	-0.4264	1.6012	-0.051	14388.2968978
186	21.6900	22.1571	-0.4671	2.2186	-0.056	14388.5136947
187	13.7900	19.1426	-5.3526	1.7782	-0.646	14417.1640892
188	22.8800	22.8525	0.0274	1.7428	0.003	14417.1640892
189	22.2500	22.8773	-0.6273	1.3914	-0.075	14417.5566635
190	31.5400	23.5746	8.2653	2.0226	0.998	14485.8711166
191	13.7900	19.6739	-5.8839	2.2039	-0.711	14520.4922142
192	15.1100	20.0244	-4.9144	3.1579	-0.593	14544.6426048
193	11.2700	14.4217	-3.1517	3.2291	-0.380	14554.5761947
194	10.2100	13.4491	-3.2391	3.0803	-0.391	14565.0664291
195	13.7600	13.9567	-0.1967	3.1350	-0.023	14565.1035385
196	23.6900	15.0637	8.6262	3.2209	1.042	14639.5136947
197	27.5200	16.1913	11.3286	3.1056	1.369	14767.8515853
198	6.3200	10.0117	-3.6917	3.0863	-0.446	14781.4804954
199	23.1900	22.8444	0.3455	1.5746	0.041	14781.5996322
200	22.4900	18.2596	4.2303	1.7048	0.511	14799.4941673
201	15.4500	16.3177	-0.8677	1.9546	-0.104	14800.2461204
202	14.8000	18.3573	-3.5573	1.8714	-0.429	14812.9004173
203	19.4300	20.3153	-0.8853	1.7928	-0.106	14813.6836204
204	21.6500	20.6218	1.0281	1.4933	0.124	14814.7402610
205	13.0000	20.7618	-7.7618	1.8863	-0.937	14874.9863548
206	7.3300	14.1469	-6.8169	1.8145	-0.823	14921.4570579
207	16.3300	16.6611	-0.3311	2.4655	-0.040	14921.5664291
208	12.2900	11.6644	0.6255	2.4596	0.075	14921.9570579
209	13.1300	12.2982	0.8317	2.3571	0.100	14922.6484642
210	9.3400	11.3608	-2.0208	2.4161	-0.244	14926.7304954
211	12.8900	14.8206	-1.9306	2.4666	-0.233	14930.4570579
212	15.1300	14.2850	0.8449	2.4373	0.102	14931.1699485
213	14.6000	14.4325	0.1674	2.4374	0.020	14931.1972923
214	8.0400	8.6623	-0.6223	2.3123	-0.075	14931.5840072
215	9.6600	17.1673	-7.5073	2.3143	-0.907	14987.9433860
216	8.6300	12.1668	-3.5368	2.4339	-0.427	15000.4511985
217	10.9200	12.3807	-1.4607	2.4628	-0.176	15002.5840072
218	11.4500	11.1722	0.2777	2.4656	0.033	15002.6601829
219	27.5400	16.2644	11.2755	2.4691	1.362	15129.7988510
220	16.4000	14.6869	1.7130	2.3443	0.207	15132.7324485
221	12.7700	12.2074	0.5625	2.5455	0.067	15133.0488510
222	9.2300	8.1176	1.1123	2.4416	0.134	15134.2851791
223	14.8600	19.8764	-5.0164	2.1670	-0.606	15159.4492454
224	7.2700	9.1558	-1.8858	2.5988	-0.227	15163.0039291
225	11.9500	16.8437	-4.8937	1.9268	-0.591	15186.9511985
226	9.3800	8.4796	0.9003	2.5773	0.108	15187.7617416
227	14.4700	19.0002	-4.5302	1.9907	-0.547	15208.2851791
228	11.8400	13.2838	-1.4438	2.4257	-0.174	15210.3691635
229	14.0600	15.8097	-1.7497	2.4115	-0.211	15213.4297142
230	9.4900	6.7489	2.7410	2.4390	0.331	15220.9414329
231	14.8600	18.3503	-3.4903	2.1788	-0.421	15233.1230697
232	9.7400	8.0444	1.6955	2.6178	0.204	15235.9961204
233	14.3800	14.7291	-0.3491	1.9478	-0.042	15236.1172103
234	13.2700	9.8465	3.4234	2.4120	0.413	15247.8359603
235	13.4900	17.6944	-4.2044	1.8678	-0.508	15265.5117416
236	11.5900	12.8735	-1.2835	2.2080	-0.155	15267.1582298
237	15.4200	17.2515	-1.8315	1.9106	-0.221	15270.5117416
238	7.5200	6.7261	0.7938	2.4275	0.095	15271.1406517
239	17.8400	29.5526	-11.7126	2.5051	-1.415	15408.3261947
240	20.0200	24.1786	-4.1586	2.5020	-0.502	15425.6191635
241	23.9500	24.5350	-0.5850	2.4095	-0.070	15425.9609642
242	22.0400	24.6148	-2.5748	2.5467	-0.311	15432.5898666
243	39.7400	30.6947	9.0452	2.9171	1.093	15514.4062767
244	27.5900	26.8548	0.7351	2.5036	0.088	15514.9453392
245	32.4500	25.4703	6.9796	2.4889	0.843	15563.6601829
246	15.7500	20.3531	-4.6031	2.3454	-0.556	15584.8476791
247	28.9100	22.2364	6.6735	2.5923	0.806	15629.3828392
248	26.3200	23.5066	2.8133	2.4879	0.339	15637.2968978
249	26.0000	21.7752	4.2247	2.5617	0.510	15655.1445579
250	25.3500	28.7506	-3.4006	2.5987	-0.410	15666.7090110
251	24.3100	25.7762	-1.4662	2.4394	-0.177	15668.8574447
252	25.2800	24.0783	1.2016	2.6148	0.145	15670.3008041
253	14.1200	17.2868	-3.1668	2.7880	-0.382	15680.3281478

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TABLE 2.5-7
PREDICTIONS BASED ON ORIGINAL DATA (DISCHARGE)

RESIDUALS AND PREDICTIONS

OBS	Y(OBS)	Y(PRED)	RESIDUAL	S.E.(Y)	NORM DEV	RESIDUALS SSQS
1	18.5200	17.6599	0.8600	1.0974	0.254	0.7396929
2	25.0400	26.5020	-1.4620	1.1895	-0.432	2.8772425
3	12.2900	15.9280	-3.6380	1.1279	-1.075	16.1127205
4	22.5200	20.3721	2.1478	1.2111	0.634	20.7261085
5	15.0000	17.0309	-2.0309	1.4508	-0.600	24.8508453
6	23.9700	23.2121	0.7578	1.4767	0.224	25.4251938
7	13.9700	18.8182	-4.8482	1.3807	-1.433	48.9309769
8	19.9200	22.6447	-2.7247	1.3106	-0.805	56.3551560
9	13.2500	17.2514	-4.0014	1.0962	-1.182	72.3666994
10	30.4600	26.4069	4.0530	1.1858	1.198	88.7939149
11	16.9300	16.7209	0.2090	1.1197	0.061	88.8376314
12	19.8200	21.2483	-1.4283	1.2096	-0.422	90.8779077
13	12.3900	15.3125	-2.9225	1.4622	-0.864	99.4191286
14	36.2600	22.1337	14.1262	1.4807	4.176	298.9699103
15	23.8700	17.9131	5.9568	1.3827	1.761	334.4543464
16	16.4200	21.4300	-5.0100	1.3119	-1.481	359.5552375
17	9.3500	10.0987	-0.7487	0.9227	-0.221	360.1157845
18	30.6300	26.5863	4.0436	1.4483	1.195	376.4669197
19	11.0900	8.2173	2.8726	0.9304	0.849	384.7189338
20	8.6100	9.8673	-1.2573	1.2169	-0.371	386.2999274
21	19.1400	19.1362	0.0037	1.7478	0.001	386.2999274
22	14.4800	14.5795	-0.0995	1.5431	-0.029	386.3098152
23	10.9200	11.6318	-0.7118	1.3550	-0.210	386.8165901
24	26.8100	18.8859	7.9240	1.7035	2.342	449.6074227
25	7.5500	9.9664	-2.4164	0.9402	-0.714	455.4464118
26	27.5000	25.7242	1.7758	1.4379	0.524	458.5998543
27	19.5200	15.9009	3.6190	1.5520	1.069	471.6974494
28	8.0400	10.5586	-2.5186	1.2223	-0.744	478.0410163
29	9.7000	16.4414	-6.7414	1.7392	-1.993	523.4881606
30	7.0700	9.7624	-2.6924	1.4522	-0.796	530.7375502
31	6.5400	10.0792	-3.5392	1.3480	-1.046	543.2637956
32	17.1100	17.8024	-0.6924	1.6988	-0.204	543.7432878
33	5.2000	10.7779	-5.5779	0.8575	-1.649	574.8564469
34	13.8500	19.7800	-5.9300	1.1058	-1.753	610.0218520
35	10.8800	13.8936	-3.0136	0.8216	-0.890	619.1038835
36	8.5800	12.4427	-3.8627	1.2057	-1.141	634.0244157
37	20.5400	11.9594	8.5805	1.3370	2.536	707.6495378
38	11.7400	13.1261	-1.3861	1.3766	-0.409	709.5709245
39	14.2200	12.5552	1.6647	1.2869	0.492	712.3421647
40	13.9100	14.8512	-0.9412	1.1283	-0.278	713.2281510
41	16.0400	12.3746	3.6653	0.8057	1.083	726.6625990
42	21.6800	20.5175	1.1624	1.0972	0.343	728.0139176
43	11.0300	13.2384	-2.2084	0.8361	-0.652	732.8912367
44	18.6400	11.9746	6.6653	1.1963	1.970	777.3179945
45	8.5300	13.8307	-5.3007	1.3419	-1.567	805.4162614
46	23.3600	14.9629	8.3970	1.3782	2.482	875.9267592
47	11.4700	13.5538	-2.0838	1.2867	-0.616	880.2691664
48	15.6700	16.0221	-0.3521	1.1320	-0.104	880.3930678
49	13.2200	12.7991	0.4208	1.1005	0.124	880.5700697
50	18.8300	22.0565	-3.2265	1.1877	-0.953	890.9805924
51	14.6500	11.3034	3.3465	1.1260	0.989	902.1801774
52	17.8400	15.5264	2.3135	1.2090	0.683	907.5327162
53	12.6100	12.2042	0.4057	1.4515	0.119	907.6972672
54	13.8500	18.6232	-4.7732	1.4669	-1.411	930.4809587
55	14.7300	13.8778	0.8521	1.3808	0.251	931.2070326
56	23.3500	17.6953	5.6546	1.3110	1.671	963.1820085
57	13.4400	12.1865	1.2534	1.0927	0.370	964.7531752
58	19.8000	21.5947	-1.7947	1.1868	-0.530	967.9742445
59	14.9400	11.9191	2.8208	1.1195	0.833	975.9316422
60	16.4900	16.3092	0.1707	1.2097	0.050	975.9606947
61	16.5900	9.9620	6.6279	1.4513	1.959	1019.8905045
62	8.5600	16.6351	-8.0751	1.4663	-2.387	1085.0993680
63	9.4800	12.4108	-2.9308	1.3833	-0.866	1093.6892116
64	13.4000	16.4826	-3.0826	1.3122	-0.911	1103.1918973
65	10.1700	11.2142	-1.0442	0.7325	-0.308	1104.2822294
66	18.5000	17.5191	0.9808	0.7548	0.289	1105.2441439
67	11.0700	12.3736	-1.3036	0.7811	-0.385	1106.9436063
68	13.4500	9.2418	4.2081	0.8221	1.244	1124.6523470
69	18.7100	13.4700	5.2399	0.7661	1.549	1152.1088895
70	16.7600	11.0471	5.7128	0.7400	1.688	1184.7448763
71	10.6500	8.6828	1.9671	0.7801	0.581	1189.6142611
72	15.7800	16.3472	-0.5672	0.8263	-0.167	1138.9357943
73	10.2900	11.1299	-0.8399	0.7514	-0.248	1189.6413607
74	16.5600	17.2207	-0.6607	0.7609	-0.195	1190.0778837
75	13.0900	12.7092	0.3807	0.7636	0.112	1190.2226591
76	10.9700	9.3191	1.6508	0.8112	0.488	1192.9480009
77	11.0200	13.2364	-2.2164	0.7743	-0.655	1197.8605990
78	12.2900	10.6810	1.6089	0.7417	0.475	1200.4492216
79	11.0400	9.7578	1.2821	0.7911	0.379	1202.0930209
80	16.6400	16.9124	-0.2724	0.8111	-0.080	1202.1672391
81	12.9400	9.4577	3.4722	0.8092	1.026	1214.2238798
82	17.2000	15.3045	1.8954	0.8814	0.560	1217.8166532
83	13.6100	12.4510	1.1589	0.7715	0.342	1219.1596708
84	8.1700	9.2730	-1.1030	0.8115	-0.326	1220.3762235
85	16.6800	12.7663	3.9136	0.7632	1.157	1235.6928739
86	9.2200	8.8231	0.3968	0.8803	0.117	1235.8501005
87	8.1300	7.9460	0.1839	0.9543	0.054	1235.8837919
88	11.9000	15.3777	-3.4777	0.9180	-1.028	1247.9782743
89	7.1500	9.9275	-2.7775	0.8014	-0.821	1255.6928739
90	12.4700	16.1708	-3.7008	0.8099	-1.094	1269.3891630
91	9.8500	11.4622	-1.6122	0.8083	-0.476	1271.9885287
92	8.0600	8.6887	-0.6287	0.8008	-0.185	1272.3837919
93	14.5500	13.1236	1.4263	0.7631	0.421	1274.4182157
94	8.5600	10.4644	-1.9044	0.7361	-0.563	1278.0449247
95	8.5000	8.6345	-0.1345	0.7818	-0.039	1278.0629911
96	11.1100	14.6553	-3.5453	0.9384	-1.048	1290.6323270
97	7.2400	11.5159	-4.2759	0.7934	-1.264	1308.9162626
98	21.8000	17.7824	4.0175	0.8197	1.187	1325.0568881
99	15.3800	13.1039	2.2760	0.7697	0.672	1330.2370638
100	13.1100	9.8592	3.2507	0.8292	0.961	1340.8046908
101	17.2100	13.4122	3.7978	0.7862	1.122	1355.2277860
102	13.1400	11.3331	1.8068	0.8054	0.534	1358.4924349
103	8.6000	10.5779	-1.9779	0.8551	-0.584	1362.4045443
104	20.8900	16.9943	3.8956	0.8138	1.151	1377.5805697
105	8.1500	12.0435	-3.8935	0.8116	-1.151	1392.7397494
106	20.5600	17.9284	2.6315	0.7884	0.777	1399.6645536
107	9.4600	13.0222	-3.5622	0.8301	-1.053	1412.3544950
108	7.3500	9.2074	-1.8574	0.8196	-0.549	1415.8042025
109	11.1700	14.2425	-3.0725	0.8312	-0.908	1425.2446322
110	8.3100	11.8663	-3.5563	0.8247	-1.051	1437.8920931
111	6.9900	9.4260	-2.4360	0.7943	-0.720	1443.8264188
112	9.9800	16.1544	-6.1744	0.8210	-1.825	1481.9497098
113	6.0600	8.9306	-2.8706	0.9081	-0.848	1490.1904325
114	12.7400	15.2796	-2.5196	0.9089	-0.744	1496.5390653
115	9.6600	8.9682	0.6917	0.9507	0.204	1497.0175814
116	8.8500	5.6942	3.1557	0.9907	0.932	1506.9763212
117	7.7900	7.9826	-0.1926	0.9230	-0.056	1507.0131864
118	11.6000	10.1001	1.4998	0.9375	0.443	1509.2624540
119	9.5800	6.1925	3.3874	0.9417	1.001	1520.7370638
120	10.1400	13.1697	-3.0297	0.9597	-0.895	1529.9162626
121	12.0500	7.6558	4.3941	0.9075	1.299	1549.2243680
122	11.2400	14.7380	-3.4980	0.9000	-1.034	1561.4606966
123	12.5900	9.3970	3.1929	0.9618	0.943	1571.6557650

TABLE 2.5-7 (CONT.)

124	8.7100	6.7677	1.9422	0.9857	0.574	1575.4279818
125	10.0000	10.6014	-0.6014	0.9144	-0.177	1575.7895536
126	6.0800	6.7935	-0.7135	0.9826	-0.210	1576.2985873
127	7.8300	5.7829	2.0470	1.0458	0.605	1580.4887728
128	7.9400	13.6497	-5.7097	0.9606	-1.688	1613.0903353
129	8.2200	5.4917	2.7282	1.0394	0.806	1620.5336942
130	9.8500	11.1803	-1.3303	1.0123	-0.393	1622.3034701
131	5.4200	6.4790	-1.0590	1.0678	-0.313	1623.4750521
132	5.8500	3.1671	2.6828	1.0674	0.793	1630.6225619
133	5.2300	4.9890	0.2409	1.0268	0.071	1630.6804232
134	5.2900	7.1449	-1.8549	1.0488	-0.548	1634.1210970
135	4.2000	2.7473	1.4526	1.0607	0.429	1636.2312040
136	10.0000	10.4575	-0.4575	1.0815	-0.135	1636.4404325
137	4.3600	4.5724	-0.2124	1.0339	-0.062	1636.4853549
138	8.9200	11.0844	-2.1644	1.0121	-0.639	1641.1701688
139	4.3700	6.7875	-2.4175	1.0580	-0.714	1647.0146512
140	5.9300	3.5894	2.3405	1.0705	0.691	1652.4926791
141	5.5200	7.1392	-1.6192	1.0458	-0.478	1655.1145052
142	4.7600	4.6772	0.0827	1.0278	0.024	1655.1213412
143	4.0200	3.5056	0.5143	1.0664	0.152	1655.3857450
144	11.7600	10.6844	1.0755	1.0715	0.317	1656.5422391
145	29.9700	37.8888	-7.9188	1.5101	-2.341	1719.2507352
146	53.1800	51.2103	1.9696	1.4593	0.582	1723.1298856
147	46.9500	42.9845	3.9654	1.4780	1.172	1738.8544950
148	46.5700	46.6590	-0.0890	1.5281	-0.026	1738.8623080
149	42.7200	40.6087	2.1112	1.4764	0.624	1743.3198270
150	48.7300	45.0940	3.6359	1.5008	1.074	1756.5400419
151	41.9300	40.4003	1.5296	1.5514	0.452	1758.8796415
152	46.6200	53.8651	-7.2451	1.5015	-2.141	1811.3720736
153	37.8600	38.4251	-0.5651	1.5099	-0.167	1811.6914091
154	59.4000	51.9054	7.4945	1.4579	2.215	1867.8593778
155	46.4300	42.6311	3.7988	1.4837	1.123	1882.2907743
156	45.5400	45.9726	-0.4326	1.5254	-0.127	1882.4777860
157	35.6000	40.3831	-4.7831	1.4747	-1.414	1905.3562040
158	43.5600	45.4952	-1.9352	1.5011	-0.572	1909.1010770
159	41.0900	39.5141	1.5758	1.5348	0.465	1911.5842318
160	50.2200	53.3218	-3.1017	1.5079	-0.917	1921.2053256
161	12.9500	8.9722	3.9777	1.0243	1.175	1937.0278353
162	11.0300	15.8234	-4.7934	1.0366	-1.417	1960.0043973
163	5.5200	8.8700	-3.3500	1.0752	-0.990	1971.2270536
164	7.6600	11.0601	-3.4001	1.0540	-1.005	1982.7880887
165	7.3500	9.0958	-1.7458	1.0422	-0.516	1985.8359408
166	16.0100	11.8723	4.1376	0.9677	1.223	2002.9559136
167	4.9200	7.7170	-2.8970	1.0467	-0.856	2011.3483915
168	26.6100	16.0373	10.5726	1.1280	3.125	2123.1303768
169	17.0600	8.0848	8.9751	1.0190	2.653	2203.6826238
170	14.2500	15.0999	-0.8499	1.0561	-0.251	2204.4047908
171	5.2600	8.0629	-2.8029	1.0841	-0.828	2212.2612361
172	10.2000	10.0590	0.1409	1.0426	0.041	2212.2807674
173	5.8300	8.8717	-3.0417	1.0049	-0.899	2221.5327215
174	10.0800	12.0434	-1.9634	0.9610	-0.580	2225.3877010
175	5.0300	7.1084	-2.0784	1.0554	-0.614	2229.7070369
176	4.8400	5.3257	-0.4857	0.8812	-0.143	2229.9428768
177	13.7500	12.2679	1.4820	0.8831	0.438	2232.1391658
178	5.0200	5.5389	-0.5189	0.9730	-0.153	2232.4082098
179	6.3000	6.7863	-0.4863	0.8679	-0.143	2232.6445369
180	5.5800	4.9739	0.6061	0.8827	0.179	2233.0117244
181	7.5700	7.9128	-0.3428	0.8121	-0.101	2233.1289119
182	3.7000	3.9010	-0.2010	0.8597	-0.059	2233.1639519
183	8.4300	12.5780	-4.1480	0.9771	-1.226	2250.3754940
184	5.1900	6.0202	-0.8302	0.9223	-0.245	2251.0644588
185	13.5600	12.3610	1.1989	0.8589	0.354	2252.5019588
186	4.4500	4.8369	-0.3869	0.9749	-0.114	2252.6513729
187	5.1600	6.1566	-0.9966	0.8643	-0.294	2253.6445369
188	7.3800	4.9810	2.3989	0.8568	0.709	2259.3994197
189	5.9900	8.6431	-2.6531	0.8421	-0.784	2266.4384822
190	9.5700	3.6063	5.9636	0.8855	1.763	2302.0029354
191	9.9100	12.4156	-2.5056	1.0563	-0.740	2308.2812557
192	3.9500	3.9713	-0.0213	1.5296	-0.006	2308.2812557
193	12.6200	15.0354	-2.4154	1.6850	-0.714	2314.1152410
194	10.2600	9.7182	0.5417	1.5743	0.160	2314.4082098
195	4.5800	8.4832	-3.9032	1.5524	-1.153	2329.5435604
196	7.2800	6.2995	0.9804	1.5241	0.289	2330.6044988
197	9.0300	5.0094	3.0205	1.5408	0.892	2339.7280340
198	21.8900	16.8959	4.9940	1.5690	1.476	2364.6684637
199	5.6100	3.7155	1.8944	1.5302	0.560	2368.2568416
200	14.9200	15.2074	-0.2874	1.6721	-0.084	2368.3393611
201	7.1600	8.5314	-1.3714	1.5848	-0.405	2370.2202215
202	3.9900	7.9403	-3.9503	1.5544	-1.167	2385.8252010
203	4.3200	7.4490	-3.1290	1.7191	-0.925	2395.6157293
204	10.1700	7.1945	2.9754	1.5146	0.879	2404.4687557
205	3.5400	4.5379	-0.9979	1.5387	-0.295	2405.4643611
206	17.9100	16.2414	1.6685	1.5696	0.493	2408.2480535
207	2.9200	2.0370	0.8829	1.2961	0.261	2409.0273494
208	12.6800	9.3207	3.3592	1.3206	0.993	2420.3120183
209	3.9200	4.3225	-0.4025	1.3372	-0.119	2420.4736394
210	4.4200	6.5152	-2.0952	1.3220	-0.619	2424.8637762
211	2.3700	2.0248	0.3451	1.3248	0.102	2424.9824285
212	5.8800	5.4514	0.4285	1.2821	0.126	2425.1660223
213	3.5100	3.3932	0.1167	1.3144	0.034	2425.1792058
214	13.7400	11.4168	2.3231	1.3545	0.686	2430.5761775
215	2.1900	2.6613	-0.4713	1.2936	-0.139	2430.7978582
216	7.5700	9.9434	-2.3734	1.3194	-0.701	2436.4306707
217	2.5000	3.8173	-1.3173	1.3449	-0.389	2438.1660223
218	4.6600	5.8961	-1.2361	1.3185	-0.365	2439.6938533
219	2.2900	3.0432	-0.7532	1.3272	-0.222	2440.2607479
220	4.6100	6.0319	-1.4219	1.2851	-0.420	2442.2822332
221	3.5700	1.9182	1.6517	1.3314	0.488	2445.0102596
222	11.6100	10.6480	0.9619	1.3588	0.284	2445.9355535
223	2.7100	3.5603	-0.8503	0.8600	-0.251	2446.6582098
224	11.3700	10.4445	0.9254	0.9136	0.273	2447.5141658
225	2.4300	4.1466	-1.7166	0.8752	-0.507	2450.4609432
226	3.8900	5.2242	-1.3342	0.9495	-0.394	2452.2407293
227	2.1700	3.9534	-1.7834	0.8598	-0.527	2455.4213933
228	3.2700	7.2088	-3.9388	0.7983	-1.164	2470.9355535
229	2.3700	1.8857	0.4842	0.9743	0.143	2471.1699285
230	16.0500	10.5324	5.5175	0.9543	1.631	2501.6127996
231	3.2000	3.3304	-0.1304	0.9449	-0.038	2501.6294002
232	16.1500	10.3889	5.7610	0.9800	1.703	2534.8183650
233	2.5400	2.7180	-0.1780	0.9283	-0.052	2534.8496160
234	4.8300	5.2588	-0.4288	0.8727	-0.126	2535.0332098
235	3.5900	3.8161	-0.2261	0.8979	-0.066	2535.0839900
236	5.6800	7.4479	-1.7679	0.8061	-0.522	2538.2089900
237	2.8800	1.9518	0.9281	0.8722	0.274	2539.0703182
238	10.5900	9.9830	0.6069	0.9501	0.179	2539.4384822
239	2.6200	3.5639	-0.9439	1.1622	-0.279	2540.3291072
240	9.7600	8.5301	1.2298	1.4209	0.363	2541.8413143
241	4.2000	5.3548	-1.1548	1.5007	-0.341	2543.1748113
242	5.0100	5.8162	-0.8062	1.5510	-0.238	2543.8247127
243	4.5600	4.8053	-0.2453	0.9354	-0.072	2543.8847713
244	3.8000	4.6842	-0.8842	1.4904	-0.261	2544.6665105
245	5.3200	3.9216	1.3983	1.5522	0.413	2546.6215887
246	10.6500	10.0607	0.5892	1.4414	0.174	2546.9687557
247	8.6200	8.1254	0.5645	1.4826	0.166	2547.2871160
248	5.1600	4.3827	0.7772	1.5093	0.229	2547.8911140
249	4.7300	4.0829	0.6470	1.4151	0.191	2548.3095769
250	3.1200	4.3998	-1.2797	1.0710	-0.378	2549.9472713
251	4.8800	4.6425	0.2374	1.5114	0.070	2550.0034236
252	2.6300	2.7967	-0.1666	1.5749	-0.049	2550.0307674
253	7.3900	8.2321	-0.8421	1.3669	-0.248	2550.7397527

TABLE 2.5-8

PREDICTIONS BASED ON ORIGINAL DATA (COMBINED GAS)

IDUALS AND PREDICTIONS

	Y(OBS)	Y(PRED)	RESIDUAL	S.E.(Y)	NORM DEV	RESIDUALS SSQS
5	63.5400	51.6851	11.8548	3.5398	1.222	140.5367740
2	39.8099	55.1758	-15.3658	3.8410	-1.584	376.6452645
3	70.9300	57.9559	12.9740	3.8075	1.337	544.9709486
4	54.9599	50.0814	4.8785	3.9610	0.502	568.7708754
5	39.9900	51.2630	-11.2730	3.8385	-1.162	695.8529069
6	55.8600	53.4222	2.4377	4.0188	0.251	701.7956559
7	68.4499	60.8227	7.6272	3.9020	0.786	759.9704604
8	55.8800	54.5184	1.3615	3.7347	0.140	761.8243424
9	59.8200	49.0388	10.7811	3.6009	1.111	878.0574967
0	57.2000	53.6968	3.5031	3.7536	0.361	890.3297133
1	50.8699	56.2405	-5.3705	3.7442	-0.553	919.1722426
2	49.2200	48.6765	0.5434	3.9518	0.056	919.4675309
3	30.8600	50.2033	-19.3433	3.8413	-1.994	1293.6330595
4	65.1300	54.7461	10.3838	4.0479	1.070	1401.4572787
5	51.9400	59.2483	-7.3083	3.9872	-0.753	1454.8696322
6	44.1600	51.7913	-7.6313	3.7134	-0.786	1513.1071805
7	29.9000	40.6709	-10.7709	2.6997	-1.110	1629.1206088
8	65.6200	58.6170	7.0029	5.0676	0.721	1678.1623563
9	31.0999	44.7895	-13.6895	3.4861	-1.411	1865.5654325
0	37.1900	41.3580	-4.1680	3.9001	-0.429	1882.9379911
1	51.5000	51.2613	0.2386	4.6164	0.024	1882.9948763
2	74.1100	62.2438	11.8661	4.5398	1.223	2023.8012728
3	72.7100	61.7768	10.9331	4.0845	1.127	2143.3344783
4	72.4199	52.6139	19.8059	4.5908	2.041	2535.6113348
5	33.6600	34.2858	-0.6258	2.8215	-0.064	2536.0029354
6	65.8900	49.5136	16.3763	4.9378	1.688	2804.1875066
7	42.9000	48.3770	-5.4770	4.9523	-0.564	2834.1855535
8	29.0000	34.4967	-5.4967	4.0023	-0.566	2864.3999080
9	30.5499	41.7977	-11.2477	4.5783	-1.159	2990.9111394
0	25.4200	44.8757	-19.4557	4.1954	-2.005	3369.4370183
1	46.2900	53.0235	-6.7335	4.0998	-0.694	3414.7778377
2	40.0200	45.6081	-5.5881	4.6333	-0.576	3446.0044002
3	26.0699	38.3400	-12.2700	2.8860	-1.264	3596.5586004
4	25.9900	50.8907	-24.9007	3.5477	-2.567	4216.6054821
5	59.6200	50.1717	9.4482	3.5717	0.974	4305.8740367
6	28.6599	38.3852	-9.7251	3.7881	-1.002	4400.4531383
7	75.2599	56.9090	18.3509	3.6057	1.891	4737.2080211
8	55.0500	58.4354	-3.3854	3.9369	-0.349	4748.6689567
9	79.8199	59.1166	20.7033	3.9546	2.134	5177.2968864
0	38.6200	55.5762	-16.9562	3.4801	-1.748	5464.8095817
1	56.2999	45.4356	10.8643	2.5740	1.120	5582.8427867
2	71.0500	54.7859	16.2640	3.5272	1.676	5847.3623180
3	52.4500	52.4236	0.0263	3.5879	0.002	5847.3623180
4	79.2000	41.3339	37.8661	3.7825	3.903	7281.2031383
5	44.8600	58.5619	-13.7019	3.6665	-1.412	7468.9453259
6	88.1199	59.9596	28.1603	3.9563	2.903	8261.9492454
7	46.0699	61.0625	-14.9925	3.9628	-1.545	8486.7246360
8	40.2099	58.1637	-17.9537	3.4834	-1.850	8809.0605697
9	53.0799	47.5134	5.5665	3.8666	0.573	8840.0449447
0	43.2200	56.3541	-13.1341	4.0232	-1.353	9012.5488510
1	45.5699	54.3064	-8.7364	4.0039	-0.900	9088.8750228
2	51.9199	41.8053	10.1146	4.2196	1.042	9191.1797142
3	54.6199	51.0216	3.5983	4.0736	0.370	9204.1269798
4	42.1600	50.2630	-8.1030	4.1922	-0.835	9269.7851791
5	44.8400	52.1937	-7.3537	4.1680	-0.758	9323.8613510
6	46.0800	49.6595	-3.5794	4.0174	-0.369	9336.6738548
7	57.2500	48.8506	8.3993	3.8577	0.865	9407.2226829
8	49.2700	58.2531	-8.9831	4.0421	-0.926	9487.9199485
9	42.7200	56.6751	-13.9551	4.0233	-1.438	9682.6640892
0	41.8000	44.7965	-2.9965	4.1787	-0.308	9691.6426048
1	90.3000	52.7548	37.5451	4.0828	3.870	11101.2832260
2	38.5200	52.9428	-14.4228	4.1904	-1.486	11309.3027572
3	46.8700	53.2708	-6.4008	4.1684	-0.659	11350.2734603
4	74.1100	51.6836	22.4263	3.9922	2.311	11853.2129173
5	34.0100	39.8636	-5.8536	2.2883	-0.603	11887.4765892
6	37.2400	48.0046	-10.7646	2.5853	-1.109	12003.3535385
7	33.7700	37.3267	-3.5567	2.4932	-0.366	12016.0039291
8	33.4300	35.7727	-2.3427	2.4480	-0.241	12021.4922142
9	45.9500	43.6090	2.3409	2.4230	0.241	12026.9707298
0	35.4300	40.7290	-5.2990	2.2620	-0.546	12055.0508041
1	33.2000	32.2032	0.9967	2.3927	0.102	12056.0429916
2	34.5400	41.4413	-6.9013	2.5396	-0.711	12103.6699485
3	40.2600	38.4011	1.8588	2.3373	0.191	12107.1250228
4	42.3400	45.7447	-3.4047	2.6279	-0.350	12118.7168235
5	45.3400	33.8846	11.4553	2.4804	1.180	12249.9414329
6	33.4700	31.3687	2.1012	2.3608	0.216	12254.3554916
7	30.4300	41.5903	-11.1603	2.4483	-1.150	12378.9082298
8	30.4399	38.2168	-7.7768	2.2719	-0.801	12439.3867454
9	29.3400	31.5149	-2.1749	2.4033	-0.224	12444.1152572
0	45.0100	38.8546	6.1553	2.5525	0.634	12482.0019760
1	34.6600	32.2101	2.4498	2.6924	0.252	12488.0019760
2	40.0200	38.6080	1.4119	2.9114	0.145	12489.9941673
3	31.6899	32.9231	-1.2331	2.4967	-0.127	12491.5136947
4	25.3499	31.1971	-5.8471	2.3580	-0.602	12525.7011985
5	37.9300	39.8394	-1.9094	2.4241	-0.196	12529.3457260
6	27.5699	31.2974	-3.7274	2.9313	-0.384	12543.2383079
7	24.7700	24.7670	0.0029	2.9258	0.000	12543.2383079
8	32.9599	33.1384	-0.1784	2.7244	-0.018	12543.2695541
9	27.5799	35.0711	-7.4911	2.6700	-0.772	12599.3867454
0	48.9399	42.9832	5.9567	2.6890	0.614	12634.8691635
1	34.9100	33.9323	0.9776	2.6122	0.100	12635.8242416
2	37.3700	33.7130	3.6569	2.3566	0.376	12649.1972923
3	39.3199	42.3187	-2.9987	2.4291	-0.309	12658.1894798
4	30.6599	38.5586	-7.8986	2.3044	-0.814	12720.5761947
5	27.5100	32.0231	-4.5131	2.3994	-0.465	12740.9433860
6	38.8600	35.1400	3.7199	2.8221	0.383	12754.7812728
7	41.7099	39.8388	1.8711	2.4660	0.192	12758.2812728
8	51.1100	47.8370	3.2729	2.8747	0.337	12768.9922142
9	35.9899	35.3546	0.6353	2.5228	0.065	12769.3945579
0	36.1900	33.3802	2.8097	2.4774	0.289	12777.2890853
1	52.9000	42.2449	10.6550	2.4873	1.098	12890.8183822
2	37.1300	40.6456	-3.5156	2.4689	-0.362	12903.1777610
3	28.2000	34.5692	-6.3692	2.7083	-0.656	12943.7441673
4	44.6700	39.1595	5.5104	2.5767	0.568	12974.1093978
5	51.6100	42.9520	8.6579	2.5117	0.892	13049.0683822
6	59.7500	49.5293	10.2206	2.7309	1.053	13153.5293197
7	32.2300	39.7425	-7.5125	2.6657	-0.774	13209.9668235
8	45.7200	35.6446	10.0753	2.4376	1.038	13311.4785423
9	43.1600	46.4859	-3.3259	2.6334	-0.342	13322.5390853
0	40.3700	43.7800	-3.4100	2.5189	-0.351	13334.1660423
1	29.8600	34.9712	-5.1112	2.4496	-0.526	13360.2890853
2	40.4500	40.7232	-0.2732	2.4989	-0.028	13360.3633041
3	27.4500	35.0705	-7.6205	2.6377	-0.785	13418.4355735
4	32.2600	39.5727	-7.3127	2.8231	-0.753	13471.9121360
5	29.0100	28.7126	0.2973	3.0396	0.030	13472.0000267
6	28.7099	30.4325	-1.7225	2.7257	-0.177	13474.9668235
7	22.9400	33.0273	-10.0873	2.6491	-1.039	13576.7207298
8	34.8899	30.9667	3.9232	3.0385	0.404	13592.1113510
9	31.3100	30.8007	0.5092	2.6967	0.052	13592.3691635
0	30.1400	33.6762	-3.5362	2.8212	-0.364	13604.8730697
1	34.2200	24.4302	9.7897	2.7117	1.009	13700.7109642
2	29.1899	31.6632	-2.4732	2.8889	-0.254	13706.8261947
3	31.3299	20.8736	10.4563	2.9618	1.077	13816.1601829
4	33.7600	24.9948	8.7651	2.7022	0.903	13892.9863548
5	31.0700	26.9411	4.1238	2.8286	0.425	13910.0332260

TABLE 2.5-8 (CONT.)

22.8499	22.7062	0.1437	2.8790	0.014	13910.0527572
28.7599	19.8344	8.9205	2.9243	0.919	13989.6269798
28.8899	26.0282	2.8617	2.7975	0.295	13997.8144760
30.0200	25.9733	4.0466	2.9755	0.417	14014.1894798
26.7400	28.0161	-1.2761	3.0975	-0.131	14015.8164291
27.4399	23.1529	4.2870	3.1217	0.441	14034.1933860
20.1399	24.7315	-4.5915	3.0004	-0.473	14055.2754135
19.7400	25.5891	-5.8491	2.9633	-0.602	14089.4863548
19.9900	23.6711	-3.6811	3.2043	-0.379	14103.0371322
17.8899	21.6802	-3.7902	3.0265	-0.390	14117.4023704
20.9900	27.2858	-6.3958	3.0830	-0.659	14159.3086166
19.7600	16.6572	3.1027	2.9964	0.319	14167.9336204
19.9200	21.7665	-1.8465	3.1107	-0.190	14171.3418197
15.6800	14.8659	0.8140	3.0885	0.083	14172.0039291
20.3600	16.8686	3.4913	3.0384	0.359	14184.1914329
20.0900	17.7576	2.3323	3.1085	0.240	14189.6308860
18.5299	18.5352	-0.0052	2.9938	-0.000	14189.6308860
18.4700	15.0686	3.4013	2.9909	0.350	14201.1992454
24.6599	18.6952	5.9647	3.0689	0.614	14236.7773666
72.2200	86.2784	-14.0584	3.7850	-1.449	14434.4160423
104.6199	95.3617	9.2582	3.8445	0.954	14520.1308860
110.0700	96.0580	14.0119	3.8521	1.444	14716.4629173
99.9900	94.6628	5.3271	3.7396	0.549	14744.8398666
94.0400	91.7519	2.2880	3.8334	0.235	14750.0742416
88.3899	89.4103	-1.0203	3.7494	-0.105	14751.1152572
94.4199	95.0561	-0.6361	3.7710	-0.065	14751.5195541
79.7900	100.7066	-20.9166	3.8358	-2.156	15189.0254135
79.8500	89.4240	-9.5740	3.7713	-0.986	15280.6855735
113.2200	99.0989	14.1210	3.8777	1.455	15480.0879135
107.2799	99.4336	7.8463	3.8382	0.808	15541.6523704
102.5099	96.7985	5.7114	3.7394	0.588	15574.2715072
83.4500	92.0603	-8.6103	3.8875	-0.887	15648.4101829
99.6699	92.0531	7.6168	3.7473	0.785	15706.4258079
97.9400	96.4474	1.4925	3.7528	0.153	15708.6523704
90.5299	103.3749	-12.8449	3.8331	-1.324	15873.6426048
48.3199	31.0615	17.2584	2.1853	1.779	16171.4941673
20.8300	32.7735	-11.9435	2.3140	-1.231	16314.1426048
22.7999	29.2328	-6.4329	2.3948	-0.663	16355.5234603
21.3700	29.4568	-8.0868	2.2053	-0.833	16420.9219284
26.8600	31.6554	-4.7954	2.4197	-0.494	16443.9180221
45.2000	30.0970	15.1029	2.1325	1.556	16672.0156707
19.5200	28.7713	-9.2513	2.1902	-0.953	16757.6016082
41.1500	31.9885	9.1614	2.3189	0.944	16841.5312957
55.8499	24.9747	30.8752	1.9615	3.182	17794.8086471
23.6300	27.2972	-3.6672	2.2028	-0.378	17808.2539596
18.0999	26.9885	-8.8886	2.3071	-0.916	17887.2578659
26.2599	26.4898	-0.2298	2.0577	-0.023	17887.3086471
25.0400	28.0390	-2.9990	2.1930	-0.309	17896.3008346
21.4400	27.9524	-6.5124	1.9412	-0.671	17938.7109832
24.1399	27.2661	-3.1261	2.2105	-0.322	17948.4805221
20.4099	30.0368	-9.6268	2.1527	-0.992	18041.1562957
62.8300	32.0879	30.7421	2.3319	3.169	18985.2344207
22.7700	29.3827	-6.6127	2.4044	-0.681	19029.9609909
44.9000	26.0955	18.8044	2.2319	1.938	19383.5664520
24.5400	28.8598	-4.3198	2.4013	-0.445	19402.2266082
24.8300	27.9064	-3.0764	2.2610	-0.317	19411.6875457
28.7799	27.1151	1.6648	2.1519	0.171	19414.4570846
34.8300	31.6611	3.1688	2.3035	0.326	19424.4961471
22.7799	29.8415	-7.0615	2.2246	-0.727	19474.3594284
33.0299	29.6523	3.3776	2.1006	0.348	19485.7656784
26.1399	27.5296	-1.3896	2.3765	-0.143	19487.6933582
18.9500	24.5118	-5.5618	1.9509	-0.573	19518.6289520
30.2599	26.1045	4.1554	2.1431	0.428	19535.8945846
28.2400	27.8444	0.3955	1.9352	0.040	19536.0508270
41.4100	26.7793	14.6306	2.1426	1.508	19750.1055145
23.7000	31.8177	-8.1177	2.5431	-0.836	19816.0000534
19.0600	30.3069	-11.2469	2.1569	-1.159	19942.4922409
23.8899	32.6812	-8.7912	2.3153	-0.906	20019.7773971
20.4700	25.4970	-5.0270	2.4408	-0.518	20045.0469207
18.3400	27.9927	-9.6527	2.1571	-0.995	20138.2227020
30.9700	27.2120	3.7579	2.3409	0.387	20152.3438034
35.5500	26.8204	8.7295	2.1576	0.899	20228.5469207
28.2100	28.2915	-0.0815	2.3970	-0.008	20228.5508270
28.7999	26.5722	2.2277	1.9280	0.229	20233.5117645
37.4100	30.5398	6.8701	2.1256	0.708	20280.7109832
22.6100	21.8384	0.7715	2.2338	0.079	20281.3047409
18.7900	26.7321	-7.9421	2.0826	-0.818	20344.3789596
23.7500	25.5824	-1.8324	2.1576	-0.188	20347.7344207
31.8199	27.7634	4.0565	1.9311	0.418	20364.1875457
16.5400	25.8258	-9.2858	2.0349	-0.957	20450.4141159
25.2400	26.6155	-1.3755	2.0861	-0.141	20452.3047409
19.2500	18.9180	0.3319	2.9139	0.034	20452.4141159
24.9700	22.2407	2.7292	3.0154	0.281	20459.8594284
17.0499	17.5712	-0.5212	3.0122	-0.053	20460.1289520
13.7599	17.8049	-4.0449	2.8899	-0.416	20476.4883346
15.2600	19.0061	-3.7461	3.0697	-0.386	20490.5195770
21.0100	19.8688	1.1411	2.8808	0.117	20491.8203659
18.1100	17.9430	0.1669	2.8718	0.017	20491.8477096
21.7800	20.0549	1.7250	2.9845	0.177	20494.8203659
11.8500	18.4612	-6.6112	2.9095	-0.681	20538.5273895
16.2000	21.7781	-5.5781	3.0152	-0.575	20569.6406707
13.4200	16.4512	-3.0312	3.0341	-0.312	20578.8281784
16.1100	16.2606	-0.1506	2.9133	-0.015	20578.8477096
29.8299	20.0169	9.8130	3.1218	1.011	20675.1406707
21.0099	19.2487	1.7612	2.9106	0.181	20678.2422332
16.3400	13.2108	3.1291	2.9088	0.322	20688.0312957
20.8400	17.9532	2.8867	2.9643	0.297	20695.3633346
17.5699	17.6015	-0.0315	3.0730	-0.003	20696.3633346
18.6399	19.4365	-0.7965	3.2165	-0.082	20696.9961471
14.3799	18.3369	-3.9569	3.2704	-0.407	20712.6523895
13.2700	14.4174	-1.1474	3.1279	-0.118	20713.9688034
16.6399	19.1991	-2.5591	3.2072	-0.263	20720.5156707
15.1099	19.4241	-4.3141	3.0724	-0.444	20739.1250457
16.4300	13.7492	2.6807	3.1249	0.276	20746.3086471
25.5400	18.1823	7.3576	3.1579	0.758	20800.4414596
18.0600	17.8703	0.1896	2.5290	0.019	20800.4766159
25.8899	20.3544	5.5355	2.7861	0.570	20831.1172332
16.9200	17.6846	-0.7646	2.4273	-0.078	20831.6992645
18.1000	19.2147	-1.1147	2.1975	-0.114	20832.9414596
17.0800	19.8126	-2.7326	2.4653	-0.281	20840.4063034
17.2700	21.4395	-4.1695	2.1668	-0.429	20857.7891159
18.2999	18.6639	-0.3639	2.1840	-0.037	20857.9180221
18.1100	20.8044	-2.6944	2.3837	-0.277	20865.1759270
20.4599	32.0618	-11.6018	2.9511	-1.196	20999.7773971
29.7799	34.7939	-5.0139	3.0250	-0.516	21024.9141159
28.1499	29.6902	-1.5402	3.0232	-0.158	21027.2852096
27.0499	31.5162	-4.4662	2.9494	-0.460	21047.2305145
44.3000	36.8187	7.4812	3.3682	0.771	21103.1992645
31.3899	32.5089	-1.1189	2.9298	-0.115	21104.4492721
37.7700	28.1852	9.5847	2.9541	0.988	21196.3164596
26.4000	31.3193	-4.9193	3.0093	-0.507	21220.5156707
37.6000	30.5045	7.0954	3.0818	0.731	21270.8594284
31.4800	26.8311	4.6488	3.0585	0.479	21292.4688034
30.7300	25.8221	4.9078	2.9845	0.505	21316.5547332
28.4700	32.5264	-4.0564	3.3078	-0.418	21333.0078582
29.1899	29.5715	-0.3815	2.9814	-0.039	21333.1523895
27.9099	24.7569	3.1530	2.9982	0.325	21343.0937957
21.5100	25.2702	-3.7602	3.2601	-0.387	21357.2305145

NO.=	3109.,	MIN.=	-11.29,	LEV.=	1	1	-1	1	1	-1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3105.,	MIN.=	-10.12,	LEV.=	1	1	1	1	1	-1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3079.,	MIN.=	-9.02,	LEV.=	1	-1	-1	1	1	1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3075.,	MIN.=	-7.85,	LEV.=	1	-1	1	1	1	1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3361.,	MIN.=	-7.02,	LEV.=	1	1	1	1	1	-1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3077.,	MIN.=	-5.89,	LEV.=	1	1	-1	1	1	1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3095.,	MIN.=	-4.82,	LEV.=	1	-1	-1	1	-1	1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3331.,	MIN.=	-4.76,	LEV.=	1	-1	1	1	1	1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3073.,	MIN.=	-4.72,	LEV.=	1	1	1	1	1	1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3173.,	MIN.=	-4.68,	LEV.=	1	1	-1	1	1	-1	-1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3365.,	MIN.=	-4.66,	LEV.=	1	1	-1	1	1	-1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3237.,	MIN.=	-4.13,	LEV.=	1	1	-1	1	1	-1	1	-1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3117.,	MIN.=	-4.13,	LEV.=	1	1	-1	-1	1	-1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3091.,	MIN.=	-3.65,	LEV.=	1	-1	1	1	-1	1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3169.,	MIN.=	-3.51,	LEV.=	1	1	1	1	1	-1	-1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3233.,	MIN.=	-2.96,	LEV.=	1	1	1	1	1	-1	1	-1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3113.,	MIN.=	-2.96,	LEV.=	1	1	1	-1	1	-1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3362.,	MIN.=	-2.66,	LEV.=	-1	1	1	1	1	-1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3603.,	MIN.=	-2.54,	LEV.=	1	-1	1	1	-1	1	1	1	1	0	-1	-1	0	0	0	0	0	0	-1	0
NO.=	3111.,	MIN.=	-2.45,	LEV.=	1	-1	-1	1	1	-1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3143.,	MIN.=	-2.41,	LEV.=	1	-1	-1	1	1	1	-1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3335.,	MIN.=	-2.40,	LEV.=	1	-1	-1	1	1	1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3617.,	MIN.=	-2.36,	LEV.=	1	1	1	1	1	-1	1	1	1	0	-1	-1	0	0	0	0	0	0	-1	0
NO.=	3207.,	MIN.=	-1.86,	LEV.=	1	-1	-1	1	1	1	1	-1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3087.,	MIN.=	-1.86,	LEV.=	1	-1	-1	-1	1	1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3245.,	MIN.=	-1.74,	LEV.=	1	1	-1	-1	1	-1	1	-1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3329.,	MIN.=	-1.62,	LEV.=	1	1	1	1	1	1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3110.,	MIN.=	-1.33,	LEV.=	-1	1	-1	1	1	-1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3107.,	MIN.=	-1.28,	LEV.=	1	-1	1	1	1	-1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3139.,	MIN.=	-1.24,	LEV.=	1	-1	1	1	1	1	-1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	2085.,	MIN.=	-1.00,	LEV.=	1	1	-1	1	1	-1	1	1	1	0	1	1	0	0	0	0	0	0	-1	0
NO.=	3203.,	MIN.=	-0.69,	LEV.=	1	-1	1	1	1	1	1	-1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3083.,	MIN.=	-0.69,	LEV.=	1	-1	1	-1	1	1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3241.,	MIN.=	-0.57,	LEV.=	1	1	1	-1	1	-1	1	-1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3347.,	MIN.=	-0.55,	LEV.=	1	-1	1	1	-1	1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3426.,	MIN.=	-0.46,	LEV.=	-1	1	1	1	1	-1	-1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3425.,	MIN.=	-0.41,	LEV.=	1	1	1	1	1	-1	-1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3332.,	MIN.=	-0.40,	LEV.=	-1	-1	1	1	1	1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3366.,	MIN.=	-0.30,	LEV.=	-1	1	-1	1	1	-1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3106.,	MIN.=	-0.16,	LEV.=	-1	1	1	1	1	-1	1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3587.,	MIN.=	-0.10,	LEV.=	1	-1	1	1	1	1	1	1	1	0	-1	-1	0	0	0	0	0	0	-1	0
NO.=	3489.,	MIN.=	0.13,	LEV.=	1	1	1	1	1	-1	1	-1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3369.,	MIN.=	0.13,	LEV.=	1	1	1	-1	1	-1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	2071.,	MIN.=	0.26,	LEV.=	1	-1	-1	1	-1	1	1	1	1	0	1	1	0	0	0	0	0	0	-1	0
NO.=	3215.,	MIN.=	0.51,	LEV.=	1	-1	-1	-1	1	1	1	-1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3859.,	MIN.=	0.54,	LEV.=	1	-1	1	1	-1	1	1	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
NO.=	3141.,	MIN.=	0.72,	LEV.=	1	1	-1	1	1	1	-1	1	1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3873.,	MIN.=	0.72,	LEV.=	1	1	1	1	1	-1	1	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
NO.=	3333.,	MIN.=	0.73,	LEV.=	1	1	-1	1	1	1	1	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
NO.=	3607.,	MIN.=	0.82,	LEV.=	1	-1	-1	1	-1	1	1	1	1	0	-1	-1	0	0	0	0	0	0	-1	0

TABLE 2.5-9B

MAXIMUM GASSING COMBINATIONS (OPEN CIRCUIT)

NO.=	218.,	MAX.=	69.68,	LEV.=	-1	1	1	-1	-1	1	-1	-1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	1003.,	MAX.=	69.52,	LEV.=	1	-1	1	-1	1	-1	-1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	748.,	MAX.=	68.92,	LEV.=	-1	-1	1	-1	1	-1	-1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	985.,	MAX.=	68.33,	LEV.=	1	1	1	-1	-1	1	-1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	730.,	MAX.=	67.72,	LEV.=	-1	1	1	-1	-1	1	-1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	154.,	MAX.=	67.48,	LEV.=	-1	1	1	-1	-1	1	1	-1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	210.,	MAX.=	67.29,	LEV.=	-1	1	1	1	-1	1	-1	-1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	90.,	MAX.=	67.29,	LEV.=	-1	1	1	-1	-1	1	-1	1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	473.,	MAX.=	67.23,	LEV.=	1	1	1	-1	-1	1	-1	-1	-1	0	1	1	0	0	0	0	0	0	1	0
NO.=	474.,	MAX.=	67.18,	LEV.=	-1	1	1	-1	-1	1	-1	-1	-1	0	1	1	0	0	0	0	0	0	1	0
NO.=	995.,	MAX.=	67.14,	LEV.=	1	-1	1	1	1	-1	-1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	875.,	MAX.=	67.14,	LEV.=	1	-1	1	-1	1	-1	-1	1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	684.,	MAX.=	66.71,	LEV.=	-1	-1	1	-1	1	-1	1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	740.,	MAX.=	66.53,	LEV.=	-1	-1	1	1	1	-1	-1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	620.,	MAX.=	66.53,	LEV.=	-1	-1	1	-1	1	-1	-1	1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	747.,	MAX.=	66.43,	LEV.=	1	-1	1	-1	1	-1	-1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	1004.,	MAX.=	66.42,	LEV.=	-1	-1	1	-1	1	-1	-1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	969.,	MAX.=	66.09,	LEV.=	1	1	1	-1	1	1	-1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	977.,	MAX.=	65.94,	LEV.=	1	1	1	1	-1	1	-1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	857.,	MAX.=	65.94,	LEV.=	1	1	1	-1	-1	1	-1	1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	666.,	MAX.=	65.52,	LEV.=	-1	1	1	-1	-1	1	1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	714.,	MAX.=	65.48,	LEV.=	-1	1	1	-1	1	1	-1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	722.,	MAX.=	65.34,	LEV.=	-1	1	1	1	-1	1	-1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	602.,	MAX.=	65.34,	LEV.=	-1	1	1	-1	-1	1	-1	1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	729.,	MAX.=	65.24,	LEV.=	1	1	1	-1	-1	1	-1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	986.,	MAX.=	65.22,	LEV.=	-1	1	1	-1	-1	1	-1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	146.,	MAX.=	65.09,	LEV.=	-1	1	1	1	-1	1	1	-1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	26.,	MAX.=	65.09,	LEV.=	-1	1	1	-1	-1	1	1	1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	410.,	MAX.=	64.98,	LEV.=	-1	1	1	-1	-1	1	1	-1	-1	0	1	1	0	0	0	0	0	0	1	0
NO.=	465.,	MAX.=	64.84,	LEV.=	1	1	1	1	-1	1	-1	-1	-1	0	1	1	0	0	0	0	0	0	1	0
NO.=	345.,	MAX.=	64.84,	LEV.=	1	1	1	-1	-1	1	-1	1	-1	0	1	1	0	0	0	0	0	0	1	0
NO.=	466.,	MAX.=	64.79,	LEV.=	-1	1	1	1	-1	1	-1	-1	-1	0	1	1	0	0	0	0	0	0	1	0
NO.=	346.,	MAX.=	64.79,	LEV.=	-1	1	1	-1	-1	1	-1	1	-1	0	1	1	0	0	0	0	0	0	1	0
NO.=	676.,	MAX.=	64.33,	LEV.=	-1	-1	1	1	1	-1	1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	556.,	MAX.=	64.33,	LEV.=	-1	-1	1	-1	1	-1	1	1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	250.,	MAX.=	64.28,	LEV.=	-1	1	1	-1	-1	-1	-1	-1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	236.,	MAX.=	64.22,	LEV.=	-1	-1	1	-1	1	-1	-1	-1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	940.,	MAX.=	64.21,	LEV.=	-1	-1	1	-1	1	-1	1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	217.,	MAX.=	64.13,	LEV.=	1	1	1	-1	-1	1	-1	-1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	739.,	MAX.=	64.04,	LEV.=	1	-1	1	1	1	-1	-1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	619.,	MAX.=	64.04,	LEV.=	1	-1	1	-1	1	-1	-1	1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	996.,	MAX.=	64.03,	LEV.=	-1	-1	1	1	1	-1	-1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	876.,	MAX.=	64.03,	LEV.=	-1	-1	1	-1	1	-1	-1	1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	961.,	MAX.=	63.70,	LEV.=	1	1	1	1	1	1	-1	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	841.,	MAX.=	63.70,	LEV.=	1	1	1	-1	1	1	-1	1	-1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	650.,	MAX.=	63.28,	LEV.=	-1	1	1	-1	1	1	1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	252.,	MAX.=	63.23,	LEV.=	-1	-1	1	-1	-1	-1	-1	-1	1	0	1	1	0	0	0	0	0	0	1	0
NO.=	658.,	MAX.=	63.13,	LEV.=	-1	1	1	1	-1	1	1	-1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	538.,	MAX.=	63.13,	LEV.=	-1	1	1	-1	-1	1	1	1	1	0	-1	1	0	0	0	0	0	0	1	0
NO.=	706.,	MAX.=	63.09,	LEV.=	-1	1	1	1	1	1	-1	-1	1	0	-1	1	0	0	0	0	0	0	1	0

TABLE 2.5-10A
MINIMUM GASSING COMBINATIONS (DISCHARGE)

NO.=	2691.,	MAX.=	70.52,	LEV.=	1	-1	1	1	1	0	1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2692.,	MAX.=	69.96,	LEV.=	-1	-1	1	1	1	0	1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2563.,	MAX.=	68.99,	LEV.=	1	-1	1	1	1	0	1	0	1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2564.,	MAX.=	68.43,	LEV.=	-1	-1	1	1	1	0	1	0	1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2947.,	MAX.=	67.48,	LEV.=	1	-1	1	1	1	0	1	0	1	0	-1	-1	0	0	0	0	0	-1	1	-1
NO.=	2948.,	MAX.=	66.93,	LEV.=	-1	-1	1	1	1	0	1	0	1	0	-1	-1	0	0	0	0	0	-1	1	-1
NO.=	2819.,	MAX.=	65.96,	LEV.=	1	-1	1	1	1	0	1	0	1	0	1	-1	0	0	0	0	0	-1	1	-1
NO.=	2723.,	MAX.=	65.57,	LEV.=	1	-1	1	1	1	0	-1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2820.,	MAX.=	65.40,	LEV.=	-1	-1	1	1	1	0	1	0	1	0	1	-1	0	0	0	0	0	-1	1	-1
NO.=	2724.,	MAX.=	65.01,	LEV.=	-1	-1	1	1	1	0	-1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2595.,	MAX.=	64.04,	LEV.=	1	-1	1	1	1	0	-1	0	1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2627.,	MAX.=	63.80,	LEV.=	1	-1	1	1	1	0	1	0	-1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	579.,	MAX.=	63.62,	LEV.=	1	-1	1	1	1	0	1	0	-1	0	1	1	0	0	0	0	0	-1	1	1
NO.=	2696.,	MAX.=	63.61,	LEV.=	-1	-1	-1	1	1	0	1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2596.,	MAX.=	63.48,	LEV.=	-1	-1	1	1	1	0	-1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2628.,	MAX.=	63.25,	LEV.=	-1	-1	1	1	1	0	1	0	-1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2695.,	MAX.=	63.22,	LEV.=	1	-1	-1	1	1	0	1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	580.,	MAX.=	63.07,	LEV.=	-1	-1	1	1	1	0	1	0	-1	0	1	1	0	0	0	0	0	-1	1	1
NO.=	2979.,	MAX.=	62.54,	LEV.=	1	-1	1	1	1	0	-1	0	1	0	-1	-1	0	0	0	0	0	-1	1	-1
NO.=	2568.,	MAX.=	62.08,	LEV.=	-1	-1	-1	1	1	0	1	0	1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2690.,	MAX.=	62.03,	LEV.=	-1	1	1	1	1	0	1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2980.,	MAX.=	61.98,	LEV.=	-1	-1	1	1	1	0	-1	0	1	0	-1	-1	0	0	0	0	0	-1	1	-1
NO.=	2567.,	MAX.=	61.69,	LEV.=	1	-1	-1	1	1	0	1	0	1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2728.,	MAX.=	61.28,	LEV.=	-1	-1	-1	1	1	0	-1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2851.,	MAX.=	61.01,	LEV.=	1	-1	1	1	1	0	-1	0	1	0	1	-1	0	0	0	0	0	-1	1	-1
NO.=	2727.,	MAX.=	60.89,	LEV.=	1	-1	-1	1	1	0	-1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2689.,	MAX.=	60.85,	LEV.=	1	1	1	1	1	0	1	0	1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2883.,	MAX.=	60.77,	LEV.=	1	-1	1	1	1	0	1	0	-1	0	1	-1	0	0	0	0	0	-1	1	-1
NO.=	835.,	MAX.=	60.59,	LEV.=	1	-1	1	1	1	0	1	0	-1	0	1	-1	0	0	0	0	0	-1	1	1
NO.=	2952.,	MAX.=	60.58,	LEV.=	-1	-1	-1	1	1	0	1	0	1	0	-1	-1	0	0	0	0	0	-1	1	-1
NO.=	2562.,	MAX.=	60.50,	LEV.=	-1	1	1	1	1	0	1	0	1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2852.,	MAX.=	60.45,	LEV.=	-1	-1	1	1	1	0	-1	0	1	0	1	-1	0	0	0	0	0	-1	1	-1
NO.=	2884.,	MAX.=	60.21,	LEV.=	-1	-1	1	1	1	0	1	0	-1	0	1	-1	0	0	0	0	0	-1	1	-1
NO.=	2951.,	MAX.=	60.19,	LEV.=	1	-1	-1	1	1	0	1	0	1	0	-1	-1	0	0	0	0	0	-1	1	-1
NO.=	836.,	MAX.=	60.03,	LEV.=	-1	-1	1	1	1	0	1	0	-1	0	1	-1	0	0	0	0	0	-1	1	1
NO.=	2600.,	MAX.=	59.75,	LEV.=	-1	-1	-1	1	1	0	-1	0	1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2179.,	MAX.=	59.59,	LEV.=	1	-1	1	1	1	0	1	0	1	0	-1	1	0	0	0	0	0	1	1	-1
NO.=	2599.,	MAX.=	59.36,	LEV.=	1	-1	-1	1	1	0	-1	0	1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2561.,	MAX.=	59.33,	LEV.=	1	1	1	1	1	0	1	0	1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2824.,	MAX.=	59.05,	LEV.=	-1	-1	-1	1	1	0	1	0	1	0	1	-1	0	0	0	0	0	-1	1	-1
NO.=	2180.,	MAX.=	59.03,	LEV.=	-1	-1	1	1	1	0	1	0	1	0	-1	1	0	0	0	0	0	1	1	-1
NO.=	2946.,	MAX.=	59.00,	LEV.=	-1	1	1	1	1	0	1	0	1	0	-1	-1	0	0	0	0	0	-1	1	-1
NO.=	2659.,	MAX.=	58.86,	LEV.=	1	-1	1	1	1	0	-1	0	-1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2755.,	MAX.=	58.82,	LEV.=	1	-1	1	1	1	0	1	0	-1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	611.,	MAX.=	58.68,	LEV.=	1	-1	1	1	1	0	-1	0	-1	0	1	1	0	0	0	0	0	-1	1	1
NO.=	2823.,	MAX.=	58.66,	LEV.=	1	-1	-1	1	1	0	1	0	1	0	1	-1	0	0	0	0	0	-1	1	-1
NO.=	707.,	MAX.=	58.64,	LEV.=	1	-1	1	1	1	0	1	0	-1	0	-1	1	0	0	0	0	0	-1	1	1
NO.=	2660.,	MAX.=	58.30,	LEV.=	-1	-1	1	1	1	0	-1	0	-1	0	1	1	0	0	0	0	0	-1	1	-1
NO.=	2756.,	MAX.=	58.26,	LEV.=	-1	-1	1	1	1	0	1	0	-1	0	-1	1	0	0	0	0	0	-1	1	-1
NO.=	2984.,	MAX.=	58.24,	LEV.=	-1	-1	-1	1	1	0	-1	0	1	0	-1	-1	0	0	0	0	0	-1	1	-1

NO.=	1517.,	MIN.=	-20.69,	LEV.=	1	1	-1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	3565.,	MIN.=	-20.63,	LEV.=	1	1	-1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	1261.,	MIN.=	-19.68,	LEV.=	1	1	-1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	1
NO.=	3309.,	MIN.=	-19.62,	LEV.=	1	1	-1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	-1
NO.=	1518.,	MIN.=	-18.56,	LEV.=	-1	1	-1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	3566.,	MIN.=	-18.50,	LEV.=	-1	1	-1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	1485.,	MIN.=	-18.36,	LEV.=	1	1	-1	-1	1	0	1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	3533.,	MIN.=	-18.30,	LEV.=	1	1	-1	-1	1	0	1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	1262.,	MIN.=	-17.55,	LEV.=	-1	1	-1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	1
NO.=	3310.,	MIN.=	-17.49,	LEV.=	-1	1	-1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	-1
NO.=	1229.,	MIN.=	-17.35,	LEV.=	1	1	-1	-1	1	0	1	0	-1	0	-1	1	0	0	0	0	0	1	-1	1
NO.=	3277.,	MIN.=	-17.29,	LEV.=	1	1	-1	-1	1	0	1	0	-1	0	-1	1	0	0	0	0	0	1	-1	-1
NO.=	3561.,	MIN.=	-16.87,	LEV.=	1	1	1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	1486.,	MIN.=	-16.23,	LEV.=	-1	1	-1	-1	1	0	1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	3534.,	MIN.=	-16.17,	LEV.=	-1	1	-1	-1	1	0	1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	3305.,	MIN.=	-15.86,	LEV.=	1	1	1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	-1
NO.=	1389.,	MIN.=	-15.71,	LEV.=	1	1	-1	-1	1	0	-1	0	-1	0	1	-1	0	0	0	0	0	1	-1	1
NO.=	3562.,	MIN.=	-15.69,	LEV.=	-1	1	1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	3437.,	MIN.=	-15.65,	LEV.=	1	1	-1	-1	1	0	-1	0	-1	0	1	-1	0	0	0	0	0	1	-1	-1
NO.=	1230.,	MIN.=	-15.22,	LEV.=	-1	1	-1	-1	1	0	1	0	-1	0	-1	1	0	0	0	0	0	1	-1	1
NO.=	3278.,	MIN.=	-15.16,	LEV.=	-1	1	-1	-1	1	0	1	0	-1	0	-1	1	0	0	0	0	0	1	-1	-1
NO.=	1513.,	MIN.=	-14.89,	LEV.=	1	1	1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	1133.,	MIN.=	-14.70,	LEV.=	1	1	-1	-1	1	0	-1	0	-1	0	1	1	0	0	0	0	0	1	-1	1
NO.=	3306.,	MIN.=	-14.68,	LEV.=	-1	1	1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	-1
NO.=	3181.,	MIN.=	-14.64,	LEV.=	1	1	-1	-1	1	0	-1	0	-1	0	1	1	0	0	0	0	0	1	-1	-1
NO.=	1257.,	MIN.=	-13.88,	LEV.=	1	1	1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	1
NO.=	1519.,	MIN.=	-13.76,	LEV.=	1	-1	-1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	1514.,	MIN.=	-13.71,	LEV.=	-1	1	1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	3567.,	MIN.=	-13.70,	LEV.=	1	-1	-1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	1390.,	MIN.=	-13.58,	LEV.=	-1	1	-1	-1	1	0	-1	0	-1	0	1	-1	0	0	0	0	0	1	-1	1
NO.=	3438.,	MIN.=	-13.52,	LEV.=	-1	1	-1	-1	1	0	-1	0	-1	0	1	-1	0	0	0	0	0	1	-1	-1
NO.=	1357.,	MIN.=	-13.37,	LEV.=	1	1	-1	-1	1	0	1	0	-1	0	1	-1	0	0	0	0	0	1	-1	1
NO.=	1520.,	MIN.=	-13.37,	LEV.=	-1	-1	-1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	3405.,	MIN.=	-13.31,	LEV.=	1	1	-1	-1	1	0	1	0	-1	0	1	-1	0	0	0	0	0	1	-1	-1
NO.=	3568.,	MIN.=	-13.31,	LEV.=	-1	-1	-1	-1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	1503.,	MIN.=	-12.98,	LEV.=	1	-1	-1	-1	-1	0	1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	3551.,	MIN.=	-12.92,	LEV.=	1	-1	-1	-1	-1	0	1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	1263.,	MIN.=	-12.75,	LEV.=	1	-1	-1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	1
NO.=	1258.,	MIN.=	-12.70,	LEV.=	-1	1	1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	1
NO.=	3311.,	MIN.=	-12.69,	LEV.=	1	-1	-1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	-1
NO.=	1504.,	MIN.=	-12.58,	LEV.=	-1	-1	-1	-1	-1	0	1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	1134.,	MIN.=	-12.57,	LEV.=	-1	1	-1	-1	1	0	-1	0	-1	0	1	1	0	0	0	0	0	1	-1	1
NO.=	3552.,	MIN.=	-12.52,	LEV.=	-1	-1	-1	-1	-1	0	1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	-1
NO.=	3182.,	MIN.=	-12.51,	LEV.=	-1	1	-1	-1	1	0	-1	0	-1	0	1	1	0	0	0	0	0	1	-1	-1
NO.=	1493.,	MIN.=	-12.47,	LEV.=	1	1	-1	1	-1	0	1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	1509.,	MIN.=	-12.43,	LEV.=	1	1	-1	1	1	0	-1	0	-1	0	-1	-1	0	0	0	0	0	1	-1	1
NO.=	1101.,	MIN.=	-12.36,	LEV.=	1	1	-1	-1	1	0	1	0	-1	0	1	1	0	0	0	0	0	1	-1	1
NO.=	1264.,	MIN.=	-12.36,	LEV.=	-1	-1	-1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	1
NO.=	3149.,	MIN.=	-12.30,	LEV.=	1	1	-1	-1	1	0	1	0	-1	0	1	1	0	0	0	0	0	1	-1	-1
NO.=	3312.,	MIN.=	-12.30,	LEV.=	-1	-1	-1	-1	1	0	-1	0	-1	0	-1	1	0	0	0	0	0	1	-1	-1

TABLE 2.5-11A
MINIMUM GASSING COMBINATIONS (COMBINED GAS)

1545.,	MIN.=	-7.41,	LEV.=	1	1	1	-1	1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1549.,	MIN.=	-6.22,	LEV.=	1	1	-1	-1	1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1673.,	MIN.=	-5.80,	LEV.=	1	1	1	-1	1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1677.,	MIN.=	-4.61,	LEV.=	1	1	-1	-1	1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1674.,	MIN.=	-3.21,	LEV.=	-1	1	1	-1	1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1930.,	MIN.=	-3.20,	LEV.=	-1	1	1	-1	1	1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1678.,	MIN.=	-2.03,	LEV.=	-1	1	-1	-1	1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1948.,	MIN.=	-1.74,	LEV.=	-1	-1	1	-1	-1	1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1609.,	MIN.=	-1.55,	LEV.=	1	1	1	-1	1	1	0	-1	1	0	1	-1	0	0	0	0	0	0	-1	0
1738.,	MIN.=	-1.26,	LEV.=	-1	1	1	-1	1	1	0	-1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1994.,	MIN.=	-1.25,	LEV.=	-1	1	1	-1	1	1	0	-1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1929.,	MIN.=	-1.04,	LEV.=	1	1	1	-1	1	1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1577.,	MIN.=	-0.66,	LEV.=	1	1	1	-1	1	-1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1613.,	MIN.=	-0.36,	LEV.=	1	1	-1	-1	1	1	0	-1	1	0	1	-1	0	0	0	0	0	0	-1	0
1742.,	MIN.=	-0.07,	LEV.=	-1	1	-1	-1	1	1	0	-1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1737.,	MIN.=	0.05,	LEV.=	1	1	1	-1	1	1	0	-1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1940.,	MIN.=	0.08,	LEV.=	-1	-1	1	1	-1	1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
2012.,	MIN.=	0.20,	LEV.=	-1	-1	1	-1	-1	1	0	-1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1947.,	MIN.=	0.40,	LEV.=	1	-1	1	-1	-1	1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1581.,	MIN.=	0.52,	LEV.=	1	1	-1	-1	1	-1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1705.,	MIN.=	0.94,	LEV.=	1	1	1	-1	1	-1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1741.,	MIN.=	1.24,	LEV.=	1	1	-1	-1	1	1	0	-1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1547.,	MIN.=	1.49,	LEV.=	1	-1	1	-1	1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1537.,	MIN.=	1.63,	LEV.=	1	1	1	1	1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1563.,	MIN.=	1.86,	LEV.=	1	-1	1	-1	-1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
2004.,	MIN.=	2.04,	LEV.=	-1	-1	1	1	-1	1	0	-1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1709.,	MIN.=	2.13,	LEV.=	1	1	-1	-1	1	-1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1934.,	MIN.=	2.13,	LEV.=	-1	1	-1	-1	1	1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1939.,	MIN.=	2.24,	LEV.=	1	-1	1	1	-1	1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1551.,	MIN.=	2.67,	LEV.=	1	-1	-1	-1	1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1541.,	MIN.=	2.81,	LEV.=	1	1	-1	1	1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1567.,	MIN.=	3.04,	LEV.=	1	-1	-1	-1	-1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1675.,	MIN.=	3.10,	LEV.=	1	-1	1	-1	1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1665.,	MIN.=	3.24,	LEV.=	1	1	1	1	1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1691.,	MIN.=	3.47,	LEV.=	1	-1	1	-1	-1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1706.,	MIN.=	3.53,	LEV.=	-1	1	1	-1	1	-1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1962.,	MIN.=	3.54,	LEV.=	-1	1	1	-1	1	-1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1552.,	MIN.=	3.59,	LEV.=	-1	-1	-1	-1	-1	1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1555.,	MIN.=	3.70,	LEV.=	1	-1	1	1	-1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1546.,	MIN.=	3.84,	LEV.=	-1	1	1	-1	1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1801.,	MIN.=	3.95,	LEV.=	1	1	1	-1	1	1	0	1	1	0	-1	-1	0	0	0	0	0	0	-1	0
1993.,	MIN.=	4.09,	LEV.=	-1	1	-1	-1	1	1	0	-1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1679.,	MIN.=	4.28,	LEV.=	1	-1	-1	-1	1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1933.,	MIN.=	4.29,	LEV.=	1	1	-1	-1	1	1	0	1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1669.,	MIN.=	4.43,	LEV.=	1	1	-1	1	1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1695.,	MIN.=	4.66,	LEV.=	1	-1	-1	-1	-1	1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1710.,	MIN.=	4.71,	LEV.=	-1	1	-1	-1	1	-1	0	1	-1	0	1	-1	0	0	0	0	0	0	-1	0
1993.,	MIN.=	4.81,	LEV.=	1	1	1	-1	1	1	0	-1	-1	0	-1	-1	0	0	0	0	0	0	-1	0
1559.,	MIN.=	4.88,	LEV.=	1	-1	-1	1	-1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0
1550.,	MIN.=	5.03,	LEV.=	-1	1	-1	-1	1	1	0	1	1	0	1	-1	0	0	0	0	0	0	-1	0

TABLE 2.5-11B
MAXIMUM GASSING COMBINATIONS (COMBINED GAS)

356.,	MAX.=	127.87,	LEV.=	-1	-1	1	1	1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
292.,	MAX.=	125.92,	LEV.=	-1	-1	1	1	1	-1	0	1	1	0	-1	1	0	0	0	0	0	0	1	0
355.,	MAX.=	125.26,	LEV.=	1	-1	1	1	1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
364.,	MAX.=	122.36,	LEV.=	-1	-1	1	-1	1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
100.,	MAX.=	121.25,	LEV.=	-1	-1	1	1	1	-1	0	-1	1	0	1	1	0	0	0	0	0	0	1	0
300.,	MAX.=	120.40,	LEV.=	-1	-1	1	-1	1	-1	0	1	1	0	-1	1	0	0	0	0	0	0	1	0
423.,	MAX.=	120.26,	LEV.=	1	-1	1	1	1	-1	0	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
363.,	MAX.=	119.75,	LEV.=	1	-1	1	-1	1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
291.,	MAX.=	119.40,	LEV.=	1	-1	1	1	1	-1	0	1	1	0	-1	1	0	0	0	0	0	0	1	0
36.,	MAX.=	119.30,	LEV.=	-1	-1	1	1	1	-1	0	1	1	0	1	1	0	0	0	0	0	0	1	0
108.,	MAX.=	115.74,	LEV.=	-1	-1	1	-1	1	-1	0	-1	1	0	1	1	0	0	0	0	0	0	1	0
227.,	MAX.=	115.51,	LEV.=	1	-1	1	1	1	-1	0	-1	-1	0	1	1	0	0	0	0	0	0	1	0
360.,	MAX.=	114.99,	LEV.=	-1	-1	-1	1	1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
491.,	MAX.=	114.75,	LEV.=	1	-1	1	-1	1	-1	0	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
419.,	MAX.=	114.40,	LEV.=	1	-1	1	1	1	-1	0	1	-1	0	-1	1	0	0	0	0	0	0	1	0
424.,	MAX.=	114.20,	LEV.=	-1	-1	1	1	1	-1	0	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
228.,	MAX.=	114.19,	LEV.=	-1	-1	1	1	1	-1	0	-1	-1	0	1	1	0	0	0	0	0	0	1	0
99.,	MAX.=	113.90,	LEV.=	1	-1	1	1	1	-1	0	-1	1	0	1	1	0	0	0	0	0	0	1	0
299.,	MAX.=	113.89,	LEV.=	1	-1	1	-1	1	-1	0	1	1	0	-1	1	0	0	0	0	0	0	1	0
44.,	MAX.=	113.78,	LEV.=	-1	-1	1	-1	1	-1	0	1	1	0	1	1	0	0	0	0	0	0	1	0
296.,	MAX.=	113.04,	LEV.=	-1	-1	-1	1	1	-1	0	1	1	0	-1	1	0	0	0	0	0	0	1	0
359.,	MAX.=	112.38,	LEV.=	1	-1	-1	1	1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
420.,	MAX.=	112.25,	LEV.=	-1	-1	1	1	1	-1	0	1	-1	0	-1	1	0	0	0	0	0	0	1	0
164.,	MAX.=	112.24,	LEV.=	-1	-1	1	1	1	-1	0	1	-1	0	1	1	0	0	0	0	0	0	1	0
324.,	MAX.=	110.55,	LEV.=	-1	-1	1	1	1	1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
235.,	MAX.=	110.00,	LEV.=	1	-1	1	-1	1	-1	0	-1	-1	0	1	1	0	0	0	0	0	0	1	0
163.,	MAX.=	109.65,	LEV.=	1	-1	1	1	1	-1	0	1	-1	0	1	1	0	0	0	0	0	0	1	0
368.,	MAX.=	109.43,	LEV.=	-1	-1	-1	-1	1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
122.,	MAX.=	109.16,	LEV.=	-1	1	1	-1	-1	-1	0	-1	1	0	1	1	0	0	0	0	0	0	1	0
427.,	MAX.=	108.89,	LEV.=	1	-1	1	-1	1	-1	0	1	-1	0	-1	1	0	0	0	0	0	0	1	0
492.,	MAX.=	108.69,	LEV.=	-1	-1	1	-1	1	-1	0	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
236.,	MAX.=	108.67,	LEV.=	-1	-1	1	-1	1	-1	0	-1	-1	0	1	1	0	0	0	0	0	0	1	0
868.,	MAX.=	108.63,	LEV.=	-1	-1	1	1	1	-1	0	-1	1	0	-1	-1	0	0	0	0	0	0	1	0
260.,	MAX.=	108.60,	LEV.=	-1	-1	1	1	1	1	0	1	1	0	-1	1	0	0	0	0	0	0	1	0
354.,	MAX.=	108.39,	LEV.=	-1	1	1	1	1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
107.,	MAX.=	108.38,	LEV.=	1	-1	1	-1	1	-1	0	-1	1	0	1	1	0	0	0	0	0	0	1	0
35.,	MAX.=	108.04,	LEV.=	1	-1	1	1	1	-1	0	1	1	0	1	1	0	0	0	0	0	0	1	0
378.,	MAX.=	107.96,	LEV.=	-1	1	1	-1	-1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
323.,	MAX.=	107.94,	LEV.=	1	-1	1	1	1	1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
304.,	MAX.=	107.52,	LEV.=	-1	-1	-1	-1	1	-1	0	1	1	0	-1	1	0	0	0	0	0	0	1	0
114.,	MAX.=	107.47,	LEV.=	-1	1	1	1	-1	-1	0	-1	1	0	1	1	0	0	0	0	0	0	1	0
487.,	MAX.=	107.38,	LEV.=	1	-1	-1	1	1	-1	0	-1	-1	0	-1	1	0	0	0	0	0	0	1	0
56.,	MAX.=	107.21,	LEV.=	-1	1	1	-1	-1	-1	0	1	1	0	1	1	0	0	0	0	0	0	1	0
367.,	MAX.=	106.87,	LEV.=	1	-1	-1	-1	1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0
428.,	MAX.=	106.73,	LEV.=	-1	-1	1	-1	1	-1	0	1	-1	0	-1	1	0	0	0	0	0	0	1	0
172.,	MAX.=	106.72,	LEV.=	-1	-1	1	-1	1	-1	0	1	-1	0	1	1	0	0	0	0	0	0	1	0
804.,	MAX.=	106.67,	LEV.=	-1	-1	1	1	1	-1	0	1	1	0	-1	-1	0	0	0	0	0	0	1	0
295.,	MAX.=	106.52,	LEV.=	1	-1	-1	1	1	-1	0	1	1	0	-1	1	0	0	0	0	0	0	1	0
298.,	MAX.=	106.44,	LEV.=	-1	1	1	1	1	-1	0	1	1	0	-1	1	0	0	0	0	0	0	1	0
370.,	MAX.=	106.27,	LEV.=	-1	1	1	1	-1	-1	0	-1	1	0	-1	1	0	0	0	0	0	0	1	0

TABLE NO. 2.5-12

MINIMUM GASSING LEVELS BY VARIABLE

VARIABLE NO.	OPEN CIRCUIT	DISCHARGE	COMBINED	"BEST" LEVEL
	Level (1X1-X21)	Level (1X1-X21)	Level (1X1-X21)	
1	+ (3.42)*	+ (0.78)*	+ (2.60)*	+
2	- (2.09)*	+ (3.51)*	+ (2.34)*	+
3	- (3.93)*	- (4.98)*	- (5.85)*	-
4	+ (4.78)*	- (8.98)*	- (3.68)*	-
5	+ (4.78)*	- (3.14)*	- (0.88)*	+
6	+ (0.58)*	+(10.24)*	+(12.03)*	+
7	+ (4.40)*	- (1.35)*	NI	+
8	+ (4.78)*	NI	+ (3.91)*	+
9	+ (2.06)*	- (7.84)*	- (6.03)*	-
10	- (3.93)	+ (3.38)	NI	-
11	+ (5.16)*	- (1.72)*	+ (3.86)*	+
12	-(10.18)*	- (2.02)*	-(12.83)*	-
13	NI	NI	NI	N/A
14	+ (3.62)	NI	NI	+
15	- (5.37)	- (3.73)	-(10.18)	-
16	NI	NI	NI	N/A
17	-(21.21)	- (8.91)	-(33.20)	-
18	+(15.57)	+(12.06)*	+(27.18)	+
19	-(24.23)*	-(31.74)*	-(54.42)*	-
20	-(19.09)	+ (0.12)*	- (20.92)	-
21	- (2.60)	0	- (5.58)	
22	0	0	+ (1.95)	
23	+ (2.80)	0	+ (4.34)	
24	+ (1.53)	0	+ (2.37)	
25	+ (4.94)	+ (3.92)	+(11.85)	
26	- (5.99)	0	- (5.29)	
27	- (2.27)	0	- (2.08)	
28	- (2,49)	0	- (2.60)	
29	- (4.31)	- (1.59)	- (6.51)	
30	0	- (4.33)	- (3.60)	
31	0	- (1.01)	+ (1.77)	
32	+ (3.32)	0	+ (3.91)	
33	0	+ (3.26)	+ (3.30)	
34	0	+ (1.78)		
35	+ (2.20)	0		
36	0	- (3.38)		
37	0	- (2.29)		
38	- (1.77)	0		
39	+ (2.39)	0		
40		- (2.37)		
41		+ (0.48)		
42		- (0.48)		
43		+ (1.37)		
44		+ (1.08)		
45		- (1.13)		
46		- (1.10)		
47		- (1.31)		
48		- (1.02)		

* Interactive

NI Not In

N/A Not Applicable

TABLE 2.5-13A
MINIMUM PERCENT OXYGEN PICKUP COMBINATIONS

.=	932.,	MIN.=	12.46,	LEV.=	-1	-1	1	1	1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	420.,	MIN.=	12.53,	LEV.=	-1	-1	1	1	1	-1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	900.,	MIN.=	12.53,	LEV.=	-1	-1	1	1	1	1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	930.,	MIN.=	12.53,	LEV.=	-1	1	1	1	1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	388.,	MIN.=	12.60,	LEV.=	-1	-1	1	1	1	1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	418.,	MIN.=	12.60,	LEV.=	-1	1	1	1	1	-1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	898.,	MIN.=	12.60,	LEV.=	-1	1	1	1	1	1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	996.,	MIN.=	12.64,	LEV.=	-1	-1	1	1	1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	436.,	MIN.=	12.67,	LEV.=	-1	-1	1	1	-1	-1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	386.,	MIN.=	12.67,	LEV.=	-1	1	1	1	1	1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	948.,	MIN.=	12.69,	LEV.=	-1	-1	1	1	-1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	931.,	MIN.=	12.70,	LEV.=	1	-1	1	1	1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	484.,	MIN.=	12.71,	LEV.=	-1	-1	1	1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	1
.=	964.,	MIN.=	12.71,	LEV.=	-1	-1	1	1	1	1	-1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	994.,	MIN.=	12.72,	LEV.=	-1	1	1	1	1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	500.,	MIN.=	12.73,	LEV.=	-1	-1	1	1	-1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	1
.=	1012.,	MIN.=	12.74,	LEV.=	-1	-1	1	1	-1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	404.,	MIN.=	12.74,	LEV.=	-1	-1	1	1	-1	1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	434.,	MIN.=	12.75,	LEV.=	-1	1	1	1	-1	-1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	916.,	MIN.=	12.76,	LEV.=	-1	-1	1	1	-1	1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	946.,	MIN.=	12.76,	LEV.=	-1	1	1	1	-1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	419.,	MIN.=	12.76,	LEV.=	1	-1	1	1	1	-1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	899.,	MIN.=	12.76,	LEV.=	1	-1	1	1	1	1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	929.,	MIN.=	12.77,	LEV.=	1	1	1	1	1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	452.,	MIN.=	12.78,	LEV.=	-1	-1	1	1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	1
.=	482.,	MIN.=	12.79,	LEV.=	-1	1	1	1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	1
.=	962.,	MIN.=	12.79,	LEV.=	-1	1	1	1	1	1	-1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	988.,	MIN.=	12.79,	LEV.=	-1	-1	1	1	-1	1	-1	-1	-1	0	1	0	0	0	0	0	0	1
.=	498.,	MIN.=	12.80,	LEV.=	-1	1	1	1	-1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	1
.=	980.,	MIN.=	12.81,	LEV.=	-1	-1	1	1	-1	1	-1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	1010.,	MIN.=	12.82,	LEV.=	-1	1	1	1	-1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	802.,	MIN.=	12.82,	LEV.=	-1	1	1	1	-1	1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	914.,	MIN.=	12.83,	LEV.=	-1	1	1	1	-1	1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	387.,	MIN.=	12.83,	LEV.=	1	-1	1	1	1	1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	917.,	MIN.=	12.84,	LEV.=	1	1	1	1	1	-1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	807.,	MIN.=	12.84,	LEV.=	1	1	1	1	1	1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	455.,	MIN.=	12.85,	LEV.=	1	-1	1	1	-1	-1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	450.,	MIN.=	12.86,	LEV.=	-1	1	1	1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	1
.=	347.,	MIN.=	12.86,	LEV.=	1	-1	1	1	-1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	442.,	MIN.=	12.87,	LEV.=	-1	1	1	-1	-1	-1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	466.,	MIN.=	12.87,	LEV.=	-1	1	1	1	-1	1	-1	-1	-1	0	1	0	0	0	0	0	0	1
.=	938.,	MIN.=	12.87,	LEV.=	-1	1	1	-1	1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	444.,	MIN.=	12.87,	LEV.=	-1	-1	1	-1	-1	-1	1	-1	-1	0	1	0	0	0	0	0	0	1
.=	395.,	MIN.=	12.88,	LEV.=	1	-1	1	1	1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	940.,	MIN.=	12.88,	LEV.=	-1	-1	1	-1	1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	954.,	MIN.=	12.88,	LEV.=	-1	1	1	-1	-1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	978.,	MIN.=	12.89,	LEV.=	-1	1	1	1	-1	1	-1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	956.,	MIN.=	12.89,	LEV.=	-1	-1	1	-1	-1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	1
.=	493.,	MIN.=	12.90,	LEV.=	1	-1	1	1	-1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	1
.=	385.,	MIN.=	12.91,	LEV.=	1	1	1	1	1	1	1	-1	-1	0	1	0	0	0	0	0	0	1

TABLE 2.5-13B
MAXIMUM PERCENT OXYGEN PICKUP COMBINATIONS

.=	1519.,	MAX.=	15.11,	LEV.=	1	-1	-1	-1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	2031.,	MAX.=	15.04,	LEV.=	1	-1	-1	-1	1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1487.,	MAX.=	15.03,	LEV.=	1	-1	-1	-1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1517.,	MAX.=	15.02,	LEV.=	1	1	-1	-1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1455.,	MAX.=	15.01,	LEV.=	1	-1	-1	-1	1	-1	1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1529.,	MAX.=	15.00,	LEV.=	-1	-1	-1	-1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1399.,	MAX.=	14.96,	LEV.=	1	-1	-1	-1	1	1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1391.,	MAX.=	14.96,	LEV.=	1	-1	-1	-1	1	-1	-1	1	-1	0	1	0	0	0	0	0	0	-1
.=	2029.,	MAX.=	14.95,	LEV.=	1	1	-1	-1	1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1483.,	MAX.=	14.95,	LEV.=	1	-1	1	-1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1485.,	MAX.=	14.94,	LEV.=	1	1	-1	-1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1481.,	MAX.=	14.94,	LEV.=	1	1	1	-1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1967.,	MAX.=	14.94,	LEV.=	1	-1	-1	-1	1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1423.,	MAX.=	14.93,	LEV.=	1	-1	-1	-1	1	1	1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	2032.,	MAX.=	14.93,	LEV.=	-1	-1	-1	-1	1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1453.,	MAX.=	14.92,	LEV.=	1	1	-1	-1	1	-1	1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1488.,	MAX.=	14.92,	LEV.=	-1	-1	-1	-1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1518.,	MAX.=	14.91,	LEV.=	-1	1	-1	-1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1456.,	MAX.=	14.90,	LEV.=	-1	-1	-1	-1	1	-1	1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1903.,	MAX.=	14.89,	LEV.=	1	-1	-1	-1	1	-1	-1	1	-1	0	-1	0	0	0	0	0	0	-1
.=	1995.,	MAX.=	14.88,	LEV.=	1	-1	1	-1	1	1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1515.,	MAX.=	14.88,	LEV.=	1	-1	1	-1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1997.,	MAX.=	14.88,	LEV.=	1	1	-1	-1	1	1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1993.,	MAX.=	14.87,	LEV.=	1	1	1	-1	1	1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1513.,	MAX.=	14.87,	LEV.=	1	1	1	-1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1389.,	MAX.=	14.87,	LEV.=	1	1	-1	-1	1	-1	-1	1	-1	0	1	0	0	0	0	0	0	-1
.=	1935.,	MAX.=	14.86,	LEV.=	1	-1	-1	-1	1	1	1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1263.,	MAX.=	14.86,	LEV.=	1	-1	-1	-1	1	-1	-1	-1	1	0	1	0	0	0	0	0	0	-1
.=	1327.,	MAX.=	14.86,	LEV.=	1	-1	-1	-1	1	-1	1	1	-1	0	1	0	0	0	0	0	0	-1
.=	1965.,	MAX.=	14.85,	LEV.=	1	1	-1	-1	1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1775.,	MAX.=	14.85,	LEV.=	1	-1	-1	-1	1	-1	-1	-1	1	0	-1	0	0	0	0	0	0	-1
.=	2000.,	MAX.=	14.85,	LEV.=	-1	-1	-1	-1	1	1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1264.,	MAX.=	14.85,	LEV.=	-1	-1	-1	-1	1	-1	-1	-1	1	0	1	0	0	0	0	0	0	-1
.=	1392.,	MAX.=	14.85,	LEV.=	-1	-1	-1	-1	1	-1	-1	1	-1	0	1	0	0	0	0	0	0	-1
.=	1421.,	MAX.=	14.85,	LEV.=	1	1	-1	-1	1	1	1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	2030.,	MAX.=	14.84,	LEV.=	-1	1	-1	-1	1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1776.,	MAX.=	14.84,	LEV.=	-1	-1	-1	-1	1	-1	-1	-1	1	0	-1	0	0	0	0	0	0	-1
.=	1484.,	MAX.=	14.84,	LEV.=	-1	-1	1	-1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1486.,	MAX.=	14.84,	LEV.=	-1	1	-1	-1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1482.,	MAX.=	14.84,	LEV.=	-1	1	1	-1	1	1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1968.,	MAX.=	14.83,	LEV.=	-1	-1	-1	-1	1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1424.,	MAX.=	14.82,	LEV.=	-1	-1	-1	-1	1	1	1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1454.,	MAX.=	14.82,	LEV.=	-1	1	-1	-1	1	-1	1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	2027.,	MAX.=	14.81,	LEV.=	1	-1	1	-1	1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1511.,	MAX.=	14.80,	LEV.=	1	-1	-1	1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	2025.,	MAX.=	14.80,	LEV.=	1	1	1	-1	1	-1	-1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1509.,	MAX.=	14.80,	LEV.=	1	1	-1	1	1	-1	-1	-1	-1	0	1	0	0	0	0	0	0	-1
.=	1983.,	MAX.=	14.80,	LEV.=	1	-1	-1	-1	-1	-1	1	-1	-1	0	-1	0	0	0	0	0	0	-1
.=	1481.,	MAX.=	14.80,	LEV.=	1	1	-1	-1	1	-1	-1	1	-1	0	-1	0	0	0	0	0	0	-1
.=	1839.,	MAX.=	14.79,	LEV.=	1	-1	-1	-1	1	-1	1	1	-1	0	-1	0	0	0	0	0	0	-1

TABLE NO. 2.5-15

MAXIMUM PER-CENT OXYGEN PICKUP

VARIABLE NO.	MAXIMUM LEVEL
1	+ (0.093)
2	+ (0.003)
3	- (0.282)
4	- (0.163)
5	+ (0.060)
6	- (0.153)
7	- (0.075)
8	- (0.299)
9	- (0.171)
10	NI
11	- (0.004)
12	+ (0.076)
13	+ (0.260)
14	- (0.300)
15	- (0.212)
16	- (0.130)
17	NI
18	NI
19	+ (0.563)
20	- (1.520)