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ECOM-0280-8

SIMULATION RESEARCH TO DEVELOP OBJECTIVE METEOROLOGICAL PREDICTION CAPABILITY

SEMI-ANNUAL REPORT

By

Tom E. Sanford, Principal Investigator

May 1972

AUG 9 1972

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College Station, Texas 77843

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This report is a continuation of the work included in Technical Report ~~ECOM-0280-7~~ regarding the investigation of the suitability of alternate expressions for the exchange coefficients for momentum, heat, and water vapor which are an integral part of the set of meteorological equations presently being used to simulate the atmospheric boundary layer. Solutions for Cases VI-A, ~~VI~~-B, ~~VII~~-A, ~~VII~~-B and ~~VIII~~ of the Dallas Tower Network data, incorporating alternate exchange coefficients, are included in ~~this~~ report. These solutions indicate that the alternate expressions for the exchange coefficients for momentum produces more realistic results which are consistent with the expected diurnal variation of the exchange coefficient and which yield predicted winds that are nearer to the observed values for the cases cited than those winds predicted by the original exchange coefficient relationships.

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Tom E. Sanford, Principal Investigator

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I. COMPARISONS OF TEMPORAL RELATIONS OF WIND SPEED AT 8-M HEIGHT, TURBULENT ENERGY EXCHANGE COEFFICIENTS, AND VERTICAL GRADIENT OF TEMPERATURE FOR CASE VI-A OF THE DALLAS TOWER NETWORK DATA.

A. Introduction

Solutions of the set of equations being used to simulate the atmospheric boundary layer were shown in Technical Report ECOM-0280-7 for Cases I-B, II, III, and IV-A of the Dallas Tower Network data. In obtaining these solutions, an alternate expression for the exchange coefficient for momentum transfer at 8-m height was employed on a trial basis. This alternate exchange coefficient is based on Deacon's wind hypothesis and is expressed as

$$K_{m,8} = \frac{S_8 k^2 (1-\beta) z_o^{(1-\beta)} 800^{\beta}}{\left[\left(\frac{800}{z_o}\right)^{(1-\beta)} - 1\right]} \quad , \; 0.11 \leq \beta \leq 1.14$$

where $K_{m,8}$ is the turbulent exchange coefficient for momentum at 8-m height, S_8 is the wind speed at a height of 8m, k is Von Karmen's constant, z_o is the surface roughness parameter, and

$$\beta = 1 - 1.43R_i - 6R_i^2 - 10R_i^3 \; ,$$

where

$$R_i \Big|_0^{8m} = \frac{800g(\theta_8 - \theta_0)}{\bar{\theta}_8 (S_8')^2} \; .$$

R_i is the layer Richardson number for the surface section, g is the acceleration due to gravity, θ_8 is the potential temperature of the air at 8-m height, θ_0 is the potential temperature of the air at the air-soil boundary, $\bar{\theta}_8$ is the mean potential temperature for the surface

layer, and $S_8'^2 = S_8^2 + a^2$ where a is a threshold wind speed. As $\beta \to 1$ this equation reduces to the form for the logrithmic wind profile. The corresponding expression for the integral exchange coefficient for the layer of the atmosphere extending from the surface of the ground to 8-m height is expressed as

$$D_8 = \left[\frac{k(1-\beta)}{\left(\frac{800}{z_o}\right)^{(1-\beta)} - 1} \right] S_8, \quad 0.11 \leq \beta \leq 1.14$$

Results obtained from these alternate expressions for the exchange coefficients for Cases I-B, II, III, and IV-A of the Dallas Tower Network data were encouraging and prompted further investigations along these lines.

For this study, preliminary trial solutions were obtained for Cases VI-A, VI-B, VII-A, VII-B, and VIII of the Dallas Tower Network data incorporating the alternate exchange coefficient expressions obtained from Deacon's wind hypothesis. For the purpose of discussion, these alternate expressions will be referred to as the D-modification.

B. Results Obtained for the D-Modification for Case VI-A of the Dallas Network Data for a Simulation Period of 48-Hr.

In order to assess the results obtained by employing the D-modification, a temporal plot of the vertical temperature difference between the surface and 8-m height is shown in Figure I.1. This solution was obtained for a period of 48 hr in order that a complete 24-hr period, uninfluenced essentially by initial conditions, might be simulated.

Initially, the soil surface is 2.5C cooler than the air at 8-m height. When the solution commences, this temperature difference is reduced almost

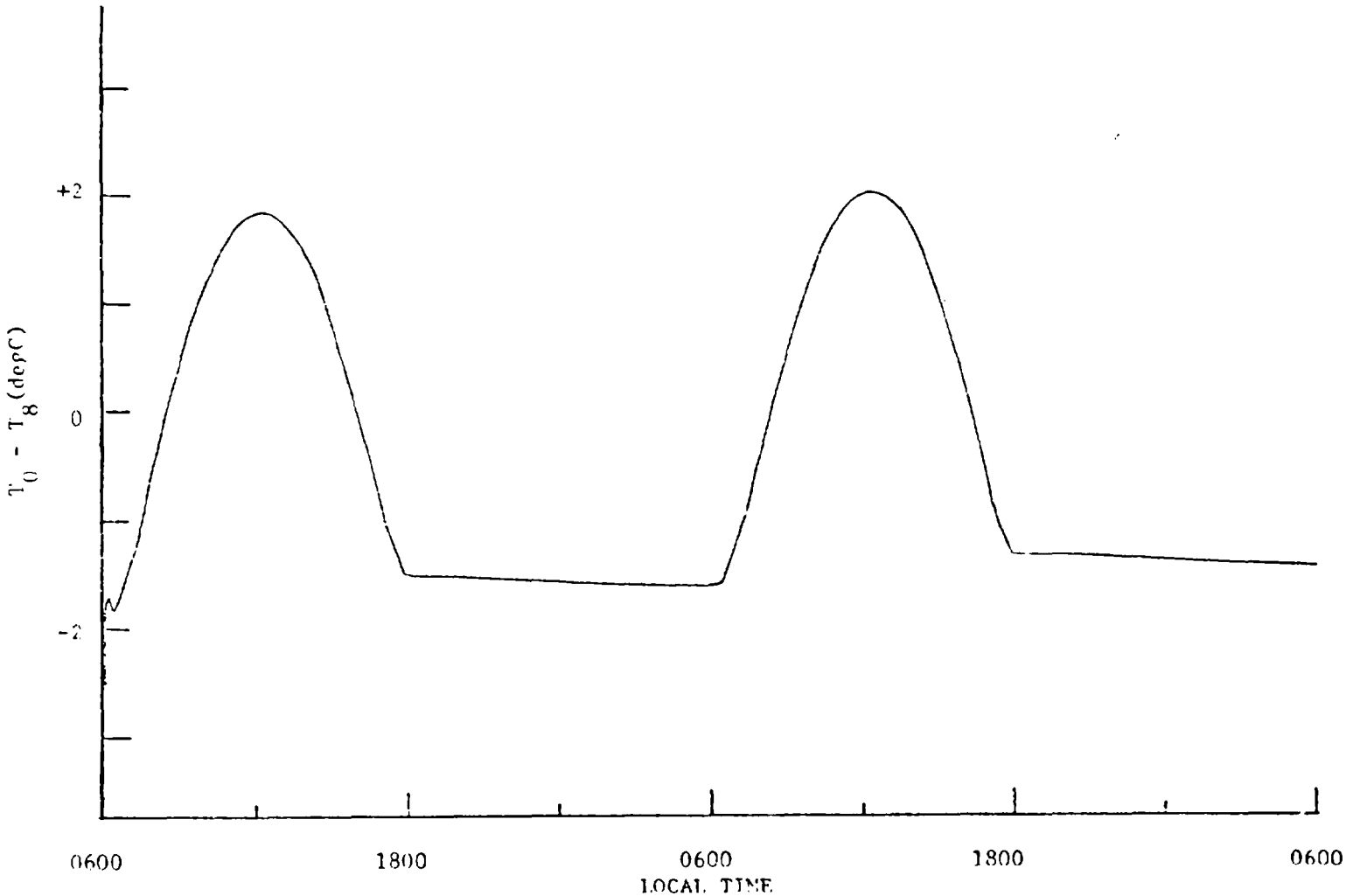

Figure 1.1 Forty-eight hour simulation of the difference in temperature between the surface and 8-m height, $T_0 - T_8$, obtained by use of the D-modification for Case VI-A of the Dallas Tower Network data.

instantaneously to approximately 1.8C. After this initial adjustment, solar energy warms the surface and by local noon $T_0 - T_8$ has increased to a maximum value of approximately 2C. $T_0 - T_8$ decreases rapidly in the afternoon with the surface layer becoming isothermal near 1600 hrs. After sunset, near 1800 hrs, $T_0 - T_8$ decreases only slightly until sunrise when the cycle is repeated, essentially. Since the surface is heated and cooled more efficiently than is the air at 8-m height, $T_0 - T_8$ experiences a slight overall increase in its values on the second day and a slight decrease at night.

In order that changes in the surface pressure gradient and advection would not disguise the characteristic of the exchange coefficient relationships, the surface pressure gradient was held fixed and the advection was set equal to zero in computing the curves shown.

Figure I.2 and I.3 are, respectively, 48-hr simulations of the turbulent exchange coefficients for momentum, $K_{m,8}$ and D_8, for Case VI-A of the Dallas Tower Network data. During the first few minutes of the solution period, these parameters also increase rapidly in magnitude and approach values slightly in excess of twice their initial values. $K_{m,8}$ and D_8 both increase until slightly after noon when their peak values are reached and then decrease rapidly until sunset when the rate of decrease is abruptly reduced. During the second day, the variation of both $K_{m,8}$ and D_8 is small. The range of $K_{m,8}$ does not exceed 5,000 cm^2/sec and that of D_8 does not exceed 0.5 cm/sec. These small variations result primarily from the extremely small variation of the wind speed, S_8, on the second day as can be seen in Figure I.4.

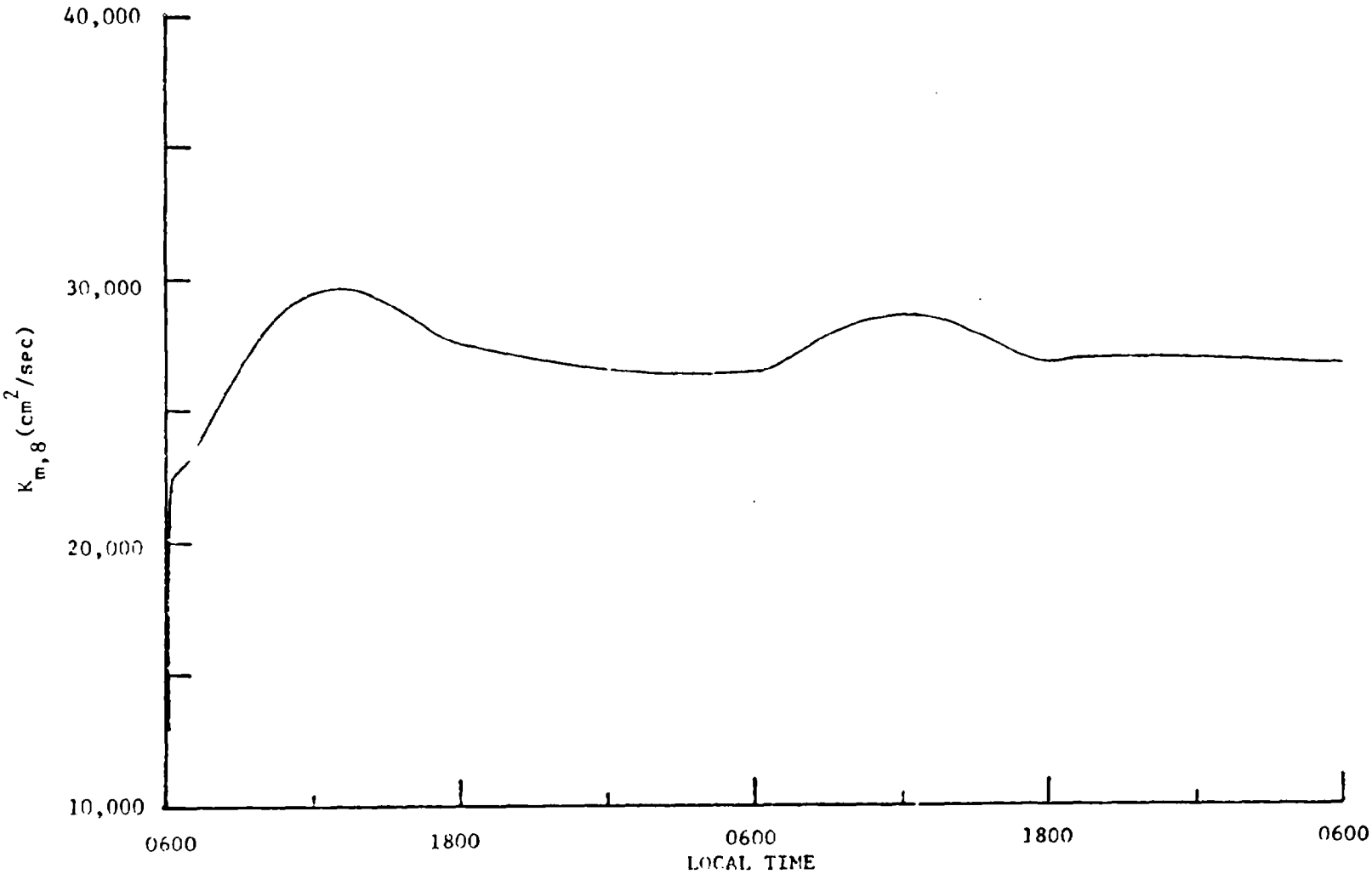

Figure I.2 Forty-eight hour simulation of the turbulent exchange coefficient for momentum at 8-m height, $K_{m,8}$, obtained by use of the D-modification for Case VI-A of the Dallas Tower Network data.

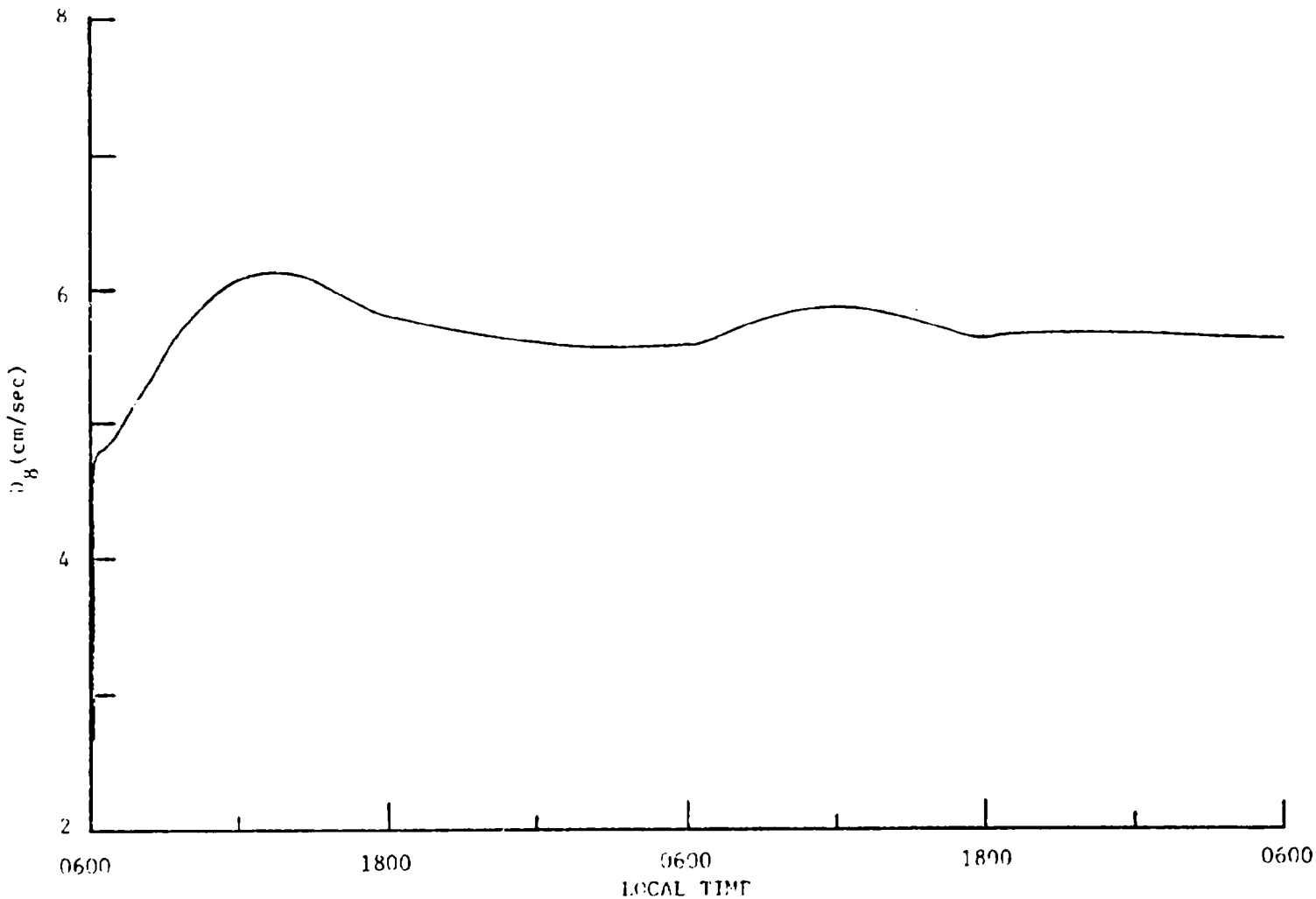

Figure I.3 Forty-eight hour simulation of the integral exchange coefficient, D_8, for the surface layer, 0 to 8-m height, obtained by use of the D-modification for Case VI-A of the Dallas Tower Network data.

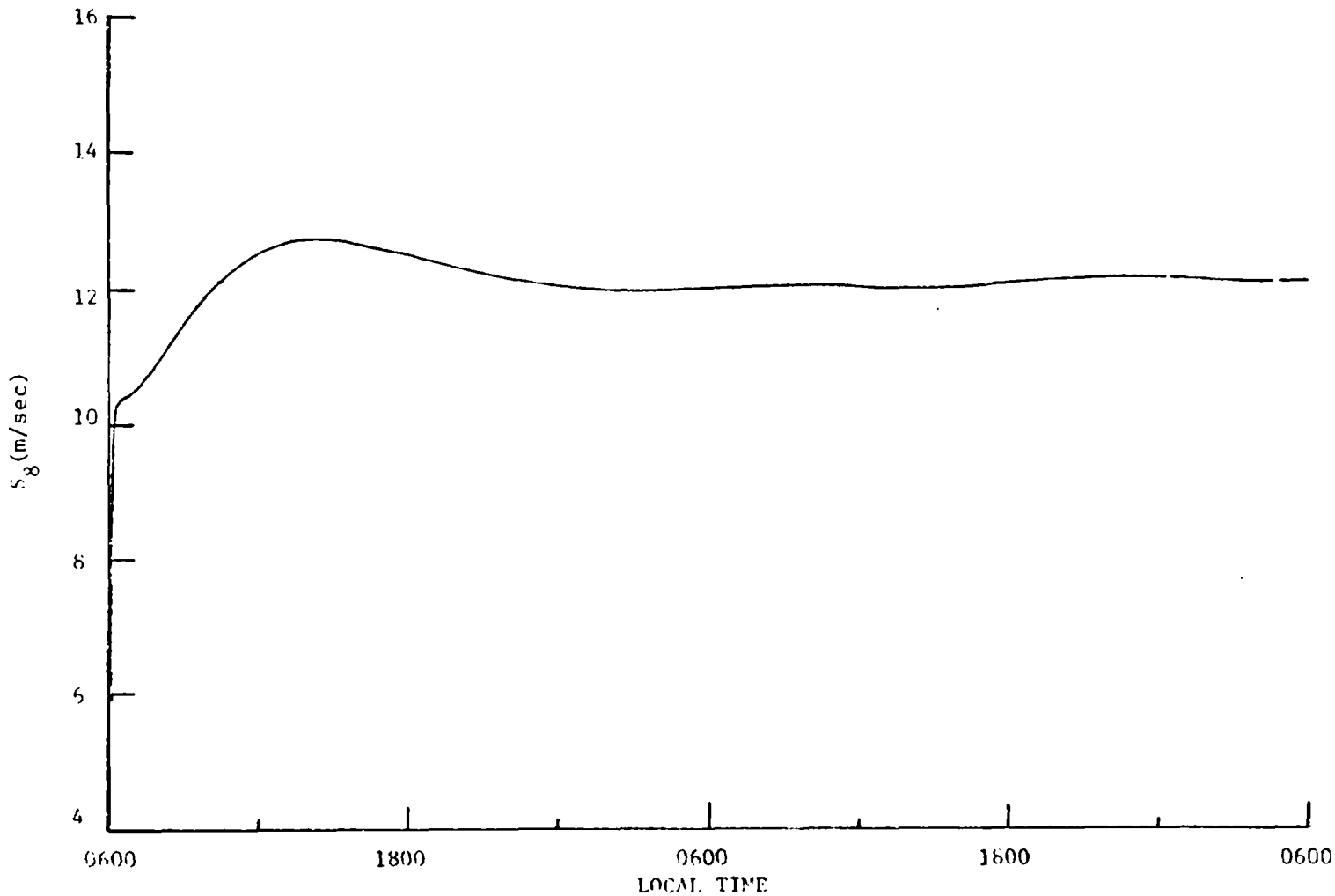

Figure I.4 Forty-eight hour simulation of the wind speed at a height of 8m obtained by use of the D-modification for Case VI-A of the Dallas Tower Network data.

At the end of the first day the wind at 8 m height begins to approach a steady state value of approximately 12 m/sec and maintains this value through the remainder of the simulation. The simulated winds are approximately 50 to 60 per cent higher than observed values. These excessive winds at 8-m height indicate that momentum loss at the soil surface is underestimated, consequently, the D_8 is inadequate in that it leads to values that are too small.

II. SOLUTIONS FOR CASES VI-A, VI-B, VII-A, VII-B, AND VIII OF THE DALLAS TOWER NETWORK DATA BASED ON THE ALTERNATE EXCHANGE COEFFICIENTS

Solutions obtained for Cases VI-A, VI-B, VII-A, VII-B, and VIII of the Dallas Tower Network data are shown on pages 13 through 87 of this report. The most general solution has been obtained for each case for time periods of 1, 2, 6, and 12 hr. The data obtained from the general purpose analog computer (GPAC) are punched directly into punch cards and the voltages representing the various meteorological parameters are subsequently converted to parameter values by means of an IBM 360/65 digital computer. The data, as printed by the digital computer, consists of a tape log, which contains a tape number assigned to each set of solutions and the conditions under which these solutions were obtained, initial values for the parameters included in the solutions, data corresponding to each of the verifying times, solutions obtained on the GPAC, and root-mean-squares of the differences between the observed and calculated values of winds, temperatures, and vapor pressures.

The data formats are the same for all cases; therefore, remarks made for Case VI-A will apply to all. The tape log for Case VI-A appears on page 13. The first column in the log contains the reference number assigned to each individual tape. The second column contains the applicable simulated time interval expressed in hours. The third column, headed SM, refers to the soil model being employed. Two soil models are available in the present equation set, a stratified soil model (Soil Model A) and a unified Soil Model (Soil Model B). For all of the solutions shown in this report Soil Model A only was used and is indicated in the third column by the letter A. The fourth column is headed

KM8 D8 and contains the letter V. This column specifies how the exchange coefficients for momentum are employed. The computer operator has the choice of permitting the exchange coefficients to vary with the wind speed at a height of 8 m or of holding their values fixed during the simulation cycle. The V in this column indicates that the exchange coefficients were allowed to vary.

The column headed SCG contains the letter A indicating that the surface contour gradient changed linearly during the solution cycle. The column headed ADV contains an N which indicates that advection of wind, temperature, and vapor pressure varies with the wind, and the column headed GEO indicates whether or not the geostrophic coupling term is omitted (indicated by O) or is included (indicated by I). The geostrophic coupling term is $\frac{1}{\rho} C_g$, where ρ is air density and $C_g = A(V_g - V_{1000})$. The parameter V_g is the geostrophic wind, V_{1000} is the wind at 1000-m height, and A is the coupling coefficient. For all the solutions in this report, A has the value of 8.33×10^{-4} gm cm^{-3}sec^{-1}. The last column contains remarks which indicate the turbulent exchange coefficient being used in a particular solution.

Two pages of initial conditions follow the tape log. The data and local time for which the observations were taken are given in the heading of each page. Since no subscripts are available on the computer printout, subscripts have been indicated by parentheses.

Four pages of comparison data follow the initial conditions. One page is shown for each of the verifying times (indicated in parentheses in the heading) of 1, 2, 6, and 12 hr after the initial

time. Verifying data for winds, temperatures, and vapor pressures are shown at all computational levels above the ground except that no verification value is available for the winds at the height of 2 m. Comparison data for soil temperatures are included as is the calculated short wave solar radiation. The symbol XXXX indicates the absence of verification data for the particular parameter in question.

The solutions obtained on the GPAC begin on Page 20. For a brief explanation of these data sheets, refer to that page. The data for each set of solutions appears on three successive pages. The first page contains the u- and v-components of the wind, the second page contains the air temperatures and vapor pressures, and the third page contains the soil temperatures, the surface energy terms, and other miscellaneous variables. Note should be taken that the wind speeds for the level indicated as 8' in the miscellaneous variables for the GPAC output data are the values for S_8' in meters per second.

The first line of the first page of the GPAC output data contains the values of the exchange coefficients for momentum for the solutions obtained according to the corresponding tape numbers which occur in the second line of the page, and the third line indicates the length of the prediction interval in hours. For example, the data for tape number 833 appears in the first column. The exchange coefficient for momentum for this set of solutions at the end of the 12-hr simulation interval is 23,844 cm^2/sec.

The value for the exchange coefficient for momentum, the tape number, and the forecast interval are centered above two columns headed GPAC and

DIFF, respectively, the columns headed GPAC contain the solution values as obtained on the general purpose analog computer, and the columns headed DIFF contain the algebraic differences between the values obtained on the general purpose analog computer and the observed or hand processed values. One complete set of GPAC data and the corresponding differences are shown in each of these pairs of columns commencing on the first page of a set and ending on the third page. Finally, the column located on the left of the page and headed LEVEL (M) indicates the height in meters at which the parameters are applicable. GEO appearing in this column refers to the geostrophic value of the wind component.

A root-mean-square error evaluation for each tape run for a particular case follows the GPAC solutions for that case. The evaluation for Case VI-A appears on pages 26 and 27. The numbers in the body of the page are root-mean-squares of the differences obtained for all prediction levels in a particular profile for the parameter appearing at the head of the column in which the number appears. In the left-most column RMS MAGNITUDE refers to the magnitude of the observed data for the atmospheric variable at the indicated number of hours after the initial time. PERSIST DIFF is the root-mean-square difference between the observed data at the time of verification and at the initial time. GPAC DIFF is the difference between the GPAC values and the observed values at verification time.

CASE VI-A TAPE LOG

TAPE NO.	FCST INT	SM	KM8 D8	SCG	ADV	GEO	REMARKS
833.	12.00	A	V	A	N	O	D-MODIFICATION
836.	12.00	A	V	A	N	I	D-MODIFICATION
907.	6.00	A	V	A	N	O	D-MODIFICATION
908.	6.00	A	V	A	N	I	D-MODIFICATION
911.	2.00	A	V	A	N	O	D-MODIFICATION
912.	2.00	A	V	A	N	I	D-MODIFICATION
915.	1.00	A	V	A	N	O	D-MODIFICATION
916.	1.00	A	V	A	N	I	D-MODIFICATION

CASE VI-A INITIAL CONDITIONS - 0600L 28 MARCH 1962
(PAGE 1 OF 2 PAGES)

SOIL PARAMETERS

LEVEL (M)	TEMP (DEG C)		
0.000	13.95	LAMBDA	= 0.59 CAL/CM^3 DEG
-0.125	15.49	MU/LAMBDA	= 0.0037 CM^2/SEC
-0.250	15.47	$(MU \times LAMBDA)^{1/2}$	= 0.036 CAL^2/CM^4 DEG^2 SEC
-0.500	14.46	Z(0)	= 2.0 CM
-1.000	14.07	S(0)	= 0.0004 CAL/CM^2 SEC MB
-2.000	13.53	G	= 3500 CM^2 SEC DEG/CAL

RADIATION PARAMETERS

LOCAL TIME	= 0600	TURBIDITY	= 0.28
DELTA	= 2.70 DEG	PSI	= 1.003
$R \times 10^5$	= 1.85 DEG C/SEC	F(C)	= 0.80
CLOUD CLASS	= 1	ALBEDO	= 0.25
E'(8)	= 9.39 MB	M	= 0.620
EPSILON	= 0.950	N	= 0.0415 $MB^{-1/2}$
PHI	= 32.5 DEG	H	= -90.0 DEG

HORIZONTAL GRADIENTS

LEVEL (M)	DE/DX (MB/100-KM)	DE/DY (MB/100-KM)	DT/DX (DEG C/100-KM)	DT/DY (DEG C/100-KM)
200	0.76	-0.99	-1.02	0.38
600	0.50	-0.54	-0.90	0.47
1000	0.25	-0.09	-0.79	0.56

CASE VI-A INITIAL CONDITIONS - 0600L 28 MARCH 1962
(PAGE 2 OF 2 PAGES)

LEVEL (M)	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
1000	8.63	14.42	15.15	3.60
900	8.22	14.65	15.47	4.20
800	7.82	14.85	15.80	4.81
700	7.40	15.05	16.13	5.43
600	7.00	15.25	16.45	6.04
500	6.60	15.58	16.77	6.65
400	5.70	16.58	17.00	7.27
300	5.90	18.65	17.03	7.89
200	7.00	17.72	14.75	8.41
100	2.98	12.80	12.73	8.89
32	1.05	9.30	12.62	9.25
8	0.28	5.95	12.67	9.39

ADVECTION TERMS
($SEC^{-1} \times 10^{5}$)

LEVEL (M)	ALPHA(1)	BETA(1)	ALPHA(2)	BETA(2)
200	1.45	-0.09	0.00	-0.66
600	2.77	-0.54	0.00	-0.94
1000	4.08	-0.98	0.00	-1.22

SURFACE CONTOUR GRADIENTS

PREDICTION INTERVAL (HR)	AZIMUTH (DEG FROM NORTH)	MAGNITUDE (FT/100-KM)
0	133.60	63.79
1	117.70	55.70
2	123.10	54.18
6	129.00	58.13
12	124.40	62.09

CASE VI-A COMPARISCN DATA FROM DALLAS (1 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	9.86	18.79		
1000	7.98	15.45	15.13	4.05
900	7.45	15.98	15.46	4.61
800	6.95	16.49	15.80	5.18
700	6.44	16.98	16.14	5.76
600	5.94	17.50	16.46	6.32
500	5.43	18.15	16.80	6.91
400	4.10	19.40	17.10	7.50
300	4.05	19.95	16.87	8.10
200	6.45	18.90	14.75	8.60
100	3.10	14.30	13.05	9.06
32	1.70	10.35	12.98	9.41
8	0.80	7.40	13.07	9.54
2	XXXX	XXXX	13.10	9.57
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	13.82
-0.125	15.31
-0.250	15.42
-0.500	14.50
-1.000	14.07
-2.000	13.53

WIND SPEED (M/SEC)

8	7.44
2	6.21

SURFACE SHEAR STRESS
(DYNES/CM SQ.)X10
TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	2.00	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VI-A COMPARISON DATA FROM DALLAS (2 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	11.25	17.28		
1000	7.95	15.58	14.92	4.50
900	7.61	16.04	15.19	5.02
800	7.29	16.50	15.45	5.55
700	6.95	17.00	15.70	6.08
600	6.60	17.48	15.97	6.61
500	6.29	17.95	16.24	7.17
400	6.66	19.46	16.34	7.73
300	7.48	19.35	14.50	8.30
200	5.30	15.70	13.32	8.78
100	3.55	12.98	13.60	9.23
32	2.43	11.03	14.28	9.57
8	1.25	7.85	14.71	9.70
2	XXXX	XXXX	14.87	9.72
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	13.95
-0.125	15.15
-0.250	15.36
-0.500	14.50
-1.000	14.08
-2.000	13.53

WIND SPEED (M/SEC)

8	7.95
2	6.13

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	6.30	Q(E,O)=	XXXX
R(N)=	XXXX	Q(S,O)=	XXXX
Q(C,O)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

F= XXXX

CASE VI-A COMPARISON DATA FROM DALLAS (6 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	13.92	17.17		
1000	5.68	14.47	15.00	6.32
900	5.18	14.16	15.34	6.66
800	4.68	13.89	15.68	7.02
700	4.20	13.60	16.01	7.38
600	3.70	13.33	16.35	7.75
500	3.15	13.19	16.69	8.20
400	2.20	13.65	17.58	8.66
300	1.79	14.03	18.35	9.12
200	1.72	13.59	19.20	9.53
100	2.10	12.48	19.95	9.92
32	2.20	10.12	20.80	10.21
8	1.20	7.30	21.32	10.32
2	XXXX	XXXX	21.54	10.34
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	18.48
-0.125	15.51
-0.250	15.14
-0.500	14.56
-1.000	14.08
-2.000	13.53

WIND SPEED (M/SEC)

8	7.40
2	4.96

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	16.60	Q(E,O)=	XXXX
R(N)=	XXXX	Q(S,O)=	XXXX
Q(C,O)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

F= XXXX

CASE VI-A COMPARISON DATA FROM DALLAS (12 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	13.34	19.49		
1000	3.80	16.47	16.11	9.03
900	3.65	16.45	16.98	9.13
800	3.50	16.44	17.86	9.23
700	3.34	16.42	18.73	9.33
600	3.20	16.40	19.59	9.45
500	2.90	16.70	20.46	9.75
400	2.10	17.54	21.29	10.05
300	1.48	17.70	22.09	10.35
200	1.25	16.59	22.90	10.65
100	1.35	14.70	23.70	10.95
32	1.25	11.70	24.27	11.16
8	0.60	8.30	24.54	11.24
2	XXXX	XXXX	24.60	11.25
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	20.19
-0.125	17.57
-0.250	15.58
-0.500	14.59
-1.000	14.11
-2.000	13.53

WIND SPEED (M/SEC)

8	8.32
2	6.66

SURFACE SHEAR STRESS
(DYNES/CM SQ.)X10
TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.00	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VI-A GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	23844	22944	24959	24625
TAPE NO.	833.	836.	907.	908.
INTERVAL	12.00HR	12.00HR	6.00HR	6.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	13.35	0.01	13.35	0.01	13.92	0.00	13.93	0.01
1000	1.26	-2.54	6.86	3.06	2.92	-2.76	8.07	2.39
900	0.79	-2.85	2.68	-0.97	2.45	-2.73	4.36	-0.82
800	0.55	-2.95	1.66	-1.84	2.19	-2.49	3.39	-1.29
700	0.36	-2.98	1.17	-2.17	1.99	-2.21	2.91	-1.29
600	0.22	-2.98	0.88	-2.32	1.83	-1.87	2.60	-1.10
500	0.09	-2.81	0.64	-2.25	1.67	-1.48	2.35	-0.80
400	-0.02	-2.12	0.46	-1.64	1.53	-0.67	2.14	-0.06
300	-0.13	-1.61	0.29	-1.19	1.38	-0.41	1.93	0.14
200	-0.24	-1.48	0.14	-1.11	1.22	-0.50	1.72	0.00
100	-0.34	-1.69	-0.02	-1.37	1.02	-1.08	1.46	-0.64
32	-0.39	-1.64	-0.12	-1.37	0.81	-1.39	1.18	-1.02
8	-0.36	-0.96	-0.14	-0.75	0.63	-0.57	0.93	-0.27

V COMPONENT (M/SEC)

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LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	19.51	0.02	19.50	0.01	17.17	0.00	17.17	0.00
1000	19.79	3.32	18.23	1.76	18.10	3.63	16.80	2.33
900	19.62	3.17	18.47	2.02	18.00	3.84	17.26	3.10
800	19.41	2.97	18.44	2.00	17.84	3.95	17.27	3.38
700	19.15	2.73	18.27	1.85	17.63	4.02	17.13	3.53
600	18.86	2.46	18.05	1.65	17.38	4.05	16.93	3.60
500	18.52	1.82	17.76	1.06	17.07	3.88	16.66	3.47
400	18.10	0.57	17.39	-0.15	16.70	3.05	16.32	2.67
300	17.57	-0.13	16.91	-0.79	16.24	2.21	15.88	1.85
200	16.84	0.25	16.23	-0.36	15.58	1.99	15.25	1.66
100	15.63	0.93	15.08	0.38	14.50	2.02	14.20	1.72
32	13.62	1.92	13.14	1.44	12.69	2.57	12.44	2.32
8	11.08	2.78	10.69	2.39	10.41	3.11	10.21	2.91

CASE VI-A GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	833.		836.		907.		908.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	16.12	0.01	16.84	0.73	15.00	0.00	15.38	0.38
900	16.20	-0.78	16.83	-0.15	15.35	0.01	15.64	0.30
800	16.25	-1.61	16.82	-1.04	15.60	-0.08	15.85	0.17
700	16.21	-2.52	16.74	-1.99	15.76	-0.25	15.98	-0.03
600	16.16	-3.43	16.67	-2.92	15.87	-0.48	16.08	-0.27
500	16.15	-4.31	16.65	-3.81	16.03	-0.66	16.23	-0.46
400	16.11	-5.18	16.59	-4.70	16.17	-1.41	16.36	-1.22
300	16.06	-6.03	16.52	-5.57	16.34	-2.01	16.52	-1.83
200	16.01	-6.89	16.45	-6.45	16.58	-2.62	16.76	-2.44
100	15.86	-7.84	16.28	-7.42	16.87	-3.08	17.03	-2.92
32	15.62	-8.65	16.01	-8.26	17.30	-3.50	17.46	-3.34
8	15.39	-9.15	15.75	-8.79	17.90	-3.42	18.05	-3.27
2	15.11	-9.49	15.44	-9.16	18.46	-3.08	18.61	-2.93
0	14.20	XXXX	14.42	XXXX	20.37	XXXX	20.51	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	11.68	2.65	11.38	2.35	8.10	1.78	8.09	1.77
900	12.07	2.94	11.81	2.68	8.55	1.89	8.54	1.88
800	12.35	3.12	12.10	2.87	8.85	1.83	8.82	1.80
700	12.59	3.26	12.33	3.00	9.09	1.71	9.07	1.69
600	12.78	3.33	12.54	3.09	9.29	1.54	9.27	1.52
500	13.01	3.26	10.77	1.02	9.54	1.34	9.52	1.32
400	13.18	3.13	12.94	2.89	9.72	1.06	9.70	1.04
300	13.36	3.01	13.13	2.78	9.95	0.83	9.93	0.81
200	13.56	2.91	13.34	2.69	10.19	0.66	10.17	0.64
100	13.68	2.73	13.46	2.51	10.41	0.49	10.40	0.48
32	13.87	2.71	13.67	2.51	10.79	0.58	10.78	0.57
8	13.93	2.69	13.73	2.49	11.11	0.79	11.11	0.79
2	13.98	2.73	13.80	2.55	11.43	1.09	11.44	1.10
0	14.16	XXXX	14.02	XXXX	12.51	XXXX	12.56	XXXX

CASE VI-A GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	833.		836.		907.		908.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	16.42	-3.77	16.55	-3.64	16.82	-1.66	16.86	-1.62
-0.125	15.97	-1.60	16.01	-1.56	15.33	-0.18	15.33	-0.18
-0.250	15.27	-0.31	15.27	-0.31	15.24	0.10	15.24	0.10
-0.500	14.55	-0.04	14.55	-0.04	14.54	-0.02	14.53	-0.03
-1.000	14.07	-0.04	14.07	-0.04	14.08	0.00	14.10	0.02
-2.000	13.53	0.00	13.53	0.00	13.53	0.00	13.54	0.01

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
8*	11.52	XXXX	11.15	XXXX	10.90	XXXX	10.73	XXXX
8	11.09	2.77	10.70	2.38	10.43	3.03	10.25	2.85
2	8.50	1.84	8.20	1.54	8.06	3.10	7.92	2.96

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(D)	0.01	0.01	0.01	0.01	17.04	0.44	17.05	0.45
R(N)	-2.08	XXXX	-2.08	XXXX	10.13	XXXX	10.10	XXXX
Q(C,O)	-2.21	XXXX	-2.39	XXXX	4.57	XXXX	4.47	XXXX
Q(E,O)	0.75	XXXX	0.90	XXXX	4.53	XXXX	4.60	XXXX
Q(S,O)	-0.63	XXXX	-0.61	XXXX	1.02	XXXX	1.05	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	5.57	XXXX	5.57	XXXX	5.57	XXXX	5.57	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	22.50	XXXX	23.10	XXXX	11.90	XXXX	12.10	XXXX

CASE VI-A GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	21209	21234	20839	20839
TAPE NO.	911.	912.	915.	916.
INTERVAL	2.00HR	2.00HR	1.00HR	1.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	11.25	0.00	11.25	0.00	9.85	-0.01	9.86	0.00
1000	5.15	-2.80	8.48	0.53	6.47	-1.51	8.64	0.66
900	4.69	-2.92	5.65	-1.95	5.95	-1.49	6.42	-1.03
800	4.39	-2.90	4.85	-2.44	5.59	-1.36	5.76	-1.19
700	4.14	-2.81	4.42	-2.53	5.28	-1.15	5.36	-1.07
600	3.92	-2.68	4.12	-2.48	5.01	-0.93	5.05	-0.89
500	3.70	-2.59	3.85	-2.44	4.74	-0.69	4.77	-0.66
400	3.49	-3.16	3.61	-3.05	4.48	0.38	4.49	0.39
300	3.25	-4.23	3.35	-4.13	4.19	0.14	4.20	0.15
200	3.00	-2.30	3.07	-2.23	3.87	-2.58	3.88	-2.57
100	2.64	-0.91	2.70	-0.85	3.42	0.32	3.42	0.32
32	2.20	-0.23	2.24	-0.19	2.86	1.16	2.86	1.16
8	1.75	0.50	1.78	0.53	2.27	1.47	2.28	1.48

V COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	17.28	0.00	17.28	0.00	18.79	0.01	18.79	0.00
1000	14.99	-0.59	15.74	0.16	14.32	-1.13	15.63	0.18
900	15.49	-0.55	15.68	-0.36	15.01	-0.97	15.26	-0.72
800	15.59	-0.91	15.69	-0.81	15.31	-1.18	15.40	-1.09
700	15.54	-1.46	15.60	-1.40	15.41	-1.57	15.46	-1.52
600	15.42	-2.06	15.46	-2.02	15.41	-2.09	15.43	-2.07
500	15.22	-2.72	15.25	-2.69	15.29	-2.85	15.31	-2.84
400	14.95	-4.51	14.98	-4.48	15.09	-4.31	15.10	-4.29
300	14.59	-4.76	14.60	-4.75	14.77	-5.18	14.78	-5.17
200	14.02	-1.68	14.04	-1.66	14.24	-4.66	14.24	-4.65
100	13.07	0.09	13.08	0.10	13.29	-1.01	13.29	-1.01
32	11.44	0.41	11.45	0.42	11.63	1.28	11.63	1.28
8	9.34	1.49	9.34	1.49	9.48	2.08	9.48	2.08

CASE VI-A GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	911.		912.		915.		916.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	15.38	0.46	15.47	0.55	15.50	0.37	15.53	0.40
900	15.26	0.07	15.32	0.13	15.62	0.16	15.64	0.18
800	15.22	-0.23	15.26	-0.19	15.61	-0.19	15.62	-0.18
700	15.13	-0.57	15.17	-0.53	15.53	-0.61	15.53	-0.61
600	15.03	-0.94	15.05	-0.92	15.38	-1.08	15.39	-1.07
500	15.01	-1.23	15.02	-1.22	15.32	-1.48	15.32	-1.48
400	14.95	-1.39	14.96	-1.38	15.20	-1.90	15.20	-1.90
300	14.90	0.40	14.91	0.41	15.09	-1.78	15.08	-1.79
200	14.86	1.54	14.88	1.56	14.95	0.20	14.95	0.20
100	14.79	1.19	14.81	1.21	14.74	1.69	14.73	1.68
32	14.66	0.38	14.66	0.38	14.37	1.39	14.36	1.38
8	14.66	-0.05	14.67	-0.04	14.08	1.01	14.08	1.01
2	14.63	-0.24	14.64	-0.23	13.75	0.65	13.75	0.65
0	14.51	XXXX	14.52	XXXX	12.67	XXXX	12.67	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	5.70	1.20	5.66	1.16	4.70	0.65	4.70	0.65
900	6.33	1.31	6.31	1.29	5.65	1.04	5.65	1.04
800	6.66	1.11	6.66	1.11	6.14	0.96	6.14	0.96
700	6.92	0.84	6.91	0.83	6.41	0.65	6.51	0.75
600	7.11	0.50	7.10	0.49	6.76	0.44	6.76	0.44
500	7.33	0.16	7.32	0.15	7.03	0.12	7.03	0.12
400	7.48	-0.25	7.48	-0.25	7.23	-0.27	7.23	-0.27
300	7.67	-0.63	7.67	-0.63	7.45	-0.65	7.45	-0.65
200	7.88	-0.90	7.87	-0.91	7.68	-0.92	7.67	-0.93
100	8.03	-1.20	8.02	-1.21	7.83	-1.23	7.84	-1.22
32	8.31	-1.26	8.31	-1.26	8.11	-1.30	8.11	-1.30
8	8.54	-1.16	8.53	-1.17	8.30	-1.24	8.31	-1.23
2	8.76	-0.96	8.76	-0.96	8.49	-1.08	8.49	-1.08
0	9.51	XXXX	9.51	XXXX	9.09	XXXX	9.09	XXXX

CASE VI-A GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	911.		912.		915.		916.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	13.91	-0.04	13.91	-0.04	13.70	-0.12	13.71	-0.11
-0.125	15.25	0.10	15.26	0.11	15.37	0.06	15.36	0.05
-0.250	15.39	0.03	15.38	0.02	15.42	-0.00	15.42	-0.00
-0.500	14.49	-0.01	14.49	-0.01	14.48	-0.02	14.49	-0.01
-1.000	14.08	0.00	14.08	0.00	14.08	0.01	14.08	0.01
-2.000	13.53	0.00	13.53	0.00	13.53	0.00	13.54	0.01

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
8*	10.02	XXXX	10.03	XXXX	10.25	XXXX	10.25	XXXX
8	9.51	1.56	9.51	1.56	9.75	2.31	9.76	2.32
2	7.31	1.18	7.31	1.18	7.47	1.26	7.47	1.26

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(D)	6.48	0.19	6.48	0.19	2.21	0.21	2.19	0.19
R(N)	2.65	XXXX	2.66	XXXX	-0.34	XXXX	-0.36	XXXX
Q(C,0)	-0.25	XXXX	-0.25	XXXX	-2.26	XXXX	-2.27	XXXX
Q(F,0)	2.74	XXXX	2.79	XXXX	2.21	XXXX	2.21	XXXX
Q(S,0)	0.17	XXXX	0.17	XXXX	-0.30	XXXX	-0.30	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	4.66	XXXX	4.66	XXXX	4.66	XXXX	4.66	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	2.60	XXXX	2.60	XXXX	1.10	XXXX	1.20	XXXX

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VI-A 12.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	P (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		4.47	16.00	21.20	10.15	16.09
PERSIST DIFF		3.83	1.64	6.73	3.41	2.69
GPAC DIFF	833.	2.23	2.14	5.95	2.97	1.68
GPAC DIFF	836.	1.72	1.45	5.60	2.62	1.62

CASE VI-A 6.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	P (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		5.10	13.34	18.13	8.68	15.30
PERSIST DIFF		3.17	2.28	4.23	1.71	1.85
GPAC DIFF	907.	1.67	3.16	2.09	1.30	0.68
GPAC DIFF	908.	1.00	2.69	1.97	1.28	0.67

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VI-A 2.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		6.68	16.03	15.03	7.74	14.44
PERSIST DIFF		0.96	1.82	1.20	0.57	0.15
GPAC DIFF	911.	2.49	2.21	0.84	0.96	0.05
GPAC DIFF	912.	2.16	2.18	0.84	0.95	0.05

CASE VI-A 1.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		5.94	16.50	15.21	7.52	14.46
PERSIST DIFF		1.01	1.77	0.18	0.28	0.09
GPAC DIFF	915.	1.22	2.67	1.14	0.89	0.06
GPAC DIFF	916.	1.10	2.63	1.14	0.89	0.05

CASE VI-B TAPE LOG

TAPE NO.	FCST INT	SM	KMB DB	SCG	ADV	GEO	REMARKS
922.	12.00	A	V	A	N	O	D-MODIFICATION
923.	12.00	A	V	A	N	I	D-MODIFICATION
926.	6.00	A	V	A	N	O	D-MODIFICATION
927.	6.00	A	V	A	N	I	D-MODIFICATION
930.	2.00	A	V	A	N	O	D-MODIFICATION
931.	2.00	A	V	A	N	I	D-MODIFICATION
934.	1.00	A	V	A	N	O	D-MODIFICATION
935.	1.00	A	V	A	N	I	D-MODIFICATION

CASE VI-B INITIAL CONDITIONS - 0600L 15 JUNE 1962
(PAGE 1 OF 2 PAGES)

SOIL PARAMETERS

LEVEL (M)	TEMP (DEG C)		
0.000	23.12	LAMBDA	= 0.59 CAL/CM^3 DEG
-0.125	25.53	MU/LAMBDA	= 0.0037 CM^2/SEC
-0.250	25.69	$(MU \times LAMBDA)^{1/2}$	= 0.036 $CAL^2/CM^4 DEG^2 SEC$
-0.500	24.06	Z(0)	= 2.0 CM
-1.000	21.85	S(0)	= 0.0004 CAL/CM^2 SEC MB
-2.000	17.27	G	= 3500 CM^2 SEC DEG/CAL

RADIATION PARAMETERS

LOCAL TIME	= 0600	TURBIDITY	= 0.24
DELTA	= 22.70 DEG	PSI	= 0.970
$R \times 10^5$	= 1.55 DEG C/SEC	F(C)	= 0.90
CLOUD CLASS	= 2	ALBEDO	= 0.25
E'(8)	= 20.98 MB	M	= 0.670
EPSILON	= 0.950	N	= 0.0360 $MB^{-1/2}$
PHI	= 32.5 DEG	H	= -90.0 DEG

HORIZONTAL GRADIENTS

LEVEL (M)	DE/DX (MB/100-KM)	DE/DY (MB/100-KM)	DT/DX (DEG C/100-KM)	DT/DY (DEG C/100-KM)
200	-0.82	-0.65	-0.66	-0.64
600	-0.80	-0.40	-0.76	-0.45
1000	-0.78	-0.15	-0.86	-0.26

CASE VI-B INITIAL CONDITIONS - 0600L 15 JUNE 1962
(PAGE 2 OF 2 PAGES)

LEVEL (M)	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
1000	-0.50	8.42	16.94	15.81
900	-0.85	9.00	17.64	16.42
800	-1.22	9.54	18.34	17.04
700	-1.60	10.10	19.04	17.65
600	-2.05	10.64	19.74	18.26
500	-2.52	11.20	20.45	18.88
400	-3.42	11.83	21.15	19.49
300	-5.19	12.50	21.74	20.10
200	-6.90	11.41	21.81	20.46
100	-6.50	7.10	20.45	20.73
32	-4.60	[illegible]	[illegible]	20.92
8	-2.70	[illegible]	19.39	20.98

ADVECTION TERMS
($SEC^{-1} \times 10^{5}$)

LEVEL (M)	ALPHA(1)	BETA(1)	ALPHA(2)	BETA(2)
200	0.97	-1.05	0.49	1.66
600	0.90	-0.05	0.31	1.54
1000	0.84	0.95	0.13	1.42

SURFACE CONTOUR GRADIENTS

PREDICTION INTERVAL (HR)	AZIMUTH (DEG FROM NORTH)	MAGNITUDE (FT/100-KM)
0	72.50	23.44
1	96.60	35.31
2	84.70	22.83
6	81.20	27.70
12	84.90	37.44

CASE VI-B COMPARISON DATA FROM DALLAS (1 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	1.62	13.34		
1000	-0.70	8.28	17.15	15.85
900	-0.94	8.70	17.81	16.45
800	-1.20	9.15	18.49	17.06
700	-1.48	9.60	19.16	17.65
600	-1.73	10.01	19.84	18.25
500	-2.01	10.49	20.51	18.86
400	-2.60	11.15	21.21	19.46
300	-3.60	11.54	21.86	20.06
200	-5.95	10.35	21.50	20.43
100	-6.09	5.70	19.95	20.72
32	-4.55	3.15	20.14	20.92
8	-3.[illegible]	1.40	20.42	20.98
2	XXXX	XXXX	20.50	21.00
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	23.00
-0.125	25.29
-0.250	25.58
-0.500	24.08
-1.000	21.85
-2.000	17.27

WIND SPEED (M/SEC)

8	3.36
2	2.39

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(0)=	6.50	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VI-B COMPARISON DATA FROM DALLAS (2 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GFD	-0.81	8.70		
1000	-0.95	7.40	17.46	15.89
900	-1.18	7.50	18.15	16.48
800	-1.39	7.60	18.82	17.07
700	-1.60	7.70	19.50	17.66
600	-1.80	7.80	20.17	18.24
500	-2.01	7.90	20.85	18.84
400	-2.35	8.72	21.55	19.43
300	-3.65	9.05	21.84	20.02
200	-5.49	6.60	20.75	20.40
100	-5.45	3.89	21.15	20.70
32	-4.70	3.70	21.71	20.91
8	-3.75	3.05	22.18	20.98
2	XXXX	XXXX	22.30	21.00
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	23.71
-0.125	25.10
-0.250	25.48
-0.500	24.09
-1.000	21.85
-2.000	17.27

WIND SPEED (M/SEC)

8	4.83
2	1.18

SURFACE SHEAR STRESS
(DYNES/CM SQ.)X10
TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	11.40	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VI-B COMPARISON DATA FROM DALLAS (6 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	-1.62	10.44		
1000	-1.31	7.27	19.04	16.05
900	-1.10	7.22	19.83	6.59
800	-0.87	7.20	20.61	17.14
700	-0.61	7.15	21.40	17.68
600	-0.40	7.10	22.19	18.20
500	-0.18	7.09	22.98	18.76
400	-0.09	7.01	23.84	19.31
300	-0.53	7.00	24.86	19.86
200	-0.91	6.97	25.79	20.27
100	-0.80	6.39	26.83	20.64
32	-0.40	5.10	27.87	20.88
8	-0.15	3.80	28.42	20.98
2	XXXX	XXXX	28.57	21.00
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	30.55
-0.125	25.58
-0.250	25.13
-0.500	24.06
-1.000	21.85
-2.000	17.27

WIND SPEED (M/SEC)

8	3.80
2	3.10

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	22.20	Q(E,O)=	XXXX
R(N)=	XXXX	Q(S,O)=	XXXX
Q(C,O)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VI-B COMPARISON DATA FROM DALLAS (12 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	-1.28	14.27		
1000	-4.09	7.70	21.06	16.29
900	-3.91	7.66	21.89	16.76
800	-3.81	7.60	22.71	17.24
700	-3.70	7.58	23.55	17.71
600	-3.60	7.51	24.37	18.18
500	-3.50	7.49	25.20	18.66
400	-3.40	7.44	26.16	19.13
300	-3.40	7.31	27.07	19.61
200	-3.75	7.10	27.98	20.09
100	-3.70	6.53	28.95	20.55
32	-3.25	5.45	29.63	20.85
8	-2.75	4.20	29.78	20.97
2	XXXX	XXXX	29.80	21.00
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	28.96
-0.125	28.41
-0.250	25.57
-0.500	24.04
-1.000	21.82
-2.000	17.27

WIND SPEED (M/SEC)

8	5.02
2	2.33

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	1.80	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VI-B GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	15334	14949	18264	18294
TAPE NO.	922.	923.	926.	927.
INTERVAL	12.00HR	12.00HR	6.00HR	6.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	-1.29	-0.01	-1.29	-0.01	-1.62	0.00	-1.62	0.00
1000	-4.56	-0.47	-2.02	2.07	0.05	1.36	-0.73	0.58
900	-5.72	-1.81	-4.39	-0.48	-1.02	0.08	-1.25	-0.15
800	-6.25	-2.44	-5.27	-1.46	-1.55	-0.68	-1.66	-0.79
700	-6.58	-2.88	-5.77	-2.07	-1.89	-1.28	-1.97	-1.36
600	-6.77	-3.17	-6.06	-2.46	-2.13	-1.72	-2.18	-1.78
500	-6.89	-3.39	-6.26	-2.76	-2.30	-2.12	-2.35	-2.17
400	-6.93	-3.53	-6.36	-2.96	-2.43	-2.34	-2.46	-2.37
300	-6.91	-3.52	-6.38	-2.98	-2.51	-1.98	-2.55	-2.02
200	-6.78	-3.03	-6.29	-2.54	-2.50	-1.59	-2.57	-1.66
100	-6.43	-2.73	-6.00	-2.30	-2.51	-1.71	-2.52	-1.72
32	-5.70	-2.45	-5.34	-2.09	-2.29	-1.89	-2.31	-1.91
8	-4.68	-1.93	-4.38	-1.63	-1.95	-1.80	-1.96	-1.81

V COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	14.27	-0.00	14.26	-0.01	10.44	0.01	10.44	0.01
1000	10.94	3.24	12.63	4.93	7.08	-0.19	9.07	1.80
900	10.52	2.86	11.01	3.35	6.97	-0.25	7.79	0.57
800	10.16	2.56	10.43	2.83	6.81	-0.39	7.35	0.15
700	9.81	2.23	10.00	2.42	6.62	-0.53	7.04	-0.11
600	9.50	1.99	9.64	2.13	6.44	-0.66	6.78	-0.32
500	9.16	1.67	9.25	1.76	6.25	-0.84	6.54	-0.55
400	8.82	1.38	8.93	1.49	6.04	-0.97	6.30	-0.71
300	8.43	1.12	8.53	1.22	5.80	-1.20	6.04	-0.96
200	7.98	0.88	8.07	0.97	5.52	-1.45	5.72	-1.25
100	7.32	0.79	7.39	0.86	5.10	-1.29	5.28	-1.11
32	6.32	0.88	6.39	0.94	4.48	-0.62	4.63	-0.47
8	5.13	0.93	5.17	0.97	3.74	-0.06	3.87	0.07

CASE VI-B GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	922.		923.		926.		927.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	25.53	4.47	25.74	4.68	21.74	2.70	21.67	2.63
900	25.95	4.06	26.10	4.21	22.38	2.55	22.33	2.50
800	26.17	3.46	26.31	3.60	22.80	2.19	22.76	2.15
700	26.24	2.69	26.34	2.79	23.04	1.64	23.01	1.61
600	26.29	1.92	26.30	1.93	23.30	1.11	23.28	1.09
500	26.36	1.16	26.46	1.26	23.56	0.58	23.54	0.56
400	26.39	0.23	26.47	0.31	23.81	-0.03	23.79	-0.05
300	26.39	-0.68	26.48	-0.59	24.10	-0.76	24.07	-0.79
200	26.41	-1.57	26.49	-1.49	24.49	-1.30	24.47	-1.32
100	26.34	-2.61	26.42	-2.53	24.98	-1.85	24.97	-1.86
32	26.15	-3.48	26.22	-3.41	25.76	-2.11	25.74	-2.13
8	26.01	-3.77	26.06	-3.72	26.77	-1.65	26.75	-1.67
2	25.78	-4.02	25.83	-3.97	27.77	-0.80	27.75	-0.82
0	25.04	XXXX	25.08	XXXX	31.71	XXXX	31.68	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	21.56	5.27	21.69	5.40	18.95	2.90	18.86	2.81
900	22.21	5.45	22.31	5.55	19.57	12.98	19.51	12.92
800	22.67	5.43	22.75	5.51	20.03	2.89	19.97	2.83
700	23.09	5.38	23.16	5.45	20.44	2.76	20.41	2.73
600	23.45	5.27	23.53	5.35	20.83	2.63	20.78	2.58
500	23.86	5.20	23.93	5.27	21.27	2.51	21.22	2.46
400	24.21	5.08	24.27	5.14	21.65	2.34	21.61	2.30
300	24.59	4.98	24.65	5.04	22.11	2.25	22.06	2.20
200	24.99	4.90	25.07	4.98	22.61	2.34	22.57	2.30
100	25.37	4.82	25.43	4.88	23.18	2.54	23.13	2.49
32	25.81	4.96	25.87	5.02	23.97	3.09	23.92	3.04
8	26.07	5.10	26.15	5.18	24.69	3.71	24.65	3.67
2	26.28	5.28	26.37	5.37	25.43	4.43	25.38	4.38
0	26.98	XXXX	27.07	XXXX	28.32	XXXX	28.24	XXXX

CASE VI-H GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	922.		923.		926.		927.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	27.47	-1.49	27.48	-1.48	27.31	-3.24	27.29	-3.26
-0.125	26.31	-2.10	26.31	-2.10	25.37	-0.21	25.37	-0.21
-0.250	25.28	-0.29	25.27	-0.30	25.32	0.19	25.31	0.18
-0.500	24.11	0.07	24.11	0.07	24.11	0.05	24.11	0.05
-1.000	21.90	0.08	21.91	0.09	.88	0.03	21.88	0.03
-2.000	17.28	0.01	17.28	0.01	17.27	-0.00	17.28	0.01

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
8'	7.63	XXXX	7.50	XXXX	5.28	XXXX	5.37	XXXX
8	6.94	1.92	6.78	1.76	4.22	0.42	4.34	0.54
2	5.31	2.98	5.19	2.86	3.37	0.27	3.46	0.36

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(D)	2.13	0.33	2.15	0.35	22.57	0.37	22.58	0.38
R(N)	0.03	XXXX	0.04	XXXX	14.56	XXXX	14.56	XXXX
Q(C,O)	-1.14	XXXX	-1.13	XXXX	5.84	XXXX	5.86	XXXX
Q(E,O)	1.86	XXXX	1.86	XXXX	7.43	XXXX	7.43	XXXX
Q(S,O)	-0.69	XXXX	-0.68	XXXX	1.27	XXXX	1.26	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	1.54	XXXX	1.54	XXXX	1.54	XXXX	1.54	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	36.20	XXXX	36.20	XXXX	16.10	XXXX	16.10	XXXX

CASE VI-B GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	16949	16954	17179	17179
TAPE NO.	930.	931.	934.	935.
INTERVAL	2.00HR	2.00HR	1.00HR	1.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	-0.81	-0.00	-0.81	-0.00	1.62	0.00	1.62	0.00
1000	0.92	1.87	-0.03	0.91	-0.29	0.41	-0.18	0.52
900	-0.09	1.09	-0.35	0.83	-1.11	-0.17	-1.13	-0.19
800	-0.68	0.71	-0.80	0.59	-1.77	-0.57	-1.78	-0.59
700	-1.10	0.50	-1.18	0.42	-2.31	-0.84	-2.32	-0.84
600	-1.41	0.39	-1.45	0.35	-2.74	-1.02	-2.75	-1.02
500	-1.65	0.36	-1.68	0.33	-3.10	-1.09	-3.11	-1.10
400	-1.83	0.52	-1.85	0.50	-3.38	-0.78	-3.38	-0.78
300	-1.97	1.68	-1.98	1.66	-3.59	0.01	-3.59	0.01
200	-2.05	3.44	-2.06	3.43	-3.71	2.24	-3.71	2.24
100	-2.04	3.41	-2.05	3.40	-3.68	2.41	-3.68	2.41
32	-1.88	2.82	-1.88	2.82	-3.36	1.19	-3.36	1.19
8	-1.58	2.17	-1.58	2.17	-2.80	0.25	-2.80	0.25

V COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	8.70	-0.00	8.69	-0.01	13.34	0.00	13.34	0.00
1000	8.86	1.46	9.04	1.64	9.16	0.88	10.18	1.90
900	9.44	1.94	9.54	2.04	10.02	1.32	10.15	1.45
800	9.53	1.93	9.59	1.99	10.40	1.25	10.44	1.29
700	9.45	1.75	9.49	1.79	10.51	0.91	10.52	0.92
600	9.32	1.52	9.35	1.55	10.49	0.48	10.50	0.49
500	9.12	1.22	9.14	1.24	10.37	-0.12	10.38	-0.11
400	8.88	0.16	8.89	0.17	10.16	-0.99	10.17	-0.98
300	8.58	-0.47	8.59	-0.46	9.87	-1.67	9.87	-1.67
200	8.18	1.58	8.19	1.59	9.44	-0.91	9.44	-0.91
100	7.56	3.67	7.57	3.68	8.75	3.05	8.74	3.04
32	6.60	2.90	6.60	2.90	7.63	4.48	7.63	4.48
8	5.43	2.38	5.44	2.39	6.24	4.84	6.23	4.84

CASE VI-B GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	930.		931.		934.		935.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	18.91	1.45	18.88	1.42	17.94	0.79	17.94	0.79
900	19.65	1.50	19.62	1.47	19.00	1.19	19.00	1.19
800	20.03	1.21	20.02	1.20	19.56	1.07	19.57	1.08
700	20.19	0.69	20.17	0.67	19.84	0.68	19.84	0.68
600	20.34	0.17	20.33	0.16	20.05	0.21	20.05	0.21
500	20.51	-0.34	20.49	-0.36	20.24	-0.27	20.24	-0.27
400	20.62	-0.93	20.61	-0.94	20.37	-0.84	20.37	-0.84
300	20.77	-1.07	20.76	-1.08	20.49	-1.37	20.49	-1.37
200	20.96	0.21	20.95	0.20	20.63	-0.87	20.63	-0.87
100	21.21	0.06	21.20	0.05	20.75	0.80	20.75	0.80
32	21.57	-0.14	21.57	-0.14	20.91	0.77	20.91	0.77
8	22.16	-0.02	22.16	-0.02	21.21	0.79	21.21	0.79
2	22.73	0.43	22.73	0.43	21.46	0.96	21.46	0.96
0	24.74	XXXX	24.74	XXXX	22.31	XXXX	22.31	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	17.01	1.12	16.90	1.01	16.39	0.54	16.45	0.60
900	17.75	1.27	17.74	1.26	17.26	0.91	17.29	0.84
800	18.19	1.12	18.19	1.12	17.80	0.74	17.83	0.77
700	18.55	0.89	18.55	0.89	18.24	0.59	18.26	0.61
600	18.87	0.63	18.85	0.61	18.61	0.36	18.62	0.37
500	19.21	0.37	19.21	0.37	18.99	0.13	19.00	0.14
400	19.51	0.08	19.50	0.07	19.30	-0.16	19.31	-0.15
300	19.84	-0.18	19.83	-0.19	19.64	-0.42	19.64	-0.42
200	20.19	-0.21	20.19	-0.21	19.99	-0.44	19.99	-0.44
100	20.52	-0.18	20.52	-0.18	20.30	-0.42	20.30	-0.42
32	20.98	0.07	20.99	0.08	20.67	-0.25	20.68	-0.24
8	21.33	0.35	21.34	0.36	20.91	-0.07	20.91	-0.07
2	21.68	0.68	21.68	0.68	21.12	0.12	21.12	0.12
0	22.90	XXXX	22.90	XXXX	21.83	XXXX	21.84	XXXX

CASE VI-B GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	930.		931.		934.		935.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	23.45	-0.26	23.46	-0.25	23.03	0.03	23.03	0.03
-0.125	25.21	0.11	25.21	0.11	25.37	0.08	25.37	0.08
-0.250	25.55	0.07	25.55	0.07	25.63	0.05	25.63	0.05
-0.500	24.09	0.00	24.09	0.00	24.08	-0.00	24.08	-0.00
-1.000	21.87	0.02	21.87	0.02	21.87	0.02	21.87	0.02
-2.000	17.28	0.01	17.28	0.01	17.27	-0.00	17.28	0.01

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
8'	6.49	XXXX	6.49	XXXX	7.54	XXXX	7.54	XXXX
8	5.66	0.83	5.67	0.84	6.84	3.48	6.83	3.47
2	4.42	3.24	4.42	3.24	5.28	2.89	5.28	2.89

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(O)	11.59	0.19	11.55	0.15	6.66	0.17	6.67	0.17
Q(N)	6.74	XXXX	6.72	XXXX	3.26	XXXX	3.26	XXXX
Q(C,O)	3.10	XXXX	3.10	XXXX	1.40	XXXX	1.40	XXXX
Q(E,O)	3.26	XXXX	3.25	XXXX	2.06	XXXX	2.06	XXXX
Q(S,O)	0.37	XXXX	0.37	XXXX	-0.20	XXXX	-0.20	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	2.59	XXXX	2.59	XXXX	2.59	XXXX	2.59	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	2.20	XXXX	2.40	XXXX	0.80	XXXX	0.80	XXXX

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VI-B 12.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		3.46	7.84	26.18	19.07	24.67
PERSIST DIFF		2.23	3.10	6.40	0.29	2.66
GPAC DIFF	922.	2.64	1.82	2.95	5.17	1.06
GPAC DIFF	923.	2.17	2.22	2.99	5.25	1.06

CASE VI-B 6.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		0.82	7.05	24.23	18.63	24.41
PERSIST DIFF		3.36	3.32	4.63	2.84	3.04
GPAC DIFF	926.	1.60	0.79	1.67	4.57	1.33
GPAC DIFF	927.	1.60	0.80	1.66	4.53	1.34

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VI-B 2.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		3.16	7.16	20.55	19.13	23.08
PERSIST DIFF		0.84	2.75	1.14	0.05	0.31
GPAC DIFF	930.	1.96	1.90	0.82	0.69	0.12
GPAC DIFF	931.	1.78	1.93	0.81	0.67	0.12

CASE VI-B 1.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		3.24	9.27	19.93	19.13	23.02
PERSIST DIFF		0.63	0.71	0.40	0.02	0.12
GPAC DIFF	934.	1.12	2.19	0.87	0.45	0.04
GPAC DIFF	935.	1.13	2.25	0.87	0.47	0.04

CASE VII-A TAPE LOG

TAPE NO.	FCST INT	SM	KMB DB	SCG	ADV	GEO	REMARKS
857.	12.00	A	V	A	N	O	D-MODIFICATION
858.	12.00	A	V	A	N	I	D-MODIFICATION
940.	6.00	A	V	A	N	O	D-MODIFICATION
941.	6.00	A	V	A	N	I	D-MODIFICATION
944.	2.00	A	V	A	N	O	D-MODIFICATION
945.	2.00	A	V	A	N	I	D-MODIFICATION
948.	1.00	A	V	A	N	O	D-MODIFICATION
949.	1.00	A	V	A	N	I	D-MODIFICATION

CASE VII-A INITIAL CONDITIONS - 1800L 15 NOVEMBER 1961
(PAGE 1 OF 2 PAGES)

SOIL PARAMETERS

LEVEL (M)	TEMP (DEG C)		
0.000	12.30	LAMBDA	= 0.59 CAL/CM^3 DEG
-0.125	14.22	MU/LAMBDA	= 0.0037 CM^2/SEC
-0.250	15.00	(MU X LAMBDA)$^{1/2}$	= 0.036 CAL^2/CM^4 DEG^2 SEC
-0.500	16.62	Z(0)	= 2.0 CM
-1.000	19.06	S(0)	= 0.0004 CAL/CM^2 SEC MB
-2.000	24.38	G	= 3500 CM^2 SEC DEG/CAL

RADIATION PARAMETERS

LOCAL TIME	= 1800	TURBIDITY	= 0.20
DELTA	= -18.00 DEG	PSI	= 1.022
R X 10^5	= 1.04 DEG C/SEC	F(C)	= 1.00
CLOUD CLASS	= 1	ALBEDO	= 0.25
E'(8)	= 6.03 MB	M	= 0.620
EPSILON	= 0.950	N	= 0.0415 MB$^{-1/2}$
PHI	= 32.5 DEG	H	= 90.0 DEG

HORIZONTAL GRADIENTS

LEVEL (M)	DE/DX (MB/100-KM)	DE/DY (MB/100-KM)	DT/DX (DEG C/100-KM)	DT/DY (DEG C/100-KM)
200	1.10	0.39	0.58	-0.84
600	0.60	0.59	1.13	-0.89
1000	0.10	0.80	1.68	-0.94

CASE VII-A INITIAL CONDITIONS - 1800L 15 NOVEMBER 1961
(PAGE 2 OF 2 PAGES)

LEVEL (M)	WIND COMPONENTS U (M/SEC)		TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
1000	16.81	3.32	3.75	4.28
900	16.38	3.43	4.73	4.46
800	15.90	3.54	5.71	4.64
700	15.49	3.65	6.70	4.80
600	15.03	3.76	7.69	4.98
500	14.60	3.88	8.67	5.16
400	14.10	3.98	9.65	5.34
300	13.49	4.10	10.54	5.52
200	12.45	4.19	11.32	5.70
100	10.31	3.94	11.85	5.87
32	6.45	2.95	11.40	5.98
8	3.80	1.70	10.95	6.03

ADVECTION TERMS
($SEC^{-1} \times 10^{5}$)

LEVEL (M)	ALPHA(1)	BETA(1)	ALPHA(2)	BETA(2)
200	2.91	2.53	0.00	1.28
600	2.66	3.25	0.00	2.14
1000	2.14	3.97	0.00	3.00

SURFACE CONTOUR GRADIENTS

PREDICTION INTERVAL (HR)	AZIMUTH (DEG FROM NORTH)	MAGNITUDE (FT/100-KM)
0	180.50	34.65
1	174.90	41.09
2	168.40	43.83
6	186.00	50.83
12	248.90	52.96

CASE VII-A COMPARISON DATA FROM DALLAS (1 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	15.54	1.39		
1000	16.20	1.53	4.04	4.36
900	15.80	1.65	5.02	4.54
800	15.39	1.78	6.01	4.71
700	14.96	1.89	7.00	4.86
600	14.55	2.00	8.00	5.04
500	14.25	2.10	9.00	5.20
400	14.45	2.21	9.95	5.38
300	14.72	2.50	10.72	5.55
200	14.10	3.30	11.72	5.72
100	11.15	4.20	11.25	5.88
32	6.10	3.25	10.47	5.99
8	2.70	1.50	9.94	6.04
2	XXXX	XXXX	9.75	6.05
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	11.70
-0.125	14.15
-0.250	15.02
-0.500	16.60
-1.000	19.06
-2.000	24.38

WIND SPEED (M/SEC)

8	3.09
2	0.71

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(O)=	0.00	Q(E,O)=	XXXX
R(N)=	XXXX	Q(S,O)=	XXXX
Q(C,O)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VII-A COMPARISON DATA FROM DALLAS (2 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	16.36	3.36		
1000	16.18	0.75	4.29	4.45
900	16.03	1.30	5.22	4.61
800	15.92	1.87	6.15	4.78
700	15.80	2.44	7.08	4.92
600	15.69	3.00	8.00	5.10
500	15.58	3.55	8.96	5.25
400	15.40	4.10	9.89	5.42
300	14.47	4.60	10.56	5.58
200	12.70	5.13	11.16	5.74
100	9.86	5.63	11.41	5.90
32	5.95	4.25	10.63	6.00
8	2.70	2.35	10.08	6.05
2	XXXX	XXXX	9.85	6.06
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	11.45
-0.125	13.99
-0.250	15.02
-0.500	16.58
-1.000	19.05
-2.000	24.38

WIND SPEED (M/SEC)

8	3.58
2	1.42

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.00	Q(F,O)=	XXXX
R(N)=	XXXX	Q(S,O)=	XXXX
Q(C,O)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VII-A COMPARISON DATA FROM DALLAS (6 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	19.26	-2.09		
1000	10.43	-6.00	4.80	4.79
900	10.29	-5.30	5.40	4.92
800	10.13	-4.53	6.02	5.05
700	9.99	-3.80	6.63	5.17
600	9.84	-3.10	7.25	5.33
500	9.80	-2.40	7.85	5.43
400	10.09	-1.70	8.46	5.57
300	11.00	-0.85	9.14	5.70
200	11.68	0.16	9.73	5.83
100	11.00	2.65	9.95	5.96
32	7.70	3.50	9.53	6.04
8	4.60	2.15	9.09	6.08
2	XXXX	XXXX	8.83	6.09
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	10.32
-0.125	13.34
-0.250	14.61
-0.500	16.57
-1.000	19.04
-2.000	24.38

WIND SPEED (M/SEC)

8	5.08
2	2.87

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.00	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VII-A COMPARISON DATA FROM DALLAS (12 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	7.31	-18.79		
1000	9.00	-17.05	3.45	5.30
900	9.18	-16.49	2.83	5.37
800	9.38	-15.90	2.30	5.45
700	9.58	-15.30	1.90	5.54
600	9.78	-14.70	1.77	5.67
500	9.98	-14.12	1.90	5.70
400	10.19	-13.43	2.35	5.79
300	10.30	-12.48	3.15	5.88
200	9.90	-11.20	4.05	5.96
100	8.75	-8.77	4.75	6.05
32	6.35	-4.90	4.85	6.10
8	3.40	-2.00	4.79	6.13
2	XXXX	XXXX	4.76	6.14
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	9.20
-0.125	12.49
-0.250	14.54
-0.500	16.50
-1.000	19.02
-2.000	24.38

WIND SPEED (M/SEC)

8	3.94
2	1.80

SURFACE SHEAR STRESS
(DYNES/CM SQ.)X10
TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.00	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VII-A GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	19494	18954	16409	16244
TAPE NO.	857.	858.	940.	941.
INTERVAL	12.00HR	12.00HR	6.00HR	6.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	7.29	-0.02	7.29	-0.02	19.26	0.00	19.26	0.01
1000	12.66	3.66	8.26	-0.74	11.49	1.06	14.01	3.58
900	12.97	3.79	10.94	1.76	11.47	1.18	11.54	1.25
800	13.06	3.68	11.75	2.37	11.38	1.25	11.16	1.03
700	13.04	3.46	12.09	2.51	11.22	1.23	10.99	1.00
600	12.97	3.19	12.23	2.45	11.04	1.20	10.84	1.00
500	12.84	2.86	12.23	2.25	10.82	1.02	10.64	0.84
400	12.65	2.46	12.14	1.95	10.56	0.47	10.41	0.32
300	12.38	2.08	11.95	1.65	10.23	-0.77	10.10	-0.90
200	11.98	2.08	11.61	1.71	9.79	-1.89	9.68	-2.00
100	11.26	2.51	10.95	2.20	9.08	-1.92	8.97	-2.03
32	9.93	3.58	9.67	3.32	7.91	0.22	7.83	0.13
8	8.11	4.71	7.91	4.51	6.42	1.82	6.36	1.76

V COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	-18.81	-0.02	-18.81	-0.02	-2.09	-0.00	-2.09	-0.00
1000	-7.71	9.34	-11.74	5.31	6.01	12.01	1.24	7.24
900	-7.44	9.05	-7.83	8.66	6.01	11.31	4.48	9.78
800	-7.20	8.69	-7.02	8.88	6.01	10.54	5.21	9.74
700	-6.99	8.31	-6.68	8.62	5.97	9.77	5.48	9.28
600	-6.76	7.94	-6.43	8.27	5.96	9.06	5.61	8.72
500	-6.54	7.58	-6.19	7.93	5.92	8.32	5.67	8.07
400	-6.29	7.14	-5.95	7.48	5.87	7.57	5.67	7.37
300	-6.02	6.45	-5.70	6.78	5.78	6.63	5.63	6.48
200	-5.66	5.53	-5.35	5.85	5.66	5.50	5.54	5.38
100	-5.15	3.62	-4.86	3.91	5.41	2.77	5.32	2.68
32	-4.41	0.49	-4.16	0.74	4.85	1.35	4.78	1.28
8	-3.55	-1.55	-3.35	-1.35	4.00	1.85	3.95	1.80

CASE VII-A GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	857.		858.		940.		941.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	0.43	-3.02	0.64	-2.81	4.90	0.10	4.34	-0.46
900	0.61	-2.22	0.79	-2.04	5.15	-0.25	4.79	-0.61
800	0.74	-1.56	0.88	-1.42	5.28	-0.74	5.02	-1.00
700	0.76	-1.14	0.90	-1.00	5.28	-1.35	5.08	-1.55
600	0.77	-1.00	0.90	-0.87	5.26	-1.99	5.11	-2.14
500	0.82	-1.08	0.95	-0.95	5.29	-2.56	5.16	-2.69
400	0.82	-1.53	0.95	-1.40	5.25	-3.21	5.13	-3.33
300	0.83	-2.32	0.95	-2.20	5.21	-3.93	5.11	-4.03
200	0.82	-3.23	0.93	-3.12	5.14	-4.59	5.05	-4.68
100	0.77	-3.98	0.89	-3.86	5.01	-4.94	4.92	-5.03
32	0.61	-4.24	0.73	-4.12	4.68	-4.85	4.61	-4.92
8	0.51	-4.28	0.63	-4.16	4.46	-4.63	4.40	-4.69
2	0.34	-4.42	0.47	-4.29	4.17	-4.66	4.11	-4.72
0	-0.21	XXXX	-0.06	XXXX	3.21	XXXX	3.16	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	3.56	-1.74	4.02	-1.28	3.67	-1.12	3.88	-0.91
900	3.43	-1.94	3.81	-1.56	3.69	-1.23	3.82	-1.10
800	3.39	-2.06	3.72	-1.73	3.73	-1.32	3.83	-1.22
700	3.39	-2.15	3.70	-1.84	3.78	-1.39	3.87	-1.30
600	3.37	-2.30	3.68	-1.99	3.82	-1.51	3.89	-1.44
500	3.42	-2.28	3.72	-1.98	3.92	-1.51	3.99	-1.44
400	3.44	-2.35	3.72	-2.07	3.97	-1.60	4.04	-1.53
300	3.49	-2.39	3.77	-2.11	4.06	-1.64	4.12	-1.58
200	3.55	-2.41	3.84	-2.12	4.18	-1.65	4.23	-1.60
100	3.58	-2.47	3.86	-2.19	4.26	-1.70	4.31	-1.65
32	3.72	-2.38	3.98	-2.12	4.44	-1.60	4.48	-1.56
8	3.78	-2.35	4.04	-2.09	4.54	-1.54	4.59	-1.49
2	3.85	-2.29	4.10	-2.04	4.65	-1.44	4.70	-1.39
0	4.06	XXXX	4.31	XXXX	5.01	XXXX	5.05	XXXX

CASE VII-A GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	857.		858.		940.		941.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	5.13	-4.07	5.18	-4.02	7.95	-2.37	7.95	-2.37
-0.125	11.35	-1.14	11.35	-1.14	12.98	-0.36	12.97	-0.37
-0.250	14.32	-0.22	14.32	-0.22	14.81	0.20	14.81	0.20
-0.500	16.52	0.02	16.52	0.02	16.59	0.02	16.59	0.02
-1.000	19.12	0.10	19.12	0.10	19.10	0.06	19.11	0.07
-2.000	24.37	-0.01	24.37	-0.01	24.37	-0.01	24.37	-0.01

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
8*	9.41	XXXX	9.16	XXXX	8.21	XXXX	8.13	XXXX
8	8.85	4.91	8.59	4.65	7.57	2.49	7.49	2.41
2	6.79	4.99	6.59	4.79	5.79	2.92	5.73	2.86

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(D)	-0.01	-0.01	-0.01	-0.01	-0.00	-0.00	0.00	0.00
R(N)	-1.88	XXXX	-1.88	XXXX	-1.90	XXXX	-1.90	XXXX
Q(C,0)	-1.08	XXXX	-1.03	XXXX	-1.58	XXXX	-1.55	XXXX
Q(E,0)	0.75	XXXX	0.67	XXXX	1.04	XXXX	1.01	XXXX
Q(S,0)	-1.53	XXXX	-1.50	XXXX	-1.36	XXXX	-1.37	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	2.80	XXXX	2.80	XXXX	2.80	XXXX	2.80	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	6.90	XXXX	6.80	XXXX	4.10	XXXX	4.00	XXXX

CASE V I V GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	14239	14239	16214	16224
TAPE NO.	944.	945.	948.	949.
INTERVAL	2.00HR	2.00HR	1.00HR	1.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	16.36	-0.00	16.35	-0.01	15.54	0.00	15.50	-0.04
1000	12.05	-4.13	13.03	-3.14	14.74	-1.46	14.45	-1.75
900	11.70	-4.33	11.74	-4.29	14.25	-1.55	14.13	-1.67
800	11.45	-4.47	11.42	-4.50	13.85	-1.54	13.79	-1.60
700	11.21	-4.59	11.18	-4.62	13.47	-1.49	13.44	-1.52
600	10.96	-4.73	10.93	-4.76	13.09	-1.46	13.07	-1.48
500	10.69	-4.89	10.66	-4.92	12.69	-1.56	12.69	-1.56
400	10.39	-5.01	10.38	-5.02	12.28	-2.17	12.27	-2.18
300	10.03	-4.44	10.01	-4.46	11.80	-2.92	11.79	-2.93
200	9.57	-3.13	9.56	-3.14	11.20	-2.90	11.20	-2.90
100	8.84	-0.96	8.83	-0.97	10.31	-0.84	10.31	-0.84
32	7.67	1.72	7.67	1.72	8.93	2.83	8.94	2.84
8	6.21	3.51	6.20	3.51	7.24	4.55	7.24	4.55

V COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	3.36	0.01	3.36	0.00	1.39	-0.00	1.39	-0.00
1000	1.86	1.11	1.96	1.21	1.86	0.33	1.35	-0.18
900	2.33	1.03	2.27	0.97	2.21	0.56	2.13	0.48
800	2.59	0.72	2.56	0.69	2.47	0.69	2.46	0.68
700	2.74	0.31	2.73	0.29	2.64	0.75	2.64	0.75
600	2.88	-0.12	2.87	-0.13	2.80	0.80	2.80	0.80
500	2.97	-0.58	2.97	-0.58	2.91	0.81	2.92	0.82
400	3.04	-1.06	3.04	-1.06	3.00	0.79	3.01	0.80
300	3.05	-1.55	3.09	-1.51	3.07	0.57	3.07	0.57
200	3.11	-2.02	3.11	-2.02	3.10	-0.20	3.10	-0.20
100	3.07	-2.56	3.07	-2.56	3.06	-1.14	3.06	-1.14
32	2.82	-1.43	2.83	-1.42	2.82	-0.43	2.82	-0.43
8	2.35	0.00	2.35	0.00	2.34	0.84	2.34	0.84

CASE VII-A GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	944.		945.		948.		949.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	4.79	0.50	4.77	0.48	4.17	0.13	4.17	0.13
900	6.19	0.97	6.17	0.95	5.93	0.91	5.93	0.91
800	6.81	0.66	6.81	0.66	6.91	0.90	6.91	0.90
700	7.09	0.01	7.09	0.01	7.47	0.47	7.47	0.47
600	7.28	-0.72	7.29	-0.71	7.87	-0.13	7.88	-0.12
500	7.45	-1.51	7.45	-1.51	8.22	-0.78	8.22	-0.78
400	7.51	-2.38	7.51	-2.38	8.43	-1.52	8.43	-1.52
300	7.55	-3.01	7.56	-3.00	8.59	-2.13	8.59	-2.13
200	7.55	-3.61	7.55	-3.61	8.70	-3.02	8.70	-3.02
100	7.46	-3.95	7.46	-3.95	8.68	-2.57	8.68	-2.57
32	7.15	-3.48	7.16	-3.47	8.44	-2.03	8.45	-2.02
8	6.90	-3.18	6.91	-3.17	8.19	-1.75	8.19	-1.75
2	6.55	-3.30	6.56	-3.29	7.82	-1.93	7.82	-1.93
0	5.44	XXXX	5.44	XXXX	6.63	XXXX	6.64	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	4.28	-0.17	4.29	-0.16	4.29	-0.07	4.31	-0.05
900	4.38	-0.23	4.39	-0.22	4.46	-0.08	4.47	-0.07
800	4.47	-0.31	4.47	-0.31	4.58	-0.13	4.59	-0.12
700	4.55	-0.37	4.55	-0.37	4.71	-0.15	4.71	-0.15
600	4.61	-0.49	4.61	-0.49	4.78	-0.26	4.79	-0.25
500	4.73	-0.52	4.73	-0.52	4.93	-0.27	4.92	-0.28
400	4.80	-0.62	4.81	-0.61	5.02	-0.36	5.01	-0.37
300	4.91	-0.67	4.91	-0.67	5.14	-0.41	5.15	-0.40
200	5.05	-0.69	5.04	-0.70	5.31	-0.41	5.30	-0.42
100	5.15	-0.75	5.16	-0.74	5.43	-0.45	5.43	-0.45
32	5.36	-0.64	5.36	-0.64	5.64	-0.35	5.64	-0.35
8	5.50	-0.55	5.51	-0.54	5.78	-0.26	5.79	-0.25
2	5.64	-0.42	5.65	-0.41	5.93	-0.12	5.93	-0.12
0	6.08	XXXX	6.06	XXXX	6.40	XXXX	6.39	XXXX

CASE VII-A GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	944.		945.		948.		949.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	10.55	-0.90	10.55	-0.90	11.45	-0.25	11.44	-0.26
-0.125	13.94	-0.05	13.95	-0.04	14.12	-0.03	14.11	-0.04
-0.250	14.96	-0.06	14.96	-0.06	14.97	-0.05	14.98	-0.04
-0.500	16.62	0.04	16.62	0.04	16.63	0.03	16.62	0.02
-1.000	19.08	0.03	19.08	0.03	19.08	0.02	19.08	0.02
-2.000	24.37	-0.01	24.37	-0.01	24.38	-0.00	24.37	-0.01

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
8*	7.36	XXXX	7.36	XXXX	8.24	XXXX	8.24	XXXX
8	6.64	3.06	6.64	3.06	7.61	4.52	7.61	4.52
2	5.07	3.65	5.06	3.64	5.82	5.11	5.82	5.11

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(0)	0.00	0.00	-0.00	-0.00	0.00	0.00	0.00	0.00
R(N)	-1.96	XXXX	-1.96	XXXX	-1.95	XXXX	-1.95	XXXX
Q(C,0)	-1.63	XXXX	-1.63	XXXX	-1.96	XXXX	-1.96	XXXX
Q(E,0)	1.13	XXXX	1.13	XXXX	1.33	XXXX	1.34	XXXX
Q(S,0)	-1.47	XXXX	-1.47	XXXX	-1.37	XXXX	-1.37	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	2.86	XXXX	2.86	XXXX	2.86	XXXX	2.86	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	1.40	XXXX	1.50	XXXX	0.70	XXXX	0.70	XXXX

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VII-A 12.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		8.90	13.54	3.50	5.78	16.74
PERSIST DIFF		4.78	16.50	5.85	0.60	1.46
GPAC DIFF	857.	3.14	6.64	2.91	2.25	1.73
GPAC DIFF	858.	2.36	6.45	2.79	1.95	1.71

CASE VII-A 6.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		10.89	3.35	8.07	5.55	16.98
PERSIST DIFF		4.25	6.09	1.26	0.30	0.90
GPAC DIFF	940.	1.23	7.72	3.41	1.49	0.98
GPAC DIFF	941.	1.53	6.84	3.50	1.42	0.98

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VII-A 2.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		13.94	3.55	9.00	5.40	17.25
PERSIST DIFF		0.73	1.36	0.47	0.10	0.36
GPAC DIFF	944.	3.86	1.22	2.49	0.53	0.37
GPAC DIFF	945.	3.80	1.22	2.49	0.52	0.37

CASE VII-A 1.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		13.65	2.40	9.00	5.36	17.30
PERSIST DIFF		0.82	1.46	0.51	0.05	0.25
GPAC DIFF	948.	2.23	0.68	1.66	0.29	0.11
GPAC DIFF	949.	2.26	0.67	1.66	0.29	0.11

CASE VII-B TAPE LOG

TAPE NO.	FCST INT	SM	KM8 D8	SCG	ADV	GEO	REMARKS
869.	12.00	A	V	A	N	O	D-MODIFICATION
870.	12.00	A	V	A	N	I	D-MODIFICATION
954.	6.00	A	V	A	N	O	D-MODIFICATION
955.	6.00	A	V	A	N	I	D-MODIFICATION
958.	2.00	A	V	A	N	O	D-MODIFICATION
959.	2.00	A	V	A	N	I	D-MODIFICATION
962.	1.00	A	V	A	N	O	D-MODIFICATION
963.	1.00	A	V	A	N	I	D-MODIFICATION

CASE VII-B INITIAL CONDITIONS - 0600L 24 OCTOBER 1961
(PAGE 1 OF 2 PAGES)

SOIL PARAMETERS

LEVEL (M)	TEMP (DEG C)		
0.000	19.03	LAMBDA	= 0.59 CAL/CM^3 DEG
-0.125	19.84	MU/LAMBDA	= 0.0037 CM^2/SEC
-0.250	20.40	$(MU \times LAMBDA)^{1/2}$	= 0.036 CAL^2/CM^4 DEG^2 SEC
-0.500	20.72	Z(0)	= 2.0 CM
-1.000	21.78	S(0)	= 0.0004 CAL/CM^2 SEC MB
-2.000	24.36	G	= 3500 CM^2 SEC DEG/CAL

RADIATION PARAMETERS

LOCAL TIME	= 0600	TURBIDITY	= 0.24
DELTA	= -11.40 DEG	PSI	= 1.012
$R \times 10^5$	= 1.35 DEG C/SEC	F(C)	= 0.90
CLOUD CLASS	= 2	ALBEDO	= 0.25
E'(B)	= 14.23 MB	M	= 0.670
EPSILON	= 0.950	N	= 0.0360 $MB^{-1/2}$
PHI	= 32.5 DEG	H	= -90.0 DEG

HORIZONTAL GRADIENTS

LEVEL (M)	DE/DX (MB/100-KM)	DE/DY (MB/100-KM)	DT/DX (DEG C/100-KM)	DT/DY (DEG C/100-KM)
200	1.61	-1.14	0.45	-1.15
600	1.00	-0.63	-0.19	-0.32
1000	0.40	-0.11	-0.84	0.50

CASE VII-B INITIAL CONDITIONS - 0600L 24 OCTOBER 1961
(PAGE 2 OF 2 PAGES)

LEVEL (M)	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
1000	6.25	6.25	16.14	14.65
900	6.45	7.18	16.91	15.40
800	6.63	8.09	17.70	16.15
700	6.82	8.99	18.48	16.90
600	7.01	9.90	19.26	17.65
500	7.21	10.82	20.05	18.40
400	7.02	12.70	20.45	17.91
300	5.32	13.10	18.79	17.30
200	5.15	11.40	17.90	16.67
100	2.09	8.88	18.07	15.50
32	0.84	5.55	18.37	14.57
8	0.30	2.50	18.51	14.23

ADVECTION TERMS
($SEC^{-1} \times 10^{5}$)

LEVEL (M)	ALPHA(1)	BETA(1)	ALPHA(2)	BETA(2)
200	-0.54	0.52	0.00	0.26
600	-0.08	0.01	0.00	0.12
1000	0.39	-0.52	0.00	-0.51

SURFACE CONTOUR GRADIENTS

PREDICTION INTERVAL (HR)	AZIMUTH (DEG FROM NORTH)	MAGNITUDE (FT/100-KM)
0	122.80	31.49
1	124.30	31.32
2	123.80	34.44
6	133.10	32.94
12	112.30	27.30

CASE VII-B COMPARISON DATA FROM DALLAS (1 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	6.73	9.86		
1000	6.54	6.96	14.99	14.55
900	6.93	8.00	15.34	15.27
800	7.31	9.05	15.70	15.99
700	7.71	10.10	16.05	16.71
600	8.11	11.15	16.40	17.43
500	8.50	12.28	16.76	18.15
400	8.58	13.54	17.12	17.74
300	6.03	13.98	17.45	17.21
200	5.69	12.64	17.91	16.67
100	3.41	10.37	18.51	15.63
32	2.12	7.20	19.00	14.80
8	0.85	4.30	19.22	14.49
2	XXXX	XXXX	19.27	14.40
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	19.08
-0.125	19.80
-0.250	20.38
-0.500	20.73
-1.000	21.77
-2.000	24.36

WIND SPEED (M/SEC)

8	4.38
2	2.32

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.30	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E = XXXX

CASE VII-B COMPARISON DATA FROM DALLAS (2 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	7.31	10.90		
1000	6.37	6.60	15.15	14.45
900	6.79	7.40	15.58	15.14
800	7.20	8.20	16.00	15.83
700	7.63	9.00	16.42	16.52
600	8.05	9.80	16.84	17.21
500	8.50	10.60	17.27	17.90
400	8.35	11.41	17.70	17.56
300	6.99	11.90	18.14	17.12
200	5.52	11.40	18.64	16.66
100	3.10	9.51	19.24	15.75
32	1.75	6.75	19.83	15.03
8	0.50	3.45	20.19	14.75
2	XXXX	XXXX	20.32	14.68
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	19.26
-0.125	19.79
-0.250	20.36
-0.500	20.7[illegible]
-1.000	21.7[illegible]
-2.000	24.36

WIND SPEED (M/SEC)

8	3.49
2	0.92

SURFACE SHEAR STRESS
(DYNES/CM SQ.)X10
TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X'000

S(D)=	4.20	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

F= XXXX

CASE VII-B COMPARISON DATA FROM DALLAS (6 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	8.58	9.16		
1000	4.10	6.64	15.89	14.04
900	4.10	7.00	16.64	14.61
800	4.10	7.33	17.39	15.19
700	4.10	7.69	18.14	15.77
600	4.10	8.02	18.90	16.34
500	4.11	8.39	19.66	16.91
400	3.90	8.90	20.43	16.86
300	2.70	9.39	21.21	16.76
200	3.91	8.63	22.10	16.65
100	3.42	8.34	23.12	16.26
32	2.20	6.70	24.03	15.94
8	0.90	4.00	24.60	15.80
2	XXXX	XXXX	24.75	15.77
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	21.77
-0.125	20.19
-0.250	20.31
-0.500	20.75
-1.000	21.75
-2.000	24.36

WIND SPEED (M/SEC)

8	4.10
2	1.83

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	15.50	Q(E,O)=	XXXX
R(N)=	XXXX	Q(S,O)=	XXXX
Q(C,O)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VII-B COMPARISON DATA FROM DALLAS (12 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	3.94	9.63		
1000	2.38	7.55	15.94	13.43
900	2.33	7.53	16.79	13.83
800	2.31	7.52	17.65	14.23
700	2.30	7.51	18.52	14.63
600	2.25	7.62	19.39	15.02
500	2.21	7.98	20.25	15.41
400	1.60	9.18	21.15	15.81
300	0.37	10.00	22.06	16.22
200	0.78	10.15	22.84	16.62
100	-0.10	8.90	23.41	17.02
32	-0.50	5.50	23.41	17.30
8	-0.25	2.00	23.29	17.38
2	XXXX	XXXX	23.25	17.42
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	22.47
-0.125	21.40
-0.250	20.63
-0.500	20.78
-1.000	21.75
-2.000	24.36

WIND SPEED (M/SEC)

8	2.01
2	0.51

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.00	Q(F,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VII-B GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	13594	13404	20229	20139
TAPE NO.	869.	870.	954.	955.
INTERVAL	12.00HR	12.00HR	6.00HR	6.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	3.93	-0.01	3.93	-0.01	8.57	-0.01	8.57	-0.01
1000	5.67	3.29	4.31	1.93	6.73	2.63	7.50	3.40
900	4.81	2.48	4.15	1.82	6.09	1.99	6.42	2.32
800	4.37	2.06	3.89	1.58	5.74	1.64	5.97	1.87
700	4.04	1.74	3.66	1.36	5.45	1.35	5.64	1.54
600	3.80	1.55	3.46	1.21	5.23	1.13	5.40	1.30
500	3.57	1.36	3.26	1.05	5.01	0.90	5.16	1.05
400	3.36	1.76	3.08	1.48	4.79	0.89	4.94	1.04
300	3.13	2.76	2.88	2.50	4.56	1.86	4.69	1.99
200	2.88	2.10	2.65	1.87	4.29	0.48	4.40	0.59
100	2.54	2.64	2.32	2.42	3.88	0.45	3.98	0.56
32	2.10	2.60	1.92	2.42	3.32	1.13	3.41	1.22
8	1.66	1.91	1.51	1.76	2.70	1.80	2.77	1.87

V COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	9.62	-0.01	9.62	-0.01	9.15	-0.01	9.15	-0.01
1000	12.38	4.83	10.84	3.29	13.82	7.18	11.48	4.84
900	12.19	4.66	11.67	4.14	13.47	6.47	12.64	5.54
800	11.95	4.43	11.65	4.13	13.16	5.83	12.67	5.34
700	11.68	4.17	11.46	3.95	12.85	5.16	12.50	4.81
600	11.40	3.78	11.23	3.61	12.55	4.53	12.27	4.25
500	11.08	3.10	10.95	2.97	12.22	3.83	11.99	3.60
400	10.74	1.56	10.63	1.44	11.86	2.96	11.66	2.76
300	10.32	0.32	10.22	0.22	11.44	2.05	11.26	1.87
200	9.78	-0.37	9.70	-0.45	10.88	2.25	10.73	2.10
100	8.96	0.05	8.89	-0.01	10.05	1.71	9.91	1.57
32	7.72	2.22	7.65	2.15	8.76	2.06	8.65	1.95
8	6.22	4.22	6.17	4.17	7.19	3.19	7.10	3.10

CASE VII-B GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	869.		870.		954.		955.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	22.29	6.35	22.29	6.35	19.40	3.51	19.51	3.62
900	22.67	5.88	22.67	5.88	19.92	3.28	19.99	3.35
800	22.84	5.19	22.85	5.20	20.26	2.87	20.32	2.93
700	22.86	4.34	22.87	4.35	20.47	2.33	20.51	2.37
600	22.87	3.48	22.87	3.48	20.63	1.73	20.66	1.76
500	22.88	2.63	22.90	2.65	20.84	1.18	20.86	1.20
400	22.83	1.68	22.85	1.70	21.00	0.57	21.02	0.59
300	22.78	0.72	22.79	0.73	21.19	-0.02	21.22	0.01
200	22.68	-0.16	22.69	-0.15	21.44	-0.66	21.47	-0.63
100	22.46	-0.95	22.48	-0.93	21.75	-1.37	21.77	-1.35
32	22.09	-1.32	22.11	-1.30	22.21	-1.82	22.23	-1.80
8	21.74	-1.55	21.74	-1.55	22.85	-1.75	22.86	-1.74
2	21.34	-1.91	21.34	-1.91	23.47	-1.28	23.49	-1.26
0	20.08	XXXX	20.07	XXXX	25.64	XXXX	25.66	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	18.29	4.86	18.27	4.84	16.29	2.25	16.23	2.19
900	18.83	5.00	18.82	4.99	16.75	2.14	16.71	2.10
800	19.22	4.99	19.20	4.97	17.11	1.92	17.07	1.88
700	19.56	4.93	19.54	4.91	17.45	1.68	17.41	1.64
600	19.84	4.82	19.83	4.81	17.74	1.40	17.71	1.37
500	20.16	4.75	20.15	4.74	18.07	1.16	18.04	1.13
400	20.43	4.62	20.42	4.61	18.36	1.50	18.32	1.46
300	20.71	4.49	20.71	4.49	18.68	1.92	18.65	1.89
200	21.00	4.38	20.99	4.37	19.05	2.40	19.01	2.36
100	21.24	4.22	21.24	4.22	19.42	3.16	19.39	3.13
32	21.49	4.19	21.47	4.17	19.89	3.95	19.87	3.93
8	21.59	4.21	21.59	4.21	20.28	4.48	20.27	4.47
2	21.66	4.24	21.66	4.24	20.66	4.89	20.65	4.88
0	21.90	XXXX	21.90	XXXX	21.99	XXXX	21.99	XXXX

CASE VII-8 GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	869.		870.		954.		955.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	21.63	-0.84	21.62	-0.85	21.66	-0.11	21.66	-0.11
-0.125	20.93	-0.47	20.94	-0.46	19.99	-0.20	19.99	-0.20
-0.250	20.38	-0.25	20.38	-0.25	20.25	-0.06	20.25	-0.06
-0.500	20.73	-0.05	20.72	-0.06	20.75	0.00	20.75	0.00
-1.000	21.85	0.10	21.84	0.09	21.83	0.08	21.82	0.07
-2.000	24.36	-0.00	24.35	-0.01	24.38	0.02	24.38	0.02

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
8*	7.18	XXXX	7.10	XXXX	8.31	XXXX	8.26	XXXX
8	6.44	4.43	6.35	4.34	7.69	3.59	[illegible].63	3.53
2	4.91	4.40	4.84	4.33	5.97	4.14	5.92	4.09

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(D)	-0.00	-0.00	0.00	0.00	15.83	0.33	15.83	0.33
R(N)	-1.66	XXXX	-1.66	XXXX	9.60	XXXX	9.55	XXXX
Q(C,D)	-1.80	XXXX	-1.79	XXXX	4.09	XXXX	4.07	XXXX
Q(E,D)	0.58	XXXX	0.58	XXXX	4.36	XXXX	4.37	XXXX
Q(S,D)	-0.44	XXXX	-0.44	XXXX	1.14	XXXX	1.15	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	3.32	XXXX	3.32	XXXX	3.32	XXXX	3.32	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	18.10	XXXX	18.10	XXXX	8.10	XXXX	7.10	XXXX

CASE VII-B GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	16234	16259	15639	15639
TAPE NO.	958.	959.	962.	963.
INTERVAL	2.00HR	2.00HR	1.00HR	1.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	7.31	-0.00	7.30	-0.01	6.73	0.01	6.73	0.00
1000	4.99	-1.38	6.15	-0.22	5.51	-1.03	5.99	-0.55
900	5.32	-1.47	5.63	-1.16	5.99	-0.94	6.08	-0.85
800	5.30	-1.90	5.44	-1.76	6.13	-1.18	6.15	-1.16
700	5.19	-2.44	5.27	-2.36	6.07	-1.64	6.08	-1.63
600	5.06	-2.99	5.11	-2.94	5.94	-2.17	5.94	-2.16
500	4.89	-3.61	4.93	-3.57	5.73	-2.77	5.73	-2.77
400	4.72	-3.63	4.74	-3.61	5.49	-3.09	5.49	-3.09
300	4.50	-2.49	4.51	-2.48	5.19	-0.84	5.18	-0.85
200	4.22	-1.30	4.23	-1.29	4.82	-0.86	4.82	-0.86
100	3.80	0.70	3.81	0.71	4.29	0.88	4.29	0.88
32	3.23	1.48	3.23	1.48	3.61	1.49	3.61	1.49
8	2.59	2.09	2.60	2.10	2.88	2.03	2.88	2.03

V COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	10.90	0.00	10.90	0.00	9.85	-0.01	9.85	-0.01
1000	9.45	2.85	10.52	3.92	7.63	0.67	8.76	1.80
900	10.39	2.99	10.74	3.34	8.97	0.97	9.21	1.21
800	10.70	2.50	10.87	2.67	9.76	0.71	9.83	0.78
700	10.76	1.76	10.87	1.87	10.19	0.09	10.23	0.13
600	10.72	0.92	10.79	0.99	10.43	-0.72	10.45	-0.70
500	10.55	-0.05	10.64	0.04	10.51	-1.77	10.52	-1.76
400	10.39	-1.02	10.42	-0.99	10.46	-3.08	10.47	-3.07
300	10.10	-1.80	10.13	-1.77	10.29	-3.69	10.29	-3.69
200	9.67	-1.73	9.68	-1.72	9.93	-2.71	9.93	-2.71
100	8.95	-0.56	8.97	-0.54	9.25	-1.12	9.25	-1.12
32	7.80	1.05	7.81	1.06	8.07	0.87	8.07	0.87
8	6.36	2.91	6.37	2.92	6.56	2.26	6.56	2.26

CASE VII-B GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	958.		959.		962.		963.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	17.72	2.57	17.72	2.57	16.99	2.00	16.98	1.99
900	18.31	2.73	18.31	2.73	18.00	2.66	18.00	2.66
800	18.56	2.56	18.56	2.56	18.47	2.77	18.46	2.76
700	18.64	2.22	18.64	2.22	18.65	2.60	18.65	2.60
600	18.65	1.81	18.65	1.81	18.71	2.31	18.71	2.31
500	18.71	1.44	18.72	1.45	18.81	2.05	18.81	2.05
400	18.71	1.01	18.71	1.01	18.79	1.67	18.79	1.67
300	18.71	0.57	18.71	0.57	18.76	1.31	18.76	1.31
200	18.70	0.06	18.70	0.06	18.70	0.79	18.70	0.79
100	18.66	-0.58	18.66	-0.58	18.54	0.03	18.54	0.03
32	18.57	-1.26	18.57	-1.26	18.24	-0.76	18.24	-0.76
8	18.62	-1.57	18.63	-1.56	18.01	-1.21	18.01	-1.21
2	18.65	-1.67	18.66	-1.66	17.73	-1.54	17.74	-1.53
0	18.74	XXXX	18.76	XXXX	16.84	XXXX	16.85	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	15.44	0.99	15.44	0.99	15.14	0.59	15.14	0.59
900	15.85	0.71	15.84	0.70	15.83	0.56	15.83	0.56
800	16.13	0.30	16.12	0.29	16.17	0.18	16.17	0.18
700	16.37	-0.15	16.37	-0.15	16.41	-0.30	16.41	-0.30
600	16.58	-0.63	16.58	-0.63	16.58	-0.85	16.58	-0.85
500	16.84	-1.06	16.84	-1.06	16.79	-1.36	16.80	-1.35
400	17.04	-0.52	17.04	-0.52	16.95	-0.79	16.95	-0.79
300	17.27	0.15	17.27	0.15	17.13	-0.08	17.13	-0.08
200	17.52	0.86	17.52	0.86	17.32	0.65	17.32	0.65
100	17.72	1.97	17.72	1.97	17.45	1.82	17.45	1.82
32	17.97	2.94	17.97	2.94	17.63	2.83	17.63	2.83
8	18.11	3.36	18.11	3.36	17.69	3.20	17.69	3.20
2	18.24	3.56	18.24	3.56	17.75	3.35	17.75	3.35
0	18.66	XXXX	18.66	XXXX	17.94	XXXX	17.94	XXXX

CASE VII-B GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	958.		959.		962.		963.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	18.53	-0.73	18.54	-0.72	18.54	-0.54	18.54	-0.54
-0.125	19.71	-0.02	19.76	-0.03	19.83	0.03	19.82	0.02
-0.250	20.33	-0.03	20.33	-0.03	20.36	-0.02	20.36	-0.02
-0.500	20.74	-0.00	20.74	-0.00	20.74	0.01	20.74	0.01
-1.000	21.81	0.04	21.81	0.04	21.80	0.03	21.81	0.04
-2.000	24.38	0.02	24.38	0.02	24.39	0.03	24.39	0.03

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
9*	7.57	XXXX	7.58	XXXX	7.84	XXXX	7.84	XXXX
8	6.87	3.38	6.88	3.39	7.17	2.79	7.17	2.79
2	5.28	4.36	5.29	4.37	5.48	3.16	5.48	3.16

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(0)	4.28	0.08	4.29	0.09	0.33	0.04	0.34	0.04
R(N)	1.39	XXXX	1.40	XXXX	-1.38	XXXX	-1.38	XXXX
Q(C,0)	0.16	XXXX	0.17	XXXX	-1.40	XXXX	-1.40	XXXX
Q(E,0)	1.16	XXXX	1.16	XXXX	0.50	XXXX	0.50	XXXX
Q(S,0)	0.06	XXXX	0.06	XXXX	-0.48	XXXX	-0.48	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	2.59	XXXX	2.59	XXXX	2.59	XXXX	2.59	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	0.80	XXXX	0.80	XXXX	0.30	XXXX	0.30	XXXX

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VII-B 12.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		1.98	8.05	20.78	15.77	21.93
PERSIST DIFF		4.07	1.86	3.06	2.12	1.55
GPAC DIFF	865.	2.17	3.18	3.42	4.60	0.41
GPAC DIFF	870.	1.77	2.87	3.42	4.59	0.41

CASE VII-B 6.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		4.20	7.83	20.74	15.94	21.57
PERSIST DIFF		2.32	2.07	3.15	1.06	1.13
GPAC DIFF	954.	1.43	4.16	2.00	2.78	0.10
GPAC DIFF	955.	1.67	3.51	2.03	2.76	0.10

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VII-B 2.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		6.50	9.30	17.87	16.09	21.11
PERSIST DIFF		0.93	0.71	1.79	0.35	0.10
GPAC DIFF	958.	2.21	1.85	1.74	1.77	0.30
GPAC DIFF	959.	2.14	2.06	1.74	1.77	0.30

CASE VII-B 1.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		6.48	10.32	17.27	16.13	21.09
PERSIST DIFF		0.97	1.23	1.97	0.18	0.03
GPAC DIFF	962.	1.67	1.82	1.85	1.69	0.22
GPAC DIFF	963.	1.65	1.89	1.85	1.69	0.22

CASE VIII TAPE LOG

TAPE NO.	FCST INT	SM	KMB 08	SCG	ADV	GFO	REMARKS
881.	12.00	A	V	A	N	0	D-MODIFICATION
882.	12.00	A	V	A	N	I	D-MODIFICATION
892.	6.00	A	V	A	N	0	D-MODIFICATION
893.	6.00	A	V	A	N	I	D-MODIFICATION
896.	2.00	A	V	A	N	0	D-MODIFICATION
897.	2.00	A	V	A	N	I	D-MODIFICATION
900.	1.00	A	V	A	N	0	D-MODIFICATION
901.	1.00	A	V	A	N	I	D-MODIFICATION

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SOIL PARAMETERS

LEVEL (M)	TEMP (DEG C)
0.000	13.70
-0.125	13.93
-0.250	13.51
-0.500	13.72
-1.000	13.74
-2.000	13.81

LAMBDA	= 0.59 CAL/CM^3 DEG
MU/LAMBDA	= 0.0037 CM^2/SEC
$(MU \times LAMBDA)^{1/2}$	= 0.036 CAL^2/CM^4 DEG^2 SEC
Z(0)	= 2.0 CM
S(0)	= 0.0004 CAL/CM^2 SEC MB
G	= 3500 CM^2 SEC DEG/CAL

RADIATION PARAMETERS

LOCAL TIME	= 1800
DELTA	= 11.80 DEG
$R \times 10^5$	= 1.04 DEG C/SEC
CLOUD CLASS	= 1
E'(B)	= 4.56 MB
EPSILON	= 0.950
PHI	= 32.5 DEG

TURBIDITY	= 0.20
PSI	= 1.023
F(C)	= 1.00
ALBEDO	= 0.25
M	= 0.620
N	= 0.0415 $MB^{-1/2}$
H	= 90.0 DEG

HORIZONTAL GRADIENTS

LEVEL (M)	DE/DX (MB/100-KM)	DE/DY (MB/100-KM)	DT/DX (DEG C/100-KM)	DT/DY (DEG C/100-KM)
200	0.85	-1.06	-0.06	-1.62
600	0.53	-0.64	0.17	-1.54
1000	0.20	-0.20	0.40	-1.45

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LEVEL (M)	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
1000	5.01	-5.62	6.57	3.25
900	4.28	-5.66	7.18	3.43
800	3.50	-5.70	7.80	3.55
700	2.75	-5.70	8.41	3.67
600	2.00	-5.75	9.04	3.80
500	1.40	-5.79	9.65	3.93
400	1.13	-5.80	10.35	4.05
300	1.09	-5.70	11.27	4.19
200	0.91	-5.50	12.22	4.32
100	1.20	-5.07	13.15	4.45
32	1.00	-3.70	13.51	4.54
8	1.30	-2.38	13.50	4.56

ADVECTION TERMS
($SEC^{-1} \times 10^{5}$)

LEVEL (M)	ALPHA(1)	BETA(1)	ALPHA(2)	BETA(2)
200	-0.34	-0.66	0.00	-1.36
600	0.08	0.43	0.00	-1.18
1000	0.50	1.52	0.00	-1.02

SURFACE CONTOUR GRADIENTS

PREDICTION INTERVAL (HR)	AZIMUTH (DEG FROM NORTH)	MAGNITUDE (FT/100-KM)
0	325.00	11.57
1	292.00	19.78
2	308.00	9.44
6	348.00	1.83
12	17.00	12.17

CASE VIII COMPARISON DATA FROM DALLAS (1 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	-2.82	-6.99		
1000	4.70	-5.50	6.55	3.38
900	3.98	-5.59	7.12	3.44
800	3.23	-5.64	7.70	3.54
700	2.50	-5.70	8.29	3.63
600	1.80	-5.79	8.85	3.78
500	1.00	-5.82	9.45	3.92
400	0.55	-5.82	10.12	4.05
300	0.57	-5.80	11.02	4.20
200	0.70	-5.69	11.90	4.34
100	0.60	-5.25	12.75	4.49
32	0.27	-3.60	12.93	4.62
8	0.09	-2.05	12.53	4.66
2	XXXX	XXXX	12.47	4.67
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	12.87
-0.125	13.88
-0.250	13.56
-0.500	13.71
-1.000	13.75
-2.000	13.81

WIND SPEED (M/SEC)

8	2.05
2	1.40

SURFACE SHEAR STRESS
(DYNES/CM SQ.)X10
TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.00	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

F= XXXX

CASE VIII COMPARISON DATA FROM DALLAS (2 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	-2.22	-2.84		
1000	4.45	-5.76	6.50	3.29
900	3.80	-6.01	7.00	3.46
800	3.20	-6.30	7.55	3.52
700	2.55	-6.57	8.05	3.59
600	1.90	-6.81	8.59	3.76
500	1.30	-7.10	9.12	3.90
400	1.30	-7.35	9.73	4.05
300	1.40	-7.65	10.50	4.21
200	1.20	-7.69	11.35	4.35
100	0.89	-7.00	11.84	4.53
32	0.60	-5.05	11.81	4.70
8	0.30	-3.30	10.99	4.75
2	XXXX	XXXX	10.75	4.77
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)	
0.000	12.01
-0.125	13.75
-0.250	13.59
-0.500	13.70
-1.000	13.75
-2.000	13.81

WIND SPEED (M/SEC)	
8	3.31
2	2.30

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.00	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VIII COMPARISON DATA FROM DALLAS (6 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	-0.68	-0.15		
1000	2.09	-5.08	6.46	3.41
900	1.25	-5.41	6.88	3.51
800	0.42	-5.80	7.30	3.47
700	-0.40	-6.18	7.71	3.43
600	-1.20	-6.51	8.13	3.67
500	-2.00	-6.90	8.55	3.84
400	-2.90	-7.00	9.00	4.04
300	-3.80	-7.20	9.60	4.24
200	-4.49	-7.30	10.35	4.41
100	-4.98	-7.01	10.80	4.68
32	-4.30	-5.20	10.11	5.02
8	-2.20	-2.90	8.70	5.14
2	XXXX	XXXX	8.35	5.16
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	9.63
-0.125	12.79
-0.250	13.54
-0.500	13.70
-1.000	13.76
-2.000	13.81

WIND SPEED (M/SEC)

8	3.64
2	1.45

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.00	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VIII COMPARISON DATA FROM DALLAS (12 HOUR)

	WIND COMPONENTS U (M/SEC)	V	TEMPERATURE (DEG C)	VAPOR PRESSURE (MB)
GEO	-4.44	1.36		
1000	-0.84	-3.19	6.50	3.56
900	-1.70	-3.40	6.69	3.59
800	-2.59	-3.60	6.87	3.39
700	-3.41	-3.80	7.05	3.19
600	-4.28	-4.01	7.24	3.45
500	-5.11	-4.21	7.42	3.75
400	-5.98	-4.40	7.63	4.04
300	-6.55	-3.97	7.80	4.30
200	-7.40	-4.48	7.90	4.50
100	-8.65	-3.69	7.40	4.90
32	-6.20	-2.30	5.41	5.50
8	-2.80	-0.90	4.21	5.73
2	XXXX	XXXX	4.00	5.75
0	XXXX	XXXX	XXXX	XXXX

SOIL TEMPERATURE (DEG C)

0.000	7.25
-0.125	11.24
-0.250	13.01
-0.500	13.65
-1.000	13.78
-2.000	13.81

WIND SPEED (M/SEC)

8	2.94
2	1.04

SURFACE SHEAR STRESS (DYNES/CM SQ.)X10

TAU= XXXX

SURFACE ENERGY TERMS (LY/SEC)X1000

S(D)=	0.60	Q(E,0)=	XXXX
R(N)=	XXXX	Q(S,0)=	XXXX
Q(C,0)=	XXXX		

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ.)X100

E= XXXX

CASE VIII GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	10369	10229	5119	5019
TAPE NO.	881.	882.	892.	893.
INTERVAL	12.00HR	12.00HR	6.00HR	6.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	-4.43	0.01	-4.43	0.01	-0.68	0.00	-0.68	0.00
1000	-0.39	0.44	-3.21	-2.37	-2.18	-4.27	-1.09	-3.18
900	-1.93	-0.23	-2.67	-0.97	-2.83	-4.08	-2.23	-3.48
800	-2.63	-0.04	-2.92	-0.33	-3.13	-3.55	-2.72	-3.14
700	-3.09	0.32	-3.20	0.21	-3.31	-2.91	-3.01	-2.61
600	-3.41	0.87	-3.43	0.85	-3.41	-2.22	-3.18	-1.98
500	-3.66	1.44	-3.63	1.48	-3.47	-1.47	-3.29	-1.29
400	-3.86	2.12	-3.80	2.18	-3.48	-0.58	-3.34	-0.44
300	-4.04	2.51	-3.97	2.58	-3.46	0.34	-3.35	0.45
200	-4.20	3.20	-4.13	3.27	-3.40	1.09	-3.31	1.18
100	-4.37	4.28	-4.30	4.35	-3.25	1.73	-3.18	1.80
32	-4.54	1.66	-4.45	1.75	-2.96	1.34	-2.92	1.38
8	-4.74	-1.94	-4.71	-1.91	-2.60	-0.40	-2.58	-0.38

V COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	1.36	0.01	1.36	0.01	-0.15	-0.00	-0.15	-0.00
1000	5.90	9.09	3.67	6.86	1.41	6.49	1.60	6.68
900	4.98	8.38	4.45	7.85	0.73	6.14	1.24	6.65
800	4.32	7.93	4.08	7.68	0.14	5.94	0.49	6.29
700	3.92	7.63	3.64	7.44	-0.38	5.81	-0.13	6.06
600	3.45	7.46	3.27	7.28	-0.75	5.76	-0.56	5.95
500	3.09	7.30	2.93	7.14	-1.09	5.81	-0.95	5.94
400	2.77	7.17	2.62	7.02	-1.39	5.61	-1.28	5.72
300	2.46	6.43	2.32	6.29	-1.64	5.56	-1.56	5.64
200	2.17	6.65	2.03	6.51	-1.81	5.49	-1.73	5.57
100	1.85	5.74	1.73	5.62	-1.86	5.15	-1.81	5.20
32	1.51	3.81	1.41	3.71	-1.71	3.49	-1.67	3.53
8	1.20	2.10	1.11	2.01	-1.37	1.53	-1.34	1.56

CASE VIII GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	881.		882.		892.		893.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	7.98	1.48	8.12	1.62	7.32	0.86	7.87	1.41
900	7.44	0.75	7.60	0.91	7.79	0.91	8.15	1.27
800	7.16	0.29	7.30	0.43	7.90	0.60	8.16	0.86
700	6.92	-0.13	7.11	0.06	7.90	0.19	8.12	0.41
600	6.68	-0.56	6.87	-0.37	7.79	-0.34	7.98	-0.15
500	6.54	-0.88	6.73	-0.69	7.73	-0.82	7.88	-0.67
400	6.35	-1.28	6.54	-1.09	7.61	-1.39	7.76	-1.24
300	6.18	-1.62	6.37	-1.43	7.47	-2.13	7.60	-2.00
200	5.97	-1.93	6.15	-1.75	7.29	-3.06	7.40	-2.95
100	5.67	-1.73	5.85	-1.55	6.96	-3.84	7.05	-3.75
32	5.23	-0.18	5.41	0.00	6.37	-3.74	6.45	-3.66
8	4.86	0.65	5.03	0.82	5.74	-2.96	5.79	-2.91
2	4.47	0.47	4.63	0.63	5.05	-3.30	5.09	-3.26
0	3.25	XXXX	3.37	XXXX	3.13	XXXX	3.15	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	4.03	0.52	4.12	0.56	3.31	-0.10	3.41	0.00
900	4.31	0.72	4.34	0.75	3.48	-0.03	3.54	0.03
800	4.45	1.06	4.49	1.10	3.60	0.13	3.65	0.18
700	4.58	1.39	4.62	1.43	3.71	0.28	3.75	0.32
600	4.68	1.23	4.71	1.26	3.81	0.14	3.84	0.17
500	4.81	1.06	4.84	1.09	3.94	0.10	3.98	0.14
400	4.89	0.85	4.92	0.88	4.03	-0.01	4.06	0.02
300	4.99	0.69	5.02	0.72	4.16	-0.08	4.19	-0.05
200	5.10	0.60	5.14	0.64	4.31	-0.10	4.34	-0.07
100	5.17	0.27	5.21	0.31	4.44	-0.24	4.47	-0.21
32	5.33	-0.17	5.36	-0.14	4.72	-0.30	4.75	-0.27
8	5.43	-0.30	5.48	-0.25	4.95	-0.19	4.99	-0.15
2	5.55	-0.20	5.60	-0.15	5.18	0.02	5.22	0.06
0	5.91	XXXX	5.96	XXXX	5.83	XXXX	5.86	XXXX

CASE VIII GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	881.		882.		892.		893.	
INTERVAL	12.00HR		12.00HR		6.00HR		6.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	6.17	-1.08	6.25	-1.00	7.94	-1.69	7.96	-1.67
-0.125	10.63	-0.31	10.94	-0.30	12.53	-0.26	12.53	-0.26
-0.250	12.99	-0.02	12.99	-0.02	13.45	-0.09	13.45	-0.09
-0.500	13.66	0.01	13.67	0.02	13.70	0.00	13.71	0.01
-1.000	13.77	-0.01	13.78	0.00	13.77	0.01	13.77	0.01
-2.000	13.79	-0.02	13.79	-0.02	13.79	-0.02	13.79	-0.02

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
8'	5.82	XXXX	5.78	XXXX	4.31	XXXX	4.29	XXXX
8	4.90	1.96	4.85	1.91	2.94	-0.70	2.91	-0.73
2	3.71	2.67	3.67	2.63	2.16	0.71	2.14	0.69

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(D)	0.64	0.05	0.64	0.04	-0.01	-0.01	-0.01	-0.01
R(N)	-1.45	XXXX	-1.49	XXXX	-1.88	XXXX	-1.88	XXXX
Q(C,O)	-1.34	XXXX	-1.36	XXXX	-1.21	XXXX	-1.20	XXXX
Q(F,O)	0.69	XXXX	0.69	XXXX	0.70	XXXX	0.70	XXXX
Q(S,O)	-0.84	XXXX	-0.82	XXXX	-1.37	XXXX	-1.37	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	0.40	XXXX	0.40	XXXX	0.40	XXXX	0.40	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	6.50	XXXX	6.40	XXXX	3.60	XXXX	3.60	XXXX

CASE VIII GPAC OUTPUT DATA

VELOCITY COMPONENTS

K(CM SQ/SEC)	6609	6614	6304	6309
TAPE NO.	896.	897.	900.	901.
INTERVAL	2.00HR	2.00HR	1.00HR	1.00HR

U COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	-2.21	0.01	-2.21	0.01	-2.81	0.01	-2.81	0.01
1000	1.79	-2.66	-1.05	-5.50	3.99	-0.71	0.75	-3.94
900	0.99	-2.81	0.61	-3.19	3.17	-0.81	2.93	-1.05
800	0.53	-2.66	0.48	-2.72	2.51	-0.72	2.49	-0.74
700	0.24	-2.31	0.24	-2.31	1.97	-0.53	1.98	-0.52
600	0.05	-1.85	0.06	-1.84	1.59	-0.21	1.60	-0.20
500	-0.08	-1.38	-0.07	-1.38	1.32	0.23	1.32	0.23
400	-0.15	-1.45	-0.15	-1.45	1.15	0.60	1.15	0.60
300	-0.22	-1.62	-0.21	-1.61	1.03	0.46	1.03	0.46
200	-0.25	-1.45	-0.25	-1.44	0.96	0.26	0.96	0.26
100	-0.26	-1.15	-0.26	-1.15	0.89	0.29	0.89	0.29
32	-0.22	-0.82	-0.22	-0.82	0.81	0.54	0.81	0.54
8	-0.16	-0.46	-0.16	-0.46	0.72	0.63	0.72	0.63

V COMPONENT (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
GEO	-2.83	0.01	-2.83	0.01	-6.99	0.00	-6.98	0.01
1000	-5.58	0.18	-2.74	3.02	-6.03	-0.53	-5.10	0.40
900	-5.56	0.45	-4.90	1.11	-6.03	-0.44	-5.85	-0.26
800	-5.61	0.69	-5.37	0.93	-6.02	-0.38	-5.96	-0.32
700	-5.72	0.85	-5.61	0.96	-6.06	-0.36	-6.03	-0.34
600	-5.76	1.05	-5.71	1.10	-6.05	-0.26	-6.04	-0.25
500	-5.81	1.29	-5.79	1.31	-6.07	-0.26	-6.07	-0.25
400	-5.84	1.51	-5.82	1.53	-6.07	-0.25	-6.07	-0.25
300	-5.82	1.82	-5.82	1.83	-6.02	-0.22	-6.02	-0.22
200	-5.70	1.98	-5.70	1.99	-5.87	-0.18	-5.87	-0.18
100	-5.39	1.61	-5.38	1.62	-5.50	-0.25	-5.49	-0.24
32	-4.71	0.34	-4.71	0.34	-4.77	-1.17	-4.77	-1.17
8	-3.76	-0.46	-3.77	-0.47	-3.79	-1.74	-3.79	-1.74

CASE VIII GPAC OUTPUT DATA

AIR TEMPERATURE AND VAPOR PRESSURE

TAPE NO.	896.		897.		900.		901.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

AIR TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	6.46	-0.04	6.69	0.19	6.40	-0.15	6.47	-0.08
900	7.54	0.54	7.70	0.70	7.26	0.14	7.31	0.19
800	8.27	0.72	8.38	0.83	8.03	0.33	8.06	0.36
700	8.76	0.71	8.82	0.77	8.67	0.38	8.68	0.39
600	9.07	0.48	9.11	0.52	9.20	0.35	9.21	0.36
500	9.35	0.23	9.37	0.25	9.74	0.29	9.74	0.29
400	9.55	-0.18	9.57	-0.16	10.22	0.10	10.23	0.11
300	9.67	-0.83	9.67	-0.83	10.62	-0.40	10.62	-0.40
200	9.72	-1.63	9.73	-1.62	10.98	-0.92	10.98	-0.92
100	9.59	-2.25	9.59	-2.25	11.07	-1.68	11.08	-1.67
32	9.17	-2.64	9.17	-2.64	10.80	-2.13	10.78	-2.15
8	8.55	-2.44	8.55	-2.44	10.11	-2.42	10.11	-2.42
2	7.83	-2.92	7.83	-2.92	9.28	-3.19	9.28	-3.19
0	5.78	XXXX	5.78	XXXX	6.95	XXXX	6.95	XXXX

VAPOR PRESSURE (MB)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
1000	3.19	-0.10	3.24	-0.05	3.22	-0.06	3.23	-0.05
900	3.33	-0.13	3.37	-0.09	3.36	-0.08	3.38	-0.06
800	3.45	-0.07	3.47	-0.05	3.47	-0.07	3.48	-0.06
700	3.55	-0.04	3.56	-0.03	3.57	-0.06	3.57	-0.06
600	3.64	-0.12	3.64	-0.12	3.67	-0.11	3.66	-0.12
500	3.79	-0.11	3.79	-0.11	3.81	-0.11	3.81	-0.11
400	3.89	-0.16	3.88	-0.17	3.91	-0.14	3.90	-0.15
300	4.04	-0.17	4.05	-0.16	4.05	-0.15	4.05	-0.15
200	4.24	-0.11	4.23	-0.12	4.25	-0.09	4.25	-0.09
100	4.43	-0.10	4.43	-0.10	4.48	-0.01	4.48	-0.01
32	4.79	0.09	4.79	0.09	4.90	0.28	4.90	0.28
8	5.11	0.36	5.10	0.35	5.28	0.62	5.27	0.61
2	5.41	0.64	5.40	0.63	5.64	0.97	5.63	0.96
0	6.26	XXXX	6.26	XXXX	6.64	XXXX	6.64	XXXX

CASE VIII GPAC OUTPUT DATA

MISCELLANEOUS VARIABLES

TAPE NO.	896.		897.		900.		901.	
INTERVAL	2.00HR		2.00HR		1.00HR		1.00HR	

SOIL TEMPERATURE (DEG C)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
0.000	11.13	-0.88	11.12	-0.89	12.28	-0.59	12.28	-0.59
-0.125	13.64	-0.11	13.64	-0.11	13.82	-0.06	13.82	-0.06
-0.250	13.54	-0.05	13.54	-0.05	13.53	-0.03	13.53	-0.03
-0.500	13.71	0.01	13.71	0.01	13.72	0.01	13.71	-0.00
-1.000	13.76	0.01	13.76	0.01	13.75	0.00	13.75	0.00
-2.000	13.79	-0.02	13.79	-0.02	13.79	-0.02	13.79	-0.02

WIND SPEED (M/SEC)

LEVEL(M)	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
8'	4.92	XXXX	4.92	XXXX	4.99	XXXX	4.99	XXXX
8	3.77	0.46	3.77	0.46	3.86	1.81	3.86	1.81
2	2.79	0.49	2.80	0.50	2.85	1.45	2.85	1.45

SURFACE ENERGY TERMS (LY/SEC)X1000

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
S(D)	-0.00	-0.00	-0.01	-0.01	-0.01	-0.01	-0.00	-0.00
R(N)	-1.96	XXXX	-1.96	XXXX	-1.96	XXXX	-1.97	XXXX
Q(C,O)	-1.60	XXXX	-1.61	XXXX	-1.78	XXXX	-1.78	XXXX
Q(E,O)	1.17	XXXX	1.16	XXXX	1.33	XXXX	1.33	XXXX
Q(S,O)	-1.52	XXXX	-1.52	XXXX	-1.52	XXXX	-1.52	XXXX

SURFACE SHEAR STRESS (DYNES/CM SQ)X10

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
TAU	0.65	XXXX	0.65	XXXX	0.65	XXXX	0.65	XXXX

INTEGRATED EVAPOTRANSPIRATION (GM/CM SQ)X100

PARAMETER	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF	GPAC	DIFF
E	1.40	XXXX	1.40	XXXX	0.60	XXXX	0.60	XXXX

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VIII 12.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		5.12	3.52	6.74	4.37	12.35
PERSIST DIFF		6.89	1.73	4.42	0.51	2.86
GPAC DIFF	881.	1.94	6.63	1.10	0.80	0.46
GPAC DIFF	882.	2.10	6.25	1.04	0.82	0.43

CASE VIII 6.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		2.82	5.92	8.71	4.20	12.96
PERSIST DIFF		4.15	1.14	2.06	0.25	1.73
GPAC DIFF	892.	2.32	5.18	2.27	0.16	0.70
GPAC DIFF	893.	1.99	5.36	2.25	0.16	0.69

ROOT MEAN SQUARES OF THE DIFFERENCES BETWEEN
THE PREDICTED AND OBSERVED ATMOSPHERIC COLUMNS

CASE VIII 2.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		2.28	6.29	9.69	4.10	13.45
PERSIST DIFF		0.42	1.34	1.05	0.08	0.69
GPAC DIFF	896.	1.79	1.13	1.56	0.23	0.36
GPAC DIFF	897.	2.28	1.46	1.57	0.22	0.37

CASE VIII 1.00 HOUR

	TAPE NO.	U (M/SEC)	V (M/SEC)	T(AIR) (DEG C)	E (MB)	T(SOIL) (DEG C)
RMS MAGNITUDE		2.30	5.45	10.37	4.07	13.60
PERSIST DIFF		0.54	0.14	0.38	0.04	0.34
GPAC DIFF	900.	0.52	0.65	1.38	0.34	0.24
GPAC DIFF	901.	1.21	0.63	1.39	0.34	0.24

III. COMPARISON OF RESULTS OBTAINED BY USE OF THE ALTERNATE EXCHANGE COEFFICIENTS

The effects on the solutions of the meteorological equations presently being used to simulate the atmospheric boundary layer and employing the alternate exchange coefficient relationships, are revealed largely by examination of wind speeds at a height of 8m. The results obtained for Case VI-A are shown in Table III.1. This case represents

Table III.1 Differences in Observed and Computed Winds at 8-m Height for Case VI-A Obtained by Use of the Original and Alternate Exchange Coefficients

Tape Number	Prediction Interval (hr)	Exchange Coefficient Used	Magnitude of Vector Wind Difference (m/sec)
243.1	1	Original Formulation	2.65
915	1	D-Modification	2.55
235.1	2	Original Formulation	2.07
911	2	D-Modification	1.57
229.1	6	Original Formulation	4.82
907	6	D-Modification	3.16
224.1	12	Original Formulation	4.86
833	12	D-Modification	2.94

a synoptic situation in which relatively high winds occur in late winter. The observations were taken on 28 March 1962 between the hours of 0600C and 1800C.

In Table III.1, as in subsequent tables, comparisons are shown for four time intervals of prediction, 1, 2, 6, and 12 hrs. Solutions obtained for the original exchange coefficient formulation have been reproduced from

Final Report, Report No. 12, Signal Corps Contract DA36-039-AMC-02195(E) and Technical Report ECOM-02286-2. These data may be referenced through the tape numbers which occur in the first column of Table III.1 and subsequent tables. The time interval for each prediction appears in the second column of the table, and the third column signifies the exchange coefficients being used in the solutions. The fourth column contains the absolute value of the differences of the magnitude of vector wind predicted for the height at 8m and the magnitude of the vector wind obtained from observations and analyses for this height.

Examination of the values in Table III.1 for a prediction interval of 1 hr shows that for Case VI-A a difference of 2.65 m/sec in the magnitudes of the vector wind was obtained for the wind at 8-m height by use of the original exchange coefficient formulation. By use of the D-modification to the exchange coefficient, this difference was reduced to 2.55 m/sec. A larger reduction in the difference of the magnitude of the vector wind at 8m height was obtained for the 2-hr simulation. Use of the D-modification resulted in a reduction of .5 m/sec from the value obtained by the original formulation.

Results for the 6 and 12 hr simulations are essentially the same as those for the 2 hr simulation. In either case, the D-modification produced lower wind speed differences than did the original exchange coefficient formulations. For Case VI-A, we note therefore, that the differences between the magnitudes of the vector winds at 8m height computed on the analog computer and those obtained through data analyses were reduced through application of the D-modification for each of the four simulation intervals.

Table III.2 contains the simulation results for Case VI-B which is a case associated with high wind conditions in early summer. Data for

Table III.2 Differences in Observed and Computed Winds at 8-m Height for Case VI-B Obtained by Use of the Original and Alternate Exchange Coefficients

Tape Number	Prediction Interval (hr)	Exchange Coefficient Used	Magnitude of Vector Wind Difference (m/sec)
297.1	1	Original Formulation	4.64
934	1	D-Modification	4.85
289.1	2	Original Formulation	2.52
930	2	D-Modification	3.22
281.3	6	Original Formulation	3.72
926	6	D-Modification	1.80
253.2	12	Original Formulation	4.22
922	12	D-Modification	2.14

this case were collected on 15 June 1962 between the hours of 0600C and 1800C. For this case, neither exchange coefficient formulation produced results consistently superior to the other. For the 1 hr simulation, the original exchange coefficient formulation produced the lower vector wind magnitude difference which amounted to 4.64 m/sec; however, this result is only slightly better than the value of 4.85 m/sec which was obtained when the D-modification was used. For the 2 hr prediction interval also, the original formulation produced a better result than did the D-modification.

For the 6 and 12 hr simulation periods, on the other hand, the D-modification produced results superior to those obtained by use of the original

exchange coefficient formulation. A reduction of 1.92 m/sec was obtained for the 6 hr time interval and a reduction of 2.08 m/sec was obtained for the 12 hr time interval.

The results for Case VII-A are shown in Table III.3. This case is associated with the occurrence of a low level jet. The data for this case

Table III.3 Differences in Observed and Computed Winds at 8-m Height for Case VII-A Obtained by Use of the Original and Alternate Exchange Coefficients

Tape Number	Prediction Interval (hr)	Exchange Coefficient Used	Magnitude of Vector Wind Difference (m/sec)
411	1	Original Formulation	4.80
948	1	D-Modification	4.63
406	2	Original Formulation	3.97
944	2	D-Modification	3.51
401	6	Original Formulation	1.35
940	6	D-Modification	2.60
393	12	Original Formulation	4.55
857	12	D-Modification	4.96

was collected from 1800C on 15 November 1961 to 0600C on 16 November 1961. Examination of Table III.3 indicates that a reduction in the difference of the magnitude of the vector wind at 8m height was produced by the D-modification for the 1 and 2 hr simulation intervals only. In either case the reductions were small, 0.17 m/sec for the 1 hr interval and 0.46 m/sec for the 2 hr interval.

For the 6 and 12 hr simulations also, the differences obtained by the two exchange coefficient formulations were small. The larger difference was the value for 6 hr which amounted to 1.25 m/sec.

Table III.4 contains the results for Case VII-B which also is associated with a low level jet occurrence. The data for this case were

Table III.4 Differences in Observed and Computed Winds at 8-m Height for Case VII-B Obtained by Use of the Original and Alternate Exchange Coefficients

Tape Number	Prediction Interval (hr)	Exchange Coefficient Used	Magnitude of Vector Wind Difference (m/sec)
502	1	Original Formulation	2.57
962	1	D-Modification	3.04
497	2	Original Formulation	3.53
958	2	D-Modification	3.59
492	6	Original Formulation	1.49
954	6	D-Modification	3.66
487	12	Original Formulation	3.95
869	12	D-Modification	4.63

collected between the hours of 0600C and 1800C on 24 October 1961. For this particular case, wind speed differences obtained with the original exchange coefficient formulation were equal to or less than those differences produced by the D-modification for each of the prediction intervals. The difference in the 1 hr values obtained by use of the two exchange coefficient formulations was 0.47 m/sec. The results for the 2 hr

simulations were identical, and as with Case VII-A, the largest difference in the values was obtained for the 6 hr prediction interval.

Table III.5 contains the results for Case VIII which represents a synoptic situation in which a relatively strong thermal inversion exists.

Table III.5 Differences in Observed and Computed Winds at 8-m Height for Case VIII Obtained by Use of the Original and Alternate Exchange Coefficients.

Tape Number	Prediction Interval (hr)	Exchange Coefficient Used	Magnitude of Vector Wind Difference (m/sec)
192.1	1	Original Formulation	2.75
900	1	D-Modification	1.85
184.1	2	Original Formulation	1.87
896	2	D-Modification	0.65
176.1	6	Original Formulation	2.97
892	6	D-Modification	1.58
168.1	12	Original Formulation	5.31
881	12	D-Modification	2.86

The data for this case were collected between 1800C 18 February 1962 and 0600C 19 February 1962. While this case was being set up on the GPAC for simulation, the direction of the surface contour gradient for the initial time was determined to be in error. As a consequence of this fact, the original synoptic analyses of the surface pressure for the initial time and for each of the verification times was consulted and the directions of the pressure gradients redetermined. The corrected values appear in the initial conditions for Case VIII.

Examining Table III.5, we can see that for each of the prediction intervals, a considerable reduction in the magnitude of the vector wind difference was obtained by employment of the D-modification. The difference in the magnitude of the vector wind obtained for the 1 hr prediction using the original exchange coefficient formulation resulted in a value of 2.75 m/sec. With the employment of the D-modification this difference was reduced to 1.85 m/sec.

Considerable reduction in the differences in the magnitudes of the vector winds were obtained also for the 2-hr, 6-hr, 12-hr prediction intervals.

The 1 and 2 hr simulations resulted in reductions of 0.90 m/sec and 1.22 m/sec, respectively. The magnitude of the reduction increased with the length of the prediction interval with the maximum reduction amounting to 2.45 m/sec for the 12 hr interval.

Table III.6 shows composite differences in the magnitudes of the vector winds at 8-m height for a combination of all the cases included in this report. Examination of the table shows that the original exchange coefficient formulations yielded a RMS difference in the magnitude of the vector wind of 3.63 m/sec for the 1-hr prediction interval. The D-modification reduced this difference to 3.58 m/sec. The 2-hr prediction interval as well as the 6-hr and 12-hr prediction intervals indicates a similar reduction for the D-modification. The amount of the reduction increases with the length of the prediction interval; the maximum reduction amounted to 0.93 m/sec and was associated with the 12-hr prediction interval. Thus, for all four prediction intervals, the D-modification produced lower RMS

Table III.6 Root-Mean-Squares of the Differences in the Magnitudes of the Vector Winds at 8-m Height for Cases VI-A, VI-B, VII-A, VII-B and VIII.

Prediction Interval (hr)	Exchange Coefficient Used	RMS Magnitude of Vector Wind Difference (m/sec)
1	Original Formulation	3.63
1	D-Modification	3.58
2	Original Formulation	2.92
2	D-Modification	2.77
6	Original Formulation	3.16
6	D-Modification	2.68
12	Original Formulation	4.60
12	D-Modification	3.67

differences in the magnitude of the vector wind than did the original exchange coefficient formulation.

With regard to Case VIII, the reduction in wind speed differences at 8-m height may not be attributed entirely to the use of the alternate relationships for the turbulent exchange coefficients since the surface pressure gradients were re-evaluated before the solutions involving the alternate relationships were obtained.

For the cases studied, a small over all improvement was obtained by employment of the D-modification; however, from these few cases alone, one cannot say that the D-modification is superior, necessarily, to the original formulation.