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Thermodynamic Data for Air Preheaters in Direct Coal-Fired Magnetohydrodynamic Power Generation Systems

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UNITED STATES DEPARTMENT OF THE INTERIOR
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CONTENTS

THERMODYNAMIC DATA FOR AIR PREHEATERS IN DIRECT COAL-FIRED MAGNETOHYDRODYNAMIC POWER GENERATION SYSTEMS

by

F. E. Spencer, Jr.,[1] and J. C. Hendrie, Jr.[2]

ABSTRACT

Calculated equilibrium data are presented for three phases in the flue gas stream from a hypothetical open cycle MHD generator. A typical coal is "burned" with 1.0 gram-mole K_2O seed per kilogram coal and with 101 percent of stoichiometric air. Tables of composition and the overt thermodynamic properties, enthalpy and entropy, are given for the temperatures 2200 (-100) 1100 kelvins, pressures 1.0 and 1.5 atmospheres, and slag rejection figures of 90 and 75 percent.

INTRODUCTION

A great economy could be realized in the implementation of magnetohydrodynamic (MHD) generator systems operating with coal if successful regenerative (or possible recuperative) air preheaters could be designed which would draw heat directly from the flue stream of the MHD duct. The peculiar problems to be faced in such systems include the high temperatures, the corrosive nature of slag and of condensed seed, rapid thermal cycling, possible abrasion, and possible caking of the condensed material. As an aid to engineers working on the preheater problem, equilibrium calculations for the pressures, temperatures, and slag rejection figures of interest are presented.

ACKNOWLEDGMENT

The authors would like to thank Professor David Oliver of M.I.T. for encouraging us to undertake these equilibrium calculations and for pointing out their usefulness in the air preheater design area.

AGREEMENT BETWEEN EXPERIMENT AND CALCULATIONS

Experimental work at the Bureau of Mines Pittsburgh Energy Research Center and elsewhere has shown that slag droplets contain, under MHD-seeded conditions, high concentrations of potassium silicates and aluminates. The molecular form of the potassium in the liquid (or glassy) slag is not known,

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[1] Mathematician.
[2] Chemical engineer.

but one could easily imagine molecules approximating potassium metasilicate and metaluminate in a solution of liquid silica, alumina, lime, and ferrous oxide. The precise slag model assumed is that of an ideal solution of oxides and mixed oxides as listed on each page of the tables in the appendix.

In addition to the seed loss previously mentioned, experiments at the Bureau of Mines Pittsburgh Energy Research Center have shown two further points of agreement with the present computer model: (1) The slag droplets cool too rapidly for crystallization to occur--they freeze rather as a glass and at temperatures above 1700 kelvins and (2) the stoichiometric agreement between the equilibrium calculated slag composition and that obtained experimentally has been good under certain conditions. Reports on these points of agreement are being prepared. From the above experimental evidence, it can be concluded that the ideal solution model of mixed liquid oxides is useful even at relatively low temperatures (1100 kelvins) for prediction of slag composition.

Experimental evidence further indicates that seed material condenses as a solution of potassium sulfate and carbonate liquids at a lower temperature than the freezing of the slag (glass) phase. The specific evidence is that all the sulfates and carbonates are water extractable from the fly ash. However, unlike the slag phase, the carbonates and sulfates do have time to get organized as crystals. The mathematical model used in this experiment was structured to effect these known pieces of information.

CALCULATIONS

The complete model consists of treating three phases at all temperatures: gas ("IDEALGAS" on the listings), slag ("GLASS"), and condensed seed ("SULF. AND CARB."). Nonappearance of a phase at a given temperature is implied by the appearance of zeros in the listing of that phase.

The data bank has been prepared for the condensed seed phase with equilibrium constants for both liquid and crystalline K_2SO_4 and K_2CO_3. The constants have been zeroed as required above and below the respective fusion temperatures for the respective salts. A decision as to whether the condensed seed is actually a liquid should be made by reference to an appropriate liquidus curve diagram. This decision is not made by the program, but the composition of the condensed seed phase should approximate reality.

All calculations have been made using the Pittsburgh Energy Research Center's multiphase equilibrium program as reported by Spencer (4).[3] Most of the thermodynamic data comes from the JANAF tables (3) with exceptions for species not tabulated by JANAF.

The exceptions are $Ar(g)$, $Al(OH)_2(g)$, $AlO_2^-(g)$, $CO_2^-(g)$, $SH^-(g)$, $SO^-(g)$, $SO_2^-(g)$, $Al_6Si_2O_{13}(\ell)$, $FeAl_2O_4(\ell)$, $KAlO_2(\ell)$. The ancestry or precision of non-JANAF thermodynamic data for the gaseous species, save $Al(OH)_2$, is

[3]Underlined numbers in parentheses refer to items in the list of references preceding the appendix.

probably not relevant to air preheater design because the non-JANAF gaseous species are all ions (which have low concentrations). In any case they will be documented elsewhere.

Jensen and Jones (1) give equilibrium constants for the reaction $Al(g) + 2H_2O(g) \rightarrow Al(OH)_2(g) + 2H(g)$. From these equilibrium constants we have deduced, using JANAF data for the other species involved, the equilibrium constants of formation for $Al(OH)_2$.

Low-temperature thermal data for the crystals $Al_6Si_2O_{13}$, $FeAl_2O_4$, and $KAlO_2$ are available: for the mullite, JANAF tables; for the two aluminates, Lowell, Schwitzgebel, and Parsons (2). Heats of fusion, fusion temperature, and liquid heat capacities were estimated by analogy with other related species tabulated in the JANAF data.

The coal treated in the tabulations has an average analysis for the Upper Freeport seam (hvBb). The ultimate and ash analyses are as follows, in weight-percent:

C.....	73.92	SiO_2.....	47.32
H.....	4.78	Al_2O_3.....	27.74
N.....	1.28	Fe_2O_3.....	18.26
O.....	4.22	K_2O.....	2.41
S.....	2.21	Na_2O.....	.27
Cl.....	.15	CaO.....	1.75
Ash.....	13.44	Other[1].....	2.25
Total.....	100.00	Total.....	100.00

[1] Includes TiO_2, MgO, B_2O_3, V_2O_5, P_2O_5, etc.

In addition, 101 percent of stoichiometric air and 1 gram-mole K_2O/kg coal was added (0.715 weight-percent of entire mixture is potassium atoms). The elements B, V, P, Ti, Mg, and others are ignored in the computations.

To approximate slag rejection figures of 90 and 75 percent, only 10 percent and 25 percent, respectively, of the aluminum, calcium, iron, and silicon from the ash analysis was fed to the program. The stoichiometry for the entire mixture in these hypothetical flue streams can be read off the top of any of the listings in the appendix.

Several of the Appalachian seams have analyses that approximate those assumed here (Pittsburgh seam, Upper, Middle, and Lower Kittanning, etc.). Since the Appalachian seams represent a large part of the available high-Btu coal reserves, these calculations should be broadly useful. Of course, more precise calculations can be made with the precise coal analyses for coals used in experiments, or, if necessary, in pilot plants.

REFERENCES

1. Jensen, D. C., and G. A. Jones. Flame Photometric Determination of the Standard Enthalpies of Formation of $Al(OH)_2$ and AlO. Trans. Faraday Soc., v. 68, 1972, pp. 259-268.

2. Lowell, P. S., K. Schwitzgebel, and T. B. Parsons. Sulfur Oxide Removal Processes Based on Dry Metal Oxides--A Compilation of Pertinent Thermodynamic Data. 65th Nat. Meeting A.I.Ch.E., paper 76, May 1969, pp. 2, 5, 16, 23-24.

3. Prophet, H., and D. R. Stull. JANAF Thermochemical Tables. Dow Chemical Co., Midland, Mich., 1960-73, unpaged.

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APPENDIX.--TABULATION OF COMPUTED EQUILIBRIUM COMPOSITIONS

A few explanations will clarify the use of the tabulated data, which are photographic reproductions of computer output pages.

The stoichiometry is specified to the program as certain numbers of gram-moles of reference state gases including $CO_2(g)$, $AlO_2(g)$, $SiO_2(g)$. Each sheet of computer output contains, at the top, a table, "stoichiometry (g mol) for case identified as D. Oliver," which gives this specified stoichiometry. One should not confuse these stoichiometric specifications with the equilibrium quantities of the same species, which are listed as "equilibrium molar quantities"--the second major division on each page.

The third major division of each listing is "molar fractions within phases." One should note that, for example, a molar fraction 0.1277 $Al_2O_3(\ell)$ means that 0.1277 of the slag phase is liquid alumina--not 0.1277 of the whole mixture.

The fourth major division gives overt chemical and thermodynamic properties for the three phases considered and for the total mixture. The heat capacity is for frozen composition and the adiabatic expansion coefficient and sonic speeds are for the gas phase, assuming frozen composition. Densities calculated for condensed materials are only approximate, and should be viewed as maximum densities since our program does not make adjustment for thermal expansion of condensed materials--such data are hard to obtain.

The fifth division on each listing is a compilation of electrical properties for the gas phase. These are of no concern in the air preheater design area.

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U S BU MINES   PGH ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 90% ASH REJECTION
    .3508#+01 AR      .6890#-01 ALO2    .6156#+02 CO2     .3900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .2890#-01 FE
    .3110#+02 H2      .2064#+01 K       .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .9970#-01 SIO2

PRESSURE =  1.50 ATM,  TEMPERATURE = 2200 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......    .3508#+01  AR      .2482#-05  ALO2    .5794#+02  CO2     .5558#-06  CA      .2293#-10  CL2     .0000#+00  CS
    .5803#-03  FE     .3559# 00  H2      .5153# 00  K       .2736#+03  N2      .5386#-02  NA      .2272#+01  O2      .1069#-07  S2
    .7459#-03  SIO2   .9133#-03  E-      .4160#-09  AL      .4929#-07  ALO     .2765#-02  AL(OH)2 .9212#-13  AL2O    .3615#+01  CO
    .3344#-06  C O S  .2440#-03  CAOH    .1111#-03  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .1576#-02  FEO
    .4022#-02  FE(OH)2 .5295#-01 H       .1032#-02  HCL     .2967#+02  H2O     .8740#-06  H2S     .4102#-01  KCL     .7064#-02  KO
    .1464#+01  KOH    .3258#-05  N       .2129#-06  NH3     .8179# 00  NO      .2003#-03  NO2     .1340#-03  NACL    .7414#-04  NAO
    .5305#-02  NAOH   .6402#-01  O       .6065# 00  OH      .1724#-04  S       .7509#-02  SO      .9301# 00  SO2     .3016#-03  SO3
    .3387#-11  SI     .1852#-04  SIO     .2098#-04  ALO2-   .1201#-09  CN-     .0000#+00  CO2-    .1020#-03  CL-     .0000#+00  CS+
    .1199#-02  K+     .1666#-07  NO-     .1099#-05  NO2-    .1858#-06  NA+     .2374#-05  O-      .5876#-04  OH-     .1073#-05  O2-
    .7679#-08  SH-    .8449#-07  SO-     .9971#-04  SO2-
  GLASS ..........    .1847#-01  AL2O3 L .3566#-02  MULLITE .3655#-02  CAO   L .0000#+00  CSOH  L .3470#-04  FEAL2O4L.2269#-01  FEO   L
    .7701#-02  KALO2 L .1396#-01  K2SIO3 L.4579#-06  NAOH  L .7601#-01  SIO2  L
  SULF. AND CARB..    .0000#+00  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .0000#+00  K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......    .9345#-02  AR      .6611#-08  ALO2    .1543# 00  CO2     .1480#-08  CA      .6107#-13  CL2     .0000#+00  CS
    .1546#-05  FE     .9480#-03  H2      .1373#-02  K       .7286# 00  N2      .1435#-04  NA      .6050#-02  O2      .2847#-10  S2
    .1987#-05  SIO2   .2433#-05  E-      .1108#-11  AL      .1313#-09  ALO     .7364#-05  AL(OH)2 .2454#-15  AL2O    .9628#-02  CO
    .8907#-09  C O S  .6498#-06  CAOH    .2958#-06  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .4198#-05  FEO
    .1071#-04  FE(OH)2 .1410#-03 H       .2750#-05  HCL     .7902#-01  H2O     .2328#-08  H2S     .1093#-03  KCL     .1882#-04  KO
    .3899#-02  KOH    .8677#-08  N       .5669#-09  NH3     .2178#-02  NO      .5334#-06  NO2     .3570#-06  NACL    .1975#-06  NAO
    .1413#-04  NAOH   .1705#-03  O       .1615#-02  OH      .4592#-07  S       .2000#-04  SO      .2477#-02  SO2     .8033#-06  SO3
    .9021#-14  SI     .4934#-05  SIO     .5589#-07  ALO2-   .3199#-12  CN-     .0000#+00  CO2-    .2717#-06  CL-     .0000#+00  CS+
    .3194#-05  K+     .4438#-10  NO-     .2927#-08  NO2-    .4950#-09  NA+     .6324#-08  O-      .1565#-06  OH-     .2857#-08  O2-
    .2045#-10  SH-    .2250#-09  SO-     .2656#-06  SO2-
  GLASS ..........    .1264# 00  AL2O3 L .2441#-01  MULLITE .2502#-01  CAO   L .0000#+00  CSOH  L .2376#-03  FEAL2O4L.1553# 00  FEO   L
    .5271#-01  KALO2 L .9558#-01  K2SIO3 L.3135#-05  NAOH  L .5203# 00  SIO2  L
  SULF. AND CARB..    .0000#+00  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .0000#+00  K2SO4 C

                                          IDEALGAS    GLASS ..    SULF. AN     MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)    .3754#+03   .1461# 00   .0000#+00   .3756#+03
AVERAGE MOLECULAR WEIGHT            (AMU)     .3001#+02   .8707#+02   .0000#+00   .3003#+02
MASS                          (KILOGRAMS)     .1127#+02   .1272#-01   .0000#+00   .1128#+02
VOLUME                    (CUBIC-METERS)      .4519#+02   .4581#-05   .0000#+00   .4519#+02
DENSITY          (KILOGRAMS/CUBIC METER)      .2493# 00   .2777#+04   .0000#+00   .2496# 00
ENTROPY               (GRAMCALORIES/DEGK)     .2423#+05   .9789#+01   .0000#+00   .2424#+05
REACTION ENTHALPY          (KILOCALORIES)    -.9837#+03  -.3094#+02   .0000#+00  -.1015#+04
HEAT OF FORMATION          (KILOCALORIES)    -.7369#+04  -.3774#+02   .0000#+00  -.7407#+04
SENSIBLE HEAT              (KILOCALORIES)     .6385#+04   .6805#+01   .0000#+00   .6392#+04
FROZEN CP             (GMCAL/GMMOL-DEGK)     .9879#+01   .2836#+02   .0000#+00   .9886#+01
ADIABATIC EXPANSION COEFFICIENT              .1252# +1    SONIC SPEED (METERS/SECOND)          .8735# +3

DEBYE LENGTH          (METERS) .72741#-06   ELECTRON DENSITY     (PER M+3) .12174#+20   COLLISION FREQUENCY  (PER SEC) .35026#+12
COEFFICIENTS FOR OHM'S LAW..   SIGMA = SCALAR COND  (MHO/METER)    .9803# 00     BETA1    (SQM-VOLT/NEWTON)          -.5127# 00
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)   .0000#+00     THETA1     (VOLT/DEGK)              .3864#-05
MAGNETIC INDUCTION (ABS B)        (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                        (METER-OHM/TESLA)  .5131# 00   .5130# 00   .5128# 00   .5128# 00   .5128# 00   .5128# 00   .5128# 00
HALL PARAMETER                               .0000#+00   .1006#+01   .2011#+01   .3016#+01   .4021#+01   .5027#+01   .6032#+01
PSI                    (METER-OHM/SQ TESLA)  .1677#-03   .1010#-03   .4600#-04   .2412#-04   .1448#-04   .9564#-05   .6760#-05
THETA2                    (VOLT/TESLA-DEGK) -.1572#-05  -.9458#-06  -.4310#-06  -.2260#-06  -.1357#-06  -.8960#-07  -.6333#-07
THETA3                 (VOLT/SQ TESLA-DEGK)  .6391#-06   .3847#-06   .1753#-06   .9191#-07   .5517#-07   .3644#-07   .2575#-07
```

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.00GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2		

PRESSURE = 1.50 ATM, TEMPERATURE = 2100 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.5153#-06	ALO2	.5943#+02	CO2	.9912#-07	CA	.9545#-11	CL2	.0000#+00	CS			
.1370#-03	FE	.2195# 00	H2	.3635# 00	K	.2737#+03	N2	.9373#-02	NA	.1626#+01	O2	.3215#-08	S2		
.1301#-03	SIO2	.4063#-03	E-	.3246#-10	AL	.6112#-08	ALO	.1274#-02	AL(OH)2	.3803#-14	AL2O	.2129#+01	CO		
.1343#-06	C O S	.8225#-04	CAOH	.5135#-04	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.4950#-03	FEO		
.2823#-02	FE(OH)2	.2298#-01	H	.6708#-03	HCL	.2988#+02	H2O	.3744#-06	H2S	.4147#-01	KCL	.4421#-02	KO		
.1580#+01	KOH	.9294#-06	N	.1193#-06	NH3	.5472# 00	NO	.1318#-03	NO2	.1504#-03	NACL	.5428#-04	NAO		
.6321#-02	NAOH	.2780#-01	O	.3658# 00	OH	.5348#-05	S	.4065#-02	SO	.9335# 00	SO2	.3265#-03	SO3		
.1158#-12	SI	.2288#-03	SIO	.6092#-05	ALO2-	.2629#-10	CN-	.0000#+00	CO2-	.5891#-04	CL-	.0000#+00	CS+		
.5673#-03	K+	.5608#-08	NO-	.6541#-06	NO2-	.8282#-07	NA+	.7477#-06	O-	.2817#-04	OH-	.4282#-06	O2-		
.2410#-08	SH-	.2964#-07	SO-	.6602#-04	SO2-										
GLASS	.2083#-01	AL2O3 L	.2202#-02	MULLITE	.3818#-02	CAO L	.0000#+00	CSOH L	.1750#-04	FEAL2O4L	.2543#-01	FEO L			
.1271#-01	KALO2 L	.3080#-01	K2SIO3 L	.9303#-06	NAOH L	.6414#-01	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C							

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9371#-02	AR	.1376#-08	ALO2	.1587# 00	CO2	.2648#-09	CA	.2550#-13	CL2	.0000#+00	CS			
.3659#-06	FE	.5863#-03	H2	.9708#-03	K	.7310# 00	N2	.1168#-04	NA	.4342#-02	O2	.8587#-11	S2		
.3476#-06	SIO2	.1085#-05	E-	.8669#-13	AL	.1633#-10	ALO	.3404#-05	AL(OH)2	.1016#-16	AL2O	.5686#-02	CO		
.3587#-09	C O S	.2197#-06	CAOH	.1372#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1322#-05	FEO		
.7539#-05	FE(OH)2	.6139#-04	H	.1792#-05	HCL	.7982#-01	H2O	.1000#-08	H2S	.1108#-03	KCL	.1181#-04	KO		
.4220#-02	KOH	.2482#-08	N	.3186#-09	NH3	.1461#-02	NO	.3522#-06	NO2	.4016#-06	NACL	.1450#-06	NAO		
.1688#-04	NAOH	.7425#-04	O	.9771#-03	OH	.1428#-07	S	.1086#-04	SO	.2493#-02	SO2	.8721#-06	SO3		
.3092#-15	SI	.6111#-06	SIO	.1627#-07	ALO2-	.7021#-13	CN-	.0000#+00	CO2-	.1573#-06	CL-	.0000#+00	CS+		
.1515#-05	K+	.1498#-10	NO-	.1747#-08	NO2-	.2212#-09	NA+	.1997#-08	O-	.7525#-07	OH-	.1164#-08	O2-		
.6436#-11	SH-	.7916#-10	SO-	.1763#-06	SO2-										
GLASS	.1303# 00	AL2O3 L	.1377#-01	MULLITE	.2387#-01	CAO L	.0000#+00	CSOH L	.1094#-03	FEAL2O4L	.1590# 00	FEO L			
.7944#-01	KALO2 L	.1926# 00	K2SIO3 L	.5816#-05	NAOH L	.4010# 00	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C							

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3744#+03	.1599# 00	.0000#+00	.3746#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3009#+02	.9353#+02	.0000#+00	.3011#+02
MASS	(KILOGRAMS)	.1126#+02	.1496#-01	.0000#+00	.1128#+02
VOLUME	(CUBIC-METERS)	.4301#+02	.5091#-05	.0000#+00	.4301#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2619# 00	.2938#+04	.0000#+00	.2622# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2400#+05	.1145#+02	.0000#+00	.2401#+05
REACTION ENTHALPY	(KILOCALORIES)	-.1488#+04	-.3402#+02	.0000#+00	-.1522#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7504#+04	-.4163#+02	.0000#+00	-.7545#+04
SENSIBLE HEAT	(KILOCALORIES)	.6016#+04	.7418#+01	.0000#+00	.6023#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9865#+01	.2944#+02	.0000#+00	.9873#+01
ADIABATIC EXPANSION COEFFICIENT		.1252# +1	SONIC SPEED (METERS/SECOND)		.8525# +3

DEBYE LENGTH	(METERS)	.99017#-06	ELECTRON DENSITY	(PER M+3)	.56899#+19	COLLISION FREQUENCY	(PER SEC)	.36423#+12
COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND	(MHO/METER)	.4404# 00	BETA1	(SQM-VOLT/NEWTON)			-.1097#+01
BETA2 (ASSUMING ZERO ION SLIP)		(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)			.2671#-05
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02
CHI	(METER-OHM/TESLA)	.1097#+01	.1097#+01	.1097#+01	.1097#+01	.1097#+01	.1097#+01	.1097#+01
HALL PARAMETER		.0000#+00	.9664# 00	.1933#+01	.2899#+01	.3865#+01	.4831#+01	.5797#+01
PSI	(METER-OHM/SQ TESLA)	.1691#-03	.1029#-03	.4733#-04	.2491#-04	.1498#-04	.9900#-05	.7001#-05
THETA2	(VOLT/TESLA-DEGK)	-.1071#-05	-.6519#-06	-.2998#-06	-.1578#-06	-.9487#-07	-.6272#-07	-.4435#-07
THETA3	(VOLT/SQ TESLA-DEGK)	.4295#-06	.2614#-06	.1202#-06	.6327#-07	.3804#-07	.2515#-07	.1778#-07

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2

PRESSURE = 1.50 ATM, TEMPERATURE = 2000 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS		.3508#+01	AR	.8928#-07	ALO2	.6041#+02	CO2	.1434#-07	CA	.3976#-11	CL2	.0000#+00	CS		
.2594#-04	FE	.1254# 00	H2	.2355# 00	K	.2738#+03	N2	.3310#-02	NA	.1188#+01	O2	.7631#-09	S2		
.1565#-04	SIO2	.1606#-03	E-	.1812#-11	AL	.5841#-09	ALO	.5123#-03	AL(OH)2	.1003#-15	AL2O	.1142#+01	CO		
.4476#-07	C O S	.2424#-04	CAOH	.2301#-04	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1316#-03	FEO		
.1821#-02	FE(OH)2	.9065#-02	H	.4304#-03	HCL	.3003#+02	H2O	.1347#-06	H2S	.4174#-01	KCL	.2578#-02	KO		
.1653#+01	KOH	.2349#-06	N	.6034#-07	NH3	.3608# 00	NO	.8780#-04	NO2	.1696#-03	NACL	.3777#-04	NAO		
.7381#-02	NAOH	.1142#-01	O	.2126# 00	OH	.1392#-05	S	.2004#-02	SO	.9356# 00	SO2	.3651#-03	SO3		
.2198#-14	SI	.1829#-04	SIO	.1460#-05	ALO2-	.4431#-11	CN-	.0000#+00	CO2-	.3231#-04	CL-	.0000#+00	CS+		
.2475#-03	K+	.1666#-08	NO-	.3741#-06	NO2-	.3383#-07	NA+	.2062#-06	O-	.1219#-04	OH-	.1576#-06	O2-		
.6011#-09	SH-	.8695#-08	SO-	.4013#-04	SO2-										
GLASS		.2191#-01	AL2O3 L	.7289#-03	MULLITE	.3876#-02	CAO L	.0000#+00	CSOH L	.7219#-05	FEAL2O4	L .2691#-01	FEO L		
.2019#-01	KALO2 L	.5543#-01	K2SIO3 L	.1909#-05	NAOH L	.4278#-01	SIO2 L								
SULF. AND CARB..		.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C						

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS		.9389#-02	AR	.2389#-09	ALO2	.1617# 00	CO2	.3836#-10	CA	.1064#-13	CL2	.0000#+00	CS		
.6941#-07	FE	.3356#-03	H2	.6303#-03	K	.7327# 00	N2	.8858#-05	NA	.3180#-02	O2	.2042#-11	S2		
.4188#-07	SIO2	.4299#-06	E-	.4850#-14	AL	.1563#-11	ALO	.1371#-05	AL(OH)2	.2685#-18	AL2O	.3057#-02	CO		
.1198#-09	C O S	.6486#-07	CAOH	.6158#-07	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3521#-06	FEO		
.4874#-05	FE(OH)2	.2426#-04	H	.1152#-05	HCL	.8036#-01	H2O	.3605#-09	H2S	.1147#-03	KCL	.6900#-05	KO		
.4423#-02	KOH	.6287#-09	N	.1615#-09	NH3	.9655#-03	NO	.2350#-06	NO2	.4538#-06	NACL	.1011#-06	NAO		
.1975#-04	NAOH	.3056#-04	O	.5690#-03	OH	.3725#-08	S	.5362#-05	SO	.2504#-02	SO2	.9770#-06	SO3		
.5881#-17	SI	.4894#-07	SIO	.3906#-08	ALO2-	.1186#-13	CN-	.0000#+00	CO2-	.8647#-07	CL-	.0000#+00	CS+		
.6622#-06	K+	.4458#-11	NO-	.1001#-08	NO2-	.9055#-10	NA+	.5517#-09	O-	.3263#-07	OH-	.4217#-09	O2-		
.1609#-11	SH-	.2327#-10	SO-	.1074#-06	SO2-										
GLASS		.1275# 00	AL2O3 L	.4242#-02	MULLITE	.2256#-01	CAO L	.0000#+00	CSOH L	.4201#-04	FEAL2O4	L .1566# 00	FEO L		
.1175# 00	KALO2 L	.3226# 00	K2SIO3 L	.1111#-04	NAOH L	.2490# 00	SIO2 L								
SULF. AND CARB..		.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C						

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3737#+03	.1718# 00	.0000#+00	.3738#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.3014#+02	.1036#+03	.0000#+00	.3017#+02
MASS (KILOGRAMS)	.1126#+02	.1780#-01	.0000#+00	.1128#+02
VOLUME (CUBIC-METERS)	.4088#+02	.5739#-05	.0000#+00	.4088#+02
DENSITY (KILOGRAMS/CUBIC METER)	.2754# 00	.3101#+04	.0000#+00	.2759# 00
ENTROPY (GRAMCALORIES/DEGK)	.2377#+05	.1354#+02	.0000#+00	.2378#+05
REACTION ENTHALPY (KILOCALORIES)	-.1945#+04	-.3758#+02	.0000#+00	-.1983#+04
HEAT OF FORMATION (KILOCALORIES)	-.7593#+04	-.4576#+02	.0000#+00	-.7638#+04
SENSIBLE HEAT (KILOCALORIES)	.5648#+04	.8183#+01	.0000#+00	.5656#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9835#+01	.3145#+02	.0000#+00	.9845#+01
ADIABATIC EXPANSION COEFFICIENT	.1253# +1	SONIC SPEED (METERS/SECOND)		.8315# +3

DEBYE LENGTH (METERS) .13906#-05 ELECTRON DENSITY (PER M+3) .23666#+19 COLLISION FREQUENCY (PER SEC) .37945#+12

COEFFICIENTS FOR OHM,S LAW.. SIGMA = SCALAR COND (MHO/METER)	.1758# 00	BETA1	(SQM-VOLT/NEWTON)					-.2637#+01	
BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)					.1307#-05	
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.2638#+01	.2638#+01	.2638#+01	.2638#+01	.2638#+01	.2638#+01	.2638#+01	.2638#+01	
HALL PARAMETER	.0000#+00	.9272# 00	.1854#+01	.2781#+01	.3709#+01	.4636#+01	.5563#+01		
PSI (METER-OHM/SQ TESLA)	.9564#-04	.5897#-04	.2743#-04	.1450#-04	.8736#-05	.5781#-05	.4090#-05		
THETA2 (VOLT/TESLA-DEGK)	-.5152#-06	-.3177#-06	-.1477#-06	-.7811#-07	-.4706#-07	-.3114#-07	-.2203#-07		
THETA3 (VOLT/SQ TESLA-DEGK)	.2031#-06	.1252#-06	.5825#-07	.3079#-07	.1855#-07	.1228#-07	.8680#-08		

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2

PRESSURE = 1.50 ATM, TEMPERATURE = 1900 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS		.3508#+01	AR	.1215#-07	ALO2	.6101#+02	CO2	.1642#-08	CA	.1651#-11	CL2	.0000#+00	CS		
.3919#-05	FE	.6440#-01	H2	.1391# 00	K	.2738#+03	N2	.2288#-02	NA	.9198# 00	O2	.1305#-09	S2		
.1188#-05	SIO2	.5533#-04	E-	.6436#-13	AL	.3939#-10	ALO	.1681#-03	AL(OH)2	.1391#-17	AL2O	.5427# 00	CO		
.1152#-07	C O S	.6235#-05	CAOH	.9927#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3014#-04	FEO		
.1117#-02	FE(OH)2	.3165#-02	H	.2687#-03	HCL	.3012#+02	H2O	.3809#-07	H2S	.4191#-01	KCL	.1420#-02	KO		
.1695#+01	KOH	.5147#-07	N	.2650#-07	NH3	.2385# 00	NO	.6117#-04	NO2	.1903#-03	NACL	.2479#-04	NAO		
.8393#-02	NAOH	.4475#-02	O	.1189# 00	OH	.2883#-06	S	.8803#-03	SO	.9367# 00	SO2	.4342#-03	SO3		
.1977#-16	SI	.8450#-06	SIO	.2707#-06	ALO2-	.5329#-12	CN-	.0000#+00	CO2-	.1655#-04	CL-	.0000#+00	CS+		
.9917#-04	K+	.4341#-09	NO-	.2107#-06	NO2-	.1243#-07	NA+	.4952#-07	O-	.4693#-05	OH-	.5466#-07	O2-		
.1100#-09	SH-	.2050#-08	SO-	.2202#-04	SO2-										
GLASS		.1928#-01	AL2O3 L	.7237#-04	MULLITE	.3894#-02	CAO L	.0000#+00	CSOH L	.2246#-05	FEAL2O4L	.2775#-01	FEO L		
.2972#-01	KALO2 L	.7852#-01	K2SIO3 L	.3944#-05	NAOH L	.2103#-01	SIO2 L								
SULF. AND CARB..		.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C						

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS		.9401#-02	AR	.3255#-10	ALO2	.1635# 00	CO2	.4399#-11	CA	.4424#-14	CL2	.0000#+00	CS		
.1050#-07	FE	.1726#-03	H2	.3728#-03	K	.7338# 00	N2	.6130#-05	NA	.2465#-02	O2	.3497#-12	S2		
.3183#-08	SIO2	.1483#-06	E-	.1725#-15	AL	.1056#-12	ALO	.4504#-06	AL(OH)2	.3726#-20	AL2O	.1454#-02	CO		
.3086#-10	C O S	.1671#-07	CAOH	.2660#-07	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.8077#-07	FEO		
.2994#-05	FE(OH)2	.8481#-05	H	.7200#-06	HCL	.8070#-01	H2O	.1021#-09	H2S	.1123#-03	KCL	.3806#-05	KO		
.4541#-02	KOH	.1379#-09	N	.7101#-10	NH3	.6392#-03	NO	.1639#-06	NO2	.5099#-06	NACL	.6642#-07	NAO		
.2249#-04	NAOH	.1199#-04	O	.3187#-03	OH	.7725#-09	S	.2359#-05	SO	.2510#-02	SO2	.1164#-05	SO3		
.5297#-19	SI	.2264#-08	SIO	.7252#-09	ALO2-	.1428#-14	CN-	.0000#+00	CO2-	.4436#-07	CL-	.0000#+00	CS+		
.2657#-06	K+	.1163#-11	NO-	.5645#-09	NO2-	.3330#-10	NA+	.1327#-09	O-	.1257#-07	OH-	.1462#-09	O2-		
.2947#-12	SH-	.5493#-11	SO-	.5899#-07	SO2-										
GLASS		.1070# 00	AL2O3 L	.4015#-03	MULLITE	.2160#-01	CAO L	.0000#+00	CSOH L	.1246#-04	FEAL2O4L	.1539# 00	FEO L		
.1649# 00	KALO2 L	.4356# 00	K2SIO3 L	.2188#-04	NAOH L	.1166# 00	SIO2 L								
SULF. AND CARB..		.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C						

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3732#+03	.1803# 00	.0000#+00	.3734#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3017#+02	.1137#+03	.0000#+00	.3021#+02
MASS	(KILOGRAMS)	.1126#+02	.2050#-01	.0000#+00	.1128#+02
VOLUME	(CUBIC-METERS)	.3879#+02	.6449#-05	.0000#+00	.3879#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2902# 00	.3179#+04	.0000#+00	.2908# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2355#+05	.1542#+02	.0000#+00	.2357#+05
REACTION ENTHALPY	(KILOCALORIES)	-.2366#+04	-.4104#+02	.0000#+00	-.2407#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7647#+04	-.4980#+02	.0000#+00	-.7697#+04
SENSIBLE HEAT	(KILOCALORIES)	.5281#+04	.8760#+01	.0000#+00	.5290#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9792#+01	.3363#+02	.0000#+00	.9803#+01
ADIABATIC EXPANSION COEFFICIENT		.1255# +1	SONIC SPEED (METERS/SECOND)		.8105# +3

DEBYE LENGTH (METERS) .20185#-05 ELECTRON DENSITY (PER M+3) .85906#+18 COLLISION FREQUENCY (PER SEC) .40135#+12

COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND (MHO/METER)		.6031#+01	BETA1 (SQM-VOLT/NE#TON)					-.7266#+01
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)		.0000#+00	THETA1 (VOLT/DEGK)					-.9139#-07
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.7266#+01	.7266#+01	.7266#+01	.7266#+01	.7266#+01	.7266#+01	.7266#+01	
HALL PARAMETER		.0000#+00	.8764# 00	.1753#+01	.2629#+01	.3506#+01	.4382#+01	.5259#+01	
PSI	(METER-OHM/SQ TESLA)	.1241#-05	.7872#-06	.3754#-06	.2006#-06	.1214#-06	.8054#-07	.5706#-07	
THETA2	(VOLT/TESLA-DEGK)	.3469#-07	.2201#-07	.1050#-07	.5607#-08	.3394#-08	.2251#-08	.1595#-08	
THETA3	(VOLT/SQ TESLA-DEGK)	-.1317#-07	-.8353#-08	-.3984#-08	-.2128#-08	-.1288#-08	-.8546#-09	-.6055#-09	

U S BU MINES PGH ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6 2 7

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2

PRESSURE = 1.50 ATM. TEMPERATURE = 1800 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS		.3508#+01	AR	.1234#-08	ALO2	.6133#+02	CO2	.1399#-09	CA	.6713#-12	CL2	.0000#+00	CS
.4497#-06	FE	.2894#-01	H2	.7446#-01	K	.2739#+03	N2	.1406#-02	NA	.7793# 00	O2	.1438#-10	S2
.5521#-07	SIO2	.1616#-04	E-	.1310#-14	AL	.1731#-11	ALO	.4270#-04	AL(OH)2	.8752#-20	AL2O	.2222# 00	CO
.2112#-08	C O S	.1346#-05	CAOH	.4048#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.5822#-05	FEO
.6459#-03	FE(OH)2	.9562#-03	H	.1607#-03	HCL	.3017#+02	H2O	.7808#-08	H2S	.4202#-01	KCL	.7446#-03	KO
.1722#+01	KOH	.9540#-08	N	.9716#-08	NH3	.1594# 00	NO	.4621#-04	NO2	.2082#-03	NACL	.1531#-04	NAO
.9263#-02	NAOH	.1682#-02	O	.6435#-01	OH	.4432#-07	S	.3317#-03	SO	.9371# 00	SO2	.5558#-03	SO3
.7635#-19	SI	.2123#-07	SIO	.3676#-07	ALO2-	.4232#-13	CN-	.0000#+00	CO2-	.7783#-05	CL-	.0000#+00	CS+
.3639#-04	K+	.9782#-10	NO-	.1185#-06	NO2-	.3989#-08	NA+	.1022#-07	O-	.1583#-05	OH-	.1789#-07	O2-
.1363#-10	SH-	.3671#-09	SO-	.1068#-04	SO2-								
GLASS		.1388#-01	AL2O3 L	.2969#-05	MULLITE	.3899#-02	CAO L	.0000#+00	CSOH L	.5008#-06	FEAL2O4	L .2825#-01	FEO L
.4108#-01	KALO2 L	.9199#-01	K2SIO3 L	.8350#-05	NAOH L	.7707#-02	SIO2 L						
SULF. AND CARB..		.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C				

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS		.9408#-02	AR	.3310#-11	ALO2	.1645# 00	CO2	.3753#-12	CA	.1800#-14	CL2	.0000#+00	CS
.1206#-08	FE	.7760#-04	H2	.1997#-03	K	.7344# 00	N2	.3769#-05	NA	.2090#-02	O2	.3855#-13	S2
.1480#-09	SIO2	.4334#-07	E-	.3513#-17	AL	.4642#-14	ALO	.1145#-06	AL(OH)2	.2347#-22	AL2O	.5957#-03	CO
.5663#-11	C O S	.3609#-08	CAOH	.1085#-07	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1561#-07	FEO
.1732#-05	FE(OH)2	.2564#-05	H	.4309#-06	HCL	.8089#-01	H2O	.2094#-10	H2S	.1127#-03	KCL	.1996#-05	KO
.4617#-02	KOH	.2558#-10	N	.2605#-10	NH3	.4274#-03	NO	.1239#-06	NO2	.5583#-06	NACL	.4104#-07	NAO
.2484#-04	NAOH	.4509#-05	O	.1726#-03	OH	.1188#-09	S	.8893#-06	SO	.2513#-02	SO2	.1490#-05	SO3
.2047#-21	SI	.5692#-10	SIO	.9857#-10	ALO2-	.1135#-15	CN-	.0000#+00	CO2-	.2087#-07	CL-	.0000#+00	CS+
.9758#-07	K+	.2623#-12	NO-	.3177#-09	NO2-	.1070#-10	NA+	.2742#-10	O-	.4246#-08	OH-	.4798#-10	O2-
.3655#-13	SH-	.9843#-12	SO-	.2865#-07	SO2-								
GLASS		.7428#-01	AL2O3 L	.1589#-04	MULLITE	.2087#-01	CAO L	.0000#+00	CSOH L	.2681#-05	FEAL2O4	L .1512# 00	FEO L
.2199# 00	KALO2 L	.4924# 00	K2SIO3 L	.4470#-04	NAOH L	.4126#-01	SIO2 L						
SULF. AND CARB..		.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C				

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3729#+03	.1868# 00	.0000#+00	.3731#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.3018#+02	.1196#+03	.0000#+00	.3023#+02
MASS (KILOGRAMS)	.1126#+02	.2235#-01	.0000#+00	.1128#+02
VOLUME (CUBIC-METERS)	.3672#+02	.7062#-05	.0000#+00	.3672#+02
DENSITY (KILOGRAMS/CUBIC METER)	.3065# 00	.3165#+04	.0000#+00	.3071# 00
ENTROPY (GRAMCALORIES/DEGK)	.2334#+05	.1652#+02	.0000#+00	.2335#+05
REACTION ENTHALPY (KILOCALORIES)	-.2761#+04	-.4364#+02	.0000#+00	-.2804#+04
HEAT OF FORMATION (KILOCALORIES)	-.7677#+04	-.5252#+02	.0000#+00	-.7730#+04
SENSIBLE HEAT (KILOCALORIES)	.4917#+04	.8880#+01	.0000#+00	.4926#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9736#+01	.3469#+02	.0000#+00	.9748#+01
ADIABATIC EXPANSION COEFFICIENT	.1256# +1	SONIC SPEED (METERS/SECOND)		.7893# +3

DEBYE LENGTH (METERS) .30380#-05 ELECTRON DENSITY (PER M+3) .26505#+18 COLLISION FREQUENCY (PER SEC) .42503#+12

COEFFICIENTS FOR OHM.S LAW.. SIGMA = SCALAR COND (MHO/METER)	.1757#+01	BETA1 (SQM-VOLT/NEWTON)						-.2355#+02	
BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)						-.1486#-05	
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.2355#+02	.2355#+02	.2355#+02	.2355#+02	.2355#+02	.2355#+02	.2355#+02		
HALL PARAMETER	.0000#+00	.8278# 00	.1655#+01	.2483#+01	.3311#+01	.4139#+01	.4966#+01		
PSI (METER-OHM/SQ TESLA)	.1021#-02	.6667#-03	.3265#-03	.1765#-03	.1074#-03	.7142#-04	.5068#-04		
THETA2 (VOLT/TESLA-DEGK)	.5418#-06	.3537#-06	.1732#-06	.9362#-07	.5697#-07	.3789#-07	.2689#-07		
THETA3 (VOLT/SQ TESLA-DEGK)	-.1976#-06	-.1290#-06	-.6317#-07	-.3414#-07	-.2077#-07	-.1382#-07	-.9806#-08		

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2

PRESSURE = 1.50 ATM, TEMPERATURE = 1700 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.8851#-10	ALO2	.6148#+02	CO2	.8469#-11	CA	.2648#-12	CL2	.0000#+00	CS			
.3728#-07	FE	.1120#-01	H2	.3568#-01	K	.2739#+03	N2	.7598#-03	NA	.7221# 00	O2	.9817#-12	S2		
.1591#-08	SIO2	.3874#-05	E-	.1389#-16	AL	.4618#-13	ALO	.7944#-05	AL(OH)2	.2182#-22	AL2O	.7729#-01	CO		
.2688#-09	C O S	.2363#-06	CAOH	.1545#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.9101#-06	FEO		
.3448#-03	FE(OH)2	.2451#-03	H	.9144#-04	HCL	.3019#+02	H2O	.1127#-08	H2S	.4208#-01	KCL	.3690#-03	KO		
.1738#+01	KOH	.1447#-06	N	.2914#-08	NH3	.1077# 00	NO	.3764#-04	NO2	.2221#-03	NACL	.8756#-05	NAO		
.9891#-02	NAOH	.5943#-04	O	.3319#-01	OH	.4917#-08	S	.1052#-03	SO	.9371# 00	SO2	.7771#-03	SO3		
.1226#-21	SI	.2911#-09	SIO	.3434#-08	ALO2-	.2096#-14	CN-	.0000#+00	CO2=	.3265#-05	CL=	.0000#+00	CS+		
.1215#-04	K+	.1840#-10	NO-	.6539#-07	NO2-	.1111#-08	NA+	.1745#-08	O=	.4537#-06	OH-	.5399#-08	O2=		
.1078#-11	SH-	.4753#-10	SO-	.4484#-05	SO2-										
GLASS	.7864#-02	AL2O3 L	.3201#-07	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.7134#-07	FEAL2O4L	.2855#-01	FEO L			
.5316#-01	KALO2 L	.9745#-01	K2SIO3 L	.1849#-04	NAOH L	.2246#-02	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C							

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9411#-02	AR	.2374#-12	ALO2	.1649# 00	CO2	.2272#-13	CA	.7102#-15	CL2	.0000#+00	CS			
.1000#-09	FE	.3005#-04	H2	.9570#-04	K	.7347# 00	N2	.2038#-05	NA	.1937#-02	O2	.2633#-14	S2		
.4267#-11	SIO2	.1039#-07	E-	.3726#-19	AL	.1239#-15	ALO	.2131#-07	AL(OH)2	.5853#-25	AL2O	.2073#-03	CO		
.7211#-12	C O S	.6338#-09	CAOH	.4145#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.2441#-08	FEO		
.9250#-06	FE(OH)2	.6575#-06	H	.2453#-06	HCL	.8099#-01	H2O	.3022#-11	H2S	.1129#-03	KCL	.9898#-06	KO		
.4661#-02	KOH	.3881#-11	N	.7816#-11	NH3	.2888#-03	NO	.1010#-06	NO2	.5956#-06	NACL	.2369#-07	NAO		
.2653#-04	NAOH	.1594#-05	O	.8902#-04	OH	.1319#-10	S	.2823#-06	SO	.2514#-02	SO2	.2084#-05	SO3		
.3288#-24	SI	.7808#-12	SIO	.9211#-11	ALO2-	.5622#-17	CN-	.0000#+00	CO2=	.8757#-08	CL=	.0000#+00	CS+		
.3259#-07	K+	.4936#-13	NO-	.1754#-09	NO2-	.2981#-11	NA+	.4680#-11	O=	.1217#-08	OH-	.1448#-10	O2=		
.2890#-14	SH-	.1275#-12	SO-	.1203#-07	SO2-										
GLASS	.4070#-01	AL2O3 L	.1657#-06	MULLITE	.2019#-01	CAO L	.0000#+00	CSOH L	.3692#-06	FEAL2O4L	.1478# 00	FEO L			
.2752# 00	KALO2 L	.5044# 00	K2SIO3 L	.9570#-04	NAOH L	.1162#-01	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C							

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3728#+03	.1932# 00	.0000#+00	.3730#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3019#+02	.1214#+03	.0000#+00	.3024#+02
MASS	(KILOGRAMS)	.1126#+02	.2346#-01	.0000#+00	.1128#+02
VOLUME	(CUBIC-METERS)	.3467#+02	.7547#-05	.0000#+00	.3467#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.3246# 00	.3108#+04	.0000#+00	.3253# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2312#+05	.1698#+02	.0000#+00	.2314#+05
REACTION ENTHALPY	(KILOCALORIES)	-.3137#+04	-.4547#+02	.0000#+00	-.3183#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7692#+04	-.5411#+02	.0000#+00	-.7746#+04
SENSIBLE HEAT	(KILOCALORIES)	.4555#+04	.8643#+01	.0000#+00	.4563#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9668#+01	.3519#+02	.0000#+00	.9681#+01
ADIABATIC EXPANSION COEFFICIENT		.1259# +1	SONIC SPEED (METERS/SECOND)		.7676# +3

DEBYE LENGTH (METERS) .47762#-05 ELECTRON DENSITY (PER M+3) .67296#+17 COLLISION FREQUENCY (PER SEC) .45096#+12

COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND (MHO/METER)			.4207#-02	BETA1 (SQM-VOLT/NEWTON)				-.9275#+02
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)			.0000#+00	THETA1 (VOLT/DEGK)				-.2826#-05
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.9279#+02	.9278#+02	.9277#+02	.9276#+02	.9276#+02	.9276#+02	.9275#+02		
HALL PARAMETER	.0000#+00	.7806# 00	.1561#+01	.2341#+01	.3122#+01	.3902#+01	.4682#+01		
PSI (METER-OHM/SQ TESLA)	.1395#-01	.9371#-02	.4722#-02	.2585#-02	.1582#-02	.1056#-02	.7505#-03		
THETA2 (VOLT/TESLA-DEGK)	.9877#-06	.6636#-06	.3344#-06	.1830#-06	.1120#-06	.7476#-07	.5314#-07		
THETA3 (VOLT/SQ TESLA-DEGK)	-.3451#-06	-.2319#-06	-.1168#-06	-.6396#-07	-.3915#-07	-.2612#-07	-.1857#-07		

U S BU MINES PGH ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6 4 8

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2		

PRESSURE = 1.50 ATM, TEMPERATURE = 1600 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.6368#-11	ALO2	.6153#+02	CO2	.4342#-12	CA	.3448#-12	CL2	.0000#+00	CS			
.2709#-08	FE	.4572#-02	H2	.8032#-02	K	.2739#+03	N2	.3813#-03	NA	.4858# 00	O2	.2292#-13	S2		
.1221#-09	SIO2	.5190#-06	E-	.1587#-18	AL	.1270#-14	ALO	.1973#-05	AL(OH)2	.7929#-25	AL2O	.2734#-01	CO		
.2138#-10	C O S	.3759#-07	CAOH	.1008#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1156#-06	FEO		
.1801#-03	FE(OH)2	.5769#-04	H	.1016#-03	HCL	.3066#+02	H2O	.1050#-09	H2S	.4183#-01	KCL	.7381#-04	KO		
.8475# 00	KOH	.1741#-09	N	.9774#-09	NH3	.5917#-01	NO	.2194#-04	NO2	.4625#-03	NACL	.4022#-05	NAO		
.1001#-01	NAOH	.1579#-03	O	.1470#-01	OH	.2864#-09	S	.1719#-04	SO	.4771# 00	SO2	.4929#-03	SO3		
.4957#-24	SI	.1131#-10	SIO	.2204#-09	ALO2-	.6436#-16	CN-	.0000#+00	CO2-	.1570#-05	CL-	.0000#+00	CS+		
.2745#-05	K+	.1593#-11	NO-	.1635#-07	NO2-	.3982#-09	NA+	.1357#-09	O-	.6894#-07	OH-	.6819#-09	O2-		
.3121#-13	SH-	.1886#-11	SO-	.5699#-06	SO2-										
GLASS	.9329#-02	AL2O3 L	.4264#-07	MULLITE	.3900#-02	CAO	L	.0000#+00	CSOH	L	.1832#-07	FEAL2O4	L	.2872#-01	FEO L
.5024#-01	KALO2 L	.9745#-01	K2SIO3 L	.4119#-04	NAOH	L	.2253#-02	SIO2	L						
SULF. AND CARB..	.3292#-03	K2CO3 L	.0000#+00	K2CO3	C	.4604# 00	K2SO4	L	.0000#+00	K2SO4	C				

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9442#-02	AR	.1714#-13	ALO2	.1656# 00	CO2	.1168#-14	CA	.9279#-15	CL2	.0000#+00	CS			
.7290#-11	FE	.1230#-04	H2	.2161#-04	K	.7372# 00	N2	.1026#-05	NA	.1307#-02	O2	.6168#-16	S2		
.3286#-12	SIO2	.1397#-08	E-	.4270#-21	AL	.3417#-17	ALO	.5310#-08	AL(OH)2	.2134#-27	AL2O	.7358#-04	CO		
.5754#-13	C O S	.1011#-09	CAOH	.2714#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3112#-09	FEO		
.4847#-06	FE(OH)2	.1552#-06	H	.2734#-06	HCL	.8249#-01	H2O	.2826#-12	H2S	.1126#-03	KCL	.1986#-06	KO		
.2281#-02	KOH	.4685#-12	N	.2630#-11	NH3	.1592#-03	NO	.5904#-07	NO2	.1245#-05	NACL	.1082#-07	NAO		
.2694#-04	NAOH	.4248#-06	O	.3956#-04	OH	.7708#-12	S	.4626#-07	SO	.1284#-02	SO2	.1326#-05	SO3		
.1334#-26	SI	.3044#-13	SIO	.5931#-12	ALO2-	.1732#-18	CN-	.0000#+00	CO2-	.4226#-08	CL-	.0000#+00	CS+		
.7388#-08	K+	.4288#-14	NO-	.4401#-10	NO2-	.1072#-11	NA+	.3651#-12	O-	.1855#-09	OH-	.1835#-11	O2-		
.8398#-16	SH-	.5075#-14	SO-	.1534#-08	SO2-										
GLASS	.4861#-01	AL2O3 L	.2221#-06	MULLITE	.2032#-01	CAO	L	.0000#+00	CSOH	L	.9544#-07	FEAL2O4	L	.1496# 00	FEO L
.2618# 00	KALO2 L	.5077# 00	K2SIO3 L	.2146#-03	NAOH	L	.1174#-01	SIO2	L						
SULF. AND CARB..	.7145#-03	K2CO3 L	.0000#+00	K2CO3	C	.9993# 00	K2SO4	L	.0000#+00	K2SO4	C				

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3716#+03	.1919# 00	.4607# 00	.3723#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3007#+02	.1216#+03	.1742#+03	.3030#+02
MASS	(KILOGRAMS)	.1118#+02	.2333#-01	.8028#-01	.1128#+02
VOLUME	(CUBIC-METERS)	.3253#+02	.7459#-05	.3016#-04	.3253#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.3436# 00	.3128#+04	.2662#+04	.3468# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2279#+05	.1647#+02	.5592#+02	.2286#+05
REACTION ENTHALPY	(KILOCALORIES)	-.3465#+04	-.4602#+02	-.1263#+03	-.3638#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7642#+04	-.5393#+02	-.1529#+03	-.7848#+04
SENSIBLE HEAT	(KILOCALORIES)	.4176#+04	.7917#+01	.2654#+02	.4211#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9578#+01	.3483#+02	.4705#+02	.9637#+01
ADIABATIC EXPANSION COEFFICIENT		.1262# +1	SONIC SPEED (METERS/SECOND)		.7471# +3

DEBYE LENGTH (METERS) .90972#-05 ELECTRON DENSITY (PER M+3) .96109#+16 COLLISION FREQUENCY (PER SEC) .46068#+12

COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND (MHO/METER)	.5894#-03	BETA1	(SQM-VOLT/NEWTON)					-.6695#+03
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)					-.6603#-05
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.6510#+03	.6505#+03	.6500#+03	.6497#+03	.6496#+03	.6496#+03	.6495#+03	
HALL PARAMETER		.0000#+00	.7667# 00	.1532#+01	.2298#+01	.3063#+01	.3828#+01	.4594#+01	
PSI	(METER-OHM/SQ TESLA)	.5357# 00	.3587# 00	.1802# 00	.9847#-01	.6023#-01	.4018#-01	.2855#-01	
THETA2	(VOLT/TESLA-DEGK)	.2319#-05	.1553#-05	.7799#-06	.4263#-06	.2607#-06	.1739#-06	.1236#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.8145#-06	-.5454#-06	-.2739#-06	-.1497#-06	-.9157#-07	-.6108#-07	-.4341#-07	

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2		

PRESSURE = 1.50 ATM, TEMPERATURE = 1500 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.4054#-12	ALO2	.6155#+02	CO2	.1504#-13	CA	.1298#-11	CL2	.0000#+00	CS			
.1380#-09	FE	.1609#-02	H2	.8686#-03	K	.2739#+03	N2	.1549#-03	NA	.3252# 00	O2	.1328#-15	S2		
.1841#-10	SIO2	.2626#-07	E-	.1194#-20	AL	.2657#-16	ALO	.4936#-06	AL(OH)2	.1996#-27	AL2O	.8198#-02	CO		
.7581#-12	C O S	.4738#-06	CAOH	.1040#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1134#-07	FEO		
.8718#-04	FE(OH)2	.1106#-04	H	.1883#-03	HCL	.3098#+02	H2O	.4431#-11	H2S	.4064#-01	KCL	.7151#-05	KO		
.2219# 00	KOH	.1579#-10	N	.2701#-09	NH3	.3075#-01	NO	.1249#-04	NO2	.1567#-02	NACL	.1509#-05	NAO		
.9087#-02	NAOH	.3610#-04	O	.5892#-02	OH	.7330#-11	S	.1441#-05	SO	.1486# 00	SO2	.2031#-03	SO3		
.2534#-26	SI	.7649#-12	SIO	.6013#-11	ALO2-	.5752#-18	CN-	.0000#+00	CO2-	.5603#-06	CL-	.0000#+00	CS+		
.6102#-06	K+	.4991#-13	NO-	.1737#-08	NO2-	.2259#-09	NA+	.3749#-11	O-	.4014#-08	OH-	.3345#-10	O2-		
.1727#-15	SH-	.1552#-13	SO-	.1801#-07	SO2-										
GLASS	.1724#-01	AL2O3 L	.1796#-05	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.6148#-08	FEAL2O4L	.2881#-01	FEO L			
.3442#-01	KALO2 L	.9361#-01	K2SIO3 L	.8905#-04	NAOH L	.6098#-02	SIO2 L								
SULF. AND CARB..	.3386#-03	K2CO3 L	.0000#+00	K2CO3 C	.7892# 00	K2SO4 L	.0000#+00	K2SO4 C							

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9463#-02	AR	.1093#-14	ALO2	.1660# 00	CO2	.4057#-16	CA	.3501#-14	CL2	.0000#+00	CS			
.3722#-12	FE	.4339#-05	H2	.2343#-05	K	.7389# 00	N2	.4179#-06	NA	.8770#-03	O2	.3582#-18	S2		
.4965#-13	SIO2	.7083#-10	E-	.3219#-23	AL	.7166#-19	ALO	.1331#-08	AL(OH)2	.5382#-30	AL2O	.2211#-04	CO		
.2045#-14	C O S	.1278#-10	CAOH	.2806#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3058#-10	FEO		
.2351#-06	FE(OH)2	.2983#-07	H	.5079#-06	HCL	.8354#-01	H2O	.1195#-13	H2S	.1096#-03	KCL	.1929#-07	KO		
.5984#-03	KOH	.4258#-15	N	.7285#-12	NH3	.8293#-04	NO	.3368#-07	NO2	.4227#-05	NACL	.4069#-08	NAO		
.2451#-04	NAOH	.9737#-07	O	.1589#-04	OH	.1977#-13	S	.3887#-08	SO	.4009#-03	SO2	.5479#-06	SO3		
.6835#-29	SI	.2063#-14	SIO	.1622#-13	ALO2-	.1551#-20	CN-	.0000#+00	CO2-	.1511#-08	CL-	.0000#+00	CS+		
.1646#-08	K+	.1346#-15	NO-	.4684#-11	NO2-	.6092#-12	NA+	.1011#-13	O-	.1083#-10	OH-	.9022#-13	O2-		
.4657#-18	SH-	.4186#-16	SO-	.4857#-10	SO2-										
GLASS	.9359#-01	AL2O3 L	.9763#-05	MULLITE	.2118#-01	CAO L	.0000#+00	CSOH L	.3338#-07	FEAL2O4L	.1565# 00	FEO L			
.1869# 00	KALO2 L	.5083# 00	K2SIO3 L	.4835#-03	NAOH L	.3311#-01	SIO2 L								
SULF. AND CARB..	.4288#-03	K2CO3 L	.0000#+00	K2CO3 C	.9996# 00	K2SO4 L	.0000#+00	K2SO4 C							

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3708#+03	.1842# 00	.7695# 00	.3717#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2999#+02	.1207#+03	.1743#+03	.3034#+02
MASS	(KILOGRAMS)	.1112#+02	.2224#-01	.1376# 00	.1128#+02
VOLUME	(CUBIC-METERS)	.3043#+02	.6894#-05	.5168#-04	.3043#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.3654# 00	.3225#+04	.2662#+04	.3707# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2248#+05	.1523#+02	.9343#+02	.2259#+05
REACTION ENTHALPY	(KILOCALORIES)	-.3795#+04	-.4547#+02	-.2202#+03	-.4061#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7604#+04	-.5237#+02	-.2620#+03	-.7918#+04
SENSIBLE HEAT	(KILOCALORIES)	.3809#+04	.6896#+01	.4176#+02	.3858#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9480#+01	.3432#+02	.4705#+02	.9572#+01
ADIABATIC EXPANSION COEFFICIENT		.1265# +1	SONIC SPEED (METERS/SECOND)		.7254# +3

DEBYE LENGTH	(METERS)	.17381#-04	ELECTRON DENSITY	(PER M+3)	.51988#+15	COLLISION FREQUENCY	(PER SEC)	.47698#+12	
COEFFICIENTS FOR OHM'S LAW..	SIGMA = SCALAR COND	(MHO/METER)	.3089#-04	BETA1	(SQM-VOLT/NEWTON)			-.1201#+05	
BETA2 (ASSUMING ZERO ION SLIP)		(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)			-.9943#-05	
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.1207#+05	.1205#+05	.1203#+05	.1202#+05	.1201#+05	.1201#+05	.1201#+05	
HALL PARAMETER		.0000#+00	.7443# 00	.1486#+01	.2227#+01	.2968#+01	.3710#+01	.4451#+01	
PSI	(METER-OHM/SQ TESLA)	.2224#+02	.1499#+02	.7576#+01	.4153#+01	.2544#+01	.1698#+01	.1208#+01	
THETA2	(VOLT/TESLA-DEGK)	.3458#-05	.2330#-05	.1178#-05	.6459#-06	.3956#-06	.2641#-06	.1878#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.1202#-05	-.8104#-06	-.4097#-06	-.2246#-06	-.1376#-06	-.9184#-07	-.6530#-07	

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U S BU MINES   PGH ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                    4 10

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS U OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 90% ASH REJECTION
    .3508#+01 AR      .6890#-01 ALO2    .6156#+02 CO2     .3900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .2890#-01 FE
    .3110#+02 H2      .2064#+01 K       .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .9970#-01 SIO2

PRESSURE =  1.50 ATM,  TEMPERATURE = 1400 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......    .3508#+01  AR      .1575#-13  ALO2    .6155#+02  CO2     .2775#-15  CA      .6908#-11  CL2     .0000#+00  CS
    .3913#-11  FE     .4202#-03  H2      .6003#-04  K       .2740#+03  N2      .3815#-04  NA      .2733# 00  O2      .1871#-18  S2
    .2079#-11  SIO2   .6291#-09  E-      .3044#-23  AL      .2520#-18  ALO     .7816#-07  AL(OH)2 .1138#-30  AL2O    .1792#-02  CO
    .1028#-13  C O S  .4098#-09  CAOH    .1167#-05  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .7825#-09  FEO
    .3751#-04  FE(OH)2 .1560#-05 H       .3832#-03  HCL     .3107#+02  H2O     .7313#-13  H2S     .3730#-01  KCL     .5016#-06  KO
    .4506#-01  KOH    .1021#-11  N       .4980#-10  NH3     .1680#-01  NO      .8713#-05  NO2     .4719#-02  NACL    .3921#-06  NAO
    .5981#-02  NAOH   .7721#-05  O       .2224#-02  OH      .7934#-13  S       .6988#-07  SO      .3718#-01  SO2     .8060#-04  SO3
    .4508#-29  SI     .2999#-13  SIO     .6359#-13  ALO2-   .1405#-20  CN-     .0000#+00  CO2-    .1334#-06  CL-     .0000#+00  CS+
    .1344#-06  K+     .7837#-15  NO-     .1277#-09  NO2-    .1142#-09  NA+     .5137#-13  O-      .1189#-09  OH-     .1016#-11  O2-
  GLASS .........     .2516#-01 AL2O3 L .5198#-04 MULLITE .3900#-02 CAO   L .0000#+00 CSOH  L .1276#-08 FEAL2O4L.2886#-01 FEO   L
    .1827#-01 KALO2 L .8072#-01 K2SIO3 L.1613#-03 NAOH  L .1888#-01 SIO2  L
  SULF. AND CARB..    .2002#-03 K2CO3 L .0000#+00 K2CO3 C .9007# 00 K2SO4 L .0000#+00 K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......    .9469#-02  AR      .4252#-16  ALO2    .1661# 00  CO2     .7490#-18  CA      .1865#-13  CL2     .0000#+00  CS
    .1056#-13  FE     .1134#-05  H2      .1620#-06  K       .7394# 00  N2      .1030#-06  NA      .7376#-03  O2      .5051#-21  S2
    .5612#-14  SIO2   .1698#-11  E-      .8215#-26  AL      .6801#-21  ALO     .2110#-09  AL(OH)2 .3071#-33  AL2O    .4836#-05  CO
    .2774#-16  C O S  .1106#-11  CAOH    .3150#-08  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .2112#-11  FEO
    .1012#-06  FE(OH)2 .4210#-06 H       .1034#-05  HCL     .8385#-01  H2O     .1974#-15  H2S     .1007#-03  KCL     .1354#-08  KO
    .1216#-03  KOH    .2756#-14  N       .1344#-12  NH3     .4533#-04  NO      .2352#-07  NO2     .1274#-04  NACL    .1058#-08  NAO
    .1614#-04  NAOH   .2084#-07  O       .6001#-05  OH      .2141#-15  S       .1886#-09  SO      .1004#-03  SO2     .2175#-06  SO3
    .1217#-31  SI     .9093#-16  SIO     .1716#-15  ALO2-   .3793#-23  CN-     .0000#+00  CO2-    .3601#-09  CL-     .0000#+00  CS+
    .3627#-09  K+     .2115#-17  NO-     .3447#-12  NO2-    .3081#-12  NA+     .1387#-15  O-      .3208#-12  OH-     .2741#-14  O2-
    .5821#-21  SH-    .1022#-16  SO-     .6345#-12  SO2-
  GLASS .........     .1429# 00 AL2O3 L .2953#-03 MULLITE .2216#-01 CAO   L .0000#+00 CSOH  L .7248#-08 FEAL2O4L.1640# 00 FEO   L
    .1038# 00 KALO2 L .4586# 00 K2SIO3 L.9166#-03 NAOH  L .1072# 00 SIO2  L
  SULF. AND CARB..    .2222#-03 K2CO3 L .0000#+00 K2CO3 C .9998# 00 K2SO4 L .0000#+00 K2SO4 C

                                          IDEALGAS    GLASS ..    SULF. AN     MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)  .3705#+03  .1760# 00  .9009# 00  .3716#+03
AVERAGE MOLECULAR WEIGHT            (AMU)   .2996#+02  .1152#+03  .1743#+03  .3035#+02
MASS                          (KILOGRAMS)   .1110#+02  .2027#-01  .1570# 00  .1128#+02
VOLUME                   (CUBIC-METERS)     .2838#+02  .6151#-05  .5898#-04  .2838#+02
DENSITY        (KILOGRAMS/CUBIC METER)      .3912# 00  .3295#+04  .2662#+04  .3975# 00
ENTROPY           (GRAMCALORIES/DEGK)       .2221#+05  .1339#+02  .1037#+03  .2233#+05
REACTION ENTHALPY        (KILOCALORIES)    -.4136#+04 -.4379#+02 -.2555#+03 -.4436#+04
HEAT OF FORMATION        (KILOCALORIES)    -.7592#+04 -.4949#+02 -.2990#+03 -.7941#+04
SENSIBLE HEAT            (KILOCALORIES)     .3456#+04  .5698#+01  .4342#+02  .3505#+04
FROZEN CP             (GMCAL/GMMOL-DEGK)    .9376#+01  .3210#+02  .4705#+02  .9478#+01
ADIABATIC EXPANSION COEFFICIENT             .1269# +1    SONIC SPEED (METERS/SECOND)        .7021# +3

DEBYE LENGTH          (METERS).34211#-04   ELECTRON DENSITY     (PER M+3).13352#+14   COLLISION FREQUENCY  (PER SEC).52009#+12
COEFFICIENTS FOR OHM,S LAW..   SIGMA = SCALAR COND  (MHO/METER)   .7296#+06    BETA1    (SQM-VOLT/NEWTON)          -.4675#+06
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)  .0000#+00     THETA1     (VOLT/DEGK)              -.1232#-04
MAGNETIC INDUCTION (ABS B)       (TESLA)  .0000#+00   .2000#+01  .4000#+01  .6000#+01  .8000#+01  .1000#+02  .1200#+02
CHI                    (METER-OHM/TESLA)  .4713#+06   .4702#+06  .4689#+06  .4683#+06  .4680#+06  .4678#+06  .4677#+06
HALL PARAMETER                            .0000#+00   .6861# 00  .1369#+01  .2050#+01  .2732#+01  .3413#+01  .4095#+01
PSI                  (METER-OHM/SQ TESLA)  .1238#+04   .8726#+03  .4626#+03  .2594#+03  .1607#+03  .1079#+03  .7695#+02
THETA2                 (VOLT/TESLA-DEGK)   .3990#-05   .2811#-05  .1490#-05  .8359#-06  .5176#-06  .3475#-06  .2479#-06
THETA3              (VOLT/SQ TESLA-DEGK)  -.1292#-05  -.9102#-06 -.4826#-06 -.2706#-06 -.1676#-06 -.1125#-06 -.8027#-07
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2		

PRESSURE = 1.50 ATM, TEMPERATURE = 1300 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.3525#-15	ALO2	.6156#+02	CO2	.2541#-17	CA	.1959#-10	CL2	.0000#+00	CS			
.5857#-13	FE	.8280#-04	H2	.4323#-05	K	.2740#+03	N2	.5512#-05	NA	.2592# 00	O2	.6541#-23	S2		
.6479#-13	SIO2	.1292#-10	E-	.2513#-26	AL	.1020#-20	ALO	.8027#-08	AL(OH)2	.1463#-34	AL2O	.2869#-03	CO		
.1747#-16	C O S	.2313#-10	CAOH	.8577#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3508#-10	FEO		
.1396#-04	FE(OH)2	.1576#-06	H	.5357#-03	HCL	.3109#+02	H2O	.1551#-15	H2S	.3401#-01	KCL	.3956#-07	KO		
.1167#-01	KOH	.4336#-13	N	.6312#-11	NH3	.8991#-02	NO	.6669#-05	NO2	.7854#-02	NACL	.6468#-07	NAO		
.2796#-02	NAOH	.1406#-05	O	.7444#-03	OH	.1117#-15	S	.5965#-09	SO	.2276#-02	SO2	.9070#-05	SO3		
.1006#-32	SI	.2548#-15	SIO	.4740#-15	ALO2-	.1760#-23	CN-	.0000#+00	CO2-	.2461#-07	CL-	.0000#+00	CS+		
.2461#-07	K+	.1050#-16	NO-	.1091#-10	NO2-	.2516#-10	NA+	.5886#-15	O-	.3180#-11	OH-	.3129#-13	O2-		
.3628#-22	SH-	.1539#-19	SO-	.7158#-12	SO2-										
GLASS	.3287#-01	AL2O3 L	.2264#-03	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.1759#-09	FEAL2O4L	.2889#-01	FEO L			
.1802#-02	KALO2 L	.7227#-01	K2SIO3 L	.2449#-03	NAOH L	.2698#-01	SIO2 L								
SULF. AND CARB..	.2754#-03	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9357# 00	K2SO4 C							

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9471#-02	AR	.9516#-18	ALO2	.1662# 00	CO2	.6860#-20	CA	.5290#-13	CL2	.0000#+00	CS			
.1581#-15	FE	.2235#-06	H2	.1167#-07	K	.7396# 00	N2	.1488#-07	NA	.6997#-03	O2	.1766#-25	S2		
.1749#-15	SIO2	.3488#-13	E-	.6784#-29	AL	.2754#-23	ALO	.2167#-10	AL(OH)2	.3950#-37	AL2O	.7745#-06	CO		
.4716#-19	C O S	.6245#-13	CAOH	.2315#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.9470#-13	FEO		
.3770#-07	FE(OH)2	.4254#-09	H	.1446#-05	HCL	.8392#-01	H2O	.4187#-18	H2S	.9181#-04	KCL	.1068#-09	KO		
.3150#-04	KOH	.1171#-15	N	.1704#-13	NH3	.2427#-04	NO	.1800#-07	NO2	.2120#-04	NACL	.1746#-09	NAO		
.7548#-05	NAOH	.3797#-06	O	.2010#-05	OH	.3016#-18	S	.1610#-11	SO	.6143#-05	SO2	.2448#-07	SO3		
.2715#-35	SI	.6878#-16	SIO	.1280#-17	ALO2-	.4751#-26	CN-	.0000#+00	CO2-	.6643#-10	CL-	.0000#+00	CS+		
.6644#-10	K+	.2835#-19	NO-	.2945#-13	NO2-	.6791#-13	NA+	.1589#-17	O-	.8565#-14	OH-	.8446#-19	O2-		
.9793#-25	SH-	.4155#-22	SO-	.1932#-14	SO2-										
GLASS	.1966# 00	AL2O3 L	.1354#-02	MULLITE	.2333#-01	CAO L	.0000#+00	CSOH L	.1052#-08	FEAL2O4L	.1728# 00	FEO L			
.1078#-01	KALO2 L	.4323# 00	K2SIO3 L	.1465#-02	NAOH L	.1614# 00	SIO2 L								
SULF. AND CARB..	.2942#-03	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9997# 00	K2SO4 C							

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3704#+03	.1672# 00	.9360# 00	.3715#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2996#+02	.1119#+03	.1743#+03	.3036#+02
MASS	(KILOGRAMS)	.1110#+02	.1870#-01	.1631# 00	.1128#+02
VOLUME	(CUBIC-METERS)	.2635#+02	.5448#-05	.6127#-04	.2635#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.4212# 00	.3407#+04	.2662#+04	.4281# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2195#+05	.1180#+02	.9826#+02	.2206#+05
REACTION ENTHALPY	(KILOCALORIES)	-.4479#+04	-.4249#+02	-.2782#+03	-.4800#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7589#+04	-.4722#+02	-.3215#+03	-.7958#+04
SENSIBLE HEAT	(KILOCALORIES)	.3110#+04	.4726#+01	.4333#+02	.3158#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9260#+01	.3114#+02	.5575#+02	.9387#+01
ADIABATIC EXPANSION COEFFICIENT		.1273# +1	SONIC SPEED (METERS/SECOND)		.6778# +3

DEBYE LENGTH (METERS) .74145#-04 ELECTRON DENSITY (PER M+3) .29541#+12 COLLISION FREQUENCY (PER SEC) .57040#+12

COEFFICIENTS FOR OHM,S LAW.. SIGMA = SCALAR COND (MHO/METER) .1475#-07 BETA1 (SQM-VOLT/NEWTON) -.2113#+08

BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON) .0000#+00 THETA1 (VOLT/DEGK) -.1403#-04

MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02
CHI	(METER-OHM/TESLA)	.2135#+08	.2129#+08	.2122#+08	.2118#+08	.2116#+08	.2115#+08	.2115#+08
HALL PARAMETER		.0000#+00	.6284# 00	.1252#+01	.1875#+01	.2498#+01	.3121#+01	.3744#+01
PSI	(METER-OHM/SQ TESLA)	.6702#+05	.4937#+05	.2758#+05	.1589#+05	.9972#+04	.6744#+04	.4832#+04
THETA2	(VOLT/TESLA-DEGK)	.4196#-05	.3091#-05	.1727#-05	.9948#-06	.6243#-06	.4222#-06	.3025#-06
THETA3	(VOLT/SQ TESLA-DEGK)	-.1254#-05	-.9240#-06	-.5162#-06	-.2974#-06	-.1867#-06	-.1262#-06	-.9043#-07

U S BU MINES PGM ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6 5 11

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2

PRESSURE = 1.50 ATM, TEMPERATURE = 1200 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS		.3508#+01	AR	.3238#-17	ALO2	.6156#+02	CO2	.9335#-20	CA	.4915#-10	CL2	.0000#+00	CS		
.3766#-15	FE	.1208#-04	H2	.2449#-06	K	.2740#+03	N2	.4528#-06	NA	.2603# 00	O2	.9142#-29	S2		
.7184#-15	SIO2	.1668#-12	E-	.4618#-30	AL	.1239#-23	ALO	.4187#-09	AL(OH)2	.2285#-39	AL2O	.3265#-04	CO		
.4677#-20	C O S	.7214#-12	CAOH	.5177#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.8362#-12	FEO		
.4003#-05	FE(OH)2	.1072#-07	H	.6743#-03	HCL	.3109#+02	H2O	.5376#-19	H2S	.3210#-01	KCL	.2573#-08	KO		
.3001#-02	KOH	.1092#-14	N	.5415#-12	NH3	.4483#-02	NO	.5212#-05	NO2	.9624#-02	NACL	.6402#-08	NAO		
.9207#-03	NAOH	.1996#-06	O	.2118#-03	OH	.2488#-19	S	.1120#-11	SO	.4392#-04	SO2	.3699#-06	SO3		
.3277#-37	SI	.5970#-16	SIO	.1432#-17	ALO2-	.7990#-27	CN-	.0000#+00	CO2-	.3497#-08	CL-	.0000#+00	CS+		
.3495#-08	K+	.8396#-19	NO-	.7828#-12	NO2-	.2867#-11	NA+	.3923#-17	O-	.5603#-13	OH-	.6825#-15	O2-		
.7859#-27	SH-	.9814#-24	SO-	.4922#-15	SO2-										
GLASS		.2906#-01	AL2O3 L	.1187#-03	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.1018#-10	FEAL2O4L	.2890#-01	FEO L		
.1008#-01	KALO2 L	.7082#-01	K2SIO3 L	.3553#-03	NAOH L	.2864#-01	SIO2 L								
SULF. AND CARB..		.6300#-03	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9380# 00	K2SO4 C						

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS		.9471#-06	AR	.8742#-20	ALO2	.1662# 00	CO2	.2520#-22	CA	.1327#-12	CL2	.0000#+00	CS		
.1017#-17	FE	.3262#-07	H2	.6612#-09	K	.7396# 00	N2	.1222#-08	NA	.7027#-03	O2	.2468#-31	S2		
.1939#-17	SIO2	.4503#-15	E-	.1247#-32	AL	.3344#-26	ALO	.1130#-11	AL(OH)2	.6167#-42	AL2O	.8814#-07	CO		
.1262#-22	C O S	.1948#-14	CAOH	.1398#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.2257#-14	FEO		
.1081#-07	FE(OH)2	.2895#-10	H	.1820#-05	HCL	.8394#-01	H2O	.1451#-21	H2S	.8666#-04	KCL	.6946#-11	KO		
.8101#-05	KOH	.2948#-17	N	.1462#-14	NH3	.1210#-04	NO	.1407#-07	NO2	.2598#-04	NACL	.1728#-10	NAO		
.2485#-05	NAOH	.5387#-09	O	.5717#-06	OH	.6716#-22	S	.3024#-14	SO	.1186#-06	SO2	.9986#-09	SO3		
.8846#-40	SI	.1612#-20	SIO	.3865#-20	ALO2-	.2157#-29	CN-	.0000#+00	CO2-	.9440#-11	CL-	.0000#+00	CS+		
.9435#-11	K+	.2267#-21	NO-	.2113#-14	NO2-	.7739#-14	NA+	.1059#-19	O-	.1513#-15	OH-	.1843#-17	O2-		
.2122#-29	SH-	.2649#-26	SO-	.1329#-17	SO2-										
GLASS		.1691# 00	AL2O3 L	.6909#-03	MULLITE	.2269#-01	CAO L	.0000#+00	CSOH L	.5924#-10	FEAL2O4L	.1681# 00	FEO L		
.5863#-01	KALO2 L	.4121# 00	K2SIO3 L	.2068#-02	NAOH L	.1666# 00	SIO2 L								
SULF. AND CARB..		.6713#-03	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9993# 00	K2SO4 C						

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3704#+03	.1719# 00	.9386# 00	.3715#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2996#+02	.1103#+03	.1742#+03	.3036#+02
MASS	(KILOGRAMS)	.1110#+02	.1896#-01	.1635# 00	.1128#+02
VOLUME	(CUBIC-METERS)	.2432#+02	.5716#-05	.6145#-04	.2432#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.4563# 00	.3317#+04	.2662#+04	.4638# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2167#+05	.1152#+02	.9452#+02	.2178#+05
REACTION ENTHALPY	(KILOCALORIES)	-.4820#+04	-.4329#+02	-.2840#+03	-.5147#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7589#+04	-.4756#+02	-.3224#+03	-.7959#+04
SENSIBLE HEAT	(KILOCALORIES)	.2769#+04	.4269#+01	.3843#+02	.2812#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9130#+01	.3063#+02	.5134#+02	.9247#+01
ADIABATIC EXPANSION COEFFICIENT		.1278# +1	SONIC SPEED (METERS/SECOND)		.6525# +3

DEBYE LENGTH (METERS) .18162#-03 ELECTRON DENSITY (PER M+3) .41312#+10 COLLISION FREQUENCY (PER SEC) .62621#+12

COEFFICIENTS FOR OHM,S LAW.. SIGMA = SCALAR COND (MHO/METER) .1884#-09 BETA1 (SQM-VOLT/NEWTON) -.1511#+10

BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00				THETA1 (VOLT/DEGK)			-.1548#-04
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.1530#+10	.1526#+10	.1520#+10	.1516#+10	.1514#+10	.1513#+10	.1513#+10	
HALL PARAMETER		.0000#+00	.5748# 00	.1145#+01	.1714#+01	.2282#+01	.2850#+01	.3419#+01	
PSI	(METER-OHM/SQ TESLA)	.5377#+07	.4124#+07	.2427#+07	.1440#+07	.9173#+06	.6255#+06	.4504#+06	
THETA2	(VOLT/TESLA-DEGK)	.4267#-05	.3273#-05	.1926#-05	.1143#-05	.7279#-06	.4964#-06	.3574#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.1176#-05	-.9020#-06	-.5309#-06	-.3149#-06	-.2006#-06	-.1368#-06	-.9851#-07	

U S BU MINES PGH ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101#SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01 AR	.6890#-01 ALO2	.6156#+02 CO2	.3900#-02 CA	.2120#-01 CL2	.0000#+00 CS	.2890#-01 FE	
.3110#+02 H2	.2064#+01 K	.2740#+03 N2	.1090#-01 NA	.1772#+02 O2	.4690# 00 S2	.9970#-01 SIO2	

PRESSURE = 1.50 ATM, TEMPERATURE = 1100 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.1502#-19	ALO2	.6155#+02	CO2	.1291#-22	CA	.1235#-09	CL2	.0000#+00	CS			
.9995#-10	FE	.1251#-05	H2	.9363#-08	K	.2740#+03	N2	.2141#-07	NA	.2616# 00	O2	.5637#-36	S2		
.2948#-17	SIO2	.1108#-14	E-	.2094#-34	AL	.5203#-27	ALO	.1477#-10	AL(OH)2	.6585#-45	AL2O	.2493#-05	CO		
.2009#-24	C O S	.1258#-13	CAOH	.2632#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1043#-13	FEO		
.9604#-05	FE(OH)2	.4528#-09	H	.8136#-03	HCL	.3109#+02	H2O	.3151#-23	H2S	.3140#-01	KCL	.1159#-09	KO		
.6890#-03	KOH	.1413#-16	N	.3000#-13	NH3	.1971#-02	NO	.3909#-05	NO2	.1019#-01	NACL	.3777#-09	NAO		
.2251#-03	NAOH	.1991#-07	O	.4802#-04	OH	.8587#-24	S	.4800#-15	SO	.2970#-06	SO2	.6055#-08	SO3		
.1366#-42	SI	.3899#-21	SIO	.1975#-20	ALO2-	.9922#-31	CN-	.0000#+00	CO2-	.3571#-09	CL-	.0000#+00	CS+		
.3570#-09	K+	.3100#-21	NO-	.3881#-13	NO2-	.1790#-12	NA+	.1172#-19	O-	.5275#-15	OH-	.8248#-17	O2-		
.1927#-32	SH-	.8591#-29	SO-	.7218#-19	SO2-										
GLASS	.3389#-01	AL2O3 L	.1091#-03	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.4863#-12	FEAL2O4L	.2890#-01	FEO L			
.4564#-03	KALO2 L	.7487#-01	K2SIO3 L	.4853#-03	NAOH L	.2461#-01	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.2859#-02	K2CO3 C	.0000#+00	K2SO4 L	.9380# 00	K2SO4 C							

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9472#-06	AR	.4056#-22	ALO2	.1662# 00	CO2	.3485#-25	CA	.3333#-12	CL2	.0000#+00	CS			
.2698#-20	FE	.3377#-08	H2	.2528#-10	K	.7396# 00	N2	.5780#-10	NA	.7061#-03	O2	.1522#-38	S2		
.7958#-20	SIO2	.2990#-17	E-	.5653#-37	AL	.1405#-29	ALO	.3988#-13	AL(OH)2	.1778#-47	AL2O	.6730#-08	CO		
.5423#-27	C O S	.3396#-16	CAOH	.7104#-09	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.2815#-16	FEO		
.2593#-08	FE(OH)2	.1222#-11	H	.2196#-05	HCL	.8394#-01	H2O	.8506#-26	H2S	.8476#-04	KCL	.3128#-12	KO		
.1860#-05	KOH	.3815#-19	N	.8099#-16	NH3	.5320#-05	NO	.1055#-07	NO2	.2751#-04	NACL	.1020#-11	NAO		
.6077#-06	NAOH	.5374#-10	O	.1296#-06	OH	.2318#-26	S	.1296#-17	SO	.8018#-09	SO2	.1635#-10	SO3		
.3688#-45	SI	.1053#-23	SIO	.5332#-23	ALO2-	.2679#-33	CN-	.0000#+00	CO2-	.9641#-12	CL-	.0000#+00	CS+		
.9637#-12	K+	.8369#-24	NO-	.1048#-15	NO2-	.4833#-15	NA+	.3163#-22	O-	.1424#-17	OH-	.2227#-19	O2-		
.5202#-35	SH-	.2319#-31	SO-	.1949#-21	SO2-										
GLASS	.2027# 00	AL2O3 L	.6524#-03	MULLITE	.2332#-01	CAO L	.0000#+00	CSOH L	.2908#-11	FEAL2O4L	.1728# 00	FEO L			
.2729#-02	KALO2 L	.4477# 00	K2SIO3 L	.2902#-02	NAOH L	.1472# 00	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.3039#-02	K2CO3 C	.0000#+00	K2SO4 L	.9970# 00	K2SO4 C							

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3704#+03	.1672# 00	.9409# 00	.3715#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2996#+02	.1130#+03	.1742#+03	.3036#+02
MASS	(KILOGRAMS)	.1110#+02	.1889#-01	.1639# 00	.1128#+02
VOLUME	(CUBIC-METERS)	.2229#+02	.5493#-05	.6160#-04	.2229#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.4978# 00	.3439#+04	.2660#+04	.5060# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2138#+05	.1106#+02	.9069#+02	.2148#+05
REACTION ENTHALPY	(KILOCALORIES)	-.5155#+04	-.4380#+02	-.2892#+03	-.5488#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7589#+04	-.4753#+02	-.3230#+03	-.7959#+04
SENSIBLE HEAT	(KILOCALORIES)	.2433#+04	.3730#+01	.3385#+02	.2471#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.8983#+01	.3124#+02	.4788#+02	.9091#+01
ADIABATIC EXPANSION COEFFICIENT		.1284# +1	SONIC SPEED (METERS/SECOND)		.6261# +3

DEBYE LENGTH (METERS) .52099#-03 ELECTRON DENSITY (PER M+3) .29925#+08 COLLISION FREQUENCY (PER SEC) .68822#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER)	.1244#-11	BETA1	(SQM-VOLT/NEWTON)					-.2086#+12	
BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)					-.1675#-04	
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.2117#+12	.2111#+12	.2101#+12	.2095#+12	.2092#+12	.2090#+12	.2089#+12		
HALL PARAMETER	.0000#+00	.5253# 00	.1046#+01	.1564#+01	.2082#+01	.2600#+01	.3119#+01		
PSI (METER-OHM/SQ TESLA)	.8003#+09	.6364#+09	.3942#+09	.2412#+09	.1563#+09	.1076#+09	.7792#+08		
THETA2 (VOLT/TESLA-DEGK)	.4251#-05	.3381#-05	.2094#-05	.1281#-05	.8302#-06	.5715#-06	.4139#-06		
THETA3 (VOLT/SQ TESLA-DEGK)	-.1079#-05	-.8578#-06	-.5314#-06	-.3251#-06	-.2107#-06	-.1450#-06	-.1050#-06		

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U S BU MINES   PGM ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                    26 31

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 90% ASH REJECTION
    .3508#+01 AR      .6890#-01 ALO2    .6156#+02 CO2     .3900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .2890#-01 FE
    .3110#+02 H2      .2064#+01 K       .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .9970#-01 SIO2

PRESSURE =  1.00 ATM,  TEMPERATURE = 2200 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......    .3508#+01  AR      .3481#-05  ALO2    .5741#+02  CO2     .9886#-06  CA      .2279#-10  CL2     .0000#+00  CS
    .1003#-02  FE     .4113# 00  H2      .6318# 00  K       .2735#+03  N2      .6128#-02  NA      .2546#+01  O2      .1275#-07  S2
    .1212#-02  SIO2   .1277#-02  E-      .7818#-09  AL      .8003#-07  ALO     .2984#-02  AL(OH)2 .1872#-12  AL2O    .4146#+01  CO
    .3418#-06  C O S  .3289#-03  CAOH    .1357#-03  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .2353#-02  FEO
    .3990#-02  FE(OH)2 .6975#-01 H       .1106#-02  HCL     .2961#+02  H2O     .9001#-06  H2S     .4092#-01  KCL     .7482#-02  KO
    .1360#+01  KOH    .3992#-05  N       .1760#-06  NH3     .8658# 00  NO      .1831#-03  NO2     .1241#-03  NACL    .7288#-04  NAO
    .4574#-02  NAOH   .8306#-01  O       .6902# 00  OH      .2307#-04  S       .8681#-02  SO      .9289# 00  SO2     .2602#-03  SO3
    .7375#-11  SI     .3484#-02  SIO     .2739#-04  ALO2-   .1211#-09  CN-     .0000#+00  CO2-    .1160#-03  CL-     .0000#+00  CS+
    .1580#-02  K+     .1642#-07  NO-     .9352#-06  NO2-    .2272#-06  NA+     .2867#-05  O-      .6224#-04  OH-     .1119#-05  O2-
    .8391#-08  SH-    .9092#-07  SO-     .9270#-04  SO2-
  GLASS ..........    .1780#-01  AL2O3 L .4102#-02  MULLITE .3570#-02  CAO   L .0000#+00  CSOH  L .3324#-04  FEAL2O4L.2152#-01  FEO
    .5604#-02  KALO2 L .8304#-02  K2SIO3 L.2509#-06  NAOH  L .7850#-01  SIO2  L
  SULF. AND CARB..    .0000#+00  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .0000#+00  K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......    .9334#-02  AR      .9261#-08  ALO2    .1527# 00  CO2     .2630#-08  CA      .6063#-13  CL2     .0000#+00  CS
    .2668#-05  FE     .1094#-02  H2      .1681#-02  K       .7277# 00  N2      .1630#-04  NA      .6772#-02  O2      .3392#-10  S2
    .3224#-05  SIO2   .3396#-05  E-      .2080#-11  AL      .2129#-09  ALO     .7938#-05  AL(OH)2 .4980#-15  AL2O    .1103#-01  CO
    .9094#-09  C O S  .8749#-06  CAOH    .3610#-06  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .6259#-05  FEO
    .1061#-04  FE(OH)2 .1856#-03 H       .2944#-05  HCL     .7879#-01  H2O     .2395#-08  H2S     .1089#-03  KCL     .1991#-04  KO
    .3618#-02  KOH    .1062#-07  N       .4684#-09  NH3     .2303#-02  NO      .4872#-06  NO2     .3301#-06  NACL    .1939#-06  NAO
    .1217#-04  NAOH   .2210#-03  O       .1836#-02  OH      .6138#-07  S       .2310#-04  SO      .2471#-02  SO2     .6923#-06  SO3
    .1962#-13  SI     .9270#-05  SIO     .7288#-07  ALO2-   .3223#-12  CN-     .0000#+00  CO2-    .3086#-06  CL-     .0000#+00  CS+
    .4203#-05  K+     .4368#-10  NO-     .2488#-08  NO2-    .6044#-09  NA+     .7628#-08  O-      .1656#-06  OH-     .2976#-08  O2-
    .2232#-10  SH-    .2419#-09  SO-     .2466#-06  SO2-
  GLASS ..........    .1277# 00  AL2O3 L .2942#-01  MULLITE .2561#-01  CAO   L .0000#+00  CSOH  L .2384#-03  FEAL2O4L.1544# 00  FEO
    .4019#-01  KALO2 L .5955#-01  K2SIO3 L.1800#-05  NAOH  L .5630# 00  SIO2  L
  SULF. AND CARB..    .0000#+00  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .0000#+00  K2SO4 C

                                          IDEALGAS     GLASS ..     SULF. AN      MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)    .3759#+03    .1394# 00    .0000#+00    .3760#+03
AVERAGE MOLECULAR WEIGHT            (AMU)     .2997#+02    .8508#+02    .0000#+00    .3000#+02
MASS                          (KILOGRAMS)     .1127#+02    .1186#-01    .0000#+00    .1128#+02
VOLUME                   (CUBIC-METERS)       .6786#+02    .4364#-05    .0000#+00    .6786#+02
DENSITY          (KILOGRAMS/CUBIC METER)      .1660# 00    .2718#+04    .0000#+00    .1662# 00
ENTROPY               (GRAMCALORIES/DEGK)     .2456#+05    .9181#+01    .0000#+00    .2457#+05
REACTION ENTHALPY          (KILOCALORIES)    -.9329#+03   -.2983#+02    .0000#+00   -.9627#+03
HEAT OF FORMATION          (KILOCALORIES)    -.7318#+04   -.3622#+02    .0000#+00   -.7354#+04
SENSIBLE HEAT              (KILOCALORIES)     .6385#+04    .6387#+01    .0000#+00    .6391#+04
FROZEN CP              (GMCAL/GMMOL-DEGK)     .9866#+01    .2811#+02    .0000#+00    .9873#+01
ADIABATIC EXPANSION COEFFICIENT               .1252# +1     SONIC SPEED (METERS/SECOND)          .8741# +3

DEBYE LENGTH          (METERS).79169#-06   ELECTRON DENSITY     (PER M+3).11331#+20   COLLISION FREQUENCY  (PER SEC).23407#+12
COEFFICIENTS FOR OHM,S LAW,,   SIGMA = SCALAR COND  (MHO/METER)    .1365#+01    BETA1    (SQM-VOLT/NEWTON)          -.5509# 00
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)   .0000#+00     THETA1     (VOLT/DEGK)              .3509#-05
MAGNETIC INDUCTION (ABS B)        (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                          (METER-OHM/TESLA)  .5512# 00   .5510# 00   .5509# 00   .5509# 00   .5509# 00   .5509# 00   .5509# 00
HALL PARAMETER                                  .0000#+00   .1504#+01   .3008#+01   .4512#+01   .6016#+01   .7520#+01   .9024#+01
PSI                     (METER-OHM/SQ TESLA)    .2222#-03   .8962#-04   .3212#-04   .1552#-04   .9008#-05   .5850#-05   .4096#-05
THETA2                    (VOLT/TESLA-DEGK)   -.2134#-05  -.8607#-06  -.3085#-06  -.1491#-06  -.8651#-07  -.5618#-07  -.3933#-07
THETA3                 (VOLT/SQ TESLA-DEGK)    .1298#-05   .5234#-06   .1876#-06   .9066#-07   .5260#-07   .3417#-07   .2392#-07
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS O OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01 AR	.6890#-01 AL02	.6156#+02 C02	.3900#-02 CA	.2120#-01 CL2	.0000#+00 CS	.2890#-01 FE	
.3110#+02 H2	.2064#+01 K	.2740#+03 N2	.1090#-01 NA	.1772#+02 02	.4690# 00 S2	.9970#-01 SI02	

PRESSURE = 1.00 ATM, TEMPERATURE = 2100 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01 AR	.7186#-06 AL02	.5909#+02 C02	.1775#-06 CA	.8996#-11 CL2	.0000#+00 CS	
.2432#-03 FE	.2550# 00 H2	.4583# 00 K	.2737#+03 N2	.5114#-02 NA	.1805#+01 02	.3910#-08 S2	
.2272#-03 SI02	.5810#-03 E-	.6119#-10 AL	.9910#-08 ALO	.1375#-02 AL(OH)2	.7744#-14 AL2O	.2461#+01 CO	
.1398#-06 C O S	.1114#-03 CAOH	.6107#-04 CL	.0000#+00 CSCL	.0000#+00 CS O	.0000#+00 CSOH	.7556#-03 FEO	
.2868#-02 FE(OH)2	.3035#-01 H	.7018#-03 HCL	.2986#+02 H2O	.3915#-06 H2S	.4143#-01 KCL	.4794#-02 KO	
.1507#+01 KOH	.1139#-05 N	.9949#-07 NH3	.5765# 00 NO	.1195#-03 NO2	.1393#-03 NACL	.5459#-04 NAO	
.5592#-02 NAOH	.3589#-01 O	.4155# 00 OH	.7226#-05 S	.4724#-02 SO	.9329# 00 SO2	.2806#-03 SO3	
.2733#-12 SI	.4645#-03 SIO	.8091#-05 AL02-	.2748#-10 CN-	.0000#+00 C02-	.6674#-04 CL-	.0000#+00 CS+	
.7510#-03 K+	.5628#-08 NO-	.5645#-06 NO2-	.1017#-06 NA+	.9194#-06 O-	.3048#-04 OH-	.4529#-06 O2-	
.2728#-08 SH-	.3280#-07 SO-	.6284#-04 SO2-					
GLASS	.2022#-01 AL2O3 L	.2909#-02 MULLITE	.3768#-02 CAO L	.0000#+00 CSOH L	.1727#-04 FEAL2O4L	.2502#-01 FEO	
.9590#-02 KALO2 L	.2103#-01 K2SIO3 L	.5304#-06 NAOH L	.7216#-01 SIO2 L				
SULF. AND CARB..	.0000#+00 K2CO3 L	.0000#+00 K2CO3 C	.0000#+00 K2SO4 L	.0000#+00 K2SO4 C			

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9364#-02 AR	.1918#-08 AL02	.1577# 00 C02	.4737#-09 CA	.2401#-13 CL2	.0000#+00 CS	
.6490#-06 FE	.6806#-03 H2	.1223#-02 K	.7304# 00 N2	.1365#-04 NA	.4817#-02 02	.1044#-10 S2	
.6064#-06 SI02	.1551#-05 E-	.1633#-12 AL	.2645#-10 ALO	.3670#-05 AL(OH)2	.2067#-16 AL2O	.6570#-02 CO	
.3731#-09 C O S	.2974#-05 CAOH	.1630#-06 CL	.0000#+00 CSCL	.0000#+00 CS O	.0000#+00 CSOH	.2017#-05 FEO	
.7654#-05 FE(OH)2	.8100#-04 H	.1873#-05 HCL	.7969#-01 H2O	.1045#-08 H2S	.1106#-03 KCL	.1279#-04 KO	
.4022#-02 KOH	.3039#-08 N	.2655#-09 NH3	.1539#-02 NO	.3189#-06 NO2	.3718#-06 NACL	.1457#-06 NAO	
.1492#-04 NAOH	.9578#-04 O	.1109#-02 OH	.1929#-07 S	.1261#-04 SO	.2490#-02 SO2	.7489#-06 SO3	
.7293#-15 SI	.1240#-05 SIO	.2159#-07 AL02-	.7333#-13 CN-	.0000#+00 C02-	.1781#-06 CL-	.0000#+00 CS+	
.2004#-05 K+	.1502#-10 NO-	.1507#-08 NO2-	.2714#-09 NA+	.2454#-08 O-	.8134#-07 OH-	.1209#-08 O2-	
.7282#-11 SH-	.8755#-10 SO-	.1677#-06 SO2-					
GLASS	.1307# 00 AL2O3 L	.1880#-01 MULLITE	.2448#-01 CAO L	.0000#+00 CSOH L	.1116#-03 FEAL2O4L	.1617# 00 FEO L	
.6198#-01 KALO2 L	.1359# 00 K2SIO3 L	.3428#-05 NAOH L	.4664# 00 SIO2 L				
SULF. AND CARB..	.0000#+00 K2CO3 L	.0000#+00 K2CO3 C	.0000#+00 K2SO4 L	.0000#+00 K2SO4 C			

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3747#+03	.1547# 00	.0000#+00	.3748#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.3007#+02	.8941#+02	.0000#+00	.3009#+02
MASS (KILOGRAMS)	.1127#+02	.1383#-01	.0000#+00	.1128#+02
VOLUME (CUBIC-METERS)	.6457#+02	.4835#-05	.0000#+00	.6457#+02
DENSITY (KILOGRAMS/CUBIC METER)	.1745# 00	.2861#+04	.0000#+00	.1747# 00
ENTROPY (GRAMCALORIES/DEGK)	.2432#+05	.1062#+02	.0000#+00	.2433#+05
REACTION ENTHALPY (KILOCALORIES)	-.1456#+04	-.3281#+02	.0000#+00	-.1488#+04
HEAT OF FORMATION (KILOCALORIES)	-.7471#+04	-.3971#+02	.0000#+00	-.7511#+04
SENSIBLE HEAT (KILOCALORIES)	.6016#+04	.6901#+01	.0000#+00	.6023#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9856#+01	.2864#+02	.0000#+00	.9864#+01
ADIABATIC EXPANSION COEFFICIENT	.1253# +1	SONIC SPEED (METERS/SECOND)		.8529# +3

DEBYE LENGTH (METERS) .10788#-05 ELECTRON DENSITY (PER M+3) .54196#+19 COLLISION FREQUENCY (PER SEC) .24325#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER)	.6281# 00	BETA1 (SQM-VOLT/NEWTON)					-.1152#+01	
BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)					.2465#-05	
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI (METER-OHM/TESLA)	.1152#+01	.1152#+01	.1152#+01	.1152#+01	.1152#+01	.1152#+01	.1152#+01	
HALL PARAMETER	.0000#+00	.1447#+01	.2893#+01	.4340#+01	.5787#+01	.7233#+01	.8680#+01	
PSI (METER-OHM/SQ TESLA)	.2262#-03	.9266#-04	.3344#-04	.1619#-04	.9402#-05	.6108#-05	.4277#-05	
THETA2 (VOLT/TESLA-DEGK)	-.1479#-05	-.6060#-06	-.2187#-06	-.1059#-06	-.6149#-07	-.3995#-07	-.2797#-07	
THETA3 (VOLT/SQ TESLA-DEGK)	.8880#-06	.3638#-06	.1313#-06	.6356#-07	.3691#-07	.2398#-07	.1679#-07	

U S BU MINES PGH ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6 2 7

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01 AR	.6890#-01 ALO2	.6156#+02 CO2	.3900#-02 CA	.2120#-01 CL2	.0000#+00 CS	.2890#-01 FE
.3110#+02 H2	.2064#+01 K	.2740#+03 N2	.1090#-01 NA	.1772#+02 O2	.4690# 00 S2	.9970#-01 SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 2000 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01 AR	.1264#-06 ALO2	.6022#+02 CO2	.2587#-07 CA	.3566#-11 CL2	.0000#+00 CS	
.4669#-04 FE	.1469# 00 H2	.3046# 00 K	.2738#+03 N2	.3992#-02 NA	.1297#+01 O2	.9604#-09 S2	
.3006#-04 SIO2	.2355#-03 E-	.3526#-11 AL	.9694#-09 ALO	.5662#-03 AL(OH)2	.2159#-15 AL2O	.1335#+01 CO	
.4791#-07 C O S	.3296#-04 CAOH	.2669#-04 CL	.0000#+00 CSCL	.0000#+00 CS O	.0000#+00 CSOH	.2020#-03 FEO	
.1862#-02 FE(OH)2	.1202#-01 H	.4412#-03 HCL	.3001#+02 H2O	.1446#-06 H2S	.4174#-01 KCL	.2844#-02 KO	
.1611#+01 KOH	.2878#-06 N	.5101#-07 NH3	.3769# 00 NO	.7823#-04 NO2	.1581#-03 NACL	.3885#-04 NAO	
.6710#-02 NAOH	.1462#-01 O	.2405# 00 OH	.1913#-05 S	.2348#-02 SO	.9353# 00 SO2	.3113#-03 SO3	
.5804#-14 SI	.4120#-04 SIO	.2018#-05 ALO2-	.4843#-11 CN-	.0000#+00 CO2-	.3662#-04 CL-	.0000#+00 CS+	
.3276#-03 K+	.1700#-06 NO-	.3257#-06 NO2-	.4177#-07 NA+	.2578#-06 O-	.1347#-04 OH-	.1681#-06 O2-	
.7132#-09 SH-	.9957#-06 SO-	.3920#-04 SO2-					
GLASS	.2222#-01 AL2O3 L	.1318#-02 MULLITE	.3867#-02 CAO L	.0000#+00 CSOH L	.7491#-05 FEAL2O4L	.2678#-01 FEO L	
.1596#-01 KALO2 L	.4372#-01 K2SIO3 L	.1125#-05 NAOH L	.5327#-01 SIO2 L				
SULF. AND CARB..	.0000#+00 K2CO3 L	.0000#+00 K2CO3 C	.0000#+00 K2SO4 L	.0000#+00 K2SO4 C			

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9385#-02 AR	.3380#-09 ALO2	.1611# 00 CO2	.6920#-10 CA	.9539#-14 CL2	.0000#+00 CS	
.1249#-06 FE	.3931#-03 H2	.8147#-03 K	.7323# 00 N2	.1068#-04 NA	.3470#-02 O2	.2569#-11 S2	
.8042#-07 SIO2	.6300#-06 E-	.9432#-14 AL	.2593#-11 ALO	.1515#-05 AL(OH)2	.5774#-18 AL2O	.3571#-02 CO	
.1282#-07 C O S	.8818#-07 CAOH	.7140#-07 CL	.0000#+00 CSCL	.0000#+00 CS O	.0000#+00 CSOH	.5403#-06 FEO	
.4981#-05 FE(OH)2	.3216#-04 H	.1180#-05 HCL	.8028#-01 H2O	.3867#-09 H2S	.1116#-03 KCL	.7607#-05 KO	
.4309#-02 KOH	.7697#-09 N	.1364#-09 NH3	.1008#-02 NO	.2093#-06 NO2	.4229#-06 NACL	.1039#-06 NAO	
.1795#-04 NAOH	.3910#-04 O	.6433#-03 OH	.5116#-08 S	.6282#-05 SO	.2502#-02 SO2	.8326#-06 SO3	
.1552#-16 SI	.1102#-06 SIO	.5399#-08 ALO2-	.1295#-13 CN-	.0000#+00 CO2-	.9796#-07 CL-	.0000#+00 CS+	
.8762#-06 K+	.4548#-11 NO-	.8711#-09 NO2-	.1117#-09 NA+	.6896#-09 O-	.3604#-07 OH-	.4496#-09 O2-	
.1908#-11 SH-	.2663#-10 SO-	.1049#-06 SO2-					
GLASS	.1330# 00 AL2O3 L	.7885#-02 MULLITE	.2313#-01 CAO L	.0000#+00 CSOH L	.4482#-04 FEAL2O4L	.1602# 00 FEO L	
.9548#-01 KALO2 L	.2616# 00 K2SIO3 L	.6729#-05 NAOH L	.3187# 00 SIO2 L				
SULF. AND CARB..	.0000#+00 K2CO3 L	.0000#+00 K2CO3 C	.0000#+00 K2SO4 L	.0000#+00 K2SO4 C			

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3739#+03	.1672# 00	.0000#+00	.3740#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3013#+02	.9860#+02	.0000#+00	.3016#+02
MASS	(KILOGRAMS)	.1126#+02	.1648#-01	.0000#+00	.1128#+02
VOLUME	(CUBIC-METERS)	.6136#+02	.5418#-05	.0000#+00	.6136#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.1836# 00	.3042#+04	.0000#+00	.1838# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2408#+05	.1260#+02	.0000#+00	.2410#+05
REACTION ENTHALPY	(KILOCALORIES)	-.1926#+04	-.3617#+02	.0000#+00	-.1962#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7574#+04	-.4378#+02	.0000#+00	-.7618#+04
SENSIBLE HEAT	(KILOCALORIES)	.5648#+04	.7607#+01	.0000#+00	.5655#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9830#+01	.3041#+02	.0000#+00	.9839#+01
ADIABATIC EXPANSION COEFFICIENT		.1253# +1	SONIC SPEED (METERS/SECOND)		.8318# +3

DEBYE LENGTH (METERS) .15205#-05 ELECTRON DENSITY (PER M+3) .23121#+19 COLLISION FREQUENCY (PER SEC) .25334#+12

COEFFICIENTS FOR OHM,S LAW.. SIGMA = SCALAR COND	(MHO/METER)	.2572# 00	BETA1	(SQM-VOLT/NEWTON)				-.2700#+01
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)				.1206#-05
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02
CHI	(METER-OHM/TESLA)	.2700#+01	.2700#+01	.2700#+01	.2700#+01	.2700#+01	.2700#+01	.2700#+01
HALL PARAMETER		.0000#+00	.1389#+01	.2777#+01	.4166#+01	.5554#+01	.6943#+01	.8332#+01
PSI	(METER-OHM/SQ TESLA)	.1249#-03	.5216#-04	.1899#-04	.9218#-05	.5358#-05	.3483#-05	.2439#-05
THETA2	(VOLT/TESLA-DEGK)	-.7121#-06	-.2974#-06	-.1083#-06	-.5255#-07	-.3055#-07	-.1986#-07	-.1391#-07
THETA3	(VOLT/SQ TESLA-DEGK)	.4205#-06	.1756#-06	.6392#-07	.3103#-07	.1804#-07	.1172#-07	.8212#-08

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2
.2970#-01	FE	.9970#-01	SIO2								

PRESSURE = 1.00 ATM, TEMPERATURE = 1900 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS		.3508#+01	AR	.1772#-07	ALO2	.6091#+02	CO2	.2971#-08	CA	.1429#-11	CL2
.0000#+00	CS	.7087#-05	FE	.7643#-01	H2	.1832# 00	K	.2738#+03	N2	.2852#-02	NA
.9795# 00	O2	.1726#-09	S2	.2500#-05	SIO2	.8324#-04	E-	.1323#-12	AL	.6821#-10	ALO
.1939#-03	AL(OH)2	.3299#-17	AL2O	.6431# 00	CO	.1282#-07	C O S	.8453#-05	CAOH	.1131#-04	CL
.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.4592#-04	FEO	.1134#-02	FE(OH)2	.4223#-02	H
.2724#-03	HCL	.3011#+02	H2O	.4244#-07	H2S	.4192#-01	KCL	.1576#-02	KO	.1672#+01	KOH
.6305#-07	N	.2283#-07	NH3	.2462# 00	NO	.5318#-04	NO2	.1802#-03	NACL	.2603#-04	NAO
.7839#-02	NAOH	.5656#-02	O	.1337# 00	OH	.4062#-06	S	.1045#-02	SO	.9366# 00	SO2
.3658#-03	SO3	.5862#-16	SI	.2111#-05	SIO	.3959#-06	ALO2-	.6136#-12	CN-	.0000#+00	CO2-
.1892#-04	CL-	.0000#+00	CS+	.1302#-03	K+	.4492#-09	NO-	.1837#-06	NO2-	.1545#-07	NA+
.6277#-07	O-	.5290#-05	OH-	.5825#-07	O2-	.1382#-09	SH-	.2440#-06	SO-	.2207#-04	SO2-
GLASS		.2128#-01	AL2O3 L	.1979#-03	MULLITE	.3892#-02	CAO L	.0000#+00	CSOH L	.2517#-05	FEAL2O4L
.2771#-01	FEO L	.2494#-01	KALO2 L	.7028#-01	K2SIO3 L	.2415#-05	NAOH L	.2902#-01	SIO2 L		
SULF. AND CARB..		.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C		

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS		.9398#-02	AR	.4746#-10	ALO2	.1632# 00	CO2	.7959#-11	CA	.3828#-14	CL2
.0000#+00	CS	.1898#-07	FE	.2047#-03	H2	.4907#-03	K	.7335# 00	N2	.7640#-05	NA
.2624#-02	O2	.4625#-12	S2	.6698#-08	SIO2	.2230#-06	E-	.3544#-15	AL	.1827#-12	ALO
.5195#-06	AL(OH)2	.8837#-20	AL2O	.1723#-02	CO	.3434#-10	C O S	.2264#-07	CAOH	.3031#-07	CL
.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1230#-06	FEO	.3038#-05	FE(OH)2	.1131#-04	H
.7296#-06	HCL	.8066#-01	H2O	.1137#-09	H2S	.1123#-03	KCL	.4221#-05	KO	.4478#-02	KOH
.1689#-09	N	.6117#-10	NH3	.6594#-03	NO	.1425#-06	NO2	.4827#-06	NACL	.6974#-07	NAO
.2100#-04	NAOH	.1515#-04	O	.3582#-03	OH	.1088#-08	S	.2799#-05	SO	.2509#-02	SO2
.9798#-06	SO3	.1570#-16	SI	.5655#-06	SIO	.1061#-08	ALO2-	.1644#-14	CN-	.0000#+00	CO2-
.5068#-07	CL-	.0000#+00	CS+	.3488#-06	K+	.1203#-11	NO-	.4920#-09	NO2-	.4139#-10	NA+
.1681#-09	O-	.1417#-07	OH-	.1560#-09	O2-	.3702#-12	SH-	.6536#-11	SO-	.5913#-07	SO2-
GLASS		.1200# 00	AL2O3 L	.1116#-02	MULLITE	.2194#-01	CAO L	.0000#+00	CSOH L	.1419#-04	FEAL2O4L
.1563# 00	FEO L	.1407# 00	KALO2 L	.3963# 00	K2SIO3 L	.1362#-04	NAOH L	.1636# 00	SIO2 L		
SULF. AND CARB..		.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C		

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3733#+03	.1773# 00	.0000#+00	.3735#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3016#+02	.1100#+03	.0000#+00	.3020#+02
MASS	(KILOGRAMS)	.1126#+02	.1950#-01	.0000#+00	.1128#+02
VOLUME	(CUBIC-METERS)	.5820#+02	.6151#-05	.0000#+00	.5820#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.1934# 00	.3170#+04	.0000#+00	.1938# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2386#+05	.1476#+02	.0000#+00	.2387#+05
REACTION ENTHALPY	(KILOCALORIES)	-.2356#+04	-.3997#+02	.0000#+00	-.2396#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7637#+04	-.4831#+02	.0000#+00	-.7686#+04
SENSIBLE HEAT	(KILOCALORIES)	.5281#+04	.8341#+01	.0000#+00	.5290#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9789#+01	.3290#+02	.0000#+00	.9800#+01
ADIABATIC EXPANSION COEFFICIENT		.1255# +1	SONIC SPEED (METERS/SECOND)		.8106# +3

DEBYE LENGTH (METERS) .22213#-05 ELECTRON DENSITY (PER M+3) .86140#+18 COLLISION FREQUENCY (PER SEC) .26782#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND	(MHO/METER)	.9063#-01	BETA1	(SQM-VOLT/NEWTON)				-.7246#+01
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)				-.1360#-06
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02
CHI	(METER-OHM/TESLA)	.7246#+01	.7246#+01	.7246#+01	.7246#+01	.7246#+01	.7246#+01	.7246#+01
HALL PARAMETER		.0000#+00	.1313#+01	.2627#+01	.3940#+01	.5254#+01	.6567#+01	.7881#+01
PSI	(METER-OHM/SQ TESLA)	.4106#-05	.1790#-05	.6647#-06	.3246#-06	.1891#-06	.1231#-06	.8626#-07
THETA2	(VOLT/TESLA-DEGK)	.7735#-07	.3371#-07	.1252#-07	.6115#-08	.2319#-08	.1625#-08	
THETA3	(VOLT/SQ TESLA-DEGK)	-.4400#-07	-.1918#-07	-.7123#-08	-.3479#-08	-.2027#-08	-.1319#-08	-.9245#-09

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2		

PRESSURE = 1.00 ATM, TEMPERATURE = 1800 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.1849#-08	ALO2	.6129#+02	CO2	.2562#-09	CA	.5663#-12	CL2	.0000#+00	CS			
.8229#-06	FE	.3481#-01	H2	.9931#-01	K	.2739#+03	N2	.1808#-02	NA	.8077# 00	O2	.2008#-10	S2		
.1229#-06	SIO2	.2500#-04	E-	.2841#-14	AL	.3120#-11	ALO	.5129#-04	AL(OH)2	.2280#-19	AL2O	.2671# 00	CO		
.2450#-08	C O S	.1833#-05	CAOH	.4553#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.8854#-05	FEO		
.6547#-03	FE(OH)2	.1285#-02	H	.1619#-03	HCL	.3017#+02	H2O	.9064#-08	H2S	.4202#-01	KCL	.8253#-03	KO		
.1709#+01	KOH	.1169#-07	N	.8545#-08	NH3	.1623# 00	NO	.3910#-04	NO2	.2009#-03	NACL	.1637#-04	NAO		
.8869#-02	NAOH	.2097#-02	O	.7185#-01	OH	.6416#-07	S	.3991#-03	SO	.9371# 00	SO2	.4620#-03	SO3		
.2460#-18	SI	.5686#-07	SIO	.5678#-07	ALO2-	.5154#-13	CN-	.0000#+00	CO2-	.9030#-05	CL-	.0000#+00	CS+		
.4706#-04	K+	.1027#-09	NO-	.1034#-06	NO2-	.4977#-08	NA+	.1315#-07	O-	.1823#-05	OH-	.1912#-07	O2-		
.1822#-10	SH-	.4555#-09	SO-	.1102#-04	SO2-										
GLASS	.1641#-01	AL2O3 L	.1112#-04	MULLITE	.3898#-02	CAO L	.0000#+00	CSOH L	.6005#-06	FEAL2O4 L	.2824#-01	FEO L			
.3596#-01	KALO2 L	.8840#-01	K2SIO3 L	.5255#-05	NAOH L	.1128#-01	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C							

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9406#-02	AR	.4957#-11	ALO2	.1643# 00	CO2	.6868#-12	CA	.1518#-14	CL2	.0000#+00	CS			
.2206#-08	FE	.9334#-04	H2	.2662#-03	K	.7343# 00	N2	.4848#-05	NA	.2165#-02	O2	.5385#-13	S2		
.3295#-09	SIO2	.6704#-07	E-	.7617#-17	AL	.8365#-14	ALO	.1375#-06	AL(OH)2	.6112#-22	AL2O	.7161#-03	CO		
.6569#-11	C O S	.4915#-06	CAOH	.1221#-07	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.2374#-07	FEO		
.1755#-05	FE(OH)2	.3444#-05	H	.4340#-06	HCL	.8087#-01	H2O	.2430#-10	H2S	.1127#-03	KCL	.2213#-05	KO		
.4582#-02	KOH	.3133#-10	N	.2291#-10	NH3	.4350#-03	NO	.1048#-06	NO2	.5386#-06	NACL	.4388#-07	NAO		
.2378#-04	NAOH	.5621#-05	O	.1926#-03	OH	.1720#-09	S	.1070#-05	SO	.2512#-02	SO2	.1239#-05	SO3		
.6595#-21	SI	.1524#-09	SIO	.1522#-09	ALO2-	.1382#-15	CN-	.0000#+00	CO2-	.2421#-07	CL-	.0000#+00	CS+		
.1262#-06	K+	.2753#-12	NO-	.2771#-09	NO2-	.1334#-10	NA+	.3525#-10	O-	.4888#-08	OH-	.5127#-10	O2-		
.4886#-13	SH-	.1221#-11	SO-	.2954#-07	SO2-										
GLASS	.8910#-01	AL2O3 L	.6038#-04	MULLITE	.2116#-01	CAO L	.0000#+00	CSOH L	.3260#-05	FEAL2O4 L	.1533# 00	FEO L			
.1952# 00	KALO2 L	.4799# 00	K2SIO3 L	.2853#-04	NAOH L	.6121#-01	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C							

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3730#+03	.1842# 00	.0000#+00	.3732#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.3018#+02	.1162#+03	.0000#+00	.3022#+02
MASS (KILOGRAMS)	.1126#+02	.2177#-01	.0000#+00	.1128#+02
VOLUME (CUBIC-METERS)	.5509#+02	.6834#-05	.0000#+00	.5509#+02
DENSITY (KILOGRAMS/CUBIC METER)	.2043# 00	.3185#+04	.0000#+00	.2047# 00
ENTROPY (GRAMCALORIES/DEGK)	.2364#+05	.1621#+02	.0000#+00	.2366#+05
REACTION ENTHALPY (KILOCALORIES)	-.2756#+04	-.4302#+02	.0000#+00	-.2799#+04
HEAT OF FORMATION (KILOCALORIES)	-.7673#+04	-.5167#+02	.0000#+00	-.7724#+04
SENSIBLE HEAT (KILOCALORIES)	.4917#+04	.8649#+01	.0000#+00	.4926#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9734#+01	.3460#+02	.0000#+00	.9747#+01
ADIABATIC EXPANSION COEFFICIENT	.1256# +1	SONIC SPEED (METERS/SECOND)		.7893# +3

DEBYE LENGTH (METERS) .33678#-05 ELECTRON DENSITY (PER M+3) .27334#+18 COLLISION FREQUENCY (PER SEC) .28350#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER)	.2717#-01	BETA1 (SQM-VOLT/NEWTON)						-.2284#+02	
BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)						-.1507#-05	
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.2284#+02	.2284#+02	.2284#+02	.2284#+02	.2284#+02	.2284#+02	.2284#+02		
HALL PARAMETER	.0000#+00	.1241#+01	.2482#+01	.3723#+01	.4964#+01	.6205#+01	.7446#+01		
PSI (METER-OHM/SQ TESLA)	.1528#-02	.6959#-03	.2642#-03	.1299#-03	.7589#-04	.4946#-04	.3469#-04		
THETA2 (VOLT/TESLA-DEGK)	.8241#-06	.3753#-06	.1425#-06	.7006#-07	.4093#-07	.2667#-07	.1871#-07		
THETA3 (VOLT/SQ TESLA-DEGK)	-.4506#-06	-.2052#-06	-.7791#-07	-.3831#-07	-.2238#-07	-.1458#-07	-.1023#-07		

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 1700 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.1372#-09	ALO2	.6146#+02	CO2	.1562#-10	CA	.2193#-12	CL2	.0000#+00	CS			
.6875#-07	FE	.1361#-01	H2	.4801#-01	K	.2739#+03	N2	.1002#-02	NA	.7334# 00	O2	.1428#-11	S2		
.3604#-08	SIO2	.6170#-05	E-	.3180#-16	AL	.8699#-13	ALO	.9975#-05	AL(OH)2	.6273#-22	AL2O	.9390#-01	CO		
.3216#-09	C O S	.3227#-06	CAOH	.1723#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1381#-05	FEO		
.3488#-03	FE(OH)2	.3310#-03	H	.9175#-04	HCL	.3019#+02	H2O	.1348#-08	H2S	.4209#-01	KCL	.4086#-03	KO		
.1732#+01	KOH	.1772#-08	N	.2602#-08	NH3	.1085# 00	NO	.3122#-04	NO2	.2176#-03	NACL	.9501#-05	NAO		
.9659#-02	NAOH	.7335#-03	O	.3687#-01	OH	.7263#-08	S	.1279#-03	SO	.9372# 00	SO2	.6396#-03	SO3		
.4102#-21	SI	.8015#-09	SIO	.5652#-08	ALO2-	.2683#-14	CN-	.0000#+00	CO2-	.3864#-05	CL-	.0000#+00	CS+		
.1540#-04	K+	.1969#-10	NO-	.5758#-07	NO2-	.1380#-08	NA+	.2287#-08	O-	.5352#-06	OH-	.5823#-08	O2-		
.1521#-11	SH-	.6134#-10	SO-	.4762#-05	SO2-										
GLASS	.1009#-01	AL2O3 L	.1577#-06	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.9256#-07	FEAL2O4 L	.2855#-01	FEO L			
.4871#-01	KALO2 L	.9635#-01	K2SIO3 L	.1190#-04	NAOH L	.3352#-02	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C							

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9410#-02	AR	.3680#-12	ALO2	.1649# 00	CO2	.4189#-13	CA	.5883#-15	CL2	.0000#+00	CS			
.1844#-09	FE	.3652#-04	H2	.1288#-03	K	.7347# 00	N2	.2687#-05	NA	.1967#-02	O2	.3830#-14	S2		
.9667#-11	SIO2	.1655#-07	E-	.8530#-19	AL	.2333#-15	ALO	.2676#-07	AL(OH)2	.1683#-24	AL2O	.2519#-03	CO		
.8625#-12	C O S	.8656#-09	CAOH	.4620#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3704#-08	FEO		
.9356#-06	FE(OH)2	.8877#-06	H	.2461#-06	HCL	.8098#-01	H2O	.3616#-11	H2S	.1129#-03	KCL	.1096#-05	KO		
.4646#-02	KOH	.4754#-11	N	.6979#-11	NH3	.2911#-03	NO	.8373#-07	NO2	.5836#-06	NACL	.2548#-07	NAO		
.2591#-04	NAOH	.1967#-05	O	.9890#-04	OH	.1948#-10	S	.3431#-06	SO	.2514#-02	SO2	.1715#-05	SO3		
.1100#-23	SI	.2150#-11	SIO	.1516#-10	ALO2-	.7196#-17	CN-	.0000#+00	CO2-	.1036#-07	CL-	.0000#+00	CS+		
.4131#-07	K+	.5282#-13	NO-	.1544#-09	NO2-	.3702#-11	NA+	.6134#-11	O-	.1435#-08	OH-	.1562#-10	O2-		
.4080#-14	SH-	.1645#-12	SO-	.1277#-07	SO2-										
GLASS	.5282#-01	AL2O3 L	.8259#-06	MULLITE	.2042#-01	CAO L	.0000#+00	CSOH L	.4847#-06	FEAL2O4 L	.1495# 00	FEO L			
.2551# 00	KALO2 L	.5045# 00	K2SIO3 L	.6230#-04	NAOH L	.1755#-01	SIO2 L								
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C							

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3728#+03	.1910# 00	.0000#+00	.3730#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3019#+02	.1212#+03	.0000#+00	.3024#+02
MASS	(KILOGRAMS)	.1126#+02	.2314#-01	.0000#+00	.1128#+02
VOLUME	(CUBIC-METERS)	.5201#+02	.7387#-05	.0000#+00	.5201#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2164# 00	.3133#+04	.0000#+00	.2169# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2342#+05	.1689#+02	.0000#+00	.2344#+05
REACTION ENTHALPY	(KILOCALORIES)	-.3135#+04	-.4514#+02	.0000#+00	-.3180#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7690#+04	-.5366#+02	.0000#+00	-.7744#+04
SENSIBLE HEAT	(KILOCALORIES)	.4555#+04	.8524#+01	.0000#+00	.4563#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9667#+01	.3518#+02	.0000#+00	.9680#+01
ADIABATIC EXPANSION COEFFICIENT		.1259# +1	SONIC SPEED (METERS/SECOND)		.7677# +3

DEBYE LENGTH (METERS) .53272#-05 ELECTRON DENSITY (PER M+3) .71453#+17 COLLISION FREQUENCY (PER SEC) .30072#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER) .6698#-02 BETA1 (SQM-VOLT/NEWTON) -.8736#+02

BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00		.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	-.2835#-05
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.8736#+02	.8736#+02	.8736#+02	.8736#+02	.8736#+02	
CHI	(METER-OHM/TESLA)	.8739#+02	.8737#+02	.2341#+01	.3511#+01	.4681#+01	.5852#+01	.7022#+01	
HALL PARAMETER		.0000#+00	.1171#+01	.3675#-02	.1821#-02	.1067#-02	.6965#-03	.4889#-03	
PSI	(METER-OHM/SQ TESLA)	.1982#-01	.9447#-02	.2755#-06	.1365#-06	.7999#-07	.5220#-07	.3664#-07	
THETA2	(VOLT/TESLA-DEGK)	.1486#-05	.7080#-06	-.1444#-06	-.7152#-07	-.4192#-07	-.2736#-07	-.1920#-07	
THETA3	(VOLT/SQ TESLA-DEGK)	-.7787#-06	-.3710#-06						

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U S BU MINES   PGH ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                                    3  9

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 90% ASH REJECTION
    .3508#+01 AR       .6890#-01 ALO2     .6156#+02 CO2      .3900#-02 CA       .2120#-01 CL2      .0000#+00 CS       .2890#-01 FE
    .3110#+02 H2       .2064#+01 K        .2740#+03 N2       .1090#-01 NA       .1772#+02 O2       .4690# 00 S2       .9970#-01 SIO2

PRESSURE =  1.00 ATM,  TEMPERATURE = 1600 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......     .3508#+01  AR      .8329#-11  ALO2    .6152#+02  CO2     .7339#-12  CA      .1612#-12  CL2     .0000#+00  CS
    .4579#-08  FE      .5152#-02  H2      .1445#-01  K       .2739#+03  N2      .4996#-03  NA      .5685# 00  O2      .4536#-13  S2
    .1445#-09  SIO2    .1007#-05  E-      .2664#-18  AL      .1882#-14  ALO     .1937#-05  AL(OH)2 .1313#-24  AL2O    .3097#-01  CO
    .2781#-10  C O S   .4858#-07  CAOH    .8450#-06  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .1725#-06  FEO
    .1780#-03  FE(OH)2 .7504#-04  H       .7376#-04  HCL     .3049#+02  H2O     .1359#-09  H2S     .4199#-01  KCL     .1172#-03  KO
    .1166#+01  KOH     .2133#-09  N       .7786#-09  NH3     .6400#-01  NO      .2095#-04  NO2     .3381#-03  NACL    .4652#-05  NAO
    .1003#-01  NAOH    .2093#-03  O       .1688#-01  OH      .4938#-09  S       .2616#-04  SO      .6409# 00  SO2     .5845#-03  SO3
    .7531#-24  SI      .1517#-10  SIO     .3726#-09  ALO2-   .8710#-16  CN-     .0000#+00  CO2-    .1701#-05  CL-     .0000#+00  CS+
    .3821#-05  K+      .2227#-11  NO-     .2018#-07  NO2-    .4037#-09  NA+     .2324#-09  O-      .1023#-06  OH-     .1031#-08  O2-
    .6023#-13  SH-     .3709#-11  SO-     .9894#-06  SO2-
  GLASS ..........     .8071#-02  AL2O3 L .1693#-07  MULLITE .3900#-02  CAO   L .0000#+00  CSOH  L .1575#-07  FEAL2O4L.2872#-01  FEO   L
    .5276#-01 KALO2 L .9791#-01  K2SIO3 L.2766#-04  NAOH  L .1788#-02  SIO2  L
  SULF. AND CARB..     .1787#-03  K2CO3 L .0000#+00  K2CO3 C .2964# 00  K2SO4 L .0000#+00  K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......     .9431#-02  AR      .2239#-13  ALO2    .1654# 00  CO2     .1973#-14  CA      .4334#-15  CL2     .0000#+00  CS
    .1231#-10  FE      .1385#-04  H2      .3883#-04  K       .7363# 00  N2      .1343#-05  NA      .1528#-02  O2      .1219#-15  S2
    .3885#-12  SIO2    .2708#-08  E-      .7160#-21  AL      .5058#-17  ALO     .5207#-08  AL(OH)2 .3530#-27  AL2O    .8326#-04  CO
    .7475#-13  C O S   .1306#-09  CAOH    .2271#-08  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .4638#-09  FEO
    .4786#-06  FE(OH)2 .2017#-06  H       .1983#-06  HCL     .8197#-01  H2O     .3652#-12  H2S     .1129#-03  KCL     .3150#-06  KO
    .3133#-02  KOH     .5735#-12  N       .2093#-11  NH3     .1720#-03  NO      .5632#-07  NO2     .9089#-06  NACL    .1250#-07  NAO
    .2696#-04  NAOH    .5625#-08  O       .4538#-04  OH      .1327#-11  S       .7032#-07  SO      .1723#-02  SO2     .1571#-05  SO3
    .2024#-26  SI      .4077#-13  SIO     .1001#-11  ALO2-   .2341#-18  CN-     .0000#+00  CO2-    .4571#-08  CL-     .0000#+00  CS+
    .1027#-07  K+      .5987#-14  NO-     .5425#-10  NO2-    .1085#-11  NA+     .6247#-12  O-      .2750#-09  OH-     .2772#-11  O2-
    .1619#-15  SH-     .9971#-14  SO-     .2660#-08  SO2-
  GLASS ..........     .4178#-01  AL2O3 L .8766#-07  MULLITE .2019#-01  CAO   L .0000#+00  CSOH  L .8151#-07  FEAL2O4L.1487# 00  FEO   L
    .2731# 00 KALO2 L .5069# 00  K2SIO3 L.1432#-03  NAOH  L .9254#-02  SIO2  L
  SULF. AND CARB..     .6025#-03  K2CO3 L .0000#+00  K2CO3 C .9994# 00  K2SO4 L .0000#+00  K2SO4 C

                                          IDEALGAS     GLASS ..     SULF. AN      MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)   .3720#+03   .1932# 00   .2966# 00   .3725#+03
AVERAGE MOLECULAR WEIGHT            (AMU)    .3012#+02   .1216#+03   .1742#+03   .3028#+02
MASS                          (KILOGRAMS)    .1120#+02   .2349#-01   .5168#-01   .1128#+02
VOLUME                   (CUBIC-METERS)      .4884#+02   .7546#-05   .1942#-04   .4884#+02
DENSITY          (KILOGRAMS/CUBIC METER)     .2294# 00   .3114#+04   .2662#+04   .2309# 00
ENTROPY             (GRAMCALORIES/DEGK)      .2313#+05   .1675#+02   .3624#+02   .2318#+05
REACTION ENTHALPY         (KILOCALORIES)    -.3478#+04  -.4619#+02  -.8134#+02  -.3606#+04
HEAT OF FORMATION         (KILOCALORIES)    -.7661#+04  -.5416#+02  -.9842#+02  -.7814#+04
SENSIBLE HEAT             (KILOCALORIES)     .4183#+04   .7974#+01   .1709#+02   .4208#+04
FROZEN CP              (GMCAL/GMMOL-DEGK)    .9582#+01   .3488#+02   .4705#+02   .9625#+01
ADIABATIC EXPANSION COEFFICIENT              .1262# +1    SONIC SPEED (METERS/SECOND)        .7465# +3

DEBYE LENGTH          (METERS) .96503#-05   ELECTRON DENSITY     (PER M+3) .12420#+17   COLLISION FREQUENCY  (PER SEC) .31152#+12
COEFFICIENTS FOR OHM'S LAW..   SIGMA = SCALAR COND  (MHO/METER)    .1126#-02    BETA1     (SQM-VOLT/NEWTON)          -.5026#+03
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)   .0000#+00     THETA1    (VOLT/DEGK)                -.5698#-05
MAGNETIC INDUCTION (ABS B)       (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                    (METER-OHM/TESLA)  .5034#+03   .5030#+03   .5027#+03   .5026#+03   .5026#+03   .5026#+03   .5026#+03
HALL PARAMETER                            .0000#+00   .1132#+01   .2263#+01   .3395#+01   .4526#+01   .5657#+01   .6788#+01
PSI                 (METER-OHM/SQ TESLA)  .4548# 00   .2196# 00   .8607#-01   .4275#-01   .2508#-01   .1637#-01   .1150#-01
THETA2                (VOLT/TESLA-DEGK)   .2948#-05   .1424#-05   .5580#-06   .2771#-06   .1626#-06   .1061#-06   .7453#-07
THETA3             (VOLT/SQ TESLA-DEGK)  -.1525#-05  -.7366#-06  -.2887#-06  -.1434#-06  -.8412#-07  -.5493#-07  -.3857#-07
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.5890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2		

PRESSURE = 1.00 ATM, TEMPERATURE = 1500 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.5290#-12	ALO2	.6155#+02	CO2	.2640#-13	CA	.5635#-12	CL2	.0000#+00	CS			
.2422#-09	FE	.1896#-02	H2	.1633#-02	K	.2739#+03	N2	.2147#-03	NA	.3501# 00	O2	.3048#-15	S2		
.2090#-10	SIO2	.5844#-07	E-	.2170#-20	AL	.4092#-16	ALO	.5060#-06	AL(OH)2	.3724#-27	AL2O	.9677#-02	CO		
.1107#-11	C O S	.6244#-08	CAOH	.8396#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1686#-07	FEO		
.8626#-04	FE(OH)2	.1471#-04	H	.1347#-03	HCL	.3093#+02	H2O	.6460#-11	H2S	.4110#-01	KCL	.1139#-04	KO		
.3132# 00	KOH	.1934#-10	N	.2304#-09	NH3	.3191#-01	NO	.1098#-04	NO2	.1168#-02	NACL	.1771#-05	NAO		
.9453#-02	NAOH	.4589#-04	O	.6637#-02	OH	.1360#-10	S	.2266#-05	SO	.1980# 00	SO2	.2292#-03	SO3		
.4009#-26	SI	.1025#-11	SIO	.1164#-10	ALO2-	.9703#-18	CN-	.0000#+00	CO2-	.6706#-06	CL-	.0000#+00	CS+		
.7735#-06	K+	.7681#-13	NO-	.2264#-08	NO2-	.2110#-09	NA+	.7068#-11	O-	.6707#-08	OH-	.5342#-10	O2-		
.4212#-15	SH-	.3619#-13	SO-	.3557#-07	SO2-										
GLASS	.1553#-01	AL2O3 L	.7387#-06	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.5488#-08	FEAL2O4 L	.2882#-01	FEO L			
.3784#-01	KALO2 L	.9505#-01	K2SIO3 L	.6230#-04	NAOH L	.4656#-02	SIO2 L								
SULF. AND CARB..	.2813#-03	K2CO3 L	.0000#+00	K2CO3 C	.7398# 00	K2SO4 L	.0000#+00	K2SO4 C							

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9460#-02	AR	.1426#-14	ALO2	.1659# 00	CO2	.7119#-16	CA	.1519#-14	CL2	.0000#+00	CS			
.6530#-12	FE	.5112#-05	H2	.4403#-05	K	.7386# 00	N2	.5788#-06	NA	.9441#-03	O2	.8219#-18	S2		
.5635#-13	SIO2	.1576#-09	E-	.5851#-23	AL	.1103#-18	ALO	.1364#-08	AL(OH)2	.1004#-29	AL2O	.2609#-04	CO		
.2984#-14	C O S	.1683#-10	CAOH	.2264#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.4545#-10	FEO		
.2326#-06	FE(OH)2	.3966#-07	H	.3632#-06	HCL	.8339#-01	H2O	.1742#-13	H2S	.1108#-03	KCL	.3071#-07	KO		
.8444#-03	KOH	.5214#-13	N	.6211#-12	NH3	.8603#-04	NO	.2960#-07	NO2	.3149#-05	NACL	.4775#-06	NAO		
.2549#-04	NAOH	.1237#-06	O	.1790#-04	OH	.3668#-13	S	.6109#-08	SO	.5338#-03	SO2	.6180#-06	SO3		
.1081#-28	SI	.2764#-14	SIO	.3137#-13	ALO2-	.2616#-20	CN-	.0000#+00	CO2-	.1808#-08	CL-	.0000#+00	CS+		
.2085#-05	K+	.2071#-15	NO-	.6105#-11	NO2-	.5690#-12	NA+	.1906#-13	O-	.1808#-10	OH-	.1440#-12	O2-		
.1136#-17	SH-	.9757#-16	SO-	.9591#-10	SO2-										
GLASS	.8354#-01	AL2O3 L	.3975#-05	MULLITE	.2099#-01	CAO L	.0000#+00	CSOH L	.2953#-07	FEAL2O4 L	.1550# 00	FEO L			
.2036# 00	KALO2 L	.5114# 00	K2SIO3 L	.3352#-03	NAOH L	.2505#-01	SIO2 L								
SULF. AND CARB..	.3801#-03	K2CO3 L	.0000#+00	K2CO3 C	.9996# 00	K2SO4 L	.0000#+00	K2SO4 C							

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3709#+03	.1859# 00	.7401# 00	.3718#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3000#+02	.1212#+03	.1743#+03	.3033#+02
MASS	(KILOGRAMS)	.1113#+02	.2253#-01	.1290# 00	.1128#+02
VOLUME	(CUBIC-METERS)	.4565#+02	.7028#-05	.4845#-04	.4565#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2437# 00	.3206#+04	.2662#+04	.2471# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2279#+05	.1560#+02	.8817#+02	.2289#+05
REACTION ENTHALPY	(KILOCALORIES)	-.3799#+04	-.4580#+02	-.2064#+03	-.4051#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7610#+04	-.5279#+02	-.2456#+03	-.7908#+04
SENSIBLE HEAT	(KILOCALORIES)	.3811#+04	.6990#+01	.3915#+02	.3857#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9481#+01	.3451#+02	.4705#+02	.9569#+01
ADIABATIC EXPANSION COEFFICIENT		.1265# +1	SONIC SPEED (METERS/SECOND)		.7252# +3

DEBYE LENGTH	(METERS) .19070#-04	ELECTRON DENSITY	(PER M+3) .77100#+15	COLLISION FREQUENCY	(PER SEC) .31930#+12			
COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND	(MHO/METER)	.6840#-04	BETA1	(SQM-VOLT/NEWTON)			-.8096#+04
BETA2 (ASSUMING ZERO ION SLIP)		(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)			-.9646#-05
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02
CHI	(METER-OHM/TESLA)	.8136#+04	.8115#+04	.8103#+04	.8099#+04	.8098#+04	.8097#+04	.8097#+04
HALL PARAMETER		.0000#+00	.1110#+01	.2217#+01	.3324#+01	.4431#+01	.5539#+01	.6646#+01
PSI	(METER-OHM/SQ TESLA)	.2105#+02	.1014#+02	.3967#+01	.1969#+01	.1155#+01	.7541# 00	.5295# 00
THETA2	(VOLT/TESLA-DEGK)	.5005#-05	.2410#-05	.9431#-06	.4681#-06	.2746#-06	.1793#-06	.1259#-06
THETA3	(VOLT/SQ TESLA-DEGK)	-.2597#-05	-.1250#-05	-.4893#-06	-.2429#-06	-.1425#-06	-.9301#-07	-.6630#-07

U S BU MINES PGH ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6 4 9

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#+01	CL2	.0000#+00	CS	.2890#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 1400 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.2097#-13	ALO2	.6155#+02	CO2	.4999#-15	CA	.3056#-11	CL2	.0000#+00	CS			
.7049#-11	FE	.5077#-03	H2	.1132#-03	K	.2740#+03	N2	.5838#-04	NA	.2806# 00	O2	.5123#-18	S2		
.2481#-11	SIO2	.1432#-06	E-	.5920#-23	AL	.4055#-18	ALO	.8381#-07	AL(OH)2	.2374#-30	AL2O	.2166#-02	CO		
.1679#-13	C O S	.5481#-09	CAOH	.9506#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1166#-08	FEO		
.3725#-04	FE(OH)2	.2100#-05	H	.2801#-03	HCL	.3106#+02	H2O	.1194#-12	H2S	.3820#-01	KCL	.7826#-06	KO		
.6309#-01	KOH	.1251#-11	N	.4410#-10	NH3	.1702#-01	NO	.7303#-05	NO2	.3921#-02	NACL	.4964#-06	NAO		
.6797#-02	NAOH	.9581#-05	O	.2477#-02	OH	.1608#-12	S	.1172#-06	SO	.5157#-01	SO2	.9247#-04	SO3		
.7861#-29	SI	.4326#-13	SIO	.1284#-12	ALO2-	.2544#-20	CN-	.0000#+00	CO2-	.1649#-06	CL-	.0000#+00	CS+		
.1671#-06	K+	.1205#-14	NO-	.1624#-09	NO2-	.1151#-09	NA+	.9673#-13	O-	.2009#-09	OH-	.1582#-11	O2-		
.5952#-18	SH-	.9636#-16	SO-	.4947#-09	SO2-										
GLASS	.2410#-01	AL2O3 L	.2855#-04	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.1214#-08	FEAL2O4	L .2886#-01	FEO L			
.2052#-01	KALO2 L	.8453#-01	K2SIO3 L	.1230#-03	NAOH L	.1512#-01	SIO2 L								
SULF. AND CARB..	.1717#-03	K2CO3 L	.0000#+00	K2CO3 C	.8863# 00	K2SO4 L	.0000#+00	K2SO4 C							

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9469#-02	AR	.5659#-16	ALO2	.1661# 00	CO2	.1349#-17	CA	.8247#-14	CL2	.0000#+00	CS			
.1902#-13	FE	.1370#-05	H2	.3056#-06	K	.7393# 00	N2	.1576#-06	NA	.7572#-03	O2	.1383#-20	S2		
.6696#-14	SIO2	.3864#-11	E-	.1598#-25	AL	.1094#-20	ALO	.2262#-09	AL(OH)2	.6407#-33	AL2O	.5845#-05	CO		
.4530#-16	C O S	.1479#-11	CAOH	.2565#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3147#-11	FEO		
.1005#-06	FE(OH)2	.5668#-08	H	.7560#-06	HCL	.8382#-01	H2O	.3222#-15	H2S	.1031#-03	KCL	.2112#-08	KO		
.1703#-03	KOH	.3376#-14	N	.1190#-12	NH3	.4593#-04	NO	.1971#-07	NO2	.1058#-04	NACL	.1340#-08	NAO		
.1834#-04	NAOH	.2586#-07	O	.6684#-05	OH	.4339#-15	S	.3162#-09	SO	.1392#-03	SO2	.2496#-06	SO3		
.2122#-31	SI	.1167#-15	SIO	.3466#-15	ALO2-	.6866#-23	CN-	.0000#+00	CO2-	.4450#-09	CL-	.0000#+00	CS+		
.4509#-09	K+	.3251#-17	NO-	.4383#-12	NO2-	.3107#-12	NA+	.2611#-15	O-	.5421#-12	OH-	.4269#-14	O2-		
.1606#-20	SH-	.2601#-16	SO-	.1335#-11	SO2-										
GLASS	.1360# 00	AL2O3 L	.1611#-03	MULLITE	.2201#-01	CAO L	.0000#+00	CSOH L	.6853#-08	FEAL2O4	L .1629# 00	FEO L			
.1158# 00	KALO2 L	.4771# 00	K2SIO3 L	.6943#-03	NAOH L	.8531#-01	SIO2 L								
SULF. AND CARB..	.1937#-03	K2CO3 L	.0000#+00	K2CO3 C	.9998# 00	K2SO4 L	.0000#+00	K2SO4 C							

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3705#+03	.1772# 00	.8865# 00	.3716#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.2997#+02	.1170#+03	.1743#+03	.3035#+02
MASS (KILOGRAMS)	.1110#+02	.2073#-01	.1545# 00	.1128#+02
VOLUME (CUBIC-METERS)	.4257#+02	.6291#-05	.5804#-04	.4257#+02
DENSITY (KILOGRAMS/CUBIC METER)	.2608# 00	.3295#+04	.2662#+04	.2650# 00
ENTROPY (GRAMCALORIES/DEGK)	.2251#+05	.1386#+02	.1027#+03	.2263#+05
REACTION ENTHALPY (KILOCALORIES)	-.4137#+04	-.4434#+02	-.2515#+03	-.4133#+04
HEAT OF FORMATION (KILOCALORIES)	-.7594#+04	-.5017#+02	-.2942#+03	-.7938#+04
SENSIBLE HEAT (KILOCALORIES)	.3456#+04	.5831#+01	.4272#+02	.3505#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9376#+01	.3259#+02	.4705#+02	.9477#+01
ADIABATIC EXPANSION COEFFICIENT	.1269# +1	SONIC SPEED (METERS/SECOND)		.7021# +3

DEBYE LENGTH (METERS) .37623#-04 ELECTRON DENSITY (PER M+3) .20259#+14 COLLISION FREQUENCY (PER SEC) .34700#+12

COEFFICIENTS FOR OHM,S LAW.. SIGMA = SCALAR COND (MHO/METER)	.1659#-05	BETA1 (SQM-VOLT/NEWTON)						-.3081#+06	
BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)						-.1226#-04	
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.3106#+06	.3094#+06	.3086#+06	.3084#+06	.3083#+06	.3082#+06	.3082#+06		
HALL PARAMETER	.0000#+00	.1027#+01	.2048#+01	.3070#+01	.4092#+01	.5113#+01	.6136#+01		
PSI (METER-OHM/SQ TESLA)	.1210#+04	.6235#+03	.2540#+03	.1278#+03	.7536#+02	.4933#+02	.3469#+02		
THETA2 (VOLT/TESLA-DEGK)	.5948#-05	.3064#-05	.1248#-05	.6279#-06	.3703#-06	.2424#-06	.1705#-06		
THETA3 (VOLT/SQ TESLA-DEGK)	-.2886#-05	-.1486#-05	-.6055#-06	-.3046#-06	-.1796#-06	-.1176#-06	-.8270#-07		

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2
										.2890#-01	FE
										.9970#-01	SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 1300 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.4783#-15	ALO2	.6156#+02	CO2	.4661#-17	CA	.1082#-10	CL2	.0000#+00 CS
.1074#-12	FE	.1012#-03	H2	.7226#-05	K	.2740#+03	N2	.8638#-05	NA	.2601# 00	O2	.3177#-22 S2
.9611#-13	SIO2	.2626#-10	E-	.5097#-26	AL	.1692#-20	ALO	.8877#-08	AL(OH)2	.3282#-34	AL2O	.3508#-03 CO
.3843#-16	C O S	.3133#-10	CAOH	.7806#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.5263#-10 FEO
.1397#-04	FE(OH)2	.2134#-06	H	.4402#-03	HCL	.3109#+02	H2O	.3412#-15	H2S	.3449#-01	KCL	.5409#-07 KO
.1440#-01	KOH	.5311#-13	N	.5688#-11	NH3	.9007#-02	NO	.5465#-05	NO2	.7467#-02	NACL	.8290#-07 NAO
.3235#-02	NAOH	.1726#-05	O	.8246#-03	OH	.3016#-15	S	.1317#-08	SO	.4109#-02	SO2	.1340#-04 SO3
.2230#-32	SI	.4621#-15	SIO	.8715#-15	ALO2-	.2910#-23	CN-	.0000#+00	CO2-	.3035#-07	CL-	.0000#+00 CS+
.3036#-07	K+	.1426#-16	NO-	.1211#-10	NO2-	.2910#-10	NA+	.9785#-15	O-	.4773#-11	OH-	.4254#-13 O2-
.1198#-21	SH-	.4604#-19	SO-	.1751#-11	SO2-						
GLASS	.3288#-01	AL2O3 L	.2216#-03	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.1760#-09	FEAL2O4 L	.2889#-01 FEO L
.1817#-02	KALO2 L	.7258#-01	K2SIO3 L	.1889#-03	NAOH L	.2668#-01	SIO2 L				
SULF. AND CARB..	.1861#-03	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9339# 00	K2SO4 C			

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9471#-02	AR	.1291#-17	ALO2	.1662# 00	CO2	.1258#-19	CA	.2921#-13	CL2	.0000#+00 CS
.2900#-15	FE	.2732#-06	H2	.1951#-07	K	.7395# 00	N2	.2332#-07	NA	.7022#-03	O2	.8575#-25 S2
.2595#-15	SIO2	.7089#-13	E-	.1376#-28	AL	.4569#-23	ALO	.2396#-10	AL(OH)2	.8859#-37	AL2O	.9469#-06 CO
.1037#-18	C O S	.8458#-13	CAOH	.2107#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1421#-12 FEO
.3770#-07	FE(OH)2	.5760#-09	H	.1186#-05	HCL	.8392#-01	H2O	.9210#-18	H2S	.9311#-04	KCL	.1460#-09 KO
.3888#-04	KOH	.1434#-15	N	.1535#-13	NH3	.2431#-04	NO	.1475#-07	NO2	.2016#-04	NACL	.2238#-09 NAO
.8734#-05	NAOH	.4658#-08	O	.2226#-05	OH	.8141#-18	S	.3555#-11	SO	.1109#-04	SO2	.3616#-07 SO3
.6019#-35	SI	.1247#-17	SIO	.2353#-17	ALO2-	.7856#-26	CN-	.0000#+00	CO2-	.8192#-10	CL-	.0000#+00 CS+
.8196#-10	K+	.3848#-19	NO-	.3270#-13	NO2-	.7854#-13	NA+	.2641#-17	O-	.1288#-13	OH-	.1148#-15 O2-
.3233#-24	SH-	.1243#-21	SO-	.4728#-14	SO2-						
GLASS	.1967# 00	AL2O3 L	.1326#-02	MULLITE	.2333#-01	CAO L	.0000#+00	CSOH L	.1053#-08	FEAL2O4 L	.1728# 00 FEO L
.1087#-01	KALO2 L	.4342# 00	K2SIO3 L	.1130#-02	NAOH L	.1596# 00	SIO2 L				
SULF. AND CARB..	.1992#-03	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9998# 00	K2SO4 C			

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3704#+03	.1671# 00	.9341# 00	.3715#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2996#+02	.1120#+03	.1743#+03	.3036#+02
MASS	(KILOGRAMS)	.1110#+02	.1873#-01	.1628# 00	.1128#+02
VOLUME	(CUBIC-METERS)	.3952#+02	.5493#-05	.6115#-04	.3952#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2808# 00	.3409#+04	.2662#+04	.2854# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2225#+05	.1196#+02	.9881#+02	.2236#+05
REACTION ENTHALPY	(KILOCALORIES)	-.4480#+04	-.4252#+02	-.2776#+03	-.4800#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7589#+04	-.4726#+02	-.3209#+03	-.7958#+04
SENSIBLE HEAT	(KILOCALORIES)	.3110#+04	.4733#+01	.4324#+02	.3158#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9260#+01	.3119#+02	.5575#+02	.9387#+01
ADIABATIC EXPANSION COEFFICIENT		.1273# +1	SONIC SPEED (METERS/SECOND)		.6778# +3

DEBYE LENGTH (METERS) .81768#-04 ELECTRON DENSITY (PER M+3) .40025#+12 COLLISION FREQUENCY (PER SEC) .38032#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER) .2998#-07 BETA1 (SQM-VOLT/NEWTON) -.1559#+08

BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)						-.1402#-04
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.1576#+08	.1569#+08	.1563#+08	.1561#+08	.1561#+08	.1560#+08	.1560#+08	
HALL PARAMETER		.0000#+00	.9406# 00	.1875#+01	.2809#+01	.3743#+01	.4678#+01	.5613#+01	
PSI	(METER-OHM/SQ TESLA)	.7407#+05	.4105#+05	.1757#+05	.8992#+04	.5342#+04	.3510#+04	.2473#+04	
THETA2	(VOLT/TESLA-DEGK)	.6288#-05	.3485#-05	.1491#-05	.7633#-06	.4534#-06	.2979#-06	.2099#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.2819#-05	-.1563#-05	-.6686#-06	-.3422#-06	-.2033#-06	-.1336#-06	-.9413#-07	

U S BU MINES PGH ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6 4 11

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.9970#-01	SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 1200 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS		.3508#+01	AR	.4392#-17	ALO2	.6156#+02	CO2	.1716#-19	CA	.2736#-10	CL2	.0000#+00	CS
.6922#-15	FE	.1480#-04	H2	.4049#-06	K	.2740#+03	N2	.7348#-06	NA	.2603# 00	O2	.4706#-28	S2
.1085#-14	SIO2	.3365#-12	E-	.9393#-30	AL	.2058#-23	ALO	.4636#-09	AL(OH)2	.5146#-39	AL2O	.3999#-04	CO
.1061#-19	C O S	.9784#-12	CAOH	.4731#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1265#-11	FEO
.4006#-05	FE(OH)2	.1453#-07	H	.5568#-03	HCL	.3109#+02	H2O	.1220#-18	H2S	.3233#-01	KCL	.3473#-08	KO
.3660#-02	KOH	.1337#-14	N	.4892#-12	NH3	.4483#-02	NO	.4256#-05	NO2	.9514#-02	NACL	.8483#-08	NAO
.1102#-02	NAOH	.2444#-06	O	.2344#-03	OH	.6913#-19	S	.2541#-11	SO	.8137#-04	SO2	.5596#-06	SO3
.7420#-37	SI	.1104#-17	SIO	.2612#-17	ALO2-	.1316#-26	CN-	.0000#+00	CO2-	.4298#-08	CL-	.0000#+00	CS+
.4295#-08	K+	.1129#-18	NO-	.8597#-12	NO2-	.3459#-11	NA+	.6462#-17	O-	.8340#-13	OH-	.9181#-15	O2-
.2654#-26	SH-	.2995#-23	SO-	.1226#-14	SO2-								
GLASS		.2907#-01	AL2O3 L	.1206#-03	MULLITE	.3900#-02	CAO L	.0000#+00	CSOH L	.1019#-10	FEAL2O4 L	.2890#-01	FEO L
.1003#-01	KALO2 L	.7065#-01	K2SIO3 L	.2834#-03	NAOH L	.2881#-01	SIO2 L						
SULF. AND CARB..		.4165#-03	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9379# 00	K2SO4 C				

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS		.9471#-02	AR	.1186#-19	ALO2	.1662# 00	CO2	.4632#-22	CA	.7386#-13	CL2	.0000#+00	CS
.1869#-17	FE	.3995#-07	H2	.1093#-08	K	.7396# 00	N2	.1984#-08	NA	.7027#-03	O2	.1270#-30	S2
.2928#-17	SIO2	.9085#-15	E-	.2536#-32	AL	.5555#-26	ALO	.1251#-11	AL(OH)2	.1389#-41	AL2O	.1079#-06	CO
.2864#-22	C O S	.2641#-14	CAOH	.1277#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3388#-14	FEO
.1081#-07	FE(OH)2	.3924#-10	H	.1503#-05	HCL	.8394#-01	H2O	.3293#-21	H2S	.8727#-04	KCL	.9377#-11	KO
.9881#-05	KOH	.3610#-17	N	.1321#-14	NH3	.1210#-04	NO	.1149#-07	NO2	.2508#-04	NACL	.2290#-10	NAO
.2976#-05	NAOH	.6598#-09	O	.6327#-06	OH	.1866#-21	S	.6861#-14	SO	.2197#-06	SO2	.1511#-08	SO3
.2003#-39	SI	.2980#-20	SIO	.7051#-20	ALO2-	.3553#-29	CN-	.0000#+00	CO2-	.1160#-10	CL-	.0000#+00	CS+
.1160#-10	K+	.3049#-21	NO-	.2321#-14	NO2-	.9336#-14	NA+	.1745#-19	O-	.2251#-15	OH-	.2478#-17	O2-
.7165#-29	SH-	.8085#-26	SO-	.3311#-17	SO2-								
GLASS		.1692# 00	AL2O3 L	.7022#-03	MULLITE	.2271#-01	CAO L	.0000#+00	CSOH L	.5934#-10	FEAL2O4 L	.1682# 00	FEO L
.5842#-01	KALO2 L	.4113# 00	K2SIO3 L	.1650#-02	NAOH L	.1677# 00	SIO2 L						
SULF. AND CARB..		.4438#-03	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9996# 00	K2SO4 C				

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3704#+03	.1718# 00	.9383# 00	.3715#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2996#+02	.1103#+03	.1742#+03	.3036#+02
MASS	(KILOGRAMS)	.1110#+02	.1894#-01	.1635# 00	.1128#+02
VOLUME	(CUBIC-METERS)	.3648#+02	.5710#-05	.6143#-04	.3648#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.3042# 00	.3317#+04	.2662#+04	.3092# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2197#+05	.1174#+02	.9525#+02	.2208#+05
REACTION ENTHALPY	(KILOCALORIES)	-.4820#+04	-.4326#+02	-.2839#+03	-.5147#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7589#+04	-.4753#+02	-.3223#+03	-.7959#+04
SENSIBLE HEAT	(KILOCALORIES)	.2769#+04	.4263#+01	.3842#+02	.2812#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9130#+01	.3061#+02	.5134#+02	.9247#+01
ADIABATIC EXPANSION COEFFICIENT		.1278# +1	SONIC SPEED (METER$/SECOND)		.6525# +3

DEBYE LENGTH	(METERS)	.20064#-03	ELECTRON DENSITY	(PER M+3)	.55566#+10	COLLISION FREQUENCY	(PER SEC)	.41749#+12	
COEFFICIENTS FOR OHM'S LAW..	SIGMA = SCALAR COND	(MHO/METER)	.3800#-09	BETA1	(SQM-VOLT/NEWTON			-.1123#+10	
BETA2 (ASSUMING ZERO ION SLIP)		(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)			-.1548#-04	
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.1138#+10	.1132#+10	.1127#+10	.1125#+10	.1125#+10	.1124#+10	.1124#+10	
HALL PARAMETER		.0000#+00	.8603# 00	.1713#+01	.2566#+01	.3419#+01	.4272#+01	.5125#+01	
PSI	(METER-OHM/SQ TESLA)	.5994#+07	.3560#+07	.1605#+07	.8380#+06	.5021#+06	.3313#+06	.2340#+06	
THETA2	(VOLT/TESLA-DEGK)	.6399#-05	.3801#-05	.1714#-05	.8946#-06	.5360#-06	.3537#-06	.2499#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.2646#-05	-.1571#-05	-.7084#-06	-.3699#-06	-.2216#-06	-.1462#-06	-.1033#-06	

U S BU MINES PGH ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.00MOL K2O/KG COAL 90% ASH REJECTION

.3508#+01	AR	.6890#-01	ALO2	.6156#+02	CO2	.3900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.2890#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4490# 00	S2	.9970#-01	SIO2		

PRESSURE = 1.00 ATM, TEMPERATURE = 1100 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.2037#-19	ALO2	.6155#+02	CO2	.2372#-22	CA	.6520#-10	CL2	.0000#+00	CS			
.1837#-17	FE	.1532#-05	H2	.1585#-07	K	.2740#+03	N2	.3618#-07	NA	.2616# 00	O2	.2648#-35	S2		
.4295#-17	SIO2	.2291#-14	E-	.4259#-34	AL	.8640#-27	ALO	.1635#-10	AL(OH)2	.1483#-44	AL2O	.3053#-05	CO		
.4351#-24	C O S	.1705#-13	CAOH	.2342#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1565#-13	FEO		
.9607#-06	FE(OH)2	.6137#-09	H	.6542#-03	HCL	.3109#+02	H2O	.6825#-23	H2S	.3153#-01	KCL	.1601#-09	KO		
.8605#-03	KOH	.1731#-10	N	.2711#-13	NH3	.1971#-02	NO	.3192#-05	NO2	.1022#-01	NACL	.5211#-09	NAO		
.2807#-03	NAOH	.2438#-07	O	.5314#-04	OH	.2278#-23	S	.1040#-14	SO	.5253#-06	SO2	.8764#-08	SO3		
.2986#-42	SI	.6959#-21	SIO	.3693#-20	ALO2-	.1676#-30	CN-	.0000#+00	CO2-	.4383#-09	CL-	.0000#+00	CS-		
.4382#-09	K+	.4276#-21	NO-	.4370#-13	NO2-	.2194#-12	NA+	.1979#-19	O-	.8050#-15	OH-	.1137#-16	O2-		
.6371#-32	SH-	.2567#-28	SO-	.1761#-18	SO2-										
GLASS	.3391#-01	AL2O3 L	.1031#-03	MULLITE	.3900#-02	CAO	L	.0000#+00	CSOH	L	.4866#-12	FEAL2O4	L	.2890#-01	FEO	L
.4653#-03	KALO2 L	.7559#-01	K2SIO3 L	.4032#-03	NAOH	L	.2390#-01	SIO2	L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.1980#-02	K2CO3	C	.0000#+00	K2SO4	L	.9380# 00	K2SO4	C				

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9472#-02	AR	.5500#-22	ALO2	.1662# 00	CO2	.6404#-25	CA	.1760#-12	CL2	.0000#+00	CS			
.4959#-20	FE	.4136#-08	H2	.4279#-10	K	.7396# 00	N2	.9768#-10	NA	.7061#-03	O2	.7140#-38	S2		
.1160#-19	SIO2	.6185#-17	E-	.1150#-36	AL	.2333#-29	ALO	.4415#-13	AL(OH)2	.4003#-47	AL2O	.8242#-08	CO		
.1175#-26	C O S	.4604#-16	CAOH	.6322#-09	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.4228#-16	FEO		
.2594#-08	FE(OH)2	.1657#-11	H	.1766#-05	HCL	.8394#-01	H2O	.1842#-25	H2S	.8512#-04	KCL	.4323#-12	KO		
.2323#-05	KOH	.4672#-19	N	.7318#-16	NH3	.5320#-05	NO	.8617#-08	NO2	.2758#-04	NACL	.1407#-11	NAO		
.7577#-06	NAOH	.6582#-10	O	.1435#-06	OH	.6150#-26	S	.2807#-17	SO	.1418#-08	SO2	.2361#-10	SO3		
.8062#-45	SI	.1879#-23	SIO	.9970#-23	ALO2-	.4524#-33	CN-	.0000#+00	CO2-	.1183#-11	CL-	.0000#+00	CS-		
.1183#-11	K+	.1154#-23	NO-	.1180#-15	NO2-	.5922#-15	NA+	.5343#-22	O-	.2173#-17	OH-	.3071#-19	O2-		
.1720#-34	SH-	.6929#-31	SO-	.4753#-21	SO2-										
GLASS	.2028# 00	AL2O3 L	.6170#-03	MULLITE	.2333#-01	CAO	L	.0000#+00	CSOH	L	.2911#-11	FEAL2O4	L	.1729# 00	FEO	L
.2784#-02	KALO2 L	.4522# 00	K2SIO3 L	.2412#-02	NAOH	L	.1430# 00	SIO2	L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.2106#-02	K2CO3	C	.0000#+00	K2SO4	L	.9979# 00	K2SO4	C				

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3704#+03	.1672# 00	.9400# 00	.3715#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2996#+02	.1134#+03	.1742#+03	.3036#+02
MASS	(KILOGRAMS)	.1110#+02	.1896#-01	.1637# 00	.1128#+02
VOLUME	(CUBIC-METERS)	.3344#+02	.5505#-05	.6154#-04	.3344#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.3319# 00	.3444#+04	.2661#+04	.3373# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2168#+05	.1123#+02	.9136#+02	.2178#+05
REACTION ENTHALPY	(KILOCALORIES)	-.5155#+04	-.4388#+02	-.2890#+03	-.5488#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7589#+04	-.4762#+02	-.3228#+03	-.7959#+04
SENSIBLE HEAT	(KILOCALORIES)	.2433#+04	.3742#+01	.3382#+02	.2471#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.8983#+01	.3135#+02	.4788#+02	.9091#+01
ADIABATIC EXPANSION COEFFICIENT		.1284# +1	SONIC SPEED (METERS/SECOND)		.6261# +3

DEBYE LENGTH	(METERS)	.57595#-03	ELECTRON DENSITY	(PER M+3)	.41271#+08	COLLISION FREQUENCY	(PER SEC)	.45882#+12	
COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND	(MHO/METER)	.2574#-11	BETA1	(SQM-VOLT/NEWTON)			-.1512#+12	
BETA2 (ASSUMING ZERO ION SLIP)		(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)			-.1675#-04	
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.1535#+12	.1527#+12	.1519#+12	.1516#+12	.1515#+12	.1514#+12	.1513#+12	
HALL PARAMETER		.0000#+00	.7860# 00	.1564#+01	.2341#+01	.3119#+01	.3896#+01	.4674#+01	
PSI	(METER-OHM/SQ TESLA)	.8704#+09	.5511#+09	.2623#+09	.1400#+09	.8474#+08	.5620#+08	.3982#+08	
THETA2	(VOLT/TESLA-DEGK)	.6377#-05	.4037#-05	.1922#-05	.1026#-05	.6208#-06	.4118#-06	.2917#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.2427#-05	-.1537#-05	-.7315#-06	-.3905#-06	-.2363#-06	-.1567#-06	-.1110#-06	

U S BU MINES PGM ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6 6 8

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.50 ATM, TEMPERATURE = 2200 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.2478#-05	ALO2	.5794#+02	CO2	.5636#-06	CA	.2414#-10	CL2	.0000#+00	CS	
.6422#-03	FE	.3562# 00	H2	.5018# 00	K	.2736#+03	N2	.5383#-02	NA	.2270#+01	O2	.1070#-07	S2
.7345#-03	SIO2	.9003#-03	E-	.4156#-09	AL	.4924#-07	ALO	.2764#-02	AL(OH)2	.9194#-13	AL2O	.3616#+01	CO
.3347#-06	C O S	.2475#-03	CAOH	.1139#-03	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1744#-02	FEO
.4452#-02	FE(OH)2	.5297#-01	H	.1060#-02	HCL	.2969#+02	H2O	.8754#-06	H2S	.4099#-01	KCL	.6877#-02	KO
.1426#+01	KOH	.3258#-05	N	.2132#-06	NH3	.8176# 00	NO	.2001#-03	NO2	.1375#-03	NACL	.7408#-04	NAO
.5304#-02	NAOH	.6400#-01	O	.6066# 00	OH	.1725#-04	S	.7511#-02	SO	.9301# 00	SO2	.3015#-03	SO3
.3337#-11	SI	.1825#-02	SIO	.2066#-04	ALO2-	.1185#-09	CN-	.0000#+00	CO2-	.1032#-03	CL-	.0000#+00	CS+
.1185#-02	K+	.1642#-07	NO-	.1082#-05	NO2-	.1884#-06	NA+	.2340#-05	O-	.5793#-04	OH-	.1057#-05	O2-
.7578#-08	SH-	.8331#-07	SO-	.9829#-04	SO2-								
GLASS	.4798#-01	AL2O3 L	.8942#-02	MULLITE	.9652#-02	CAO L	.0000#+00	CSOH L	.9974#-04	FEAL2O4L	.6536#-01	FEO L	
.1950#-01	KALO2 L	.3395#-01	K2SIO3 L	.1192#-05	NAOH L	.1949# 00	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C					

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9346#-02	AR	.6602#-08	ALO2	.1543# 00	CO2	.1501#-08	CA	.6429#-13	CL2	.0000#+00	CS	
.1711#-05	FE	.9489#-03	H2	.1337#-02	K	.7287# 00	N2	.1434#-04	NA	.6047#-02	O2	.2850#-10	S2
.1956#-05	SIO2	.2398#-05	E-	.1107#-11	AL	.1312#-09	ALO	.7362#-05	AL(OH)2	.2449#-15	AL2O	.9631#-02	CO
.8916#-09	C O S	.6592#-06	CAOH	.3035#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.4645#-05	FEO
.1186#-04	FE(OH)2	.1411#-03	H	.2823#-05	HCL	.7908#-01	H2O	.2332#-08	H2S	.1092#-03	KCL	.1832#-04	KO
.3798#-02	KOH	.8677#-08	N	.5678#-09	NH3	.2178#-02	NO	.5331#-06	NO2	.3661#-06	NACL	.1973#-06	NAO
.1413#-04	NAOH	.1705#-03	O	.1616#-02	OH	.4595#-07	S	.2001#-04	SO	.2477#-02	SO2	.8032#-06	SO3
.8889#-14	SI	.4860#-05	SIO	.5502#-07	ALO2-	.3156#-12	CN-	.0000#+00	CO2-	.2748#-06	CL-	.0000#+00	CS+
.3156#-05	K+	.4374#-10	NO-	.2883#-08	NO2-	.5019#-09	NA+	.6233#-08	O-	.1543#-06	OH-	.2815#-08	O2-
.2018#-10	SH-	.2219#-09	SO-	.2618#-06	SO2-								
GLASS	.1261# 00	AL2O3 L	.2351#-01	MULLITE	.2537#-01	CAO L	.0000#+00	CSOH L	.2622#-03	FEAL2O4L	.1718# 00	FEO L	
.5127#-01	KALO2 L	.8925#-01	K2SIO3 L	.3134#-05	NAOH L	.5124# 00	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C					

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3754#+03	.3804# 00	.0000#+00	.3758#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3000#+02	.8628#+02	.0000#+00	.3006#+02
MASS	(KILOGRAMS)	.1126#+02	.3282#-01	.0000#+00	.1130#+02
VOLUME	(CUBIC-METERS)	.4518#+02	.1172#-04	.0000#+00	.4518#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2493# 00	.2799#+04	.0000#+00	.2500# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2423#+05	.2519#+02	.0000#+00	.2426#+05
REACTION ENTHALPY	(KILOCALORIES)	-.9836#+03	-.7896#+02	.0000#+00	-.1063#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7368#+04	-.9644#+02	.0000#+00	-.7465#+04
SENSIBLE HEAT	(KILOCALORIES)	.6384#+04	.1749#+02	.0000#+00	.6402#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9879#+01	.2799#+02	.0000#+00	.9897#+01
ADIABATIC EXPANSION COEFFICIENT		.1252# +1	SONIC SPEED (METERS/SECOND)		.8736# +3

DEBYE LENGTH (METERS) .73134#-06 ELECTRON DENSITY (PER M+3) .12000#+20 COLLISION FREQUENCY (PER SEC) .34939#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER) .9687# 00 BETA1 (SQM-VOLT/NEWTON) -.5201# 00

BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON) .0000#+00 THETA1 (VOLT/DEGK) .3801#-05

MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.5205# 00	.5204# 00	.5202# 00	.5202# 00	.5202# 00	.5202# 00	.5202# 00	.5202# 00	.5201# 00
HALL PARAMETER	.0000#+00	.1008#+01	.2016#+01	.3024#+01	.4031#+01	.5039#+01	.6047#+01		
PSI (METER-OHM/SQ TESLA)	.1650#-03	.9913#-04	.4509#-04	.2363#-04	.1418#-04	.9364#-05	.6618#-05		
THETA2 (VOLT/TESLA-DEGK)	-.1550#-05	-.9308#-06	-.4234#-06	-.2219#-06	-.1331#-06	-.8793#-07	-.6214#-07		
THETA3 (VOLT/SQ TESLA-DEGK)	.6319#-06	.3795#-06	.1726#-06	.9046#-07	.5429#-07	.3585#-07	.2534#-07		

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K20/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.50 ATM, TEMPERATURE = 2100 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.5150#-06	ALO2	.5943#+02	CO2	.1008#-06	CA	.1058#-10	CL2	.0000#+00	CS	
.1460#-03	FE	.2199# 00	H2	.3448# 00	K	.2737#+03	N2	.4369#-02	NA	.1623#+01	O2	.3224#-08	S2
.1329#-03	SIO2	.3947#-03	E-	.3248#-10	AL	.6112#-08	ALO	.1276#-02	AL(OH)2	.3807#-14	AL2O	.2130#+01	CO
.1346#-06	C O S	.8365#-04	CAOH	.5405#-04	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.5273#-03	FEO
.3012#-02	FE(OH)2	.2300#-01	H	.7069#-03	HCL	.2992#+02	H2O	.3757#-06	H2S	.4142#-01	KCL	.4191#-02	KO
.1499#+01	KOH	.9293#-06	N	.1197#-06	NH3	.5468# 00	NO	.1317#-03	NO2	.1581#-03	NACL	.5419#-04	NAO
.6317#-02	NAOH	.2778#-01	O	.3659# 00	OH	.5355#-05	S	.4068#-02	SO	.9335# 00	SO2	.3263#-03	SO3
.1183#-12	SI	.2337#-03	SIO	.5914#-05	ALO2-	.2557#-10	CN-	.0000#+00	CO2-	.6024#-04	CL-	.0000#+00	CS+
.5540#-03	K+	.5443#-06	NO-	.6345#-06	NO2-	.8516#-07	NA+	.7257#-06	O-	.2737#-04	OH-	.4154#-06	O2-
.2346#-08	SH-	.2881#-07	SO-	.6413#-04	SO2-								
GLASS	.5271#-01	AL2O3 L	.5804#-02	MULLITE	.9816#-02	CAO	L	.0000#+00	CSOH	L	.4718#-04	FEAL2O4	L .6857#-01 FEO L
.3049#-01	KALO2 L	.7160#-01	K2SIO3 L	.2353#-05	NAOH	L	.1657# 00	SIO2	L				
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3	C	.0000#+00	K2SO4	L	.0000#+00	K2SO4	C		

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9373#-02	AR	.1376#-08	ALO2	.1588# 00	CO2	.2692#-09	CA	.2826#-13	CL2	.0000#+00	CS	
.3902#-06	FE	.5875#-03	H2	.9212#-03	K	.7311# 00	N2	.1167#-04	NA	.4337#-02	O2	.8613#-11	S2
.3549#-06	SIO2	.1054#-05	E-	.8676#-13	AL	.1633#-10	ALO	.3410#-05	AL(OH)2	.1017#-16	AL2O	.5691#-02	CO
.3595#-09	C O S	.2235#-06	CAOH	.1444#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1409#-05	FEO
.8045#-05	FE(OH)2	.6145#-04	H	.1888#-05	HCL	.7994#-01	H2O	.1004#-08	H2S	.1107#-03	KCL	.1120#-04	KO
.4005#-02	KOH	.2483#-08	N	.3197#-09	NH3	.1461#-02	NO	.3517#-06	NO2	.4224#-06	NACL	.1448#-06	NAO
.1687#-04	NAOH	.7420#-04	O	.9775#-03	OH	.1431#-07	S	.1087#-04	SO	.2494#-02	SO2	.8717#-06	SO3
.3161#-15	SI	.6244#-06	SIO	.1580#-07	ALO2-	.6831#-13	CN-	.0000#+00	CO2-	.1609#-06	CL-	.0000#+00	CS+
.1480#-05	K+	.1454#-10	NO-	.1695#-08	NO2-	.2275#-09	NA+	.1939#-08	O-	.7313#-07	OH-	.1110#-08	O2-
.6268#-11	SH-	.7696#-10	SO-	.1713#-06	SO2-								
GLASS	.1302# 00	AL2O3 L	.1434#-01	MULLITE	.2425#-01	CAO	L	.0000#+00	CSOH	L	.1166#-03	FEAL2O4	L .1694# 00 FEO L
.7534#-01	KALO2 L	.1769# 00	K2SIO3 L	.5813#-05	NAOH	L	.4094# 00	SIO2	L				
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3	C	.0000#+00	K2SO4	L	.0000#+00	K2SO4	C		

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3743#+03	.4048# 00	.0000#+00	.3747#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3008#+02	.9222#+02	.0000#+00	.3015#+02
MASS	(KILOGRAMS)	.1126#+02	.3733#-01	.0000#+00	.1130#+02
VOLUME	(CUBIC-METERS)	.4300#+02	.1271#-04	.0000#+00	.4300#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2618# 00	.2937#+04	.0000#+00	.2627# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2399#+05	.2849#+02	.0000#+00	.2402#+05
REACTION ENTHALPY	(KILOCALORIES)	-.1487#+04	-.8503#+02	.0000#+00	-.1572#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7502#+04	-.1035#+03	.0000#+00	-.7605#+04
SENSIBLE HEAT	(KILOCALORIES)	.6015#+04	.1849#+02	.0000#+00	.6033#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9864#+01	.2907#+02	.0000#+00	.9885#+01
ADIABATIC EXPANSION COEFFICIENT		.1252# +1	SONIC SPEED (METERS/SECOND)		.8526# +3

DEBYE LENGTH	(METERS)	.10003#-05	ELECTRON DENSITY	(PER M+3)	.55272#+19	COLLISION FREQUENCY	(PER SEC)	.36251#+12
COEFFICIENTS FOR OHM'S LAW..	SIGMA = SCALAR COND	(MHO/METER)	.4298# 00	BETA1	(SQM-VOLT/NEWTON)			-.1129#+01
BETA2 (ASSUMING ZERO ION SLIP)		(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)			.2514#-05
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02
CHI	(METER-OHM/TESLA)	.1130#+01	.1130#+01	.1129#+01	.1129#+01	.1129#+01	.1129#+01	.1129#+01
HALL PARAMETER		.0000#+00	.9709# 00	.1942#+01	.2912#+01	.3883#+01	.4854#+01	.5824#+01
PSI	(METER-OHM/SQ TESLA)	.1550#-03	.9393#-04	.4306#-04	.2263#-04	.1360#-04	.8986#-05	.6353#-05
THETA2	(VOLT/TESLA-DEGK)	-.1013#-05	-.6142#-06	-.2815#-06	-.1480#-06	-.8891#-07	-.5876#-07	-.4154#-07
THETA3	(VOLT/SQ TESLA-DEGK)	.4084#-06	.2476#-06	.1135#-06	.5964#-07	.3584#-07	.2368#-07	.1674#-07

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U S BU MINES   PGH ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                                    2  7

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 75% ASH REJECTION
    .3508#+01 AR      .1721# 00 ALO2    .6156#+02 CO2     .9900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .7230#-01 FE
    .3110#+02 H2      .2064#+01 K       .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .2493# 00 SIO2

PRESSURE =  1.50 ATM,  TEMPERATURE = 2000 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......    .3508#+01  AR      .8998#-07  ALO2    .6041#+02  CO2     .1465#-07  CA      .4782#-11  CL2     .0000#+00  CS
    .2713#-04  FE     .1258# 00  H2      .2144# 00  K       .2738#+03  N2      .3302#-02  NA      .1185#+01  O2      .7668#-09  S2
    .1729#-04  SIO2   .1523#-03  E-      .1830#-11  AL      .5894#-09  ALO     .5183#-03  AL(OH)2 .1023#-15  AL2O    .1144#+01  CO
    .4493#-07  C O S  .2478#-04  CAOH    .2523#-04  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .1375#-03  FEO
    .1908#-02  FE(OH)2 .9080#-06 H       .4728#-03  HCL     .3010#+02  H2O     .1355#-06  H2S     .4168#-01  KCL     .2344#-02  KO
    .1506#+01  KOH    .2349#-06  N       .6068#-07  NH3     .3603# 00  NO      .8758#-04  NO2     .1856#-03  NACL    .3764#-04  NAO
    .7370#-02  NAOH   .1140#-01  O       .2127# 00  OH      .1395#-05  S       .2006#-02  SO      .9356# 00  SO2     .3646#-03  SO3
    .2433#-14  SI     .2022#-04  SIO     .1395#-05  ALO2-   .4212#-11  CN-     .0000#+00  CO2-    .3360#-04  CL-     .0000#+00  CS+
    .2376#-03  K+     .1577#-08  NO-     .3539#-06  NO2-    .3560#-07  NA+     .1952#-06  O-      .1157#-04  OH-     .1490#-06  O2-
    .5723#-09  SH-    .8254#-08  SO-     .3806#-04  SO2-
  GLASS .........    .5563#-01  AL2O3 L .2338#-02  MULLITE .9875#-02  CAO   L .0000#+00  CSOH  L .1916#-04  FEAL2O4L.7021#-01  FEO   L
    .4625#-01 KALO2 L .1266# 00 K2SIO3 L.4758#-05  NAOH  L .1180# 00  SIO2  L
  SULF. AND CARB..    .0000#+00  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .0000#+00  K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......    .9392#-02  AR      .2409#-09  ALO2    .1617# 00  CO2     .3920#-10  CA      .1280#-13  CL2     .0000#+00  CS
    .7262#-07  FE     .3369#-03  H2      .5739#-03  K       .7329# 00  N2      .8840#-05  NA      .3173#-02  O2      .2053#-11  S2
    .4627#-07  SIO2   .4077#-06  E-      .4900#-14  AL      .1578#-11  ALO     .1387#-05  AL(OH)2 .2738#-18  AL2O    .3061#-02  CO
    .1203#-09  C O S  .6633#-07  CAOH    .6754#-07  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .3680#-06  FEO
    .5107#-05  FE(OH)2 .2431#-04 H       .1266#-05  HCL     .8057#-01  H2O     .3628#-09  H2S     .1116#-03  KCL     .6276#-05  KO
    .4031#-02  KOH    .6287#-09  N       .1624#-09  NH3     .9645#-03  NO      .2345#-06  NO2     .4967#-06  NACL    .1008#-06  NAO
    .1973#-04  NAOH   .3053#-04  O       .5695#-03  OH      .3734#-08  S       .5369#-05  SO      .2504#-02  SO2     .9761#-06  SO3
    .6512#-17  SI     .5414#-07  SIO     .3734#-08  ALO2-   .1128#-13  CN-     .0000#+00  CO2-    .8993#-07  CL-     .0000#+00  CS+
    .6360#-06  K+     .4223#-11  NO-     .9472#-09  NO2-    .9530#-10  NA+     .5226#-09  O-      .3097#-07  OH-     .3989#-09  O2-
    .1532#-11  SH-    .2209#-10  SO-     .1019#-06  SO2-
  GLASS .........    .1297# 00  AL2O3 L .5452#-02  MULLITE .2302#-01  CAO   L .0000#+00  CSOH  L .4466#-04  FEAL2O4L.1637# 00  FEO   L
    .1078# 00 KALO2 L .2952# 00 K2SIO3 L.1109#-04  NAOH  L .2751# 00  SIO2  L
  SULF. AND CARB..    .0000#+00  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .0000#+00  K2SO4 C

                                          IDEALGAS    GLASS ..    SULF. AN     MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)     .3736#+03   .4289# 00   .0000#+00   .3740#+03
AVERAGE MOLECULAR WEIGHT            (AMU)      .3012#+02   .1013#+03   .0000#+00   .3021#+02
MASS                          (KILOGRAMS)      .1125#+02   .4343#-01   .0000#+00   .1130#+02
VOLUME                     (CUBIC-METERS)      .4087#+02   .1407#-04   .0000#+00   .4087#+02
DENSITY       (KILOGRAMS/CUBIC METER)          .2753# 00   .3086#+04   .0000#+00   .2764# 00
ENTROPY          (GRAMCALORIES/DEGK)           .2376#+05   .3295#+02   .0000#+00   .2379#+05
REACTION ENTHALPY             (KILOCALORIES)  -.1944#+04  -.9277#+02   .0000#+00  -.2036#+04
HEAT OF FORMATION             (KILOCALORIES)  -.7589#+04  -.1127#+03   .0000#+00  -.7702#+04
SENSIBLE HEAT                 (KILOCALORIES)   .5645#+04   .1997#+02   .0000#+00   .5665#+04
FROZEN CP                (GMCAL/GMMOL-DEGK)    .9634#+01   .3090#+02   .0000#+00   .9859#+01
ADIABATIC EXPANSION COEFFICIENT                .1253# +1    SONIC SPEED (METERS/SECOND)          .8317# +3

DEBYE LENGTH          (METERS) .14148#-05   ELECTRON DENSITY     (PER M+3) .22440#+19   COLLISION FREQUENCY  (PER SEC) .37643#+12
COEFFICIENTS FOR OHM,S LAW..   SIGMA = SCALAR COND  (MHO/METER)    .1680# 00     BETA1     (SQM-VOLT/NEWTON)          -.2782#+01
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)   .0000#+00     THETA1      (VOLT/DEGK)              .9871#-06
MAGNETIC INDUCTION (ABS B)      (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                    (METER-OHM/TESLA)  .2782#+01   .2782#+01   .2782#+01   .2782#+01   .2782#+01   .2782#+01   .2782#+01
HALL PARAMETER                            .0000#+00   .9345# 00   .1869#+01   .2804#+01   .3738#+01   .4673#+01   .5607#+01
PSI                 (METER-OHM/SQ TESLA)  .5808#-04   .3557#-04   .1644#-04   .8672#-05   .5219#-05   .3452#-05   .2442#-05
THETA2                (VOLT/TESLA-DEGK) -.3927#-06  -.2405#-06  -.1112#-06  -.5864#-07  -.3529#-07  -.2334#-07  -.1651#-07
THETA3              (VOLT/SQ TESLA-DEGK)  .1562#-06   .9566#-07   .4423#-07   .2333#-07   .1404#-07   .9284#-08   .6567#-08
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01 AR	.1721# 00 ALO2	.6156#+02 CO2	.9900#-02 CA	.2120#-01 CL2	.0000#+00 CS	.7230#-01 FE	
.3110#+02 H2	.2064#+01 K	.2740#+03 N2	.1090#-01 NA	.1772#+02 O2	.4690# 00 S2	.2493# 00 SIO2	

PRESSURE = 1.50 ATM, TEMPERATURE = 1900 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01 AR	.1260#-07 ALO2	.6101#+02 CO2	.1680#-08 CA	.2198#-11 CL2	.0000#+00 CS	
.4045#-05 FE	.6473#-01 H2	.1204# 00 K	.2738#+03 N2	.2278#-02 NA	.9170# 00 O2	.1313#-09 S2	
.1489#-05 SIO2	.5080#-04 E-	.6697#-13 AL	.4093#-10 ALO	.1754#-03 AL(OH)2	.1504#-17 AL2O	.5434# 00 CO	
.1157#-07 C O S	.6390#-05 CAOH	.1145#-04 CL	.0000#+00 CSCL	.0000#+00 CS O	.0000#+00 CSOH	.3107#-04 FEO	
.1156#-02 FE(OH)2	.3173#-06 H	.3108#-03 HCL	.3023#+02 H2O	.3840#-07 H2S	.4184#-01 KCL	.1227#-02 KO	
.1468#+01 KOH	.5146#-07 N	.2672#-07 NH3	.2382# 00 NO	.6099#-04 NO2	.2186#-03 NACL	.2465#-04 NAO	
.8369#-02 NAOH	.4467#-02 O	.1191# 00 OH	.2891#-06 S	.8816#-03 SO	.9367# 00 SO2	.4336#-03 SO3	
.2485#-16 SI	.1061#-05 SIO	.2579#-06 ALO2-	.4908#-12 CN-	.0000#+00 CO2-	.1754#-04 CL-	.0000#+00 CS+	
.9341#-04 K+	.3981#-09 NO-	.1929#-06 NO2-	.1347#-07 NA+	.4540#-07 O-	.4314#-05 OH-	.4995#-07 O2-	
.1016#-09 SH-	.1886#-06 SO-	.2022#-04 SO2-					
GLASS	.5171#-01 AL2O3 L	.3554#-03 MULLITE	.9894#-02 CAO L	.0000#+00 CSOH L	.6211#-05 FEAL2O4L	.7110#-01 FEO L	
.6636#-01 KALO2 L	.1830# 00 K2SIO3 L	.9777#-05 NAOH L	.6554#-01 SIO2 L				
SULF. AND CARB..	.0000#+00 K2CO3 L	.0000#+00 K2CO3 C	.0000#+00 K2SO4 L	.0000#+00 K2SO4 C			

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9404#-02 AR	.3378#-10 ALO2	.1635# 00 CO2	.4504#-11 CA	.5891#-14 CL2	.0000#+00 CS	
.1084#-07 FE	.1735#-03 H2	.3226#-03 K	.7340# 00 N2	.6107#-05 NA	.2458#-02 O2	.3519#-12 S2	
.3992#-08 SIO2	.1362#-06 E-	.1795#-15 AL	.1097#-12 ALO	.4701#-06 AL(OH)2	.4032#-20 AL2O	.1457#-02 CO	
.3101#-10 C O S	.1713#-07 CAOH	.3069#-07 CL	.0000#+00 CSCL	.0000#+00 CS O	.0000#+00 CSOH	.8329#-07 FEO	
.3100#-05 FE(OH)2	.8504#-05 H	.8332#-06 HCL	.8103#-01 H2O	.1029#-09 H2S	.1122#-03 KCL	.3289#-05 KO	
.3935#-02 KOH	.1379#-09 N	.7161#-10 NH3	.6384#-03 NO	.1635#-06 NO2	.5861#-06 NACL	.6608#-07 NAO	
.2243#-04 NAOH	.1197#-04 O	.3192#-03 OH	.7749#-09 S	.2363#-05 SO	.2511#-02 SO2	.1162#-05 SO3	
.6661#-19 SI	.2844#-06 SIO	.6914#-09 ALO2-	.1316#-14 CN-	.0000#+00 CO2-	.4701#-07 CL-	.0000#+00 CS+	
.2504#-06 K+	.1067#-11 NO-	.5172#-09 NO2-	.3612#-10 NA+	.1217#-09 O-	.1156#-07 OH-	.1339#-09 O2-	
.2723#-12 SH-	.5054#-11 SO-	.5420#-07 SO2-					
GLASS	.1154# 00 AL2O3 L	.7933#-03 MULLITE	.2208#-01 CAO L	.0000#+00 CSOH L	.1386#-04 FEAL2O4L	.1587# 00 FEO L	
.1481# 00 KALO2 L	.4086# 00 K2SIO3 L	.2182#-04 NAOH L	.1463# 00 SIO2 L				
SULF. AND CARB..	.0000#+00 K2CO3 L	.0000#+00 K2CO3 C	.0000#+00 K2SO4 L	.0000#+00 K2SO4 C			

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3731#+03	.4480# 00	.0000#+00	.3735#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3015#+02	.1111#+03	.0000#+00	.3024#+02
MASS	(KILOGRAMS)	.1125#+02	.4978#-01	.0000#+00	.1130#+02
VOLUME	(CUBIC-METERS)	.3878#+02	.1566#-04	.0000#+00	.3878#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2900# 00	.3178#+04	.0000#+00	.2913# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2354#+05	.3734#+02	.0000#+00	.2357#+05
REACTION ENTHALPY	(KILOCALORIES)	-.2364#+04	-.1010#+03	.0000#+00	-.2465#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7642#+04	-.1223#+03	.0000#+00	-.7764#+04
SENSIBLE HEAT	(KILOCALORIES)	.5278#+04	.2127#+02	.0000#+00	.5299#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9790#+01	.3302#+02	.0000#+00	.9818#+01
ADIABATIC EXPANSION COEFFICIENT		.1255# +1	SONIC SPEED (METERS/SECOND)		.8108# +3

DEBYE LENGTH	(METERS)	.20694#-05	ELECTRON DENSITY	(PER M+3)	.78900#+18	COLLISION FREQUENCY	(PER SEC)	.39678#+12
COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND	(MHO/METER)	.5603#-01	BETA1	(SQM-VOLT/NEWTON)		-.7911#+01	
BETA2 (ASSUMING ZERO ION SLIP)		(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)		-.6172#-06	
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02
CHI	(METER-OHM/TESLA)	.7911#+01	.7911#+01	.7911#+01	.7911#+01	.7911#+01	.7911#+01	.7911#+01
HALL PARAMETER		.0000#+00	.8866# 00	.1773#+01	.2660#+01	.3546#+01	.4433#+01	.5319#+01
PSI	(METER-OHM/SQ TESLA)	.6245#-04	.3923#-04	.1855#-04	.9871#-05	.5965#-05	.3954#-05	.2800#-05
THETA2	(VOLT/TESLA-DEGK)	.2374#-06	.1491#-06	.7051#-07	.3753#-07	.2268#-07	.1503#-07	.1064#-07
THETA3	(VOLT/SQ TESLA-DEGK)	-.9132#-07	-.5737#-07	-.2712#-07	-.1444#-07	-.8723#-08	-.5782#-08	-.4094#-08

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U S BU MINES   PGM ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                                    2  7

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 75% ASH REJECTION
    .3508#+01 AR      .1721# 00 ALO2    .6156#+02 CO2     .9900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .7230#-01 FE
    .3110#+02 H2      .2064#+01 K       .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .2493# 00 SIO2

PRESSURE =  1.50 ATM,  TEMPERATURE = 1800 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......    .3508#+01  AR      .1338#-08  ALO2    .6133#+02  CO2     .1437#-09  CA      .9804#-12  CL2     .0000#+00  CS
    .4611#-06  FE     .2911#-01  H2      .6149#-01  K       .2739#+03  N2      .1396#-02  NA      .7775# 00  O2      .1444#-10  S2
    .7891#-07  SIO2   .1436#-04  E-      .1423#-14  AL      .1878#-11  ALO     .4657#-04  AL(OH)2 .1031#-19  AL2O    .2224# 00  CO
    .2119#-08  C O S  .1384#-05  CAOH    .4890#-05  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .5962#-05  FEO
    .6650#-03  FE(OH)2 .9588#-03 H       .1948#-03  HCL     .3032#+02  H2O     .7873#-08  H2S     .4194#-01  KCL     .6143#-03  KO
    .1425#+01  KOH    .9538#-08  N       .9806#-08  NH3     .1592# 00  NO      .4611#-04  NO2     .2499#-03  NACL    .1519#-04  NAO
    .9218#-02  NAOH   .1679#-02  O       .6446#-01  OH      .4441#-07  S       .3320#-03  SO      .9371# 00  SO2     .5553#-03  SO3
    .1093#-18  SI     .3037#-07  SIO     .3542#-07  ALO2-   .3771#-13  CN-     .0000#+00  CO2-    .8362#-05  CL-     .0000#+00  CS+
    .3380#-04  K+     .8688#-10  NO-     .1051#-06  NO2-    .4455#-08  NA+     .9079#-08  O-      .1410#-05  OH-     .1587#-07  O2-
    .1218#-10  SH-    .3267#-09  SO-     .9500#-05  SO2-
  GLASS .........   .4041#-01 AL2O3 L .2448#-04 MULLITE .9899#-02 CAO   L .0000#+00 CSOH  L .1494#-05 FEAL2O4L.7163#-01 FEO   L
    .9108#-01 KALO2 L .2220# 00 K2SIO3 L.2058#-04 NAOH  L .2727#-01 SIO2  L
  SULF. AND CARB..    .0000#+00 K2CO3 L .0000#+00 K2CO3 C .0000#+00 K2SO4 L .0000#+00 K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......    .9412#-02  AR      .3589#-11  ALO2    .1645# 00  CO2     .3854#-12  CA      .2630#-14  CL2     .0000#+00  CS
    .1237#-08  FE     .7809#-04  H2      .1650#-03  K       .7347# 00  N2      .3744#-05  NA      .2086#-02  O2      .3874#-13  S2
    .2117#-09  SIO2   .3853#-07  E-      .3817#-17  AL      .5038#-14  ALO     .1249#-06  AL(OH)2 .2767#-22  AL2O    .5965#-03  CO
    .5685#-11  C O S  .3714#-05  CAOH    .1312#-07  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .1599#-07  FEO
    .1784#-05  FE(OH)2 .2572#-05 H       .5225#-06  HCL     .8133#-01  H2O     .2112#-10  H2S     .1125#-03  KCL     .1648#-05  KO
    .3822#-02  KOH    .2559#-10  N       .2631#-10  NH3     .4271#-03  NO      .1237#-06  NO2     .6705#-06  NACL    .4074#-07  NAO
    .2473#-04  NAOH   .4505#-05  O       .1729#-03  OH      .1191#-09  S       .8906#-06  SO      .2514#-02  SO2     .1490#-05  SO3
    .2933#-21  SI     .8148#-10  SIO     .9503#-10  ALO2-   .1012#-15  CN-     .0000#+00  CO2-    .2243#-07  CL-     .0000#+00  CS+
    .9067#-07  K+     .2331#-12  NO-     .2820#-09  NO2-    .1195#-10  NA+     .2435#-10  O-      .3784#-08  OH-     .4258#-10  O2-
    .3268#-13  SH-    .8765#-12  SO-     .2549#-07  SO2-
  GLASS .........   .8741#-01 AL2O3 L .5296#-04 MULLITE .2141#-01 CAO   L .0000#+00 CSOH  L .3233#-05 FEAL2O4L.1549# 00 FEO   L
    .1970# 00 KALO2 L .4801# 00 K2SIO3 L.4451#-04 NAOH  L .5900#-01 SIO2  L
  SULF. AND CARB..    .0000#+00 K2CO3 L .0000#+00 K2CO3 C .0000#+00 K2SO4 L .0000#+00 K2SO4 C

                                          IDEALGAS    GLASS ..    SULF. AN     MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)     .3728#+03   .4623# 00   .0000#+00   .3732#+03
AVERAGE MOLECULAR WEIGHT            (AMU)      .3016#+02   .1182#+03   .0000#+00   .3027#+02
MASS                          (KILOGRAMS)      .1124#+02   .5465#-01   .0000#+00   .1130#+02
VOLUME                      (CUBIC-METERS)     .3671#+02   .1716#-04   .0000#+00   .3671#+02
DENSITY          (KILOGRAMS/CUBIC METER)       .3063# 00   .3185#+04   .0000#+00   .3077# 00
ENTROPY            (GRAMCALORIES/DEGK)         .2332#+05   .4033#+02   .0000#+00   .2336#+05
REACTION ENTHALPY       (KILOCALORIES)        -.2757#+04  -.1078#+03   .0000#+00  -.2864#+04
HEAT OF FORMATION       (KILOCALORIES)        -.7670#+04  -.1295#+03   .0000#+00  -.7799#+04
SENSIBLE HEAT           (KILOCALORIES)         .4913#+04   .2171#+02   .0000#+00   .4935#+04
FROZEN CP            (GMCAL/GMMOL-DEGK)        .9733#+01   .3458#+02   .0000#+00   .9764#+01
ADIABATIC EXPANSION COEFFICIENT                .1257# +1    SONIC SPEED (METERS/SECOND)          .7897# +3

DEBYE LENGTH          (METERS).31326#-05   ELECTRON DENSITY     (PER M+3).23568#+18   COLLISION FREQUENCY  (PER SEC).41905#+12
COEFFICIENTS FOR OHM,S LAW..   SIGMA = SCALAR COND  (MHO/METER)    .1585#-01    BETA1    (SQM-VOLT/NEWTON)          -.2648#+02
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)   .0000#+00     THETA1     (VOLT/DEGK)              -.2208#-05
MAGNETIC INDUCTION (ABS B)       (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                     (METER-OHM/TESLA)  .2649#+02   .2649#+02   .2649#+02   .2649#+02   .2648#+02   .2648#+02   .2648#+02
HALL PARAMETER                             .0000#+00   .8398# 00   .1679#+01   .2519#+01   .3359#+01   .4198#+01   .5038#+01
PSI                  (METER-OHM/SQ TESLA)  .2581#-02   .1665#-02   .8062#-03   .4336#-03   .2632#-03   .1749#-03   .1240#-03
THETA2                 (VOLT/TESLA-DEGK)   .8190#-06   .5283#-06   .2559#-06   .1376#-06   .8355#-07   .5551#-07   .3936#-07
THETA3              (VOLT/SQ TESLA-DEGK)  -.3038#-06  -.1960#-06  -.9490#-07  -.5104#-07  -.3099#-07  -.2059#-07  -.1460#-07
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.50 ATM, TEMPERATURE = 1700 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.1017#-09	ALO2	.6148#+02	CO2	.8695#-11	CA	.4138#-12	CL2	.0000#+00	CS	
.3799#-07	FE	.1127#-01	H2	.2848#-01	K	.2739#+03	N2	.7521#-03	NA	.7214# 00	O2	.9830#-12	S2
.2490#-08	SIO2	.3349#-05	E-	.1597#-16	AL	.5308#-13	ALO	.9188#-05	AL(OH)2	.2885#-22	AL2O	.7730#-01	CO
.2691#-09	C O S	.2433#-06	CAOH	.1931#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.9272#-06	FEO
.3535#-03	FE(OH)2	.2458#-03	H	.1147#-03	HCL	.3037#+02	H2O	.1134#-08	H2S	.4201#-01	KCL	.2945#-03	KO
.1391#+01	KOH	.1447#-08	N	.2941#-08	NH3	.1076# 00	NO	.3762#-04	NO2	.2748#-03	NACL	.8665#-05	NAO
.9819#-02	NAOH	.5939#-03	O	.3327#-01	OH	.4919#-08	S	.1053#-03	SO	.9371# 00	SO2	.7770#-03	SO3
.1920#-21	SI	.4558#-09	SIO	.3413#-08	ALO2-	.1814#-14	CN-	.0000#+00	CO2-	.3529#-05	CL-	.0000#+00	CS+
.1121#-04	K+	.1591#-10	NO-	.5652#-07	NO2-	.1272#-08	NA+	.1508#-08	O-	.3934#-06	OH-	.4666#-08	O2-
.9354#-12	SH-	.4112#-10	SO-	.3878#-05	SO2-								
GLASS	.2571#-01	AL2O3 L	.4489#-06	MULLITE	.9900#-02	CAO L	.0000#+00	CSOH L	.2377#-06	FEAL2O4L	.7195#-01	FEO L	
.1207# 00	KALO2 L	.2406# 00	K2SIO3 L	.4539#-04	NAOH L	.8695#-02	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C					

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9416#-02	AR	.2730#-12	ALO2	.1650# 00	CO2	.2333#-13	CA	.1111#-14	CL2	.0000#+00	CS	
.1020#-09	FE	.3024#-04	H2	.7642#-04	K	.7351# 00	N2	.2018#-05	NA	.1936#-02	O2	.2638#-14	S2
.6684#-11	SIO2	.8988#-08	E-	.4286#-19	AL	.1424#-15	ALO	.2466#-07	AL(OH)2	.7742#-25	AL2O	.2075#-03	CO
.7222#-12	C O S	.6529#-09	CAOH	.5183#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.2488#-08	FEO
.9487#-06	FE(OH)2	.6596#-06	H	.3077#-06	HCL	.8149#-01	H2O	.3044#-11	H2S	.1127#-03	KCL	.7903#-06	KO
.3734#-02	KOH	.3882#-11	N	.7893#-11	NH3	.2888#-03	NO	.1010#-06	NO2	.7376#-06	NACL	.2325#-07	NAO
.2635#-04	NAOH	.1594#-05	O	.8929#-04	OH	.1320#-10	S	.2825#-06	SO	.2515#-02	SO2	.2085#-05	SO3
.5153#-24	SI	.1223#-11	SIO	.9160#-11	ALO2-	.4868#-17	CN-	.0000#+00	CO2-	.9471#-08	CL-	.0000#+00	CS+
.3010#-07	K+	.4270#-13	NO-	.1517#-09	NO2-	.3413#-11	NA+	.4047#-11	O-	.1056#-08	OH-	.1252#-10	O2-
.2510#-14	SH-	.1104#-12	SO-	.1041#-07	SO2-								
GLASS	.5383#-01	AL2O3 L	.9400#-06	MULLITE	.2073#-01	CAO L	.0000#+00	CSOH L	.4977#-06	FEAL2O4L	.1506# 00	FEO L	
.2527# 00	KALO2 L	.5038# 00	K2SIO3 L	.9505#-04	NAOH L	.1821#-01	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C					

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3726#+03	.4776# 00	.0000#+00	.3731#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3016#+02	.1211#+03	.0000#+00	.3028#+02
MASS	(KILOGRAMS)	.1124#+02	.5783#-01	.0000#+00	.1130#+02
VOLUME	(CUBIC-METERS)	.3465#+02	.1844#-04	.0000#+00	.3465#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.3243# 00	.3136#+04	.0000#+00	.3260# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2310#+05	.4182#+02	.0000#+00	.2314#+05
REACTION ENTHALPY	(KILOCALORIES)	-.3132#+04	-.1128#+03	.0000#+00	-.3245#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7683#+04	-.1341#+03	.0000#+00	-.7817#+04
SENSIBLE HEAT	(KILOCALORIES)	.4551#+04	.2129#+02	.0000#+00	.4572#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9665#+01	.3514#+02	.0000#+00	.9698#+01
ADIABATIC EXPANSION COEFFICIENT		.1259# +1	SONIC SPEED (METERS/SECOND)		.7681# +3

DEBYE LENGTH	(METERS)	.49408#-05	ELECTRON DENSITY	(PER M+3)	.58204#+17	COLLISION FREQUENCY	(PER SEC)	.44383#+12	
COEFFICIENTS FOR OHM'S LAW..	SIGMA = SCALAR COND	(MHO/METER)	.3698#-02	BETA1	(SQM-VOLT/NEWTON)			-.1072#+03	
BETA2 (ASSUMING ZERO ION SLIP)		(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)			-.3708#-05	
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.1073#+03	.1073#+03	.1073#+03	.1073#+03	.1072#+03	.1072#+03	.1072#+03	
HALL PARAMETER		.0000#+00	.7936# 00	.1587#+01	.2380#+01	.3173#+01	.3966#+01	.4759#+01	
PSI	(METER-OHM/SQ TESLA)	.2831#+01	.1877#-01	.9339#-02	.5982#-02	.3102#-02	.2067#-02	.1468#-02	
THETA2	(VOLT/TESLA-DEGK)	.1321#-05	.8763#-06	.4359#-06	.2372#-06	.1448#-06	.9648#-07	.6853#-07	
THETA3	(VOLT/SQ TESLA-DEGK)	-.4708#-06	-.3123#-06	-.1553#-06	-.8452#-07	-.5159#-07	-.3438#-07	-.2442#-07	

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U S BU MINES   PGH ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                                    4  9

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 75% ASH REJECTION
    .3508#+01 AR      .1721# 00 ALO2     .6156#+02 CO2     .9900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .7230#-01 FE
    .3110#+02 H2      .2064#+01 K        .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .2493# 00 SIO2

PRESSURE =  1.50 ATM,  TEMPERATURE = 1600 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......    .3508#+01  AR      .7118#-11  ALO2    .6153#+02  CO2     .4198#-12  CA      .4826#-12  CL2     .0000#+00  CS
    .2591#-08  FE     .4327#-02  H2      .6778#-02  K       .2739#+03  N2      .3663#-03  NA      .5446# 00  O2      .2872#-13  S2
    .1622#-09  SIO2   .4430#-06  E-      .1583#-18  AL      .1341#-14  ALO     .2087#-05  AL(OH)2 .8348#-25  AL2O    .2583#-01  CO
    .2261#-10  C O S  .3741#-07  CAOH    .1193#-05  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .1171#-06  FEO
    .1826#-03  FE(OH)2 .5613#-04 H       .1169#-03  HCL     .3071#+02  H2O     .1112#-09  H2S     .4175#-01  KCL     .6593#-04  KO
    .7363# 00  KOH    .1741#-09  N       .8995#-09  NH3     .6265#-01  NO      .2459#-04  NO2     .5256#-03  NACL    .4091#-05  NAO
    .9903#-02  NAOH   .1672#-03  O       .1514#-01  OH      .3207#-09  S       .2037#-04  SO      .5986# 00  SO2     .6547#-03  SO3
    .5877#-24  SI     .1419#-10  SIO     .2102#-09  ALO2-   .4899#-16  CN-     .0000#+00  CO2-    .1585#-05  CL-     .0000#+00  CS+
    .2715#-05  K+     .1439#-11  NO-     .1564#-07  NO2-    .4484#-09  NA+     .1226#-09  O-      .6059#-07  OH-     .6522#-09  O2-
    .2899#-13  SH-    .1907#-11  SO-     .6100#-06  SO2-
  GLASS .........     .2730#-01  AL2O3 L .3061#-06  MULLITE .9900#-02  CAO   L .0000#+00  CSOH  L .5425#-07  FEAL2O4L.7212#-01  FEO   L
    .1175# 00  KALO2 L .2419# 00 K2SIO3 L.1010#-03  NAOH  L .7424#-02  SIO2  L
  SULF. AND CARB..    .1824#-03  K2CO3 L .0000#+00  K2CO3 C .3387# 00  K2SO4 L .0000#+00  K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......    .9438#-02  AR      .1915#-13  ALO2    .1655# 00  CO2     .1129#-14  CA      .1298#-14  CL2     .0000#+00  CS
    .6970#-11  FE     .1164#-04  H2      .1823#-04  K       .7369# 00  N2      .9855#-06  NA      .1405#-02  O2      .7726#-16  S2
    .4363#-12  SIO2   .1192#-08  E-      .4258#-21  AL      .3607#-17  ALO     .5613#-08  AL(OH)2 .2246#-27  AL2O    .6949#-04  CO
    .6082#-13  C O S  .1006#-09  CAOH    .3210#-08  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .3149#-09  FEO
    .4913#-06  FE(OH)2 .1510#-06 H       .3146#-06  HCL     .8262#-01  H2O     .2992#-12  H2S     .1123#-03  KCL     .1774#-06  KO
    .1981#-02  KOH    .4684#-12  N       .2420#-11  NH3     .1685#-03  NO      .6616#-07  NO2     .1414#-05  NACL    .1100#-07  NAO
    .2664#-04  NAOH   .4497#-06  O       .4073#-04  OH      .8626#-12  S       .5481#-07  SO      .1610#-02  SO2     .1761#-05  SO3
    .1581#-26  SI     .3818#-13  SIO     .5654#-12  ALO2-   .1318#-18  CN-     .0000#+00  CO2-    .4265#-08  CL-     .0000#+00  CS+
    .7304#-08  K+     .3872#-14  NO-     .4207#-10  NO2-    .1206#-11  NA+     .3297#-12  O-      .1630#-09  OH-     .1754#-11  O2-
    .7800#-16  SH-    .5131#-14  SO-     .1641#-08  SO2-
  GLASS .........     .5733#-01  AL2O3 L .6428#-06  MULLITE .2079#-01  CAO   L .0000#+00  CSOH  L .1139#-06  FEAL2O4L.1514# 00  FEO   L
    .2467# 00  KALO2 L .5079# 00 K2SIO3 L.2122#-03  NAOH  L .1559#-01  SIO2  L
  SULF. AND CARB..    .5381#-03  K2CO3 L .0000#+00  K2CO3 C .9995# 00  K2SO4 L .0000#+00  K2SO4 C

                                          IDEALGAS    GLASS ..    SULF. AN     MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)      .3717#+03   .4762# 00   .3389# 00   .3725#+03
AVERAGE MOLECULAR WEIGHT            (AMU)       .3008#+02   .1214#+03   .1742#+03   .3032#+02
MASS                          (KILOGRAMS)       .1118#+02   .5781#-01   .5905#-01   .1130#+02
VOLUME                      (CUBIC-METERS)      .3254#+02   .1837#-04   .2219#-04   .3254#+02
DENSITY          (KILOGRAMS/CUBIC METER)        .3436# 00   .3148#+04   .2662#+04   .3472# 00
ENTROPY            (GRAMCALORIES/DEGK)          .2280#+05   .4078#+02   .4114#+02   .2288#+05
REACTION ENTHALPY          (KILOCALORIES)      -.3470#+04  -.1145#+03   -.9293#+02  -.3677#+04
HEAT OF FORMATION          (KILOCALORIES)      -.7647#+04  -.1341#+03   -.1125#+03  -.7894#+04
SENSIBLE HEAT              (KILOCALORIES)       .4178#+04   .1961#+02   .1952#+02   .4217#+04
FROZEN CP             (GMCAL/GMMOL-DEGK)        .9578#+01   .3474#+02   .4705#+02   .9644#+01
ADIABATIC EXPANSION COEFFICIENT                 .1262# +1    SONIC SPEED (METERS/SECOND)          .7471# +3

DEBYE LENGTH          (METERS).90841#-05   ELECTRON DENSITY     (PER M+3).81998#+16   COLLISION FREQUENCY  (PER SEC).45810#+12
COEFFICIENTS FOR OHM'S LAW..   SIGMA = SCALAR COND  (MHO/METER)   .5058#-03    BETA1    (SQM-VOLT/NEWTON)          -.7612#+03
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)   .0000#+00     THETA1     (VOLT/DEGK)              -.6923#-05
MAGNETIC INDUCTION (ABS B)       (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                    (METER-OHM/TESLA)  .7632#+03   .7625#+03   .7619#+03   .7616#+03   .7614#+03   .7614#+03   .7613#+03
HALL PARAMETER                            .0000#+00   .7713# 00   .1541#+01   .2311#+01   .3081#+01   .3851#+01   .4621#+01
PSI                 (METER-OHM/SQ TESLA)  .6951# 00   .4633# 00   .2316# 00   .1263# 00   .7719#-01   .5146#-01   .3656#-01
THETA2                (VOLT/TESLA-DEGK)   .2448#-05   .1632#-05   .8158#-06   .4450#-06   .2719#-06   .1813#-06   .1288#-06
THETA3              (VOLT/SQ TESLA-DEGK) -.8659#-06  -.5772#-06  -.2885#-06  -.1574#-06  -.9616#-07  -.6411#-07  -.4555#-07
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.50 ATM. TEMPERATURE = 1500 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.4684#-12	ALO2	.6155#+02	CO2	.1439#-13	CA	.2613#-11	CL2	.0000#+00	CS			
.1304#-09	FE	.1487#-02	H2	.6046#-03	K	.2739#+03	N2	.1400#-03	NA	.3812# 00	O2	.3005#-15	S2		
.3394#-10	SIO2	.1847#-07	E-	.1177#-20	AL	.2836#-16	ALO	.5272#-06	AL(OH)2	.2099#-27	AL2O	.7573#-02	CO		
.1053#-11	C O S	.4719#-06	CAOH	.1476#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1159#-07	FEO		
.8921#-04	FE(OH)2	.1064#-04	H	.2569#-03	HCL	.3101#+02	H2O	.6162#-11	H2S	.4013#-01	KCL	.5389#-05	KO		
.1608# 00	KOH	.1579#-10	N	.2401#-09	NH3	.3329#-01	NO	.1464#-04	NO2	.2009#-02	NACL	.1476#-05	NAO		
.8545#-02	NAOH	.3910#-04	O	.6134#-02	OH	.1103#-10	S	.2347#-05	SO	.2621# 00	SO2	.3878#-03	SO3		
.3987#-26	SI	.1303#-11	SIO	.4885#-11	ALO2-	.3450#-18	CN-	.0000#+00	CO2-	.5591#-06	CL-	.0000#+00	CS+		
.6040#-06	K+	.3800#-13	NO-	.1431#-08	NO2-	.2902#-09	NA+	.2855#-11	O-	.2939#-08	OH-	.2758#-10	O2-		
.1756#-15	SH-	.1778#-13	SO-	.2233#-07	SO2-										
GLASS	.5206#-01	AL2O3 L	.2801#-04	MULLITE	.9900#-02	CAO	L	.0000#+00	CSOH	L	.1898#-07	FEAL2O4	L	.7221#-01	FEO	L
.6781#-01	KALO2 L	.2217# 00	K2SIO3 L	.2052#-03	NAOH	L	.2755#-01	SIO2	L						
SULF. AND CARB..	.1518#-03	K2CO3 L	.0000#+00	K2CO3	C	.6755# 00	K2SO4	L	.0000#+00	K2SO4	C				

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9459#-02	AR	.1263#-14	ALO2	.1659# 00	CO2	.3881#-16	CA	.7045#-14	CL2	.0000#+00	CS			
.3515#-12	FE	.4010#-05	H2	.1630#-05	K	.7386# 00	N2	.3774#-06	NA	.1028#-02	O2	.8102#-18	S2		
.9151#-13	SIO2	.4981#-10	E-	.3172#-23	AL	.7645#-19	ALO	.1421#-08	AL(OH)2	.5659#-30	AL2O	.2042#-04	CO		
.2840#-14	C O S	.1272#-10	CAOH	.3980#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3126#-10	FEO		
.2405#-06	FE(OH)2	.2868#-07	H	.6927#-06	HCL	.8360#-01	H2O	.1661#-13	H2S	.1082#-03	KCL	.1453#-07	KO		
.4334#-03	KOH	.4257#-13	N	.6473#-12	NH3	.8976#-04	NO	.3946#-07	NO2	.5416#-05	NACL	.3978#-08	NAO		
.2304#-04	NAOH	.1054#-06	O	.1654#-04	OH	.2974#-13	S	.6328#-08	SO	.7066#-03	SO2	.1045#-05	SO3		
.1075#-28	SI	.3512#-14	SIO	.1317#-13	ALO2-	.9302#-21	CN-	.0000#+00	CO2-	.1507#-08	CL-	.0000#+00	CS+		
.1628#-08	K+	.1024#-15	NO-	.3859#-11	NO2-	.7824#-12	NA+	.7697#-14	O-	.7924#-11	OH-	.7435#-13	O2-		
.4735#-18	SH-	.4792#-16	SO-	.6020#-10	SO2-										
GLASS	.1153# 00	AL2O3 L	.6204#-04	MULLITE	.2193#-01	CAO	L	.0000#+00	CSOH	L	.4205#-07	FEAL2O4	L	.1600# 00	FEO	L
.1502# 00	KALO2 L	.4911# 00	K2SIO3 L	.4545#-03	NAOH	L	.6103#-01	SIO2	L						
SULF. AND CARB..	.2247#-03	K2CO3 L	.0000#+00	K2CO3	C	.9998# 00	K2SO4	L	.0000#+00	K2SO4	C				

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3709#+03	.4515# 00	.6757# 00	.3720#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2999#+02	.1187#+03	.1743#+03	.3036#+02
MASS	(KILOGRAMS)	.1113#+02	.5358#-01	.1177# 00	.1130#+02
VOLUME	(CUBIC-METERS)	.3044#+02	.1644#-04	.4423#-04	.3044#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.3655# 00	.3260#+04	.2662#+04	.3711# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2249#+05	.3661#+02	.7995#+02	.2260#+05
REACTION ENTHALPY	(KILOCALORIES)	-.3800#+04	-.1114#+03	-.1885#+03	-.4099#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7611#+04	-.1280#+03	-.2242#+03	-.7963#+04
SENSIBLE HEAT	(KILOCALORIES)	.3811#+04	.1660#+02	.3574#+02	.3863#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9481#+01	.3365#+02	.4705#+02	.9578#+01
ADIABATIC EXPANSION COEFFICIENT		.1265# +1	SONIC SPEED (METERS/SECOND)		.7253# +3

DEBYE LENGTH (METERS) .17416#-04 ELECTRON DENSITY (PER M+3) .36556#+15 COLLISION FREQUENCY (PER SEC) .47539#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER)		.2180#-04	BETA1						-.1707#+05
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)					-.1014#-04
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.1717#+05	.1714#+05	.1711#+05	.1709#+05	.1709#+05	.1708#+05	.1708#+05	
HALL PARAMETER		.0000#+00	.7471# 00	.1491#+01	.2235#+01	.2979#+01	.3723#+01	.4467#+01	
PSI	(METER-OHM/SQ TESLA)	.3303#+02	.2220#+02	.1119#+02	.6128#+01	.3751#+01	.2503#+01	.1780#+01	
THETA2	(VOLT/TESLA-DEGK)	.3541#-05	.2380#-05	.1200#-05	.6570#-06	.4022#-06	.2684#-06	.1908#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.1237#-05	-.8312#-06	-.4190#-06	-.2294#-06	-.1404#-06	-.9372#-07	-.6663#-07	

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U S BU MINES   PGH ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                                3 10

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 75% ASH REJECTION
    .3508#+01 AR      .1721# 00 ALO2    .6156#+02 CO2     .9900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .7230#-01 FE
    .3110#+02 H2      .2064#+01 K       .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .2493# 00 SIO2

PRESSURE =  1.50 ATM,  TEMPERATURE = 1400 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......    .3508#+01  AR      .1725#-13  ALO2    .6155#+02  CO2     .2739#-15  CA      .1915#-10  CL2     .0000#+00  CS
    .3809#-11  FE     .3977#-03  H2      .3466#-04  K       .2740#+03  N2      .2878#-04  NA      .3052# 00  O2      .1085#-17  S2
    .4472#-11  SIO2   .3708#-09  E-      .2985#-23  AL      .2611#-18  ALO     .8099#-07  AL(OH)2 .1156#-30  AL2O    .1696#-02  CO
    .2342#-13  C O S  .4159#-09  CAOH    .1943#-05  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .8050#-09  FEO
    .3859#-04  FE(OH)2 .1518#-05 H       .6207#-03  HCL     .3108#+02  H2O     .1667#-12  H2S     .3585#-01  KCL     .3060#-06  KO
    .2674#-01  KOH    .1021#-11  N       .4586#-10  NH3     .1775#-01  NO      .9730#-05  NO2     .5927#-02  NACL    .3126#-06  NAO
    .4639#-02  NAOH   .8161#-05  O       .2286#-02  OH      .1911#-12  S       .1778#-06  SO      .9998#-01  SO2     .2290#-03  SO3
    .8684#-29  SI     .6104#-13  SIO     .4103#-13  ALO2-   .7417#-21  CN-     .0000#+00  CO2-    .1309#-06  CL-     .0000#+00  CS+
    .1317#-06  K+     .4881#-15  NO-     .8404#-10  NO2-    .1461#-09  NA+     .3200#-13  O-      .7202#-10  OH-     .6684#-12  O2-
    .2978#-18  SH-    .5681#-16  SO-     .3725#-09  SO2-
  GLASS .........   .6944#-01 AL2O3 L .8530#-03 MULLITE .9900#-02 CAO   L .0000#+00 CSOH  L .3621#-08 FEAL2O4L.7226#-01 FEO   L
    .2811#-01 KALO2 L .1488# 00 K2SIO3 L.3045#-03 NAOH  L .9881#-01 SIO2  L
  SULF. AND CARB..    .6554#-04 K2CO3 L .0000#+00 K2CO3 C .8378# 00 K2SO4 L .0000#+00 K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......    .9467#-02  AR      .4654#-16  ALO2    .1661# 00  CO2     .7392#-18  CA      .5168#-13  CL2     .0000#+00  CS
    .1028#-13  FE     .1073#-05  H2      .9352#-07  K       .7392# 00  N2      .7767#-07  NA      .8237#-03  O2      .2927#-20  S2
    .1207#-13  SIO2   .1001#-11  E-      .8053#-26  AL      .7045#-21  ALO     .2185#-09  AL(OH)2 .3119#-33  AL2O    .4576#-05  CO
    .6319#-16  C O S  .1122#-11  CAOH    .5244#-08  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .2172#-11  FEO
    .1041#-06  FE(OH)2 .4096#-08 H       .1675#-05  HCL     .8386#-01  H2O     .4498#-15  H2S     .9674#-04  KCL     .8258#-09  KO
    .7216#-04  KOH    .2756#-14  N       .1237#-12  NH3     .4789#-04  NO      .2625#-07  NO2     .1599#-04  NACL    .8436#-09  NAO
    .1252#-04  NAOH   .2202#-07  O       .6169#-05  OH      .5156#-15  S       .4798#-09  SO      .2698#-03  SO2     .6179#-06  SO3
    .2343#-31  SI     .1647#-15  SIO     .1107#-15  ALO2-   .2001#-23  CN-     .0000#+00  CO2-    .3533#-09  CL-     .0000#+00  CS+
    .3553#-09  K+     .1317#-17  NO-     .2268#-12  NO2-    .3944#-12  NA+     .8635#-16  O-      .1943#-12  OH-     .1804#-14  O2-
    .8035#-21  SH-    .1533#-16  SO-     .1005#-11  SO2-
  GLASS .........   .1621# 00 AL2O3 L .1991#-02 MULLITE .2311#-01 CAO   L .0000#+00 CSOH  L .8452#-08 FEAL2O4L.1687# 00 FEO   L
    .6560#-01 KALO2 L .3472# 00 K2SIO3 L.7108#-03 NAOH  L .2306# 00 SIO2  L
  SULF. AND CARB..    .7823#-04 K2CO3 L .0000#+00 K2CO3 C .9999# 00 K2SO4 L .0000#+00 K2SO4 C

                                                  IDEALGAS    GLASS ..    SULF. AN     MIXTURE
MOLAR QUANTITY                    (GRAM-MOLES)    .3706#+03   .4265# 00   .8379# 00   .3719#+03
AVERAGE MOLECULAR WEIGHT             (AMU)        .2997#+02   .1047#+03   .1743#+03   .3038#+02
MASS                              (KILOGRAMS)     .1111#+02   .4465#-01   .1460# 00   .1130#+02
VOLUME                         (CUBIC-METERS)     .2838#+02   .1387#-04   .5485#-04   .2838#+02
DENSITY           (KILOGRAMS/CUBIC METER)         .3913# 00   .3233#+04   .2662#+04   .3980# 00
ENTROPY              (GRAMCALORIES/DEGK)          .2222#+05   .2927#+02   .9643#+02   .2234#+05
REACTION ENTHALPY       (KILOCALORIES)           -.4139#+04  -.1024#+03  -.2377#+03  -.4479#+04
HEAT OF FORMATION       (KILOCALORIES)           -.7596#+04  -.1150#+03  -.2780#+03  -.7989#+04
SENSIBLE HEAT           (KILOCALORIES)            .3457#+04   .1258#+02   .4038#+02   .3510#+04
FROZEN CP            (GMCAL/GMMOL-DEGK)           .9377#+01   .2929#+02   .4705#+02   .9484#+01
ADIABATIC EXPANSION COEFFICIENT                   .1269# +1    SONIC SPEED (METERS/SECOND)        .7020# +3

DEBYE LENGTH          (METERS) .34547#-04   ELECTRON DENSITY     (PER M+3) .78687#+13   COLLISION FREQUENCY  (PER SEC) .51950#+12
COEFFICIENTS FOR OHM'S LAW..   SIGMA = SCALAR COND  (MHO/METER)    .4305#-06     BETA1     (SQM-VOLT/NEWTON)          -.7932#+06
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)   .0000#+00     THETA1    (VOLT/DEGK)                -.1239#-04
MAGNETIC INDUCTION (ABS B)       (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                        (METER-OHM/TESLA)  .7998#+06   .7979#+06   .7957#+06   .7946#+06   .7941#+06   .7938#+06   .7937#+06
HALL PARAMETER                                .0000#+00   .6870# 00   .1370#+01   .2053#+01   .2735#+01   .3417#+01   .4100#+01
PSI                  (METER-OHM/SQ TESLA)     .2126#+04   .1497#+04   .7929#+03   .4445#+03   .2752#+03   .1847#+03   .1318#+03
THETA2                  (VOLT/TESLA-DEGK)     .4017#-05   .2828#-05   .1498#-05   .8396#-06   .5198#-06   .3489#-06   .2489#-06
THETA3               (VOLT/SQ TESLA-DEGK)    -.1302#-05  -.9168#-06  -.4856#-06  -.2722#-06  -.1685#-06  -.1131#-06  -.8070#-07
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2		

PRESSURE = 1.50 ATM, TEMPERATURE = 1300 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS		.3508#+01	AR	.3467#-15	ALO2	.6156#+02	CO2	.2618#-17	CA	.8815#-10	CL2	.0000#+00	CS		
.5948#-13	FE	.8194#-04	H2	.1931#-05	K	.2740#+03	N2	.2993#-05	NA	.2647# 00	O2	.1512#-21	S2		
.1558#-12	SIO2	.5933#-11	E-	.2420#-26	AL	.9928#-21	ALO	.7812#-08	AL(OH)2	.1371#-34	AL2O	.2839#-03	CO		
.8310#-16	C O S	.2396#-10	CAOH	.1819#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3601#-10	FEO		
.1433#-04	FE(OH)2	.1568#-06	H	.1130#-02	HCL	.3109#+02	H2O	.7379#-15	H2S	.3222#-01	KCL	.1786#-07	KO		
.5240#-02	KOH	.4336#-15	N	.6214#-11	NH3	.9086#-02	NO	.6810#-05	NO2	.9045#-02	NACL	.3549#-07	NAO		
.1526#-02	NAOH	.1421#-05	O	.7484#-03	OH	.5371#-15	S	.2898#-08	SO	.1117#-01	SO2	.4499#-04	SO3		
.2369#-32	SI	.6064#-15	SIO	.2140#-15	ALO2-	.7912#-24	CN-	.0000#+00	CO2-	.2396#-07	CL-	.0000#+00	CS+		
.2395#-07	K+	.4872#-17	NO-	.5115#-11	NO2-	.2975#-10	NA+	.2731#-15	O-	.1468#-11	OH-	.1467#-13	O2-		
.7964#-22	SH-	.3432#-19	SO-	.1613#-11	SO2-										
GLASS		.7669#-01	AL2O3 L	.2798#-02	MULLITE	.9900#-02	CAO L	.0000#+00	CSOH L	.4213#-09	FEAL2O4L	.7229#-01	FEO L		
.1931#-02	KALO2 L	.8546#-01	K2SIO3 L	.3260#-03	NAOH L	.1582# 00	SIO2 L								
SULF. AND CARB..		.5498#-04	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9268# 00	K2SO4 C						

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS		.9471#-02	AR	.9358#-18	ALO2	.1662# 00	CO2	.7067#-20	CA	.2380#-12	CL2	.0000#+00	CS		
.1606#-15	FE	.2212#-06	H2	.5213#-08	K	.7395# 00	N2	.8080#-08	NA	.7145#-03	O2	.4080#-24	S2		
.4207#-15	SIO2	.1601#-13	E-	.6533#-29	AL	.2680#-23	ALO	.2109#-10	AL(OH)2	.3701#-37	AL2O	.7664#-06	CO		
.2243#-18	C O S	.6468#-13	CAOH	.4911#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.9719#-13	FEO		
.3869#-07	FE(OH)2	.4232#-09	H	.3051#-05	HCL	.8393#-01	H2O	.1992#-17	H2S	.8698#-04	KCL	.4821#-10	KO		
.1415#-04	KOH	.1170#-15	N	.1677#-13	NH3	.2453#-04	NO	.1838#-07	NO2	.2442#-04	NACL	.9581#-10	NAO		
.4120#-05	NAOH	.3837#-09	O	.2020#-05	OH	.1460#-17	S	.7822#-11	SO	.3016#-04	SO2	.1215#-06	SO3		
.6394#-35	SI	.1637#-17	SIO	.5777#-18	ALO2-	.2136#-26	CN-	.0000#+00	CO2-	.6469#-10	CL-	.0000#+00	CS+		
.6465#-10	K+	.1315#-19	NO-	.1381#-13	NO2-	.8032#-13	NA+	.7371#-18	O-	.3962#-14	OH-	.3960#-16	O2-		
.2150#-24	SH-	.9266#-22	SO-	.4355#-14	SO2-										
GLASS		.1881# 00	AL2O3 L	.6863#-02	MULLITE	.2429#-01	CAO L	.0000#+00	CSOH L	.1034#-08	FEAL2O4L	.1773# 00	FEO L		
.4736#-02	KALO2 L	.2097# 00	K2SIO3 L	.7997#-03	NAOH L	.3882# 00	SIO2 L								
SULF. AND CARB..		.5932#-04	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.9999# 00	K2SO4 C						

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3704#+03	.4076# 00	.9268# 00	.3718#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.2996#+02	.9238#+02	.1743#+03	.3038#+02
MASS (KILOGRAMS)	.1110#+02	.3766#-01	.1615# 00	.1130#+02
VOLUME (CUBIC-METERS)	.2635#+02	.1198#-04	.6067#-04	.2635#+02
DENSITY (KILOGRAMS/CUBIC METER)	.4212# 00	.3144#+04	.2662#+04	.4288# 00
ENTROPY (GRAMCALORIES/DEGK)	.2195#+05	.2311#+02	.9730#+02	.2207#+05
REACTION ENTHALPY (KILOCALORIES)	-.4480#+04	-.9479#+02	-.2755#+03	-.4650#+04
HEAT OF FORMATION (KILOCALORIES)	-.7590#+04	-.1043#+03	-.3184#+03	-.8012#+04
SENSIBLE HEAT (KILOCALORIES)	.3110#+04	.9463#+01	.4291#+02	.3162#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9260#+01	.2587#+02	.5575#+02	.9394#+01
ADIABATIC EXPANSION COEFFICIENT	.1273# +1	SONIC SPEED (METERS/SECOND)		.6778# +3

DEBYE LENGTH (METERS) .75153#-04 ELECTRON DENSITY (PER M+3) .13562#+12 COLLISION FREQUENCY (PER SEC) .57019#+12

COEFFICIENTS FOR OHM,S LAW.. SIGMA = SCALAR COND (MHO/METER)	.6777#-06	BETA1 (SQM-VOLT/NEWTON)						-.4602#+08	
BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)						-.1406#-04	
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.4651#+08	.4638#+08	.4623#+08	.4614#+08	.4610#+08	.4607#+08	.4606#+08		
HALL PARAMETER	.0000#+00	.6297# 00	.1253#+01	.1876#+01	.2499#+01	.3122#+01	.3745#+01		
PSI (METER-OHM/SQ TESLA)	.1466#+06	.1090#+06	.6029#+05	.3473#+05	.2179#+05	.1474#+05	.1056#+05		
THETA2 (VOLT/TESLA-DEGK)	.4205#-05	.3097#-05	.1730#-05	.9963#-06	.6252#-06	.4228#-06	.3029#-06		
THETA3 (VOLT/SQ TESLA-DEGK)	-.1258#-05	-.9264#-06	-.5173#-06	-.2980#-06	-.1870#-06	-.1265#-06	-.9060#-07		

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U S BU MINES   PGH ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                                    4 11

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 75% ASH REJECTION
    .3508#+01 AR      .1721# 00 ALO2     .6156#+02 CO2     .9900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .7230#-01 FE
    .3110#+02 H2      .2064#+01 K        .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .2493# 00 SIO2

PRESSURE =  1.50 ATM,  TEMPERATURE = 1200 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .....     .3508#+01  AR      .3342#-17  ALO2    .6156#+02  CO2     .9801#-20  CA      .2635#-09  CL2     .0000#+00  CS
    .3897#-15  FE    .1206#-04  H2      .1013#-06  K       .2740#+03  N2      .2051#-06  NA      .2615# 00  O2      .3070#-27  S2
    .1789#-14  SIO2  .7051#-13  E-      .4743#-30  AL      .1275#-23  ALO     .4311#-09  AL(OH)2 .2416#-39  AL2O    .3257#-04  CO
    .2704#-19  C O S .7583#-12  CAOH    .1199#-05  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .8672#-12  FEO
    .4152#-05  FE(OH)2 .1071#-07 H       .1560#-02  HCL     .3109#+02  H2O     .3108#-18  H2S     .3075#-01  KCL     .1067#-08  KO
    .1243#-02  KOH   .1092#-14  N       .5396#-12  NH3     .4494#-02  NO      .5236#-05  NO2     .1009#-01  NACL    .2907#-08  NAO
    .4175#-03  NAOH  .2000#-06  O       .2120#-03  OH      .1442#-18  S       .6506#-11  SO      .2557#-03  SO2     .2158#-05  SO3
    .8125#-37  SI    .1484#-17  SIO     .6245#-18  ALO2-   .3362#-27  CN-     .0000#+00  CO2-    .3422#-08  CL-     .0000#+00  CS+
    .3420#-08  K+    .3557#-19  NO-     .3324#-12  NO2-    .3072#-11  NA+     .1662#-17  O-      .2371#-13  OH-     .2898#-15  O2-
    .1923#-26  SH-   .2409#-23  SO-     .1211#-14  SO2-
  GLASS .........    .7447#-01 AL2O3 L .2131#-02 MULLITE .9900#-02 CAO   L .0000#+00 CSOH  L .2706#-10 FEAL2O4L.7230#-01 FEO   L
    .1037#-01 KALO2 L .7297#-01 K2SIO3 L.3887#-03 NAOH  L .1721# 00 SIO2  L
  SULF. AND CARB..   .1079#-03 K2CO3 L .0000#+00 K2CO3 C .0000#+00 K2SO4 L .9377# 00 K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .....     .9471#-02  AR      .9021#-20  ALO2    .1662# 00  CO2     .2646#-22  CA      .7114#-12  CL2     .0000#+00  CS
    .1052#-17  FE    .3255#-07  H2      .2735#-09  K       .7396# 00  N2      .5537#-09  NA      .7059#-03  O2      .8288#-30  S2
    .4830#-17  SIO2  .1903#-15  E-      .1280#-32  AL      .3443#-26  ALO     .1164#-11  AL(OH)2 .6522#-42  AL2O    .8794#-07  CO
    .7299#-22  C O S .2047#-14  CAOH    .3236#-08  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .2341#-14  FEO
    .1121#-07  FE(OH)2 .2892#-10 H       .4211#-05  HCL     .8394#-01  H2O     .8391#-21  H2S     .8300#-04  KCL     .2880#-11  KO
    .3355#-05  KOH   .2948#-17  N       .1457#-14  NH3     .1213#-04  NO      .1413#-07  NO2     .2725#-04  NACL    .7846#-11  NAO
    .1127#-05  NAOH  .5400#-09  O       .5723#-06  OH      .3892#-21  S       .1756#-13  SO      .6903#-06  SO2     .5827#-08  SO3
    .2193#-39  SI    .4005#-20  SIO     .1686#-20  ALO2-   .9075#-30  CN-     .0000#+00  CO2-    .9239#-11  CL-     .0000#+00  CS+
    .9232#-11  K+    .9603#-22  NO-     .8973#-15  NO2-    .8293#-14  NA+     .4487#-20  O-      .6401#-16  OH-     .7824#-18  O2-
    .5191#-29  SH-   .6504#-26  SO-     .3270#-17  SO2-
  GLASS .........    .1796# 00 AL2O3 L .5140#-02 MULLITE .2388#-01 CAO   L .0000#+00 CSOH  L .6527#-10 FEAL2O4L.1744# 00 FEO   L
    .2502#-01 KALO2 L .1760# 00 K2SIO3 L.9376#-03 NAOH  L .4150# 00 SIO2  L
  SULF. AND CARB..   .1151#-03 K2CO3 L .0000#+00 K2CO3 C .0000#+00 K2SO4 L .9999# 00 K2SO4 C

                                          IDEALGAS    GLASS ..    SULF. AN     MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)     .3704#+03   .4146# 00   .9379# 00   .3718#+03
AVERAGE MOLECULAR WEIGHT             (AMU)     .2996#+02   .8896#+02   .1743#+03   .3039#+02
MASS                           (KILOGRAMS)     .1110#+02   .3688#-01   .1634# 00   .1130#+02
VOLUME                      (CUBIC-METERS)     .2432#+02   .1197#-04   .6140#-04   .2432#+02
DENSITY          (KILOGRAMS/CUBIC METER)     .4563# 00   .3082#+04   .2662#+04   .4645# 00
ENTROPY            (GRAMCALORIES/DEGK)     .2167#+05   .2178#+02   .9444#+02   .2179#+05
REACTION ENTHALPY          (KILOCALORIES)    -.4820#+04  -.9480#+02  -.2838#+03  -.5198#+04
HEAT OF FORMATION          (KILOCALORIES)    -.7589#+04  -.1030#+03  -.3222#+03  -.8014#+04
SENSIBLE HEAT              (KILOCALORIES)     .2769#+04   .8234#+01   .3840#+02   .2816#+04
FROZEN CP            (GMCAL/GMMOL-DEGK)     .9130#+01   .2479#+02   .5134#+02   .9254#+01
ADIABATIC EXPANSION COEFFICIENT             .1278# +1    SONIC SPEED (METERS/SECOND)          .6525# +3

DEBYE LENGTH          (METERS) .18359#-03   ELECTRON DENSITY      (PER M+3) .17462#+10   COLLISION FREQUENCY   (PER SEC) .62615#+12
COEFFICIENTS FOR OHM,S LAW..   SIGMA = SCALAR COND  (MHO/METER)    .7963#-10     BETA1     (SQM-VOLT/NEWTON)          -.3574#+10
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)   .0000#+00      THETA1     (VOLT/DEGK)               -.1549#-04
MAGNETIC INDUCTION (ABS B)       (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                    (METER-OHM/TESLA)  .3621#+10   .3610#+10   .3595#+10   .3587#+10   .3582#+10   .3580#+10   .3578#+10
HALL PARAMETER                            .0000#+00   .5749# 00   .1145#+01   .1714#+01   .2282#+01   .2851#+01   .3419#+01
PSI                 (METER-OHM/SQ TESLA)  .1274#+08   .9767#+07   .5747#+07   .3409#+07   .2172#+07   .1481#+07   .1066#+07
THETA2                 (VOLT/TESLA-DEGK)  .4270#-05   .3275#-05   .1927#-05   .1143#-05   .7282#-06   .4966#-06   .3575#-06
THETA3              (VOLT/SQ TESLA-DEGK) -.1177#-05  -.9027#-06  -.5312#-06  -.3151#-06  -.2007#-06  -.1369#-06  -.9856#-07
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.50 ATM, TEMPERATURE = 1100 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.1477#-19	ALO2	.6156#+02	CO2	.1331#-22	CA	.7409#-09	CL2	.0000#+00	CS	
.1016#-17	FE	.1248#-05	H2	.3664#-08	K	.2740#+03	N2	.8848#-08	NA	.2626# 00	O2	.2376#-34	S2
.8162#-17	SIO2	.4427#-15	E-	.2050#-34	AL	.5104#-27	ALO	.1449#-10	AL(OH)2	.6323#-45	AL2O	.2488#-05	CO
.1302#-23	C O S	.1298#-13	CAOH	.6446#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1062#-13	FEO
.9779#-06	FE(OH)2	.4523#-09	H	.1991#-02	HCL	.3109#+02	H2O	.2041#-22	H2S	.3009#-01	KCL	.4543#-10	KO
.2699#-03	KOH	.1413#-16	N	.2990#-13	NH3	.1975#-02	NO	.3926#-05	NO2	.1031#-01	NACL	.1564#-09	NAO
.9312#-04	NAOH	.1995#-07	O	.4807#-04	OH	.5575#-23	S	.3123#-14	SO	.1937#-05	SO2	.3956#-07	SO3
.3767#-42	SI	.1077#-20	SIO	.7761#-21	ALO2-	.3950#-31	CN-	.0000#+00	CO2-	.3497#-09	CL-	.0000#+00	CS+
.3495#-09	K+	.1242#-21	NO-	.1558#-13	NO2-	.1851#-12	NA+	.4694#-20	O-	.2111#-15	OH-	.3311#-17	O2-
.4996#-32	SH-	.2234#-25	SO-	.1881#-18	SO2-								
GLASS	.8031#-01	AL2O3 L	.1843#-02	MULLITE	.9900#-02	CAO L	.0000#+00	CSOH L	.1173#-11	FEAL2O4L	.7230#-01	FEO L	
.4313#-03	KALO2 L	.7817#-01	K2SIO3 L	.4932#-03	NAOH L	.1674# 00	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.4376#-03	K2CO3 C	.0000#+00	K2SO4 L	.9380# 00	K2SO4 C					

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9472#-02	AR	.3987#-22	ALO2	.1662# 00	CO2	.3593#-25	CA	.2000#-11	CL2	.0000#+00	CS	
.2742#-20	FE	.3370#-08	H2	.9892#-11	K	.7396# 00	N2	.2389#-10	NA	.7090#-03	O2	.6414#-37	S2
.2203#-19	SIO2	.1195#-17	E-	.5533#-37	AL	.1378#-29	ALO	.3912#-13	AL(OH)2	.1707#-47	AL2O	.6716#-08	CO
.3514#-26	C O S	.3504#-16	CAOH	.1740#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.2866#-16	FEO
.2640#-08	FE(OH)2	.1221#-11	H	.5374#-05	HCL	.8394#-01	H2O	.5511#-25	H2S	.8124#-04	KCL	.1226#-12	KO
.7286#-06	KOH	.3815#-17	N	.8073#-16	NH3	.5331#-05	NO	.1060#-07	NO2	.2784#-04	NACL	.4222#-12	NAO
.2514#-06	NAOH	.5385#-10	O	.1298#-06	OH	.1505#-25	S	.8430#-17	SO	.5228#-08	SO2	.1068#-09	SO3
.1017#-44	SI	.2909#-23	SIO	.2095#-23	ALO2-	.1006#-33	CN-	.0000#+00	CO2-	.9440#-12	CL-	.0000#+00	CS+
.9435#-12	K+	.3352#-24	NO-	.4205#-16	NO2-	.4996#-15	NA+	.1267#-22	O-	.5697#-18	OH-	.8937#-20	O2-
.1349#-34	SH-	.6032#-31	SO-	.5078#-21	SO2-								
GLASS	.1954# 00	AL2O3 L	.4485#-02	MULLITE	.2409#-01	CAO L	.0000#+00	CSOH L	.2855#-11	FEAL2O4L	.1760# 00	FEO L	
.1050#-02	KALO2 L	.1902# 00	K2SIO3 L	.1200#-02	NAOH L	.4075# 00	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.4664#-03	K2CO3 C	.0000#+00	K2SO4 L	.9995# 00	K2SO4 C					

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3704#+03	.4109# 00	.9384# 00	.3718#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2996#+02	.8982#+02	.1742#+03	.3039#+02
MASS	(KILOGRAMS)	.1110#+02	.3691#-01	.1635# 00	.1130#+02
VOLUME	(CUBIC-METERS)	.2229#+02	.1174#-04	.6144#-04	.2229#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.4978# 00	.3144#+04	.2662#+04	.5068# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2138#+05	.2084#+02	.9046#+02	.2149#+05
REACTION ENTHALPY	(KILOCALORIES)	-.5155#+04	-.9593#+02	-.2886#+03	-.5540#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7589#+04	-.1031#+03	-.3224#+03	-.8014#+04
SENSIBLE HEAT	(KILOCALORIES)	.2433#+04	.7215#+01	.3377#+02	.2474#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.8983#+01	.2465#+02	.4788#+02	.9099#+01
ADIABATIC EXPANSION COEFFICIENT		.1284# +1	SONIC SPEED (METERS/SECOND)		.6261# +3

DEBYE LENGTH	(METERS) .52653#-03	ELECTRON DENSITY	(PER M+3) .11962#+08	COLLISION FREQUENCY	(PER SEC) .68820#+12				
COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND	(MHO/METER)	.4973#-12	BETA1	(SQM-VOLT/NEWTON)				-.5218#+12
BETA2 (ASSUMING ZERO ION SLIP)		(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1	(VOLT/DEGK)				-.1676#-04
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.5297#+12	.5281#+12	.5257#+12	.5242#+12	.5234#+12	.5229#+12	.5226#+12	
HALL PARAMETER		.0000#+00	.5253# 00	.1046#+01	.1564#+01	.2082#+01	.2600#+01	.3119#+01	
PSI	(METER-OHM/SQ TESLA)	.2003#+10	.1593#+10	.9865#+09	.6036#+09	.3911#+09	.2692#+09	.1950#+09	
THETA2	(VOLT/TESLA-DEGK)	.4252#-05	.3381#-05	.2094#-05	.1281#-05	.8303#-06	.5716#-06	.4139#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.1079#-05	-.8590#-06	-.5314#-06	-.3252#-06	.2107#-06	-.1450#-06	-.1050#-06	

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U S BU MINES   PGM ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                                    7  9

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 75% ASH REJECTION
    .3508#+01 AR      .1721# 00 ALO2    .6156#+02 CO2     .9900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .7230#-01 FE
    .3110#+02 H2      .2064#+01 K       .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .2493# 00 SIO2

PRESSURE =  1.00 ATM,  TEMPERATURE = 2200 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......    .3508#+01  AR      .3465#-05  ALO2    .5741#+02  CO2     .9998#-06  CA      .2356#-10  CL2     .0000#+00  CS
    .1125#-02  FE     .4115# 00  H2      .6211# 00  K       .2735#+03  N2      .6127#-02  NA      .2545#+01  O2      .1276#-07  S2
    .1186#-02  SIO2   .1265#-02  E-      .7785#-09  AL      .7968#-07  ALO     .2972#-02  AL(OH)2 .1856#-12  AL2O    .4147#+01  CO
    .3420#-06  C O S  .3326#-05  CAOH    .1379#-03  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .2638#-02  FEO
    .4477#-02  FE(OH)2 .6977#-01 H       .1125#-02  HCL     .2963#+02  H2O     .9009#-06  H2S     .4089#-01  KCL     .7354#-02  KO
    .1337#+01  KOH    .3992#-05  N       .1762#-06  NH3     .8656# 00  NO      .1831#-03  NO2     .1261#-03  NACL    .7284#-04  NAO
    .4574#-02  NAOH   .8304#-01  O       .6902# 00  OH      .2308#-04  S       .8683#-02  SO      .9289# 00  SO2     .2602#-03  SO3
    .7221#-11  SI     .3411#-02  SIO     .2702#-04  ALO2-   .1201#-09  CN-     .0000#+00  CO2-    .1169#-03  CL-     .0000#+00  CS+
    .1567#-02  K+     .1627#-07  NO-     .9264#-06  NO2-    .2292#-06  NA+     .2840#-05  O-      .6168#-04  OH-     .1108#-05  O2-
    .8320#-08  SH-    .9011#-07  SO-     .9185#-04  SO2-
  GLASS .........     .4676#-01  AL2O3 L .1014#-01  MULLITE .9546#-02  CAO   L .0000#+00  CSOH  L .9793#-04  FEAL2O4L.6396#-01  FEO   L
    .1453#-01 KALO2 L .2081#-01  K2SIO3 L.6649#-06  NAOH  L .2036# 00  SIO2  L
  SULF. AND CARB..    .0000#+00  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .0000#+00  K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......    .9335#-02  AR      .9220#-08  ALO2    .1527# 00  CO2     .2660#-08  CA      .6268#-13  CL2     .0000#+00  CS
    .2992#-05  FE     .1095#-02  H2      .1652#-02  K       .7277# 00  N2      .1630#-04  NA      .6770#-02  O2      .3394#-10  S2
    .3156#-05  SIO2   .3365#-05  E-      .2071#-11  AL      .2120#-09  ALO     .7907#-05  AL(OH)2 .4938#-15  AL2O    .1103#-01  CO
    .9100#-09  C O S  .8849#-06  CAOH    .3670#-06  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .7020#-05  FEO
    .1191#-04  FE(OH)2 .1856#-03 H       .2994#-05  HCL     .7882#-01  H2O     .2397#-08  H2S     .1088#-03  KCL     .1956#-04  KO
    .3557#-02  KOH    .1062#-07  N       .4688#-09  NH3     .2303#-02  NO      .4870#-06  NO2     .3355#-06  NACL    .1938#-06  NAO
    .1217#-04  NAOH   .2209#-03  O       .1836#-02  OH      .6141#-07  S       .2310#-04  SO      .2472#-02  SO2     .6922#-06  SO3
    .1921#-13  SI     .9076#-05  SIO     .7189#-07  ALO2-   .3195#-12  CN-     .0000#+00  CO2-    .3109#-06  CL-     .0000#+00  CS+
    .4169#-05  K+     .4328#-10  NO-     .2465#-08  NO2-    .6098#-09  NA+     .7557#-08  O-      .1641#-06  OH-     .2948#-08  O2-
    .2214#-10  SH-    .2397#-09  SO-     .2444#-06  SO2-
  GLASS .........     .1265# 00  AL2O3 L .2746#-01  MULLITE .2589#-01  CAO   L .0000#+00  CSOH  L .2650#-03  FEAL2O4L.1731# 00  FEO   L
    .3934#-01 KALO2 L .5632#-01  K2SIO3 L.1799#-05  NAOH  L .5511# 00  SIO2  L
  SULF. AND CARB..    .0000#+00  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .0000#+00  K2SO4 C

                                                  IDEALGAS    GLASS ..    SULF. AN     MIXTURE
MOLAR QUANTITY                    (GRAM-MOLES)    .3759#+03   .3695# 00   .0000#+00   .3762#+03
AVERAGE MOLECULAR WEIGHT              (AMU)       .2997#+02   .8420#+02   .0000#+00   .3003#+02
MASS                              (KILOGRAMS)     .1127#+02   .3111#-01   .0000#+00   .1130#+02
VOLUME                         (CUBIC-METERS)     .6785#+02   .1131#-04   .0000#+00   .6785#+02
DENSITY              (KILOGRAMS/CUBIC METER)      .1660# 00   .2750#+04   .0000#+00   .1665# 00
ENTROPY                 (GRAMCALORIES/DEGK)       .2456#+05   .2402#+02   .0000#+00   .2458#+05
REACTION ENTHALPY          (KILOCALORIES)        -.9329#+03  -.7700#+02   .0000#+00  -.1010#+04
HEAT OF FORMATION          (KILOCALORIES)        -.7317#+04  -.9366#+02   .0000#+00  -.7411#+04
SENSIBLE HEAT              (KILOCALORIES)         .6384#+04   .1666#+02   .0000#+00   .6401#+04
FROZEN CP                (GMCAL/GMMOL-DEGK)       .9866#+01   .2766#+02   .0000#+00   .9883#+01
ADIABATIC EXPANSION COEFFICIENT                   .1252# +1    SONIC SPEED (METERS/SECOND)          8742# +3

DEBYE LENGTH          (METERS).79454#-06   ELECTRON DENSITY     (PER M+3).11228#+20   COLLISION FREQUENCY  (PER SEC).23368#+12
COEFFICIENTS FOR OHM,S LAW..   SIGMA = SCALAR COND  (MHO/METER)   .1355#+01    BETA1     (SQM-VOLT/NEWTON)          -.5559# 00
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)  .0000#+00     THETA1      (VOLT/DEGK)              .3473#-05
MAGNETIC INDUCTION (ABS B)       (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                          (METER-OHM/TESLA)  .5563# 00   .5561# 00   .5560# 00   .5560# 00   .5559# 00   .5559# 00   .5559# 00
HALL PARAMETER                                  .0000#+00   .1507#+01   .3013#+01   .4520#+01   .6026#+01   .7533#+01   .9039#+01
PSI                      (METER-OHM/SQ TESLA)   .2200#-03   .8856#-04   .3172#-04   .1532#-04   .8890#-05   .5774#-05   .4042#-05
THETA2                     (VOLT/TESLA-DEGK)    .2115#-05  -.8515#-06  -.3050#-06  -.1473#-06  -.8548#-07  -.5552#-07  -.3886#-07
THETA3                   (VOLT/SQ TESLA-DEGK)   .1288#-05   .5187#-06   .1858#-06   .8975#-07   .5207#-07   .3382#-07   .2367#-07
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2		

PRESSURE = 1.00 ATM, TEMPERATURE = 2100 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.7176#-06	ALO2	.5909#+02	CO2	.1801#-06	CA	.9671#-11	CL2	.0000#+00	CS			
.2601#-03	FE	.2554# 00	H2	.4416# 00	K	.2737#+03	N2	.5110#-02	NA	.1803#+01	O2	.3919#-08	S2		
.2275#-03	SIO2	.5694#-03	E-	.6117#-10	AL	.9902#-08	ALO	.1375#-02	AL(OH)2	.7736#-14	AL2O	.2463#+01	CO		
.1400#-06	C O S	.1131#-03	CAOH	.6332#-04	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.8078#-03	FEO		
.3069#-02	FE(OH)2	.3037#-01	H	.7282#-03	HCL	.2988#+02	H2O	.3925#-06	H2S	.4140#-01	KCL	.4617#-02	KO		
.1453#+01	KOH	.1139#-05	N	.9972#-07	NH3	.5762# 00	NO	.1193#-03	NO2	.1443#-03	NACL	.5452#-04	NAO		
.5589#-02	NAOH	.3586#-01	O	.4155# 00	OH	.7233#-05	S	.4726#-02	SO	.9329# 00	SO2	.2805#-03	SO3		
.2739#-12	SI	.4654#-03	SIO	.7919#-05	ALO2-	.2696#-10	CN-	.0000#+00	CO2-	.6781#-04	CL-	.0000#+00	CS+		
.7384#-03	K+	.5513#-08	NO-	.5527#-06	NO2-	.1037#-06	NA+	.9005#-06	O-	.2987#-04	OH-	.4433#-06	O2-		
.2679#-08	SH-	.3217#-07	SO-	.6159#-04	SO2-										
GLASS	.5140#-01	AL2O3 L	.7387#-02	MULLITE	.9787#-02	CAO	L	.0000#+00	CSOH	L	.4695#-04	FEAL2O4	L	.6812#-01	FEO L
.2351#-01	KALO2	L	.4978#-01	K2SIO3	L	.1350#-05	NAOH	L	.1840# 00	SIO2	L				
SULF. AND CARB..	.0000#+00	K2CO3	L	.0000#+00	K2CO3	C	.0000#+00	K2SO4	L	.0000#+00	K2SO4	C			

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9365#-02	AR	.1915#-08	ALO2	.1577# 00	CO2	.4807#-09	CA	.2581#-13	CL2	.0000#+00	CS			
.6943#-06	FE	.6816#-03	H2	.1179#-02	K	.7305# 00	N2	.1364#-04	NA	.4812#-02	O2	.1046#-10	S2		
.6073#-06	SIO2	.1520#-05	E-	.1633#-12	AL	.2643#-10	ALO	.3671#-05	AL(OH)2	.2065#-16	AL2O	.6574#-02	CO		
.3737#-09	C O S	.3019#-06	CAOH	.1690#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.2156#-05	FEO		
.8191#-05	FE(OH)2	.8106#-04	H	.1944#-05	HCL	.7977#-01	H2O	.1048#-08	H2S	.1105#-03	KCL	.1232#-04	KO		
.3877#-02	KOH	.3039#-08	N	.2662#-09	NH3	.1538#-02	NO	.3186#-06	NO2	.3853#-06	NACL	.1455#-06	NAO		
.1492#-04	NAOH	.9573#-04	O	.1109#-02	OH	.1931#-07	S	.1262#-04	SO	.2490#-02	SO2	.7486#-06	SO3		
.7311#-15	SI	.1242#-05	SIO	.2114#-07	ALO2-	.7195#-13	CN-	.0000#+00	CO2-	.1810#-06	CL-	.0000#+00	CS+		
.1971#-05	K+	.1471#-10	NO-	.1475#-08	NO2-	.2767#-09	NA+	.2404#-08	O-	.7974#-07	OH-	.1183#-08	O2-		
.7150#-11	SH-	.8586#-10	SO-	.1644#-06	SO2-										
GLASS	.1304# 00	AL2O3	L	.1874#-01	MULLITE	.2483#-01	CAO	L	.0000#+00	CSOH	L	.1191#-03	FEAL2O4	L	.1729# 00 FEO L
.5966#-01	KALO2	L	.1263# 00	K2SIO3	L	.3427#-05	NAOH	L	.4670# 00	SIO2	L				
SULF. AND CARB..	.0000#+00	K2CO3	L	.0000#+00	K2CO3	C	.0000#+00	K2SO4	L	.0000#+00	K2SO4	C			

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3746#+03	.3941# 00	.0000#+00	.3750#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.3006#+02	.8852#+02	.0000#+00	.3012#+02
MASS (KILOGRAMS)	.1126#+02	.3488#-01	.0000#+00	.1130#+02
VOLUME (CUBIC-METERS)	.6456#+02	.1216#-04	.0000#+00	.6456#+02
DENSITY (KILOGRAMS/CUBIC METER)	.1744# 00	.2869#+04	.0000#+00	.1750# 00
ENTROPY (GRAMCALORIES/DEGK)	.2431#+05	.2673#+02	.0000#+00	.2434#+05
REACTION ENTHALPY (KILOCALORIES)	-.1455#+04	-.8245#+02	.0000#+00	-.1538#+04
HEAT OF FORMATION (KILOCALORIES)	-.7470#+04	-.9982#+02	.0000#+00	-.7570#+04
SENSIBLE HEAT (KILOCALORIES)	.6015#+04	.1737#+02	.0000#+00	.6032#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9856#+01	.2834#+02	.0000#+00	.9875#+01
ADIABATIC EXPANSION COEFFICIENT	.1253# +1	SONIC SPEED (METERS/SECOND)		.8529# +3

DEBYE LENGTH (METERS) .10868#-05 ELECTRON DENSITY (PER M+3) .53117#+19 COLLISION FREQUENCY (PER SEC) .24242#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER) .6176# 00 BETA1 (SQM-VOLT/NEWTON) -.1175#+01

BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON) .0000#+00 THETA1 (VOLT/DEGK) .2360#-05

MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI (METER-OHM/TESLA)	.1175#+01	.1175#+01	.1175#+01	.1175#+01	.1175#+01	.1175#+01	.1175#+01	
HALL PARAMETER	.0000#+00	.1452#+01	.2903#+01	.4355#+01	.5806#+01	.7258#+01	.8709#+01	
PSI (METER-OHM/SQ TESLA)	.2124#-03	.8662#-04	.3120#-04	.1510#-04	.8765#-05	.5694#-05	.3987#-05	
THETA2 (VOLT/TESLA-DEGK)	-.1422#-05	-.5798#-06	-.2088#-06	-.1011#-06	-.5868#-07	-.3812#-07	-.2669#-07	
THETA3 (VOLT/SQ TESLA-DEGK)	.8565#-06	.3493#-06	.1258#-06	.6089#-07	.3535#-07	.2297#-07	.1608#-07	

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508≠+01	AR	.1721≠ 00	ALO2	.6156≠+02	CO2	.9900≠-02	CA	.2120≠-01	CL2	.0000≠+00	CS	.7230≠-01	FE
.3110≠+02	H2	.2064≠+01	K	.2740≠+03	N2	.1090≠-01	NA	.1772≠+02	O2	.4690≠ 00	S2	.2493≠ 00	SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 2000 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508≠+01	AR	.1265≠-06	ALO2	.6022≠+02	CO2	.2639≠-07	CA	.4116≠-11	CL2	.0000≠+00	CS	
.4883≠-04	FE	.1474≠ 00	H2	.2832≠ 00	K	.2738≠+03	N2	.3986≠-02	NA	.1294≠+01	O2	.9648≠-09	S2
.3188≠-04	SIO2	.2261≠-03	E-	.3538≠-11	AL	.9717≠-09	ALO	.5688≠-03	AL(OH)2	.2171≠-15	AL2O	.1337≠+01	CO
.4808≠-07	C O S	.3364≠-04	CAOH	.2868≠-04	CL	.0000≠+00	CSCL	.0000≠+00	CS O	.0000≠+00	CSOH	.2110≠-03	FEO
.1949≠-02	FE(OH)2	.1204≠-01	H	.4747≠-03	HCL	.3007≠+02	H2O	.1453≠-06	H2S	.4169≠-01	KCL	.2641≠-02	KO
.1498≠+01	KOH	.2877≠-06	N	.5124≠-07	NH3	.3765≠ 00	NO	.7806≠-04	NO2	.1696≠-03	NACL	.3875≠-04	NAO
.6703≠-02	NAOH	.1460≠-01	O	.2406≠ 00	OH	.1917≠-05	S	.2351≠-02	SO	.9353≠ 00	SO2	.3109≠-03	SO3
.6167≠-14	SI	.4373≠-04	SIO	.1941≠-05	ALO2-	.4661≠-11	CN-	.0000≠+00	CO2-	.3778≠-04	CL-	.0000≠+00	CS+
.3171≠-03	K+	.1631≠-09	NO-	.3120≠-06	NO2-	.4343≠-07	NA+	.2472≠-06	O-	.1294≠-04	OH-	.1610≠-06	O2-
.6874≠-09	SH-	.9571≠-08	SO-	.3764≠-04	SO2-								
GLASS	.5587≠-01	AL2O3 L	.3757≠-02	MULLITE	.9866≠-02	CAO L	.0000≠+00	CSOH L	.1968≠-04	FEAL2O4L	.7007≠-01	FEO L	
.3721≠-01	KALO2 L	.1003≠ 00	K2SIO3 L	.2814≠-05	NAOH L	.1414≠ 00	SIO2 L						
SULF. AND CARB..	.0000≠+00	K2CO3 L	.0000≠+00	K2CO3 C	.0000≠+00	K2SO4 L	.0000≠+00	K2SO4 C					

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9387≠-02	AR	.3385≠-09	ALO2	.1611≠ 00	CO2	.7060≠-10	CA	.1101≠-13	CL2	.0000≠+00	CS	
.1306≠-06	FE	.3943≠-03	H2	.7576≠-03	K	.7325≠ 00	N2	.1066≠-04	NA	.3463≠-02	O2	.2581≠-11	S2
.8528≠-07	SIO2	.6050≠-06	E-	.9466≠-14	AL	.2600≠-11	ALO	.1522≠-05	AL(OH)2	.5810≠-18	AL2O	.3576≠-02	CO
.1286≠-09	C O S	.9000≠-07	CAOH	.7672≠-07	CL	.0000≠+00	CSCL	.0000≠+00	CS O	.0000≠+00	CSOH	.5646≠-06	FEO
.5215≠-05	FE(OH)2	.3221≠-04	H	.1270≠-05	HCL	.8044≠-01	H2O	.3888≠-09	H2S	.1115≠-03	KCL	.7066≠-05	KO
.4069≠-02	KOH	.7698≠-09	N	.1371≠-09	NH3	.1007≠-02	NO	.2088≠-06	NO2	.4538≠-06	NACL	.1037≠-06	NAO
.1793≠-04	NAOH	.3906≠-04	O	.6436≠-03	OH	.5128≠-08	S	.6290≠-05	SO	.2502≠-02	SO2	.8318≠-06	SO3
.1650≠-16	SI	.1170≠-06	SIO	.5192≠-08	ALO2-	.1247≠-13	CN-	.0000≠+00	CO2-	.1011≠-06	CL-	.0000≠+00	CS+
.8485≠-06	K+	.4363≠-11	NO-	.8348≠-09	NO2-	.1162≠-09	NA+	.6615≠-09	O-	.3463≠-07	OH-	.4307≠-09	O2-
.1639≠-11	SH-	.2561≠-10	SO-	.1007≠-06	SO2-								
GLASS	.1335≠ 00	AL2O3 L	.8977≠-02	MULLITE	.2358≠-01	CAO L	.0000≠+00	CSOH L	.4702≠-04	FEAL2O4L	.1674≠ 00	FEO L	
.8891≠-01	KALO2 L	.2396≠ 00	K2SIO3 L	.6723≠-05	NAOH L	.3380≠ 00	SIO2 L						
SULF. AND CARB..	.0000≠+00	K2CO3 L	.0000≠+00	K2CO3 C	.0000≠+00	K2SO4 L	.0000≠+00	K2SO4 C					

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3738≠+03	.4185≠ 00	.0000≠+00	.3742≠+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3012≠+02	.9679≠+02	.0000≠+00	.3019≠+02
MASS	(KILOGRAMS)	.1126≠+02	.4051≠-01	.0000≠+00	.1130≠+02
VOLUME	(CUBIC-METERS)	.6134≠+02	.1337≠-04	.0000≠+00	.6134≠+02
DENSITY	(KILOGRAMS/CUBIC METER)	.1835≠ 00	.3029≠+04	.0000≠+00	.1842≠ 00
ENTROPY	(GRAMCALORIES/DEGK)	.2408≠+05	.3087≠+02	.0000≠+00	.2411≠+05
REACTION ENTHALPY	(KILOCALORIES)	-.1925≠+04	-.8967≠+02	.0000≠+00	-.2015≠+04
HEAT OF FORMATION	(KILOCALORIES)	-.7571≠+04	-.1084≠+03	.0000≠+00	-.7680≠+04
SENSIBLE HEAT	(KILOCALORIES)	.5646≠+04	.1869≠+02	.0000≠+00	.5665≠+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9830≠+01	.2996≠+02	.0000≠+00	.9852≠+01
ADIABATIC EXPANSION COEFFICIENT		.1253≠ +1	SONIC SPEED (METERS/SECOND)		.8319≠ +3

DEBYE LENGTH (METERS) .15415≠-05 ELECTRON DENSITY (PER M+3) .22203≠+19 COLLISION FREQUENCY (PER SEC) .25173≠+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER) .2485≠ 00 BETA1 (SQM-VOLT/NEWTON) -.2811≠+01

BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000≠+00	THETA1	(VOLT/DEGK)					.9625≠-06
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000≠+00	.2000≠+01	.4000≠+01	.6000≠+01	.8000≠+01	.1000≠+02	.1200≠+02	
CHI	(METER-OHM/TESLA)	.2811≠+01	.2811≠+01	.2811≠+01	.2811≠+01	.2811≠+01	.2811≠+01	.2811≠+01	
HALL PARAMETER		.0000≠+00	.1397≠+01	.2795≠+01	.4192≠+01	.5590≠+01	.6987≠+01	.8385≠+01	
PSI	(METER-OHM/SQ TESLA)	.8343≠-04	.3456≠-04	.1253≠-04	.6077≠-05	.3531≠-05	.2295≠-05	.1607≠-05	
THETA2	(VOLT/TESLA-DEGK)	-.5724≠-06	.2371≠-06	-.8597≠-07	-.4169≠-07	-.2422≠-07	-.1574≠-07	-.1102≠-07	
THETA3	(VOLT/SQ TESLA-DEGK)	.3404≠-06	.1410≠-06	.5112≠-07	.2479≠-07	.1440≠-07	.9361≠-08	.6555≠-08	

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 1900 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.1812#-07	ALO2	.6091#+02	CO2	.3040#-08	CA	.1824#-11	CL2	.0000#+00	CS	
.7316#-05	FE	.7679#-01	H2	.1619# 00	K	.2738#+03	N2	.2843#-02	NA	.9762# 00	O2	.1738#-09	S2
.2969#-05	SIO2	.7751#-04	E-	.1357#-12	AL	.6987#-10	ALO	.1993#-03	AL(OH)2	.3467#-17	AL2O	.6441# 00	CO
.1288#-07	C O S	.8658#-05	CAOH	.1278#-04	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.4733#-04	FEO
.1173#-02	FE(OH)2	.4233#-02	H	.3084#-03	HCL	.3021#+02	H2O	.4279#-07	H2S	.4186#-01	KCL	.1390#-02	KO
.1479#+01	KOH	.6304#-07	N	.2300#-07	NH3	.2457# 00	NO	.5301#-04	NO2	.2030#-03	NACL	.2591#-04	NAO
.7822#-02	NAOH	.5646#-02	O	.1338# 00	OH	.4074#-06	S	.1046#-02	SO	.9366# 00	SO2	.3652#-03	SO3
.6982#-16	SI	.2510#-05	SIO	.3771#-06	ALO2-	.5734#-12	CN-	.0000#+00	CO2-	.1990#-04	CL-	.0000#+00	CS+
.1235#-03	K+	.4177#-09	NO-	.1705#-06	NO2-	.1654#-07	NA+	.5835#-07	O-	.4930#-05	OH-	.5407#-07	O2-
.1294#-09	SH-	.2276#-04	SO-	.2056#-04	SO2-								
GLASS	.5549#-01	AL2O3 L	.7996#-03	MULLITE	.9891#-02	CAO L	.0000#+00	CSOH L	.6767#-05	FEAL2O4	L .7107#-01	FEO L	
.5611#-01	KALO2 L	.1620# 00	K2SIO3 L	.5996#-05	NAOH L	.8571#-01	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C					

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9401#-02	AR	.4856#-10	ALO2	.1632# 00	CO2	.8146#-11	CA	.4888#-14	CL2	.0000#+00	CS	
.1960#-07	FE	.2058#-03	H2	.4338#-03	K	.7338# 00	N2	.7619#-05	NA	.2616#-02	O2	.4656#-12	S2
.7955#-06	SIO2	.2077#-06	E-	.3637#-15	AL	.1872#-12	ALO	.5342#-06	AL(OH)2	.9292#-20	AL2O	.1726#-02	CO
.3452#-10	C O S	.2320#-07	CAOH	.3425#-07	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1268#-06	FEO
.3143#-03	FE(OH)2	.1134#-04	H	.8265#-06	HCL	.8094#-01	H2O	.1147#-09	H2S	.1122#-03	KCL	.3725#-05	KO
.3962#-02	KOH	.1689#-09	N	.6164#-10	NH3	.6585#-03	NO	.1420#-06	NO2	.5438#-06	NACL	.6944#-07	NAO
.2096#-04	NAOH	.1513#-04	O	.3585#-03	OH	.1092#-08	S	.2804#-05	SO	.2510#-02	SO2	.9787#-06	SO3
.1871#-18	SI	.6727#-06	SIO	.1011#-08	ALO2-	.1536#-14	CN-	.0000#+00	CO2-	.5334#-07	CL-	.0000#+00	CS+
.3311#-06	K+	.1119#-11	NO-	.4569#-09	NO2-	.4431#-10	NA+	.1564#-09	O-	.1321#-07	OH-	.1449#-09	O2-
.3468#-12	SH-	.6099#-11	SO-	.5509#-07	SO2-								
GLASS	.1258# 00	AL2O3 L	.1813#-02	MULLITE	.2243#-01	CAO L	.0000#+00	CSOH L	.1534#-04	FEAL2O4	L .1611# 00	FEO L	
.1272# 00	KALO2 L	.3673# 00	K2SIO3 L	.1359#-04	NAOH L	.1943# 00	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C					

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3732#+03	.4411# 00	.0000#+00	.3736#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.3014#+02	.1073#+03	.0000#+00	.3023#+02
MASS (KILOGRAMS)	.1125#+02	.4731#-01	.0000#+00	.1130#+02
VOLUME (CUBIC-METERS)	.5818#+02	.1497#-04	.0000#+00	.5818#+02
DENSITY (KILOGRAMS/CUBIC METER)	.1933# 00	.3160#+04	.0000#+00	.1941# 00
ENTROPY (GRAMCALORIES/DEGK)	.2385#+05	.3572#+02	.0000#+00	.2388#+05
REACTION ENTHALPY (KILOCALORIES)	-.2354#+04	-.9833#+02	.0000#+00	-.2452#+04
HEAT OF FORMATION (KILOCALORIES)	-.7632#+04	-.1186#+03	.0000#+00	-.7751#+04
SENSIBLE HEAT (KILOCALORIES)	.5278#+04	.2024#+02	.0000#+00	.5299#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9788#+01	.3217#+02	.0000#+00	.9814#+01
ADIABATIC EXPANSION COEFFICIENT	.1255# +1	SONIC SPEED (METERS/SECOND)		.8109# +3

DEBYE LENGTH (METERS) .22702#-05 ELECTRON DENSITY (PER M+3) .80229#+18 COLLISION FREQUENCY (PER SEC) .26516#+12

COEFFICIENTS FOR OHM.S LAW.. SIGMA = SCALAR COND (MHO/METER)	.8526#-01	BETA1 (SQM-VOLT/NEWTON)						-.7780#+01	
BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)						-.5833#-06	
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.7780#+01	.7780#+01	.7780#+01	.7780#+01	.7780#+01	.7780#+01	.7780#+01		
HALL PARAMETER	.0000#+00	.1327#+01	.2653#+01	.3980#+01	.5306#+01	.6633#+01	.7960#+01		
PSI (METER-OHM/SQ TESLA)	.8204#-04	.3530#-04	.1303#-04	.6350#-05	.3697#-05	.2405#-05	.1685#-05		
THETA2 (VOLT/TESLA-DEGK)	.3356#-06	.1444#-06	.5329#-07	.2598#-07	.1512#-07	.9839#-08	.6895#-08		
THETA3 (VOLT/SQ TESLA-DEGK)	-.1931#-06	-.8308#-07	-.3067#-07	-.1495#-07	-.8703#-08	-.5662#-08	-.3967#-08		

U S BU MINES PGH ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6 2 7

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2		

PRESSURE = 1.00 ATM, TEMPERATURE = 1800 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.1966#-08	ALO2	.6129#+02	CO2	.2628#-09	CA	.8014#-12	CL2	.0000#+00	CS			
.8433#-06	FE	.3502#-01	H2	.8333#-01	K	.2739#+03	N2	.1798#-02	NA	.8052# 00	O2	.2020#-10	S2		
.1681#-06	SIO2	.2249#-04	E-	.3028#-14	AL	.3321#-11	ALO	.5486#-04	AL(OH)2	.2587#-19	AL2O	.2675# 00	CO		
.2461#-08	C O S	.1884#-05	CAOH	.5415#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.9061#-05	FEO		
.6733#-03	FE(OH)2	.1288#-02	H	.1931#-03	HCL	.3030#+02	H2O	.9145#-08	H2S	.4195#-01	KCL	.6916#-03	KO		
.1437#+01	KOH	.1168#-07	N	.8624#-08	NH3	.1620# 00	NO	.3899#-04	NO2	.2377#-03	NACL	.1625#-04	NAO		
.8835#-02	NAOH	.2093#-02	O	.7195#-01	OH	.6433#-07	S	.3996#-03	SO	.9371# 00	SO2	.4614#-03	SO3		
.3374#-18	SI	.7788#-07	SIO	.5432#-07	ALO2-	.4651#-13	CN-	.0000#+00	CO2-	.9664#-05	CL-	.0000#+00	CS+		
.4388#-04	K+	.9227#-10	NO-	.9276#-07	NO2-	.5499#-08	NA+	.1181#-07	O-	.1643#-05	OH-	.1716#-07	O2-		
.1649#-10	SH-	.4104#-09	SO-	.9916#-05	SO2-										
GLASS	.4604#-01	AL2O3 L	.7493#-04	MULLITE	.9898#-02	CAO	L	.0000#+00	CSOH	L	.1725#-05	FEAL2O4	L	.7161#-01	FEO L
.7952#-01	KALO2 L	.2109# 00	K2SIO3 L	.1297#-04	NAOH	L	.3823#-01	SIO2	L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4	L	.0000#+00	K2SO4	C					

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9410#-02	AR	.5272#-11	ALO2	.1644# 00	CO2	.7049#-12	CA	.2149#-14	CL2	.0000#+00	CS			
.2262#-08	FE	.9392#-04	H2	.2235#-03	K	.7346# 00	N2	.4823#-05	NA	.2160#-02	O2	.5418#-13	S2		
.4509#-09	SIO2	.6032#-07	E-	.8121#-17	AL	.8907#-14	ALO	.1472#-06	AL(OH)2	.6939#-22	AL2O	.7173#-03	CO		
.6601#-11	C O S	.5054#-08	CAOH	.1452#-07	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.2430#-07	FEO		
.1906#-05	FE(OH)2	.3455#-05	H	.5180#-06	HCL	.8127#-01	H2O	.2453#-10	H2S	.1125#-03	KCL	.1855#-05	KO		
.3853#-02	KOH	.3133#-10	N	.2313#-10	NH3	.4346#-03	NO	.1046#-06	NO2	.6374#-06	NACL	.4359#-07	NAO		
.2370#-04	NAOH	.5614#-05	O	.1930#-03	OH	.1725#-09	S	.1072#-05	SO	.2514#-02	SO2	.1237#-05	SO3		
.9051#-21	SI	.2089#-09	SIO	.1457#-09	ALO2-	.1248#-15	CN-	.0000#+00	CO2-	.2592#-07	CL-	.0000#+00	CS+		
.1177#-06	K+	.2475#-12	NO-	.2488#-09	NO2-	.1475#-10	NA+	.3168#-10	O-	.4407#-08	OH-	.4602#-10	O2-		
.4424#-13	SH-	.1101#-11	SO-	.2660#-07	SO2-										
GLASS	.1009# 00	AL2O3 L	.1642#-03	MULLITE	.2169#-01	CAO	L	.0000#+00	CSOH	L	.3780#-05	FEAL2O4	L	.1569# 00	FEO L
.1743# 00	KALO2 L	.4622# 00	K2SIO3 L	.2843#-04	NAOH	L	.8378#-01	SIO2	L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4	L	.0000#+00	K2SO4	C					

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3728#+03	.4563# 00	.0000#+00	.3733#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.3016#+02	.1163#+03	.0000#+00	.3026#+02
MASS (KILOGRAMS)	.1124#+02	.5307#-01	.0000#+00	.1130#+02
VOLUME (CUBIC-METERS)	.5507#+02	.1659#-04	.0000#+00	.5507#+02
DENSITY (KILOGRAMS/CUBIC METER)	.2042# 00	.3199#+04	.0000#+00	.2051# 00
ENTROPY (GRAMCALORIES/DEGK)	.2362#+05	.3946#+02	.0000#+00	.2366#+05
REACTION ENTHALPY (KILOCALORIES)	-.2752#+04	-.1061#+03	.0000#+00	-.2858#+04
HEAT OF FORMATION (KILOCALORIES)	-.7666#+04	-.1271#+03	.0000#+00	-.7793#+04
SENSIBLE HEAT (KILOCALORIES)	.4913#+04	.2108#+02	.0000#+00	.4934#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9732#+01	.3418#+02	.0000#+00	.9762#+01
ADIABATIC EXPANSION COEFFICIENT	.1257# +1	SONIC SPEED (METERS/SECOND)		.7897# +3

DEBYE LENGTH (METERS) .34649#-05 ELECTRON DENSITY (PER M+3) .24597#+18 COLLISION FREQUENCY (PER SEC) .27979#+12

COEFFICIENTS FOR OHM,S LAW.. SIGMA = SCALAR COND (MHO/METER)	.2478#-01	BETA1 (SQM-VOLT/NEWTON)							-.2538#+02
BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)							-.2171#-05
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.2538#+02	.2538#+02	.2538#+02	.2538#+02	.2538#+02	.2538#+02	.2538#+02		
HALL PARAMETER	.0000#+00	.1258#+01	.2515#+01	.3773#+01	.5030#+01	.6288#+01	.7546#+01		
PSI (METER-OHM/SQ TESLA)	.3577#-02	.1601#-02	.6027#-03	.2955#-03	.1725#-03	.1123#-03	.7876#-04		
THETA2 (VOLT/TESLA-DEGK)	.1206#-05	.5397#-06	.2031#-06	.9960#-07	.5812#-07	.3786#-07	.2654#-07		
THETA3 (VOLT/SQ TESLA-DEGK)	-.6695#-06	-.2997#-06	-.1128#-06	-.5531#-07	-.3228#-07	-.2102#-07	-.1474#-07		

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 1700 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.1541#-09	ALO2	.6146#+02	CO2	.1605#-10	CA	.3360#-12	CL2	.0000#+00	CS	
.7013#-07	FE	.1370#-01	H2	.3872#-01	K	.2739#+03	N2	.9932#-03	NA	.7323# 00	O2	.1431#-11	S2
.5505#-08	SIO2	.5381#-05	E-	.3576#-16	AL	.9776#-13	ALO	.1128#-04	AL(OH)2	.7930#-22	AL2O	.9395#-01	CO
.3222#-09	C O S	.3326#-06	CAOH	.2132#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1408#-05	FEO
.3577#-03	FE(OH)2	.3319#-03	H	.1139#-03	HCL	.3036#+02	H2O	.1358#-08	H2S	.4201#-01	KCL	.3294#-03	KO
.1401#+01	KOH	.1772#-08	N	.2627#-08	NH3	.1084# 00	NO	.3118#-04	NO2	.2670#-03	NACL	.9413#-05	NAO
.9601#-02	NAOH	.7328#-03	O	.3696#-01	OH	.7271#-08	S	.1280#-03	SO	.9372# 00	SO2	.6392#-03	SO3
.6273#-21	SI	.1225#-08	SIO	.5538#-08	ALO2-	.2344#-14	CN-	.0000#+00	CO2-	.4171#-05	CL-	.0000#+00	CS+
.1424#-04	K+	.1717#-10	NO-	.5017#-07	NO2-	.1568#-08	NA+	.1993#-08	O-	.4680#-06	OH-	.5072#-08	O2-
.1333#-11	SH-	.5355#-10	SO-	.4154#-05	SO2-								
GLASS	.3148#-01	AL2O3 L	.1835#-05	MULLITE	.9900#-02	CAO L	.0000#+00	CSOH L	.2947#-06	FEAL2O4 L	.7194#-01	FEO L	
.1091# 00	KALO2 L	.2366# 00	K2SIO3 L	.2923#-04	NAOH L	.1266#-01	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C					

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9415#-02	AR	.4135#-12	ALO2	.1649# 00	CO2	.4307#-13	CA	.9015#-15	CL2	.0000#+00	CS	
.1882#-09	FE	.3675#-04	H2	.1039#-03	K	.7350# 00	N2	.2665#-05	NA	.1965#-02	O2	.3841#-14	S2
.1477#-10	SIO2	.1444#-07	E-	.9596#-19	AL	.2623#-15	ALO	.3026#-07	AL(OH)2	.2128#-24	AL2O	.2521#-03	CO
.8647#-12	C O S	.8924#-09	CAOH	.5720#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3778#-08	FEO
.9600#-06	FE(OH)2	.8906#-06	H	.3056#-06	HCL	.8147#-01	H2O	.3645#-11	H2S	.1127#-03	KCL	.8838#-06	KO
.3758#-02	KOH	.4755#-11	N	.7049#-11	NH3	.2910#-03	NO	.8366#-07	NO2	.7165#-06	NACL	.2526#-07	NAO
.2576#-04	NAOH	.1966#-05	O	.9917#-04	OH	.1951#-10	S	.3434#-06	SO	.2515#-02	SO2	.1715#-05	SO3
.1683#-23	SI	.3287#-11	SIO	.1486#-10	ALO2-	.6289#-17	CN-	.0000#+00	CO2-	.1119#-07	CL-	.0000#+00	CS+
.3820#-07	K+	.4607#-13	NO-	.1346#-09	NO2-	.4208#-11	NA+	.5348#-11	O-	.1256#-08	OH-	.1361#-10	O2-
.3576#-14	SH-	.1437#-12	SO-	.1115#-07	SO2-								
GLASS	.6674#-01	AL2O3 L	.3890#-05	MULLITE	.2098#-01	CAO L	.0000#+00	CSOH L	.6246#-06	FEAL2O4 L	.1525# 00	FEO L	
.2313# 00	KALO2 L	.5016# 00	K2SIO3 L	.6196#-04	NAOH L	.2683#-01	SIO2 L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.0000#+00	K2CO3 C	.0000#+00	K2SO4 L	.0000#+00	K2SO4 C					

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3727#+03	.4718# 00	.0000#+00	.3731#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3016#+02	.1206#+03	.0000#+00	.3028#+02
MASS	(KILOGRAMS)	.1124#+02	.5691#-01	.0000#+00	.1130#+02
VOLUME	(CUBIC-METERS)	.5199#+02	.1800#-04	.0000#+00	.5199#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2162# 00	.3161#+04	.0000#+00	.2173# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2340#+05	.4150#+02	.0000#+00	.2344#+05
REACTION ENTHALPY	(KILOCALORIES)	-.3130#+04	-.1118#+03	.0000#+00	-.3242#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7681#+04	-.1328#+03	.0000#+00	-.7814#+04
SENSIBLE HEAT	(KILOCALORIES)	.4551#+04	.2094#+02	.0000#+00	.4572#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9665#+01	.3508#+02	.0000#+00	.9697#+01
ADIABATIC EXPANSION COEFFICIENT		.1259# +1	SONIC SPEED (METERS/SECOND)		.7681# +3

DEBYE LENGTH (METERS) .55009#-05 ELECTRON DENSITY (PER M+3) .62339#+17 COLLISION FREQUENCY (PER SEC) .29614#+12

COEFFICIENTS FOR OHM'S LAW.. SIGMA = SCALAR COND (MHO/METER)		.5936#-02	BETA1 (SQM-VOLT/NE*TON)				-.1001#+03	
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)				-.3680#-05	
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02
CHI	(METER-OHM/TESLA)	.1002#+03	.1002#+03	.1001#+03	.1001#+03	.1001#+03	.1001#+03	.1001#+03
HALL PARAMETER		.0000#+00	.1199#+01	.2378#+01	.3567#+01	.4755#+01	.5944#+01	.7133#+01
PSI	(METER-OHM/SQ TESLA)	.3899#-01	.1822#-01	.7011#-02	.3462#-02	.2026#-02	.1321#-02	.9272#-03
THETA2	(VOLT/TESLA-DEGK)	.1965#-05	.9179#-06	.3533#-06	.1744#-06	.1021#-06	.6658#-07	.4672#-07
THETA3	(VOLT/SQ TESLA-DEGK)	-.1049#-05	-.4901#-06	-.1886#-06	-.9314#-07	-.5451#-07	-.3555#-07	-.2495#-07

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U S BU MINES   PGH ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                    3  9

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS O OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K2O/KG COAL 75% ASH REJECTION
    .3508#+01 AR       .1721# 00 ALO2     .6156#+02 CO2      .9900#-02 CA       .2120#+01 CL2      .0000#+00 CS       .7230#-01 FE
    .3110#+02 H2       .2064#+01 K        .2740#+03 N2       .1090#-01 NA       .1772#+02 O2       .4690# 00 S2       .2493# 00 SIO2

PRESSURE =  1.00 ATM,  TEMPERATURE = 1600 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......     .3508#+01  AR      .9154#-11  ALO2    .6153#+02  CO2     .7136#-12  CA      .2107#-12  CL2     .0000#+00  CS
    .4405#-08  FE      .4917#-02  H2      .1263#-01  K       .2739#+03  N2      .4841#-03  NA      .6270# 00  O2      .5270#-13  S2
    .1805#-09  SIO2    .8925#-06  E-      .2655#-18  AL      .1969#-14  ALO     .2031#-05  AL(OH)2 .1370#-24  AL2O    .2950#-01  CO
    .2854#-10  C O S   .4845#-07  CAOH    .9660#-06  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .1742#-06  FEO
    .1801#-03  FE(OH)2 .7331#-04  H       .8236#-04  HCL     .3055#+02  H2O     .1397#-09  H2S     .4194#-01  KCL     .1075#-03  KO
    .1045#+01  KOH     .2134#-09  N       .7256#-09  NH3     .6722#-01  NO      .2310#-04  NO2     .3745#-03  NACL    .4734#-05  NAO
    .9968#-02  NAOH    .2198#-03  O       .1732#-01  OH      .5323#-09  S       .2961#-04  SO      .7618# 00  SO2     .7295#-03  SO3
    .8532#-24  SI      .1804#-10  SIO     .3627#-09  ALO2-   .6996#-16  CN-     .0000#+00  CO2-    .1722#-05  CL-     .0000#+00  CS+
    .3770#-05  K+      .2072#-11  NO-     .1971#-07  NO2-    .4417#-09  NA+     .2162#-09  O-      .9297#-07  OH-     .1007#-08  O2-
    .5617#-13  SH-     .3719#-11  SO-     .1042#-05  SO2-
  GLASS ..........     .2307#-01  AL2O3 L .9977#-07  MULLITE .9900#-02  CAO   L .0000#+00  CSOH  L .4545#-07  FEAL2O4L.7212#-01  FEO   L
    .1259# 00  KALO2 L .2437# 00  K2SIO3 L.6833#-04  NAOH  L .5552#-02  SIO2  L
  SULF. AND CARB..     .8475#-04  K2CO3 L .0000#+00  K2CO3 C .1754# 00  K2SO4 L .0000#+00  K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......     .9428#-02  AR      .2460#-13  ALO2    .1653# 00  CO2     .1918#-14  CA      .5661#-15  CL2     .0000#+00  CS
    .1184#-10  FE      .1321#-04  H2      .3393#-04  K       .7361# 00  N2      .1301#-05  NA      .1685#-02  O2      .1416#-15  S2
    .4852#-12  SIO2    .2398#-06  E-      .7135#-21  AL      .5292#-17  ALO     .5457#-08  AL(OH)2 .3681#-27  AL2O    .7927#-04  CO
    .7669#-13  C O S   .1302#-09  CAOH    .2596#-08  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .4682#-09  FEO
    .4840#-06  FE(OH)2 .1970#-06  H       .2213#-06  HCL     .8211#-01  H2O     .3755#-12  H2S     .1127#-03  KCL     .2890#-06  KO
    .2808#-02  KOH     .5734#-12  N       .1950#-11  NH3     .1806#-03  NO      .6208#-07  NO2     .1006#-05  NACL    .1272#-07  NAO
    .2679#-04  NAOH    .5907#-06  O       .4653#-04  OH      .1430#-11  S       .7957#-07  SO      .2047#-02  SO2     .1960#-05  SO3
    .2293#-26  SI      .4848#-13  SIO     .9746#-12  ALO2-   .1880#-18  CN-     .0000#+00  CO2-    .4628#-08  CL-     .0000#+00  CS+
    .1013#-07  K+      .5568#-14  NO-     .5297#-10  NO2-    .1147#-11  NA+     .5810#-12  O-      .2498#-09  OH-     .2707#-11  O2-
    .1509#-15  SH-     .9994#-14  SO-     .2799#-08  SO2-
  GLASS ..........     .4803#-01  AL2O3 L .2077#-06  MULLITE .2061#-01  CAO   L .0000#+00  CSOH  L .9461#-07  FEAL2O4L.1501# 00  FEO   L
    .2622# 00  KALO2 L .5074# 00  K2SIO3 L.1422#-03  NAOH  L .1156#-01  SIO2  L
  SULF. AND CARB..     .4829#-04  K2CO3 L .0000#+00  K2CO3 C .9995# 00  K2SO4 L .0000#+00  K2SO4 C

                                          IDEALGAS    GLASS ..    SULF. AN     MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)      .3721#+03   .4804# 00   .1755# 00   .3728#+03
AVERAGE MOLECULAR WEIGHT            (AMU)       .3012#+02   .1215#+03   .1742#+03   .3030#+02
MASS                           (KILOGRAMS)      .1121#+02   .5839#-01   .3059#-01   .1130#+02
VOLUME                      (CUBIC-METERS)      .4886#+02   .1866#-04   .1149#-04   .4886#+02
DENSITY          (KILOGRAMS/CUBIC METER)        .2294# 00   .3128#+04   .2662#+04   .2312# 00
ENTROPY             (GRAMCALORIES/DEGK)         .2313#+05   .4160#+02   .2145#+02   .2320#+05
REACTION ENTHALPY        (KILOCALORIES)        -.3482#+04  -.1151#+03  -.4813#+02  -.3645#+04
HEAT OF FORMATION        (KILOCALORIES)        -.7667#+04  -.1349#+03  -.5824#+02  -.7860#+04
SENSIBLE HEAT            (KILOCALORIES)         .4184#+04   .1981#+02   .1011#+02   .4214#+04
FROZEN CP             (GMCAL/GMMOL-DEGK)        .9582#+01   .3482#+02   .4705#+02   .9633#+01
ADIABATIC EXPANSION COEFFICIENT                 .1262# +1    SONIC SPEED (METERS/SECOND)          .7465# +3

DEBYE LENGTH          (METERS) .96422#-05   ELECTRON DENSITY     (PER M+3) .11002#+17   COLLISION FREQUENCY  (PER SEC) .30965#+12
COEFFICIENTS FOR OHM,S LAW..   SIGMA = SCALAR COND  (MHO/METER)    .1003#-02    BETA1     (SQM-VOLT/NEWTON)          -.5674#+03
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)   .0000#+00     THETA1     (VOLT/DEGK)               -.6033#-05
MAGNETIC INDUCTION (ABS B)        (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                    (METER-OHM/TESLA)   .5685#+03   .5679#+03   .5676#+03   .5675#+03   .5674#+03   .5674#+03   .5674#+03
HALL PARAMETER                             .0000#+00   .1139#+01   .2278#+01   .3416#+01   .4554#+01   .5692#+01   .6831#+01
PSI                 (METER-OHM/SQ TESLA)   .5799# 00   .2779# 00   .1084# 00   .5379#-01   .3153#-01   .2059#-01   .1445#-01
THETA2                (VOLT/TESLA-DEGK)    .3145#-05   .1507#-05   .5881#-06   .2917#-06   .1710#-06   .1116#-06   .7837#-07
THETA3             (VOLT/SQ TESLA-DEGK)   -.1639#-05  -.7856#-06  -.3066#-06  -.1520#-06  -.8914#-07  -.5819#-07  -.4085#-07
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3503#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE		
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2		

PRESSURE = 1.00 ATM, TEMPERATURE = 1500 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS		.3508#+01	AR	.6085#-12	ALO2	.6155#+02	CO2	.2527#-13	CA	.1028#-11	CL2	.0000#+00	CS		
.2289#-09	FE	.1759#-02	H2	.1199#-02	K	.2739#+03	N2	.1987#-03	NA	.4081# 00	O2	.5699#-15	S2		
.3537#-10	SIO2	.4341#-07	E-	.2143#-20	AL	.4361#-16	ALO	.5397#-06	AL(OH)2	.3918#-27	AL2O	.8965#-02	CO		
.1402#-11	C O S	.6211#-06	CAOH	.1134#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1719#-07	FEO		
.8805#-04	FE(OH)2	.1417#-04	H	.1752#-03	HCL	.3097#+02	H2O	.8191#-11	H2S	.4076#-01	KCL	.9028#-05	KO		
.2391# 00	KOH	.1934#-10	N	.2057#-09	NH3	.3445#-01	NO	.1279#-04	NO2	.1460#-02	NACL	.1769#-05	NAO		
.9092#-02	NAOH	.4955#-04	O	.6901#-02	OH	.1850#-10	S	.3344#-05	SO	.3155# 00	SO2	.3942#-03	SO3		
.5823#-26	SI	.1607#-11	SIO	.9938#-11	ALO2-	.6182#-18	CN-	.0000#+00	CO2-	.6727#-06	CL-	.0000#+00	CS+		
.7651#-06	K+	.6156#-13	NO-	.1959#-08	NO2-	.2630#-09	NA+	.5666#-11	O-	.5178#-08	OH-	.4623#-10	O2-		
.4118#-15	SH-	.3966#-13	SO-	.4208#-07	SO2-										
GLASS		.4676#-01	AL2O3 L	.9553#-05	MULLITE	.9900#-02	CAO L	.0000#+00	CSOH L	.1685#-07	FEAL2O4	L .7221#-01	FEO L		
.7853#-01	KALO2 L	.2299# 00	K2SIO3 L	.1472#-03	NAOH L	.1936#-01	SIO2 L								
SULF. AND CARB..		.1375#-03	K2CO3 L	.0000#+00	K2CO3 C	.6222# 00	K2SO4 L	.0000#+00	K2SO4 C						

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS		.9456#-02	AR	.1640#-14	ALO2	.1659# 00	CO2	.6811#-16	CA	.2771#-14	CL2	.0000#+00	CS		
.6168#-12	FE	.4740#-05	H2	.3232#-05	K	.7383# 00	N2	.5354#-06	NA	.1100#-02	O2	.1536#-17	S2		
.9532#-13	SIO2	.1170#-09	E-	.5775#-23	AL	.1175#-18	ALO	.1454#-08	AL(OH)2	.1056#-29	AL2O	.2416#-04	CO		
.3778#-14	C O S	.1674#-10	CAOH	.3057#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.4633#-10	FEO		
.2373#-06	FE(OH)2	.3819#-07	H	.4723#-06	HCL	.8346#-01	H2O	.2208#-13	H2S	.1099#-03	KCL	.2433#-07	KO		
.6444#-03	KOH	.5213#-13	N	.5544#-12	NH3	.9284#-04	NO	.3448#-07	NO2	.3935#-05	NACL	.4768#-08	NAO		
.2451#-04	NAOH	.1336#-06	O	.1860#-04	OH	.5014#-13	S	.9014#-08	SO	.8502#-03	SO2	.1062#-05	SO3		
.1569#-28	SI	.4331#-14	SIO	.2678#-13	ALO2-	.1666#-20	CN-	.0000#+00	CO2-	.1813#-08	CL-	.0000#+00	CS+		
.2062#-08	K+	.1659#-15	NO-	.5280#-11	NO2-	.7089#-12	NA+	.1527#-13	O-	.1395#-10	OH-	.1246#-12	O2-		
.1110#-17	SH-	.1069#-15	SO-	.1134#-09	SO2-										
GLASS		.1023# 00	AL2O3 L	.2091#-04	MULLITE	.2167#-01	CAO L	.0000#+00	CSOH L	.3688#-07	FEAL2O4	L .1581# 00	FEO L		
.1719# 00	KALO2 L	.5033# 00	K2SIO3 L	.3223#-03	NAOH L	.4238#-01	SIO2 L								
SULF. AND CARB..		.2210#-03	K2CO3 L	.0000#+00	K2CO3 C	.9998# 00	K2SO4 L	.0000#+00	K2SO4 C						

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3710#+03	.4568# 00	.6223# 00	.3721#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.3001#+02	.1201#+03	.1743#+03	.3036#+02
MASS	(KILOGRAMS)	.1113#+02	.5486#-01	.1084# 00	.1130#+02
VOLUME	(CUBIC-METERS)	.4567#+02	.1692#-04	.4074#-04	.4567#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2438# 00	.3241#+04	.2662#+04	.2473# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2280#+05	.3791#+02	.7414#+02	.2291#+05
REACTION ENTHALPY	(KILOCALORIES)	-.3803#+04	-.1128#+03	-.1736#+03	-.4090#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7616#+04	-.1298#+03	-.2065#+03	-.7953#+04
SENSIBLE HEAT	(KILOCALORIES)	.3813#+04	.1700#+02	.3292#+02	.3863#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9482#+01	.3410#+02	.4705#+02	.9575#+01
ADIABATIC EXPANSION COEFFICIENT		.1265# +1	SONIC SPEED (METERS/SECOND)		.7251# +3

DEBYE LENGTH (METERS) .19084#-04 ELECTRON DENSITY (PER M+3) .57242#+15 COLLISION FREQUENCY (PER SEC) .31805#+12

COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND (MHO/METER)	.5100#-04	BETA1 (SQM-VOLT/NEWTON)						-.1090#+05
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)						-.9883#-05
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CHI	(METER-OHM/TESLA)	.1096#+05	.1093#+05	.1091#+05	.1091#+05	.1091#+05	.1091#+05	.1091#+05	
HALL PARAMETER		.0000#+00	.1115#+01	.2227#+01	.3338#+01	.4450#+01	.5562#+01	.6674#+01	
PSI	(METER-OHM/SQ TESLA)	.2991#+02	.1433#+02	.5592#+01	.2773#+01	.1626#+01	.1061#+01	.7451# 00	
THETA2	(VOLT/TESLA-DEGK)	.5153#-05	.2469#-05	.9632#-06	.4777#-06	.2801#-06	.1828#-06	.1283#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.2687#-05	-.1287#-05	-.5022#-06	-.2491#-06	-.1460#-06	-.9532#-07	-.6692#-07	

U S BU MINES PGM ENERGY RES CTR MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6 3 10

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K20/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 1400 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS		.3508#+01	AR	.2330#-13	ALO2	.6155#+02	CO2	.4877#-15	CA	.8085#-11	CL2	.0000#+00	CS		
.6782#-11	FE	.4761#-03	H2	.6726#-04	K	.2740#+03	N2	.4623#-04	NA	.3194# 00	O2	.2454#-17	S2		
.5387#-11	SIO2	.8667#-09	E-	.5780#-23	AL	.4223#-18	ALO	.8730#-07	AL(OH)2	.2413#-30	AL2O	.2030#-02	CO		
.3443#-13	C O S	.5524#-09	CAOH	.1546#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1197#-08	FEO		
.3824#-04	FE(OH)2	.2034#-05	H	.4413#-03	HCL	.3107#+02	H2O	.2450#-12	H2S	.3691#-01	KCL	.4960#-06	KO		
.3872#-01	KOH	.1251#-11	N	.4004#-10	NH3	.1816#-01	NO	.8313#-05	NO2	.5049#-02	NACL	.4193#-06	NAO		
.5559#-02	NAOH	.1023#-04	O	.2559#-02	OH	.3520#-12	S	.2736#-06	SO	.1285# 00	SO2	.2458#-03	SO3		
.1498#-28	SI	.8796#-13	SIO	.8636#-13	ALO2-	.1352#-20	CN-	.0000#+00	CO2-	.1623#-06	CL-	.0000#+00	CS+		
.1640#-06	K+	.7779#-15	NO-	.1119#-09	NO2-	.1507#-09	NA+	.6247#-13	O-	.1256#-09	OH-	.1090#-11	O2-		
.7634#-18	SH-	.1362#-15	SO-	.7458#-09	SO2-										
GLASS		.6801#-01	AL2O3	L .5069#-03	MULLITE	.9900#-02	CAO	L .0000#+00	CSOH	L .3516#-08	FEAL2O4	L .7226#-01	FEO	L	
.3303#-01	KALO2	L .1683# 00	K2SIO3	L .2454#-03	NAOH	L .7998#-01	SIO2	L							
SULF. AND CARB..		.5899#-04	K2CO3	L .0000#+00	K2CO3	C .8093# 00	K2SO4	L .0000#+00	K2SO4	C					

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS		.9466#-02	AR	.6286#-16	ALO2	.1661# 00	CO2	.1316#-17	CA	.2181#-13	CL2	.0000#+00	CS		
.1830#-13	FE	.1285#-05	H2	.1815#-06	K	.7391# 00	N2	.1247#-06	NA	.8619#-03	O2	.6621#-20	S2		
.1452#-13	SIO2	.2338#-11	E-	.1559#-25	AL	.1139#-20	ALO	.2355#-09	AL(OH)2	.6511#-33	AL2O	.5478#-05	CO		
.9289#-16	C O S	.1490#-11	CAOH	.4172#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.3230#-11	FEO		
.1032#-06	FE(OH)2	.5488#-08	H	.1191#-05	HCL	.8383#-01	H2O	.6610#-15	H2S	.9958#-04	KCL	.1338#-08	KO		
.1045#-03	KOH	.3375#-14	N	.1080#-12	NH3	.4899#-04	NO	.2243#-07	NO2	.1362#-04	NACL	.1131#-08	NAO		
.1500#-04	NAOH	.2759#-07	O	.6904#-05	OH	.9496#-15	S	.7382#-09	SO	.3467#-03	SO2	.6632#-06	SO3		
.4043#-31	SI	.2373#-15	SIO	.2330#-15	ALO2-	.3649#-23	CN-	.0000#+00	CO2-	.4379#-09	CL-	.0000#+00	CS+		
.4425#-09	K+	.2099#-17	NO-	.3018#-12	NO2-	.4065#-12	NA+	.1685#-15	O-	.3388#-12	OH-	.2940#-14	O2-		
.2060#-20	SH-	.3674#-16	SO-	.2012#-11	SO2-										
GLASS		.1573# 00	AL2O3	L .1173#-02	MULLITE	.2290#-01	CAO	L .0000#+00	CSOH	L .8135#-08	FEAL2O4	L .1672# 00	FEO	L	
.7642#-01	KALO2	L .3894# 00	K2SIO3	L .5677#-03	NAOH	L .1850# 00	SIO2	L							
SULF. AND CARB..		.7288#-04	K2CO3	L .0000#+00	K2CO3	C .9999# 00	K2SO4	L .0000#+00	K2SO4	C					

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3706#+03	.4322# 00	.8093# 00	.3719#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.2997#+02	.1086#+03	.1743#+03	.3038#+02
MASS (KILOGRAMS)	.1111#+02	.4692#-01	.1410# 00	.1130#+02
VOLUME (CUBIC-METERS)	.4258#+02	.1437#-04	.5298#-04	.4258#+02
DENSITY (KILOGRAMS/CUBIC METER)	.2609# 00	.3265#+04	.2662#+04	.2653# 00
ENTROPY (GRAMCALORIES/DEGK)	.2252#+05	.3111#+02	.9380#+02	.2265#+05
REACTION ENTHALPY (KILOCALORIES)	-.4141#+04	-.1049#+03	-.2296#+03	-.4475#+04
HEAT OF FORMATION (KILOCALORIES)	-.7599#+04	-.1181#+03	-.2686#+03	-.7985#+04
SENSIBLE HEAT (KILOCALORIES)	.3458#+04	.1317#+02	.3900#+02	.3510#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.9377#+01	.3033#+02	.4705#+02	.9483#+01
ADIABATIC EXPANSION COEFFICIENT	.1269# +1	SONIC SPEED (METERS/SECOND)		.7020# +3

DEBYE LENGTH (METERS)	.37940#-04	ELECTRON DENSITY (PER M+3)	.12259#+14	COLLISION FREQUENCY (PER SEC)	.34650#+12				
COEFFICIENTS FOR OHM,S LAW..	SIGMA = SCALAR COND (MHO/METER)	.1006#-05	BETA1 (SQM-VOLT/NEWTON)		-.5092#+06				
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)		-.1234#-04				
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02		
CHI (METER-OHM/TESLA)	.5133#+06	.5113#+06	.5100#+06	.5096#+06	.5094#+06	.5093#+06	.5093#+06		
HALL PARAMETER	.0000#+00	.1028#+01	.2051#+01	.3075#+01	.4098#+01	.5121#+01	.6145#+01		
PSI (METER-OHM/SQ TESLA)	.2031#+04	.1044#+04	.4250#+03	.2138#+03	.1260#+03	.8251#+02	.5802#+02		
THETA2 (VOLT/TESLA-DEGK)	.5999#-05	.3085#-05	.1255#-05	.6313#-06	.3723# 06	.2437#-06	.1714#-06		
THETA3 (VOLT/SQ TESLA-DEGK)	-.2916#-05	-.1499#-05	-.6101#-06	-.3068#-06	-.1809#-06	-.1184#-06	-.8328#-07		

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.00 ATM. TEMPERATURE = 1300 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.4725#-15	ALO2	.6156#+02	CO2	.4770#-17	CA	.4489#-10	CL2	.0000#+00	CS			
.1084#-12	FE	.9969#-04	H2	.3369#-05	K	.2740#+03	N2	.4970#-05	NA	.2683# 00	O2	.5966#-21	S2		
.2249#-12	SIO2	.1257#-10	E-	.4882#-26	AL	.1646#-20	ALO	.8635#-08	AL(OH)2	.3057#-34	AL2O	.3454#-03	CO		
.1637#-15	C O S	.3231#-10	CAOH	.1590#-05	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.5392#-10	FEO		
.1431#-04	FE(OH)2	.2119#-06	H	.8897#-03	HCL	.3109#+02	H2O	.1454#-14	H2S	.3276#-01	KCL	.2561#-07	KO		
.6768#-02	KOH	.5311#-13	N	.5559#-11	NH3	.9147#-02	NO	.5636#-05	NO2	.8751#-02	NACL	.4844#-07	NAO		
.1876#-02	NAOH	.1753#-05	O	.8310#-03	OH	.1305#-14	S	.5786#-08	SO	.1834#-01	SO2	.6070#-04	SO3		
.5059#-32	SI	.1065#-14	SIO	.4120#-15	ALO2-	.1351#-23	CN-	.0000#+00	CO2-	.2959#-07	CL-	.0000#+00	CS+		
.2958#-07	K+	.6929#-17	NO-	.5979#-11	NO2-	.3498#-10	NA+	.4756#-15	O-	.2302#-11	OH-	.2100#-13	O2-		
.2461#-21	SH-	.9681#-19	SO-	.3740#-11	SO2-										
GLASS	.7715#-01	AL2O3 L	.2627#-02	MULLITE	.9900#-02	CAO	L	.0000#+00	CSOH	L	.4231#-09	FEAL2O4	L	.7229#-01	FEO	L
.2044#-02	KALO2 L	.9157#-01	K2SIO3 L	.2676#-03	NAOH	L	.1525# 00	SIO2	L						
SULF. AND CARB..	.4044#-04	K2CO3 L	.0000#+00	K2CO3	C	.0000#+00	K2SO4	L	.9196# 00	K2SO4	C				

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9471#-02	AR	.1275#-17	ALO2	.1662# 00	CO2	.1288#-19	CA	.1212#-12	CL2	.0000#+00	CS			
.2925#-15	FE	.2691#-06	H2	.9094#-08	K	.7395# 00	N2	.1342#-07	NA	.7241#-03	O2	.1605#-23	S2		
.6070#-15	SIO2	.3393#-13	E-	.1318#-28	AL	.4444#-23	ALO	.2331#-10	AL(OH)2	.8252#-37	AL2O	.9324#-06	CO		
.4419#-18	C O S	.8722#-13	CAOH	.4292#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1455#-12	FEO		
.3862#-07	FE(OH)2	.5717#-09	H	.2402#-05	HCL	.8392#-01	H2O	.3924#-17	H2S	.8842#-04	KCL	.6913#-10	KO		
.1827#-04	KOH	.1434#-15	N	.1500#-13	NH3	.2469#-04	NO	.1521#-07	NO2	.2362#-04	NACL	.1308#-09	NAO		
.5064#-05	NAOH	.4731#-08	O	.2243#-05	OH	.3522#-17	S	.1562#-10	SO	.4949#-04	SO2	.1638#-06	SO3		
.1366#-34	SI	.2874#-17	SIO	.1112#-17	ALO2-	.3646#-26	CN-	.0000#+00	CO2-	.7987#-10	CL-	.0000#+00	CS+		
.7984#-10	K+	.1870#-19	NO-	.1614#-13	NO2-	.9441#-13	NA+	.1284#-17	O-	.6215#-14	OH-	.5669#-16	O2-		
.6644#-24	SH-	.2613#-21	SO-	.1010#-13	SO2-										
GLASS	.1889# 00	AL2O3 L	.6433#-02	MULLITE	.2425#-01	CAO	L	.0000#+00	CSOH	L	.1036#-08	FEAL2O4	L	.1770# 00	FEO	L
.5005#-02	KALO2 L	.2243# 00	K2SIO3 L	.6553#-03	NAOH	L	.3734# 00	SIO2	L						
SULF. AND CARB..	.4397#-04	K2CO3 L	.0000#+00	K2CO3	C	.0000#+00	K2SO4	L	.1000#+01	K2SO4	C				

		IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY	(GRAM-MOLES)	.3705#+03	.4083# 00	.9196# 00	.3718#+03
AVERAGE MOLECULAR WEIGHT	(AMU)	.2996#+02	.9364#+02	.1743#+03	.3038#+02
MASS	(KILOGRAMS)	.1110#+02	.3823#-01	.1603# 00	.1130#+02
VOLUME	(CUBIC-METERS)	.3952#+02	.1208#-04	.6020#-04	.3952#+02
DENSITY	(KILOGRAMS/CUBIC METER)	.2808# 00	.3164#+04	.2662#+04	.2858# 00
ENTROPY	(GRAMCALORIES/DEGK)	.2225#+05	.2385#+02	.9728#+02	.2237#+05
REACTION ENTHALPY	(KILOCALORIES)	-.4480#+04	-.9551#+02	-.2734#+03	-.4849#+04
HEAT OF FORMATION	(KILOCALORIES)	-.7590#+04	-.1051#+03	-.3159#+03	-.8011#+04
SENSIBLE HEAT	(KILOCALORIES)	.3110#+04	.9612#+01	.4257#+02	.3162#+04
FROZEN CP	(GMCAL/GMMOL-DEGK)	.9260#+01	.2621#+02	.5575#+02	.9394#+01
ADIABATIC EXPANSION COEFFICIENT		.1273# +1	SONIC SPEED (METERS/SECOND)		.6778# +3

DEBYE LENGTH (METERS) .82830#-04 ELECTRON DENSITY (PER M+3) .19158#+12 COLLISION FREQUENCY (PER SEC) .38015#+12

COEFFICIENTS FOR OHM'S LAW..	SIGMA = SCALAR COND (MHO/METER)	.1436#-07	BETA1 (SQM-VOLT/NEWTON)					-.3258#+08	
BETA2 (ASSUMING ZERO ION SLIP)	(SQM-VOLT/TESLA-NEWTON)	.0000#+00	THETA1 (VOLT/DEGK)					-.1405#-04	
MAGNETIC INDUCTION (ABS B)	(TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02	
CH1	(METER-OHM/TESLA)	.3293#+08	.3277#+08	.3266#+08	.3262#+08	.3261#+08	.3260#+08	.3259#+08	
HALL PARAMETER		.0000#+00	.9411# 00	.1876#+01	.2810#+01	.3745#+01	.4680#+01	.5615#+01	
PSI	(METER-OHM/SQ TESLA)	.1555#+06	.8615#+05	.3685#+05	.1886#+05	.1120#+05	.7360#+04	.5186#+04	
THETA2	(VOLT/TESLA-DEGK)	.6305#-05	.3493#-05	.1494#-05	.7646#-06	.4542#-06	.2984#-06	.2103#-06	
THETA3	(VOLT/SQ TESLA-DEGK)	-.2829#-05	-.1567#-05	-.6702#-06	-.3430#-06	-.2038#-06	-.1339#-06	-.9434#-07	

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U S BU MINES   PGH ENERGY RES CTR   MULTIPHASE EQUILIBRIUM PROGRAM (ALGOL) 01MAY72 VERSION6                    4 11

STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER  AVG UPPER FREEPORT HVBB  101%SA  1.0GMOL K20/KG COAL 75% ASH REJECTION
    .3508#+01 AR      .1721# 00 ALO2    .6156#+02 CO2     .9900#-02 CA      .2120#-01 CL2     .0000#+00 CS      .7230#-01 FE
    .3110#+02 H2      .2064#+01 K       .2740#+03 N2      .1090#-01 NA      .1772#+02 O2      .4690# 00 S2      .2493# 00 SIO2

PRESSURE =  1.00 ATM,  TEMPERATURE = 1200 DEGK

EQUILIBRIUM MOLAR QUANTITIES
  IDEALGAS .......    .3508#+01  AR      .4530#-17  ALO2    .6156#+02  CO2     .1801#-19  CA      .1463#-09  CL2     .0000#+00  CS
    .7159#-15  FE     .1476#-04  H2      .1681#-06  K       .2740#+03  N2      .3367#-06  NA      .2616# 00  O2      .1554#-26  S2
    .2685#-14  SIO2   .1426#-1c  E-      .9641#-30  AL      .2117#-23  ALO     .4770#-09  AL(OH)2 .5435#-39  AL2O    .3989#-04  CO
    .6083#-19  C O S  .1028#-11  CAOH    .1094#-05  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .1301#-11  FEO
    .4153#-05  FE(OH)2 .1452#-07 H       .1286#-02  HCL     .3109#+02  H2O     .6992#-18  H2S     .3103#-01  KCL     .1446#-08  KO
    .1521#-02  KOH    .1337#-14  N       .4875#-12  NH3     .4494#-02  NO      .4277#-05  NO2     .1008#-01  NACL    .3897#-08  NAO
    .5058#-03  NAOH   .2450#-06  O       .2347#-03  OH      .3973#-18  S       .1464#-10  SO      .4699#-03  SO2     .3240#-05  SO3
    .1828#-36  SI     .2726#-17  SIO     .1142#-17  ALO2-   .5550#-27  CN-     .0000#+00  CO2-    .4211#-08  CL-     .0000#+00  CS+
    .4208#-08  K+     .4798#-19  NO-     .3661#-12  NO2-    .3740#-11  NA+     .2746#-17  O-      .3539#-13  OH-     .3910#-15  O2-
    .6456#-26  SH-    .7312#-23  SO-     .3002#-14  SO2-
  GLASS .........     .7447#-01  AL2O3 L .2133#-02  MULLITE .9900#-02  CAO   L .0000#+00  CSOH  L .2707#-10  FEAL2O4L.7230#-01  FEO   L
    .1037#-01 KALO2 L .7294#-01  K2SIO3 L.3139#-03  NAOH  L .1721# 00  SIO2  L
  SULF. AND CARB..    .7191#-04  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .9375# 00  K2SO4 C

MOLAR FRACTIONS WITHIN PHASES
  IDEALGAS .......    .9471#-0c  AR      .1223#-19  ALO2    .1662# 00  CO2     .4861#-22  CA      .3948#-12  CL2     .0000#+00  CS
    .1933#-17  FE     .3986#-07  H2      .4538#-09  K       .7396# 00  N2      .9090#-09  NA      .7062#-03  O2      .4196#-29  S2
    .7248#-17  SIO2   .3850#-15  E-      .2603#-32  AL      .5716#-26  ALO     .1288#-11  AL(OH)2 .1467#-41  AL2O    .1077#-06  CO
    .1642#-21  C O S  .2775#-1+  CAOH    .2953#-08  CL      .0000#+00  CSCL    .0000#+00  CS O    .0000#+00  CSOH    .3512#-14  FEO
    .1121#-07  FE(OH)2 .3919#-1( H       .3471#-05  HCL     .8394#-01  H2O     .1888#-20  H2S     .8378#-04  KCL     .3902#-11  KO
    .4107#-05  KOH    .3610#-17  N       .1316#-14  NH3     .1213#-04  NO      .1155#-07  NO2     .2721#-04  NACL    .1052#-10  NAO
    .1365#-05  NAOH   .6614#-09  O       .6335#-06  OH      .1072#-20  S       .3952#-13  SO      .1269#-05  SO2     .8745#-08  SO3
    .4935#-39  SI     .7359#-2(  SIO     .3082#-20  ALO2-   .1498#-29  CN-     .0000#+00  CO2-    .1137#-10  CL-     .0000#+00  CS+
    .1136#-10  K+     .1295#-21  NO-     .9884#-15  NO2-    .1010#-13  NA+     .7412#-20  O-      .9554#-16  OH-     .1056#-17  O2-
    .1743#-28  SH-    .1974#-2(  SO-     .8104#-17  SO2-
  GLASS .........     .1796# 00  AL2O3 L .5146#-02  MULLITE .2388#-01  CAO   L .0000#+00  CSOH  L .6529#-10  FEAL2O4L.1744# 00  FEO   L
    .2502#-01 KALO2 L .1760# 00  K2SIO3 L.7572#-03  NAOH  L .4152# 00  SIO2  L
  SULF. AND CARB..    .7669#-04  K2CO3 L .0000#+00  K2CO3 C .0000#+00  K2SO4 L .9999# 00  K2SO4 C

                                          IDEALGAS     GLASS ..     SULF. AN      MIXTURE
MOLAR QUANTITY                (GRAM-MOLES)     .3704#+03    .4145# 00    .9376# 00    .3718#+03
AVERAGE MOLECULAR WEIGHT            (AMU)      .2996#+02    .8896#+02    .1743#+03    .3039#+02
MASS                          (KILOGRAMS)      .1110#+02    .3687#-01    .1634# 00    .1130#+02
VOLUME                     (CUBIC-METERS)      .3648#+02    .1196#-04    .6138#-04    .3648#+02
DENSITY          (KILOGRAMS/CUBIC METER)       .3042# 00    .3082#+04    .2662#+04    .3097# 00
ENTROPY             (GRAMCALORIES/DEGK)        .2197#+05    .2210#+02    .9517#+02    .2209#+05
REACTION ENTHALPY         (KILOCALORIES)      -.4820#+04   -.9479#+02   -.2837#+03   -.5198#+04
HEAT OF FORMATION         (KILOCALORIES)      -.7589#+04   -.1030#+03   -.3221#+03   -.8014#+04
SENSIBLE HEAT             (KILOCALORIES)       .2769#+04    .8232#+01    .3839#+02    .2816#+04
FROZEN CP           (GMCAL/GM-MOL-DEGK)        .9130#+01    .2479#+02    .5134#+02    .9254#+01
ADIABATIC EXPANSION COEFFICIENT                .1278# +1     SONIC SPEED (METERS/SECOND)          .6525# +3

DEBYE LENGTH          (METERS) .20271#-03   ELECTRON DENSITY     (PER M+3) .23549#+10   COLLISION FREQUENCY  (PER SEC) .41744#+12
COEFFICIENTS FOR OHM'S LAW..   SIGMA = SCALAR COND  (MHO/METER)    .1611#-09    BETA1    (SQM-VOLT/NEWTON)          -.2651#+10
BETA2  (ASSUMING ZERO ION SLIP)          (SQM-VOLT/TESLA-NEWTON)    .0000#+00     THETA1     (VOLT/DEGK)              -.1549#-06
MAGNETIC INDUCTION (ABS B)        (TESLA)  .0000#+00   .2000#+01   .4000#+01   .6000#+01   .8000#+01   .1000#+02   .1200#+02
CHI                        (METER-OHM/TESLA)  .2685#+10   .2671#+10   .2660#+10   .2655#+10   .2653#+10   .2652#+10   .2652#+10
HALL PARAMETER                        .0000#+00   .8605# 00   .1714#+01   .2566#+01   .3419#+01   .4273#+01   .5126#+01
PSI                    (METER-OHM/SQ TESLA)  .1416#+08   .8411#+07   .3791#+07   .1979#+07   .1186#+07   .7826#+06   .5528#+06
THETA2                    (VOLT/TESLA-DEGK)  .6404#-05   .3803#-05   .1714#-05   .8951#-06   .5363#-06   .3539#-06   .2500#-06
THETA3                 (VOLT/SQ TESLA-DEGK) -.2648#-05  -.1573#-05  -.7089#-06  -.3701#-06  -.2217#-06  -.1463#-06  -.1034#-06
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STOICHIOMETRY (GMOL) FOR CASE IDENTIFIED AS D OLIVER AVG UPPER FREEPORT HVBB 101%SA 1.0GMOL K2O/KG COAL 75% ASH REJECTION

.3508#+01	AR	.1721# 00	ALO2	.6156#+02	CO2	.9900#-02	CA	.2120#-01	CL2	.0000#+00	CS	.7230#-01	FE
.3110#+02	H2	.2064#+01	K	.2740#+03	N2	.1090#-01	NA	.1772#+02	O2	.4690# 00	S2	.2493# 00	SIO2

PRESSURE = 1.00 ATM, TEMPERATURE = 1100 DEGK

EQUILIBRIUM MOLAR QUANTITIES

IDEALGAS	.3508#+01	AR	.2002#-19	ALO2	.6156#+02	CO2	.2445#-22	CA	.4110#-09	CL2	.0000#+00	CS			
.1866#-17	FE	.1529#-05	H2	.6081#-08	K	.2740#+03	N2	.1465#-07	NA	.2627# 00	O2	.1204#-33	S2		
.1225#-16	SIO2	.8958#-15	E-	.4168#-34	AL	.8473#-27	ALO	.1604#-10	AL(OH)2	.1423#-44	AL2O	.3047#-05	CO		
.2930#-23	C O S	.1760#-13	CAOH	.5880#-06	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.1593#-13	FEO		
.9781#-05	FE(OH)2	.6130#-09	H	.1641#-02	HCL	.3109#+02	H2O	.4596#-22	H2S	.3037#-01	KCL	.6157#-10	KO		
.3305#-03	KOH	.1731#-16	N	.2702#-13	NH3	.1975#-02	NO	.3205#-05	NO2	.1038#-01	NACL	.2114#-09	NAO		
.1138#-03	NAOH	.2443#-07	O	.5320#-04	OH	.1537#-22	S	.7030#-14	SO	.3560#-05	SO2	.5938#-07	SO3		
.8479#-42	SI	.1980#-20	SIO	.1419#-20	ALO2-	.6525#-31	CN-	.0000#+00	CO2-	.4302#-09	CL-	.0000#+00	CS+		
.4300#-09	K+	.1675#-21	NO-	.1716#-13	NO2-	.2272#-12	NA+	.7754#-20	O-	.3151#-15	OH-	.4466#-17	O2-		
.1679#-31	SH-	.6785#-26	SO-	.4664#-18	SO2-										
GLASS	.8030#-01	AL2O3 L	.1845#-02	MULLITE	.9900#-02	CAO	L	.0000#+00	CSOH	L	.1173#-11	FEAL2O4	L	.7230#-01	FEO	L
.4312#-03	KALO2 L	.7814#-01	K2SIO3 L	.4016#-03	NAOH	L	.1675# 00	SIO2	L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.2916#-03	K2CO3	C	.0000#+00	K2SO4	L	.9380# 00	K2SO4	C				

MOLAR FRACTIONS WITHIN PHASES

IDEALGAS	.9471#-02	AR	.5405#-22	ALO2	.1662# 00	CO2	.6602#-25	CA	.1109#-11	CL2	.0000#+00	CS			
.5038#-20	FE	.4127#-06	H2	.1642#-10	K	.7396# 00	N2	.3955#-10	NA	.7090#-03	O2	.3251#-36	S2		
.3306#-19	SIO2	.2418#-17	E-	.1125#-36	AL	.2287#-29	ALO	.4330#-13	AL(OH)2	.3841#-47	AL2O	.8225#-08	CO		
.7910#-26	C O S	.4751#-16	CAOH	.1587#-08	CL	.0000#+00	CSCL	.0000#+00	CS O	.0000#+00	CSOH	.4301#-16	FEO		
.2640#-08	FE(OH)2	.1655#-11	H	.4430#-05	HCL	.8394#-01	H2O	.1241#-24	H2S	.8200#-04	KCL	.1662#-12	KO		
.8922#-06	KOH	.4672#-19	N	.7295#-16	NH3	.5331#-05	NO	.8653#-08	NO2	.2803#-04	NACL	.5708#-12	NAO		
.3071#-06	NAOH	.6596#-10	O	.1436#-06	OH	.4150#-25	S	.1898#-16	SO	.9610#-08	SO2	.1603#-09	SO3		
.2289#-44	SI	.5345#-23	SIO	.3831#-23	ALO2-	.1761#-33	CN-	.0000#+00	CO2-	.1161#-11	CL-	.0000#+00	CS+		
.1161#-11	K+	.4522#-24	NO-	.4632#-16	NO2-	.6133#-15	NA+	.2093#-22	O-	.8505#-18	OH-	.1206#-19	O2-		
.4533#-34	SH-	.1832#-30	SO-	.1259#-20	SO2-										
GLASS	.1955# 00	AL2O3 L	.4491#-02	MULLITE	.2410#-01	CAO	L	.0000#+00	CSOH	L	.2856#-11	FEAL2O4	L	.1760# 00	FEO	L
.1050#-02	KALO2 L	.1902# 00	K2SIO3 L	.9776#-03	NAOH	L	.4077# 00	SIO2	L						
SULF. AND CARB..	.0000#+00	K2CO3 L	.3108#-03	K2CO3	C	.0000#+00	K2SO4	L	.9997# 00	K2SO4	C				

	IDEALGAS	GLASS ..	SULF. AN	MIXTURE
MOLAR QUANTITY (GRAM-MOLES)	.3704#+03	.4108# 00	.9383# 00	.3718#+03
AVERAGE MOLECULAR WEIGHT (AMU)	.2996#+02	.8983#+02	.1743#+03	.3039#+02
MASS (KILOGRAMS)	.1110#+02	.3690#-01	.1635# 00	.1130#+02
VOLUME (CUBIC-METERS)	.3344#+02	.1174#-04	.6143#-04	.3344#+02
DENSITY (KILOGRAMS/CUBIC METER)	.3319# 00	.3144#+04	.2662#+04	.3378# 00
ENTROPY (GRAMCALORIES/DEGK)	.2168#+05	.2116#+02	.9120#+02	.2179#+05
REACTION ENTHALPY (KILOCALORIES)	-.5155#+04	-.9592#+02	-.2886#+03	-.5540#+04
HEAT OF FORMATION (KILOCALORIES)	-.7589#+04	-.1031#+03	-.3223#+03	-.8014#+04
SENSIBLE HEAT (KILOCALORIES)	.2433#+04	.7213#+01	.3377#+02	.2474#+04
FROZEN CP (GMCAL/GMMOL-DEGK)	.8983#+01	.2485#+02	.4788#+02	.9099#+01
ADIABATIC EXPANSION COEFFICIENT	.1284# +1	SONIC SPEED (METERS/SECOND)		.6261# +3

DEBYE LENGTH (METERS) .58136#-03 ELECTRON DENSITY (PER M+3) .16135#+08 COLLISION FREQUENCY (PER SEC) .6880#+12

COEFFICIENTS FOR OHM.S LAW.. SIGMA = SCALAR COND (MHO/METER) .1006#-11

BETA2 (ASSUMING ZERO ION SLIP) (SQM-VOLT/TESLA-NEWTON)	.0000#+00	BETA1 THETA1	(SQM-VOLT/NEWTON) (VOLT/DEGK)				-.3868#+12 -.1676#-04
MAGNETIC INDUCTION (ABS B) (TESLA)	.0000#+00	.2000#+01	.4000#+01	.6000#+01	.8000#+01	.1000#+02	.1200#+02
CHI (METER-OHM/TESLA)	.3927#+12	.3906#+12	.3886#+12	.3878#+12	.3874#+12	.3872#+12	.3871#+12
HALL PARAMETER	.0000#+00	.7860# 00	.1564#+01	.2341#+01	.3119#+01	.3897#+01	.4675#+01
PSI (METER-OHM/SQ TESLA)	.2227#+10	.1410#+10	.6712#+09	.3583#+09	.2168#+09	.1438#+09	.1019#+09
THETA2 (VOLT/TESLA-DEGK)	.6378#-05	.4038#-05	.1922#-05	.1026#-05	.6209#-06	.4118#-06	.2917#-06
THETA3 (VOLT/SQ TESLA-DEGK)	-.2428#-05	-.1537#-05	-.7316#-06	-.3906#-06	-.2363#-06	-.1567#-06	-.1110#-06