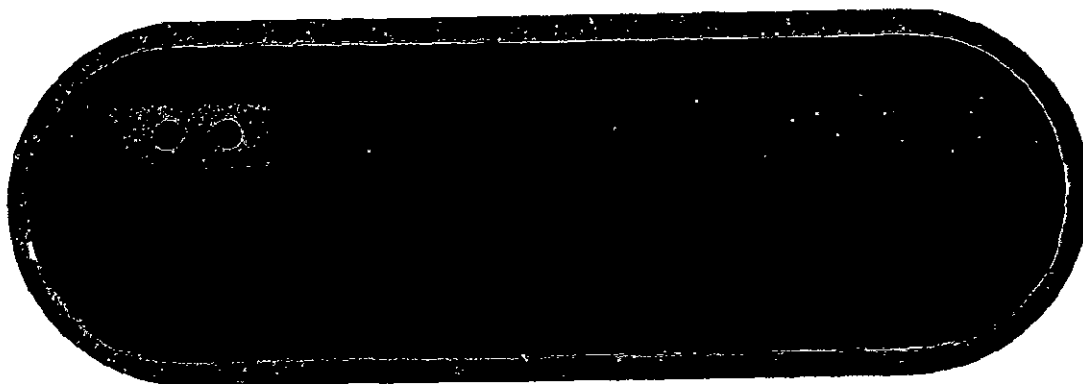


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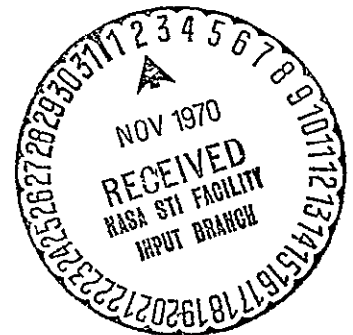


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SEATTLE, WASHINGTON

EVALUATION OF NINE LUNAR MODELS FOR APOLLO

By Gayle D. Barrow



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ABSTRACT

Various lunar gravitational models were evaluated for Apollo mission control using checkpoint techniques developed under CCN 157B, NASA Contract NAS 1-3800. All checkpoints were selected from low inclination Lunar Orbiter missions in order that the results would be applicable to the Apollo missions. Identical techniques were used for each model evaluated in order that relative performance (rapidity of convergence, fit to doppler data, etc.) could be determined.

KEY WORDS

Lunar Model

Gravitational Potential

Lunar Orbiter

Apollo

Orbit Determination

Photo Site

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1.0 PURPOSE

This document reports the work accomplished under Task D of NASA contract NAS 1-7954 concerning lunar gravitational model analysis in support of Apollo mission control.

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2.0 SCOPE

This document is a final report covering all the work done under NASA contract NAS 1-7954, Task D. A thorough analysis of all lunar gravitational models provided has been accomplished using photo checkpoint techniques.

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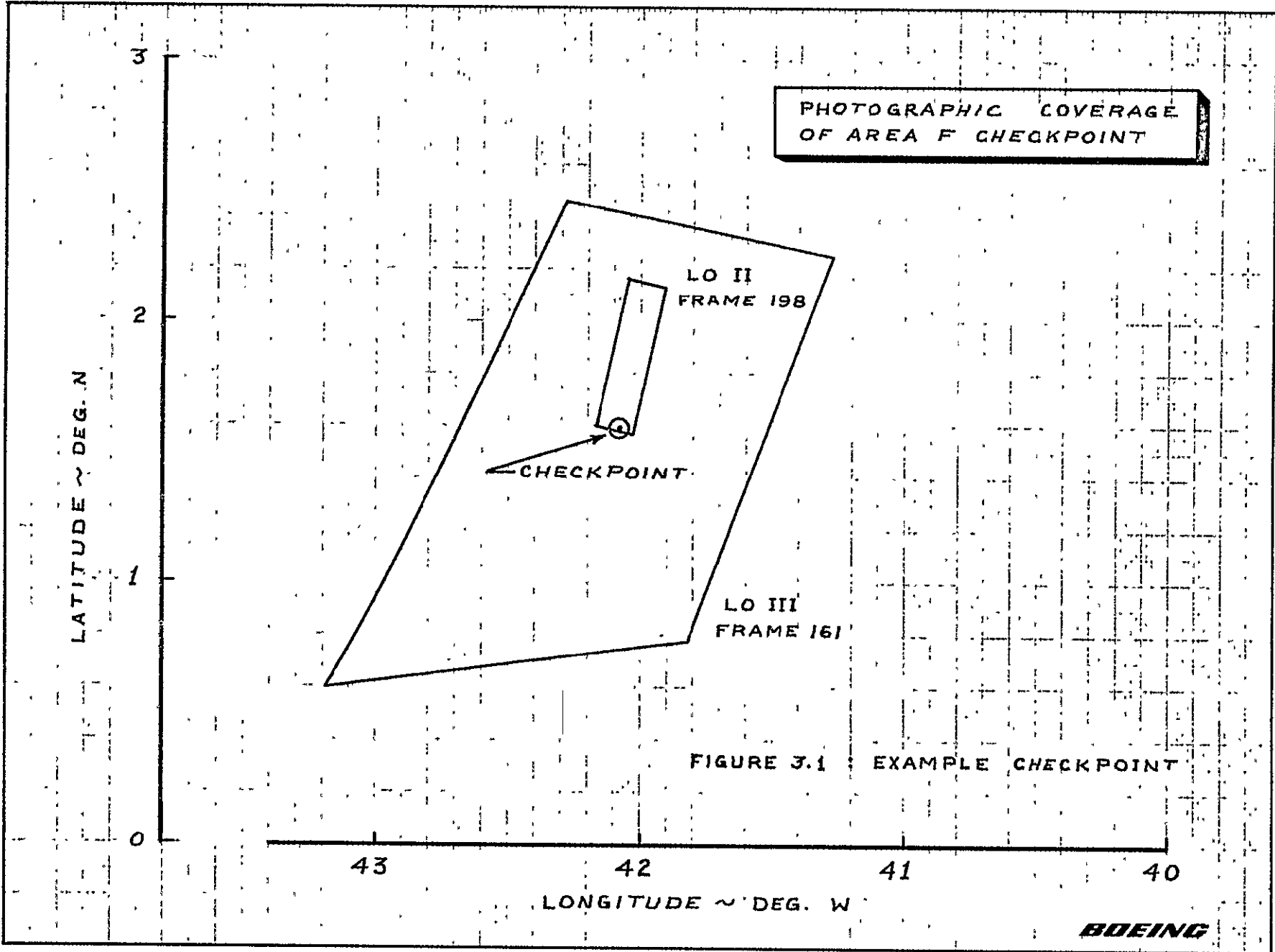
3.0 INTRODUCTION

The object of this study was to evaluate the capability of various lunar gravitational models to accurately predict spacecraft position within low inclination lunar orbits. The primary method of evaluation consisted of photo checkpoint consistency analysis. A checkpoint is defined as a landmark or feature present in the photographs from at least two Lunar Orbiter missions. A pictorial representation of a checkpoint is shown in Figure 3.1. In this example two telephoto frames are plotted, one from Mission II and the other from Mission III. The checkpoint which is a small crater of about 100 meters diameter was found in both pictures. As indicated, it is on the southern edge of L/O II frame 198 and near the center of LO III frame 161. Using measurements of the checkpoint location on the actual photograph it was possible to compute the selenographic location of the checkpoint. This also required the maneuver angles performed to point the camera and the spacecraft position at shutter actuation as computed by the orbit determination program (ODFL). Since each mission resulted in an independent computation of the checkpoint location it was possible to judge model effectiveness by the closeness of the checkpoint grouping in each area. A more thorough description of the checkpoint technique is given in Reference 1.

Various types of information concerning operation of the orbit determination program are presented to aid in the model evaluations along with checkpoint consistency. These are rapidity of convergence, fit to doppler data and epoch forwarding accuracy. Each of these parameters is important in the process of model selection. Rapid convergence is a necessary requirement for a real time orbit determination technique, due to serious time constraints. A good fit to the doppler data is a requirement since it is the only measurement of the accuracy of the spacecraft state vector that is available. The epoch forwarding capability is one of the more important criteria since orbital maneuvers (orbital transfers and descent maneuvers) must be planned in advance and prediction must be accurate to guarantee mission success.

Included in the model evaluation are two gravitational models developed by Boeing. These models are simple 3 and 4 coefficient models and were developed under Task E of NAS 1-7954. A description of this model development is presented in a companion document (Reference 2).

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4.0 LUNAR GRAVITATIONAL MODELS

A total of nine (9) lunar gravitational models were evaluated in this study. These models are summarized in Table 4.0 and described in detail in Tables 4.1 through 4.9. Also indicated in the Tables is the type of data used for the development of the models.

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TABLE 4.0

CANDIDATE LUNAR MODELS - SUMMARY

<u>MODEL NO.</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>ORDER</u>	<u>COEFFICIENTS</u>
1	BELLCOMM	L/O III APOLLO DATA	7	51/60
2	BELLCOMM	L/O III APOLLO DATA	7	60/60
3	MSC TRIAX	LUNAR OBSERVATIONS	2	2/5
4	BELLCOMM MOD.	L/O III APOLLO DATA	4	16/21
5	MSC ONBOARD	L/O III APOLLO DATA	4	5/21
6	BOEING R-1	L/O III APOLLO DATA	3	3/12
7	LRC 11/11/66	L/O I DATA	4	21/21
8	BOEING R-2	L/O III APOLLO DATA	3	4/12
9	LRC 10/25/68	L/O III APOLLO DATA	7	60/60

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TABLE 4.1

MODEL NUMBER 1

ORIGINATOR: BELLCOMM .
TITLE: BELLCOMM 1
DATA USED: LUNAR ORBITER III APOLLO TYPE ORBIT

J20 = 0.207108E-3
J30 = 0.98581804E-5
J40 = 0.49550331E-4
J50 = 0.0
J60 = 0.75188194E-4
J70 = -0.35500736E-4

C21 = -3.9776317E-05	S21 = -4.7217270E-06
C31 = 3.3213026E-05	S31 = 1.4974646E-05
C41 = 0.	S41 = 0.
C51 = 0.	S51 = 0.
C61 = 1.2657471E-05	S61 = -6.1370453E-07
C71 = 6.7081228E-06	S71 = 1.0263172E-06
C22 = 2.0716000E-05	S22 = 7.7402253E-05
C32 = -2.2410583E-06	S32 = -2.2349550E-06
C42 = -1.4083560E-05	S42 = 7.0877375E-06
C52 = 0.	S52 = 0.
C62 = -5.2701180E-06	S62 = -3.5242460E-07
C72 = -6.9782366E-08	S72 = 1.0326581E-06
C33 = 4.4266445E-06	S33 = -1.7840169E-05
C43 = 3.2464947E-06	S43 = 2.4580384E-06
C53 = 0.	S53 = 0.
C63 = 2.9880958E-07	S63 = 5.7326869E-07
C73 = -2.1056882E-09	S73 = 1.8104489E-07
C44 = -1.3213365E-06	S44 = 2.6692057E-06
C54 = -4.5592296E-07	S54 = -3.1371824E-07
C64 = -1.2867158E-07	S64 = 6.0992406E-08
C74 = -5.5243105E-08	S74 = -2.4886564E-09
C55 = 1.4862670E-07	S55 = -2.1222278E-07
C65 = 2.7005284E-08	S65 = 1.6473946E-08
C75 = 5.9734587E-09	S75 = 3.0897843E-09
C66 = -1.0064906E-08	S66 = 1.2687316E-08
C76 = -1.0578404E-09	S76 = -7.6381850E-10
C77 = 2.8230676E-10	S77 = -2.9036816E-10

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TABLE 4.2

MODEL NUMBER 2

ORIGINATOR: BELLCOMM
 TITLE: BELLCOMM 2
 DATA USED: LUNAR ORBITER III APOLLO TYPE ORBIT

J20 = 0.207108E-3
 J30 = 0.17970204E-2
 J40 = -0.76735410E-4
 J50 = 0.19095957E-2
 J60 = -0.85003980E-4
 J70 = 0.78944872E-3

C21 = 1.4543006E-04	S21 = 3.4579930E-05
C31 = -9.6883980E-06	S31 = 3.0530006E-05
C41 = 1.2815026E-04	S41 = 3.6995436E-05
C51 = -3.5295498E-05	S51 = 1.4809342E-05
C61 = 4.8279619E-05	S61 = 9.3870128E-06
C71 = -8.6594147E-06	S71 = 9.9566301E-06
C22 = 2.0716000E-05	S22 = -3.8859542E-05
C32 = -2.1084699E-05	S32 = 2.1089459E-05
C42 = -5.7342925E-06	S42 = -1.3995678E-05
C52 = -8.6097890E-06	S52 = 9.3183367E-06
C62 = -3.0496452E-06	S62 = -3.5314852E-06
C72 = -2.3735247E-06	S72 = 3.4918373E-06
C33 = -1.9226409E-06	S33 = 1.1966527E-05
C43 = 4.3634825E-06	S43 = -5.0166073E-07
C53 = -1.4454957E-06	S53 = 4.2339079E-06
C63 = 6.0073073E-07	S63 = 1.5947311E-07
C73 = -2.4828267E-07	S73 = 8.3648790E-07
C44 = 5.8258219E-08	S44 = -9.1385325E-07
C54 = -4.6616091E-07	S54 = 2.3960547E-08
C64 = -6.4292186E-08	S64 = -7.8623184E-08
C74 = -4.6557719E-08	S74 = 3.0322951E-08
C55 = -2.3400825E-08	S55 = 8.5687764E-08
C65 = 3.0750422E-08	S65 = -5.0017239E-09
C75 = 3.3995792E-09	S75 = 9.9527488E-09
C66 = 1.8544857E-09	S66 = -2.2064067E-09
C76 = -1.2328288E-09	S76 = 1.3284679E-10
C77 = -1.1865522E-10	S77 = 1.0324456E-10

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TABLE 4.3

MODEL NUMBER 3

ORIGINATOR: APOLLO NAVIGATION WORKING GROUP
TITLE: TRIAXIAL
DATA USED: LUNAR MOTION

$$J20 = 2.07108E-4$$

$$C22 = 0.20716E-4$$

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TABLE 4.4

MODEL NUMBER 4

ORIGINATOR: BELLCOMM
TITLE: MODIFIED 4TH ORDER (10)
DATA USED: LUNAR ORBITER III APOLLO TYPE ORBIT

$$J20 = 2.07108E-4$$

$$J30 = -0.26945668E-4$$

$$J40 = -0.57958992E-4$$

$$C21 = 1.1036661E-4$$

$$S21 = 0.0076646865E-4$$

$$C31 = 0.28729637E-4$$

$$S31 = 0$$

$$C41 = 0$$

$$S41 = 0$$

$$C22 = 0.20716E-4$$

$$S22 = 0.059796056E-4$$

$$C32 = -0.01750379E-4$$

$$S32 = 0.029055825E-4$$

$$C42 = 0$$

$$S42 = 0$$

$$C33 = 0.017825856E-4$$

$$S33 = -0.025694597E-4$$

$$C43 = 0.010741808E-4$$

$$S43 = -0.00086112432E-4$$

$$C44 = -0.0018118974E-4$$

$$S44 = 0.0015013695E-4$$

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TABLE 4.5
MODEL NUMBER 5

ORIGINATOR: BELLCOMM
TITLE: MSC ONBOARD (11)
DATA USED: LUNAR ORBITER III APOLLO TYPE ORBIT

$$J20 = 2.07108E-4$$

$$J30 = -0.47908523E-4$$

$$J40 = -1.8483822E-4$$

$$C22 = 0.20716E-4$$

$$S22 = 0.0020772811E-4$$

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TABLE 4.6

MODEL NUMBER 6

ORIGINATOR: THE BOEING COMPANY
TITLE: R-1
DATA USED: LUNAR ORBITER III APOLLO TYPE ORBIT

$$J20 = 2.10E-4$$

$$J30 = -0.40E-4$$

$$C22 = 0.21E-4$$

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TABLE 4.7
MODEL NUMBER 7

ORIGINATOR: NASA LANGLEY RESEARCH CENTER
TITLE: LRC 11/11/66
DATA USED: LUNAR ORBITER I

J20 = 2.07E-4
J30 = -0.446E-4
J40 = -0.209E-4

C21 = 0.088E-4	S21 = -0.411E-4
C31 = 0.435E-4	S31 = 0.107E-4
C41 = -0.051E-4	S41 = -0.102E-4
C22 = 0.276E-4	S22 = -0.058E-4
C32 = -0.052E-4	S32 = 0.0187E-4
C42 = 0.028E-4	S42 = -0.083E-4
C33 = 0.0091 E-4	S33 = -0.033E-4
C43 = -0.0047E-4	S43 = -0.026E-4
C44 = 0.00094E-4	S44 = 0.0017E-4

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TABEL 4.8

MODEL NUMBER 8

ORIGINATOR: THE BOEING COMPANY
TITLE: R-2
DATA USED: LUNAR ORBITER III APOLLO TYPE ORBIT

$$J20 = 2.07108E-4$$

$$J30 = -0.21E-4$$

$$C22 = 0.20716E-4$$

$$C31 = 0.34E-4$$

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TABLE 4.9

MODEL NUMBER 9

ORIGINATOR: NASA LANGLEY RESEARCH CENTER
 TITLE: LRC 10/25/68
 DATA USED: LUNAR ORBITER III APOLLO TYPE ORBIT

J20 = 2.0895762E-04
 J30 = -7.0817213E-06
 J40 = -4.1084407E-06
 J50 = 1.1248121E-05
 J60 = 1.1040699E-05
 J70 = -8.0224215E-06

C21 = 1.1396825E-05	S21 = 6.0958266E-06
C31 = 1.4722564E-05	S31 = -1.3479223E-06
C41 = 2.2069451E-05	S41 = 1.0610489E-05
C51 = -1.2156903E-05	S51 = -1.6812389E-05
C61 = 1.1440266E-05	S61 = 1.0323198E-06
C71 = 6.0295296E-07	S71 = -4.4028212E-06
C22 = 2.3907473E-05	S22 = -1.6479207E-05
C32 = -8.8680256E-06	S32 = 3.3091048E-07
C42 = -7.6658589E-06	S42 = -9.5150496E-06
C52 = -4.3435654E-06	S52 = 1.2360283E-06
C62 = -3.7152925E-06	S62 = -2.6982194E-06
C72 = -1.5769262E-06	S72 = 1.6361181E-06
C33 = -1.2147350E-06	S33 = 8.1316292E-06
C43 = 2.4462728E-06	S43 = 1.7614518E-06
C53 = -1.4122894E-06	S53 = 3.9591574E-06
C63 = 2.7446677E-07	S63 = 4.5105290E-07
C73 = -2.4247715E-07	S73 = 8.2099308E-07
C44 = -1.1124650E-07	S44 = -5.5596755E-07
C54 = -2.8197929E-07	S54 = -2.0913355E-07
C64 = -7.0410714E-08	S64 = -6.2672641E-08
C74 = -3.2039024E-08	S74 = 4.8543875E-09
C55 = -4.8913061E-09	S55 = 7.2718664E-08
C65 = 1.9132617E-08	S65 = 4.7220892E-09
C75 = 4.0067647E-09	S75 = 1.0940427E-08
C66 = 1.2381062E-09	S66 = -2.1321294E-09
C76 = -8.3987487E-10	S76 = -1.7262483E-10
C77 = -1.3085110E-10	S77 = 1.2726415E-10

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5.0 METHOD OF ANALYSIS

5.1 CHECKPOINT SELECTION

For this analysis checkpoint locations were selected based on the following criteria:

- periods of two-station coverage (two and three-way doppler data) must be present within the orbit containing the checkpoint photograph,
- checkpoints must be contained in the photographs from two low inclination Lunar Orbiter missions (L/O I, II or III),
- checkpoints should be widely separated on the lunar surface such that orbits with various tracking station viewing geometries could be investigated.

Three checkpoints were used for this analysis and are described in Table 5.1.

5.2 MODEL ANALYSIS

The analysis of each specified lunar gravitational model was accomplished in exactly the same manner in order that relative performance could be evaluated. Using the orbit determination program (ODPL) and the tracking data acquired from the first three Lunar Orbiter missions the following technique was used for model analysis:

- compute the spacecraft position at each specified exposure time by processing tracking data with ODPL using data arcs of one and two orbits duration (first orbit includes the exposure time),
- compute the resulting locations on the lunar surface of each of the selected checkpoint features based on the solutions described above.

To aid in the determination of the epoch forwarding capability of each model the following technique was used:

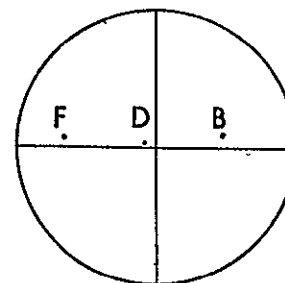
- determine spacecraft position using ODPL and tracking data three orbits prior to the exposure time (two and three-way doppler),
- map this solution forward to the selected exposure time with the specified lunar model,
- compute the resulting locations on the lunar surface of each of the selected checkpoint features.

A pictorial description of the procedure is shown in Figure 5.1.

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TABLE 5.1
CHECKPOINTS USED IN EVALUATION

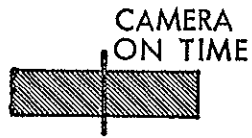
<u>AREA</u>	<u>APPROXIMATE LOCATION</u>	<u>LUNAR ORBITER MISSION</u>	<u>SITE</u>	<u>RESOLUTION</u>
B	36° E 3° N	I	I S6	WIDE ANGLE
		II	II S2B	TELEPHOTO
D	2° W 1° N	II	II P8C	WIDE ANGLE
		III	III P7A	WIDE ANGLE
F	42° W 2° N	II	II P13A	TELEPHOTO
		III	III S25	TELEPHOTO



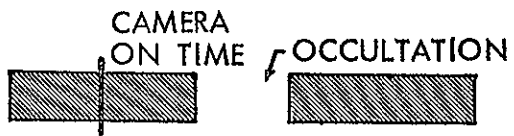
BOEING

FIGURE 5.1
ORBIT DETERMINATION PROCEDURES

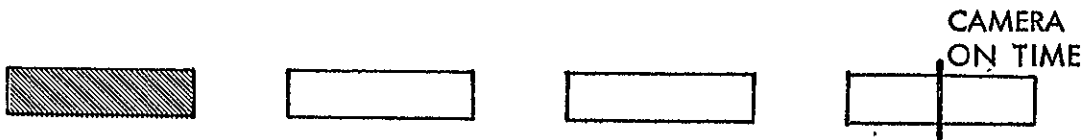
ONE ORBIT FIT



TWO ORBIT FIT



MAPPING OD



6.0 RESULTS

The results of this investigation are presented in the form of checkpoint plots which are predicted locations on the lunar surface (longitude and latitude) of the selected checkpoint feature. These checkpoint plots are shown in Figures 6.1 through 6.27 for the three checkpoint areas and the nine gravitational models studied. A key to the symbols used in these figures is given in Table 6.1. The same data in tabular form is presented in Tables 6.2 through 6.9. Also included as supplemental information is the sum of the squares of the doppler residuals resulting from the orbit determination procedure. This is a measure of the accuracy of trajectory prediction based on each lunar model as compared to the actual doppler tracking data received.

Two of the checkpoint plots (Figures 6.4 and 6.5) of area B do not contain a point for a two orbit fit of Mission II data. The orbit determination program would not converge to a solution using the lunar models involved.

It should be noted that the checkpoint location computed from this two orbit fit of Mission II data is not included in the consistency analysis conducted in the following section. It was determined that this solution was in error since for all models studied this point was always far outside the cluster of points resulting from the other solutions (Figure 6.1 through 6.9). No reason for this problem could be found in the tracking data involved in the data fitting procedure but it is obvious that a problem exists based on the results.

All data accumulated during the orbit determination computer runs involved in this study is included in the Appendix of this document. This includes the orbit determination summary reports at both the epoch of the data arc and also at the exposure time. The plots of the doppler residuals for each run are also provided.

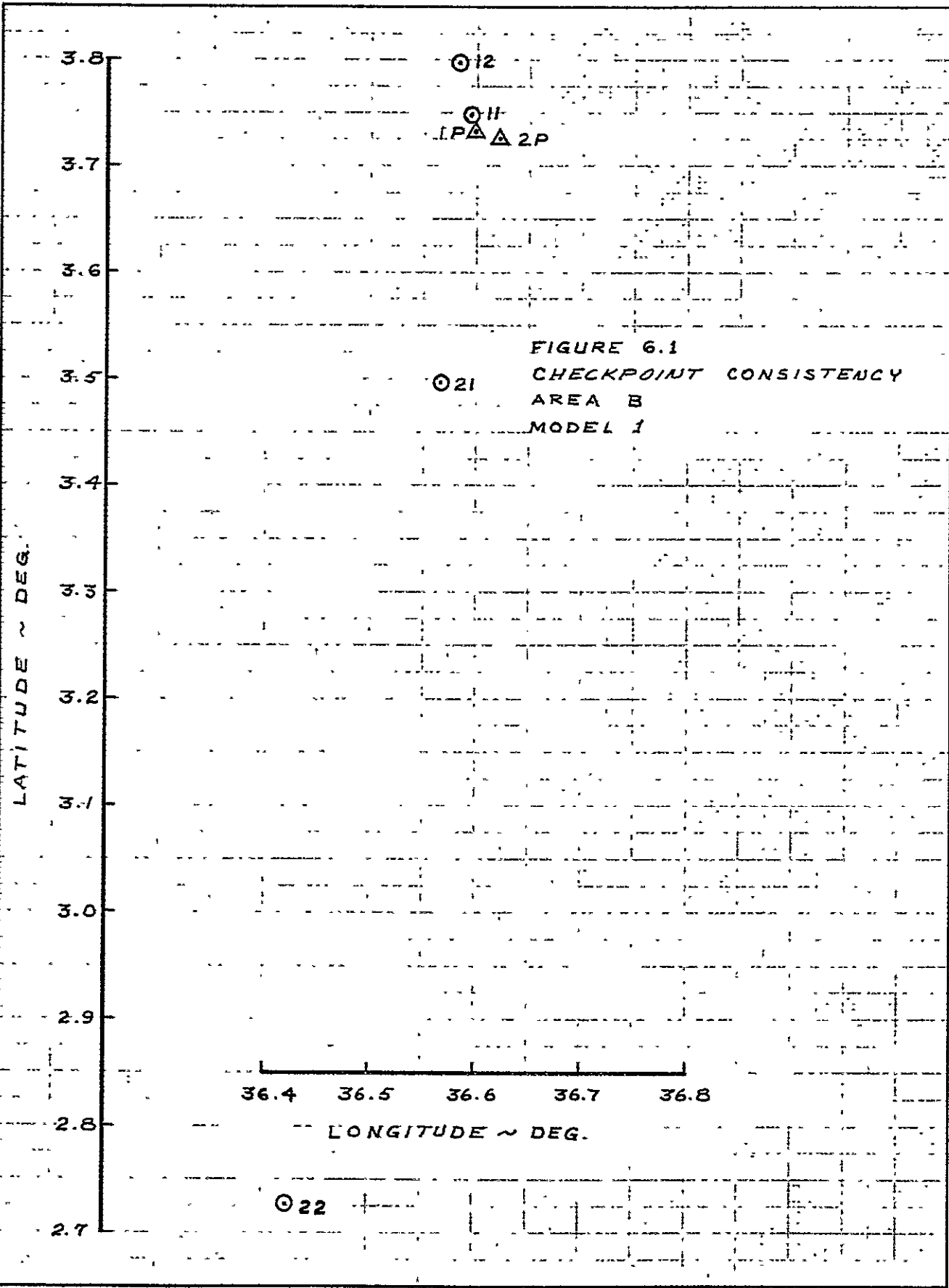
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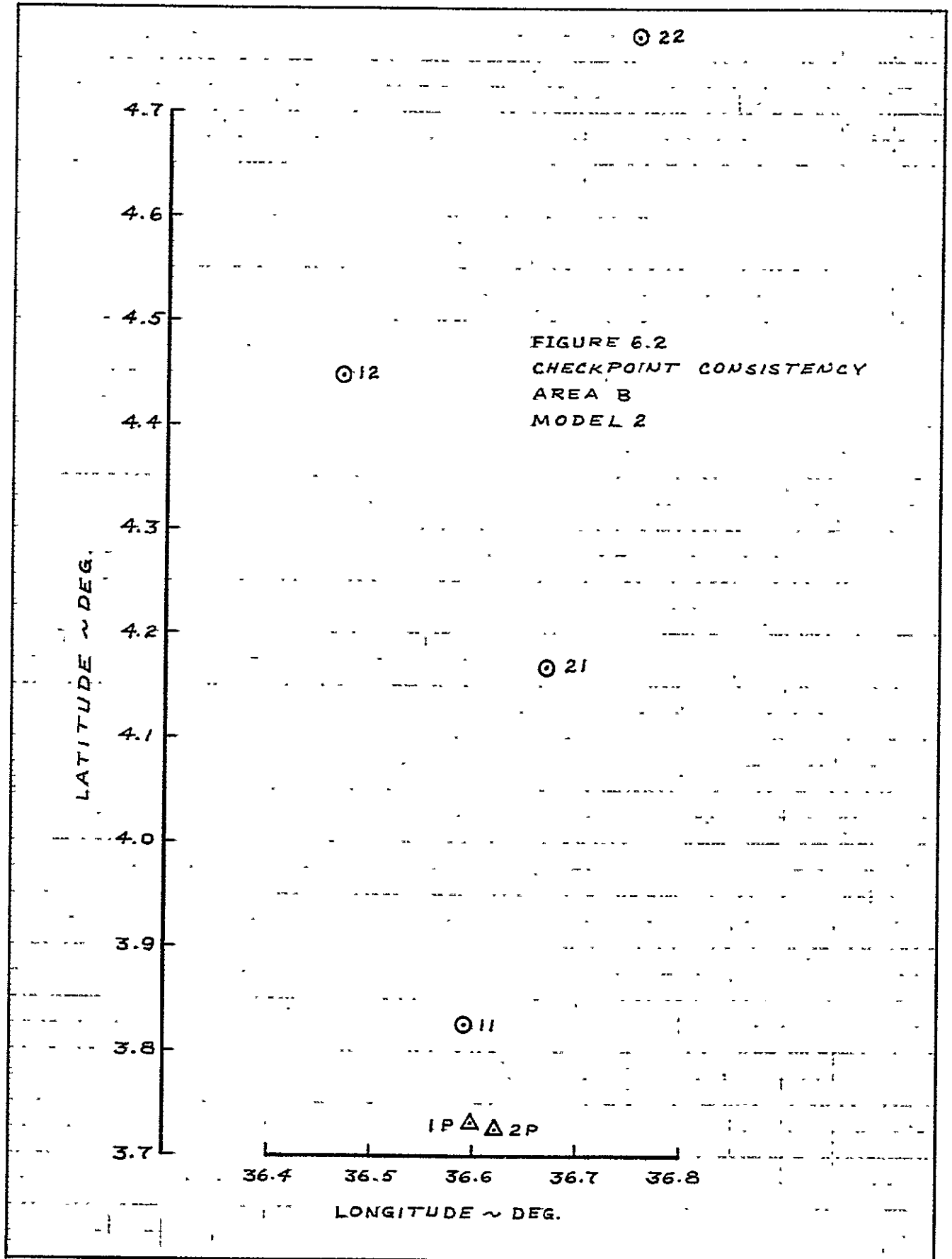
TABLE 6.1

CHECKPOINT CONSISTENCY DATA SYMBOLS

⊙ 21	LUNAR ORBITER II	ONE ORBIT FIT
⊙ 22	LUNAR ORBITER II	TWO ORBITS FIT
⊙ 31	LUNAR ORBITER III	ONE ORBIT FIT
⊙ 32	LUNAR ORBITER III	TWO ORBITS FIT
⊙ 3M	LUNAR ORBITER III	ONE ORBIT FIT MAP 3 1/2 ORBITS
△ 2P	LUNAR ORBITER II	PRIME LOCATION *
△ 3P	LUNAR ORBITER III	PRIME LOCATION *

* BEST ESTIMATE OF CHECKPOINT LOCATION





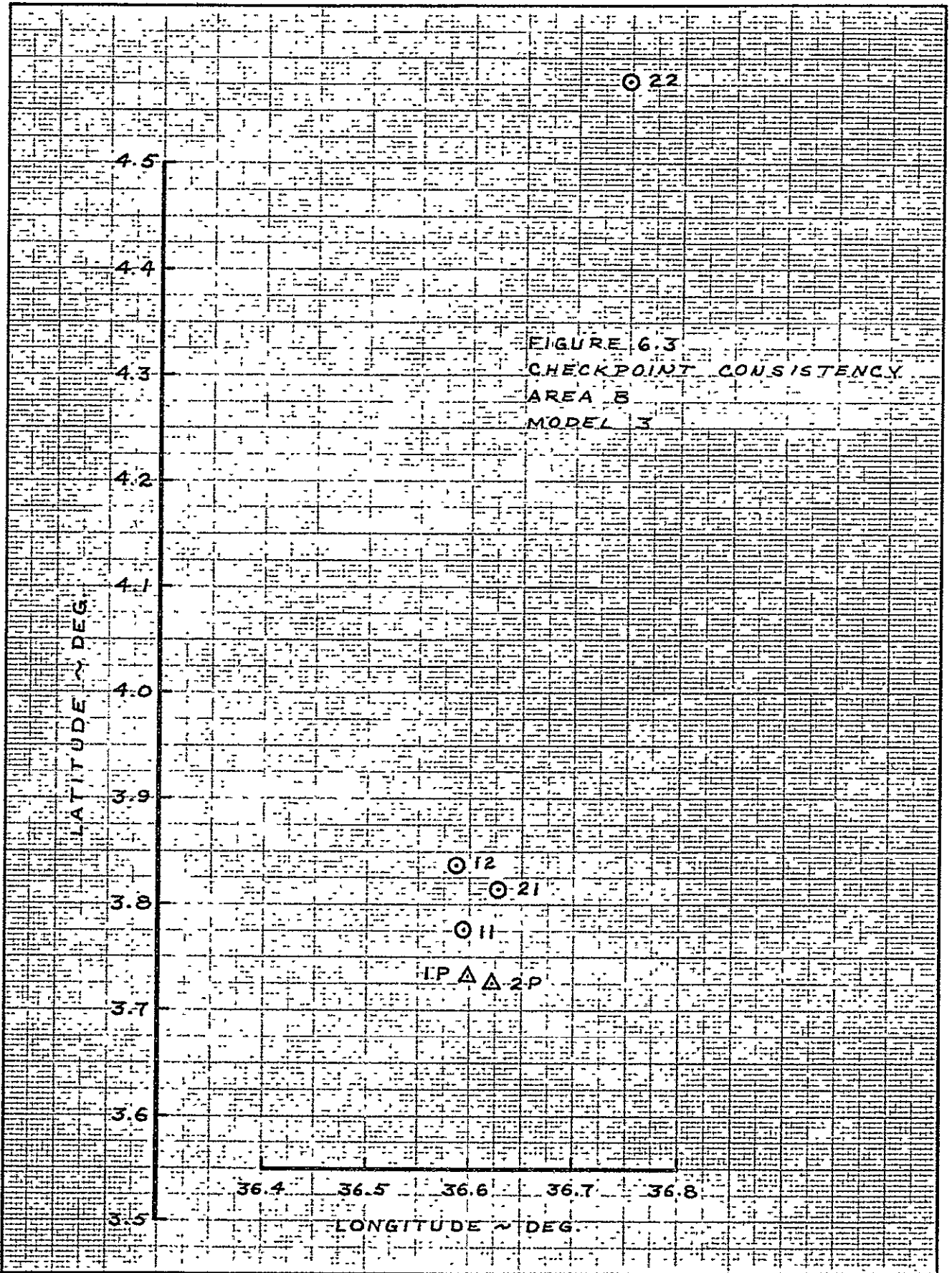


FIGURE 6.4
CHECKPOINT CONSISTENCY
AREA B
MODEL 4

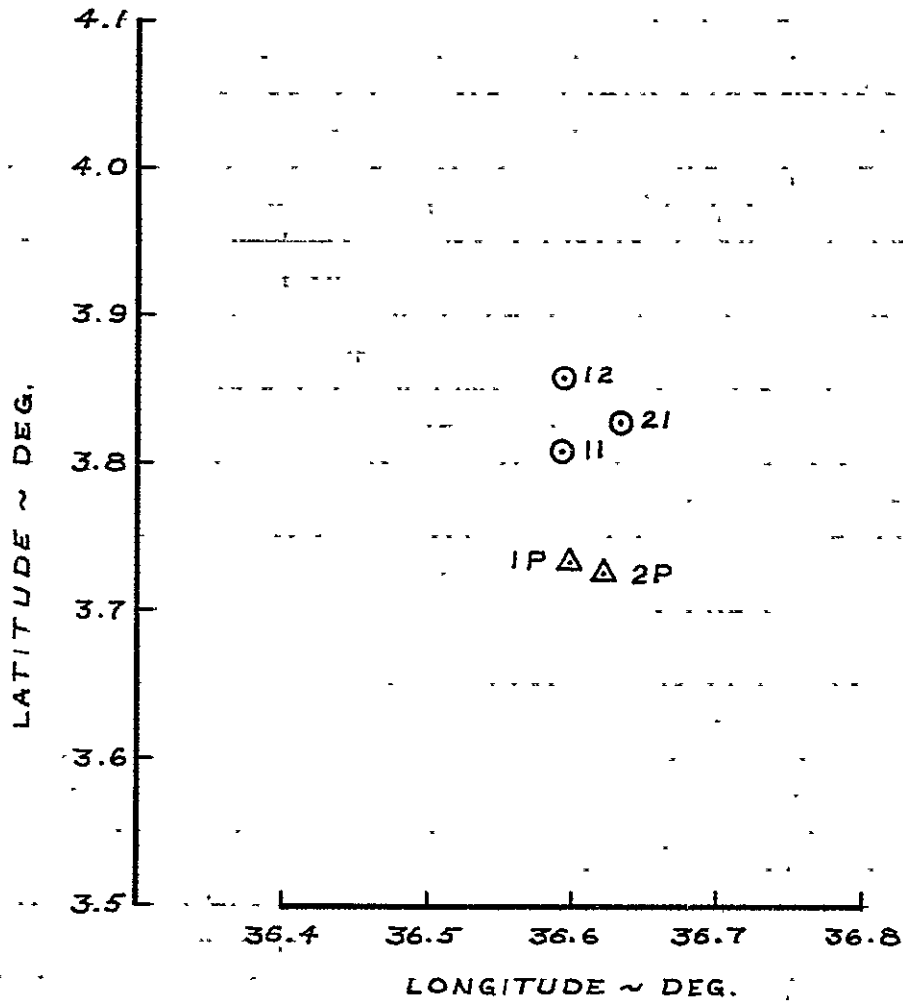
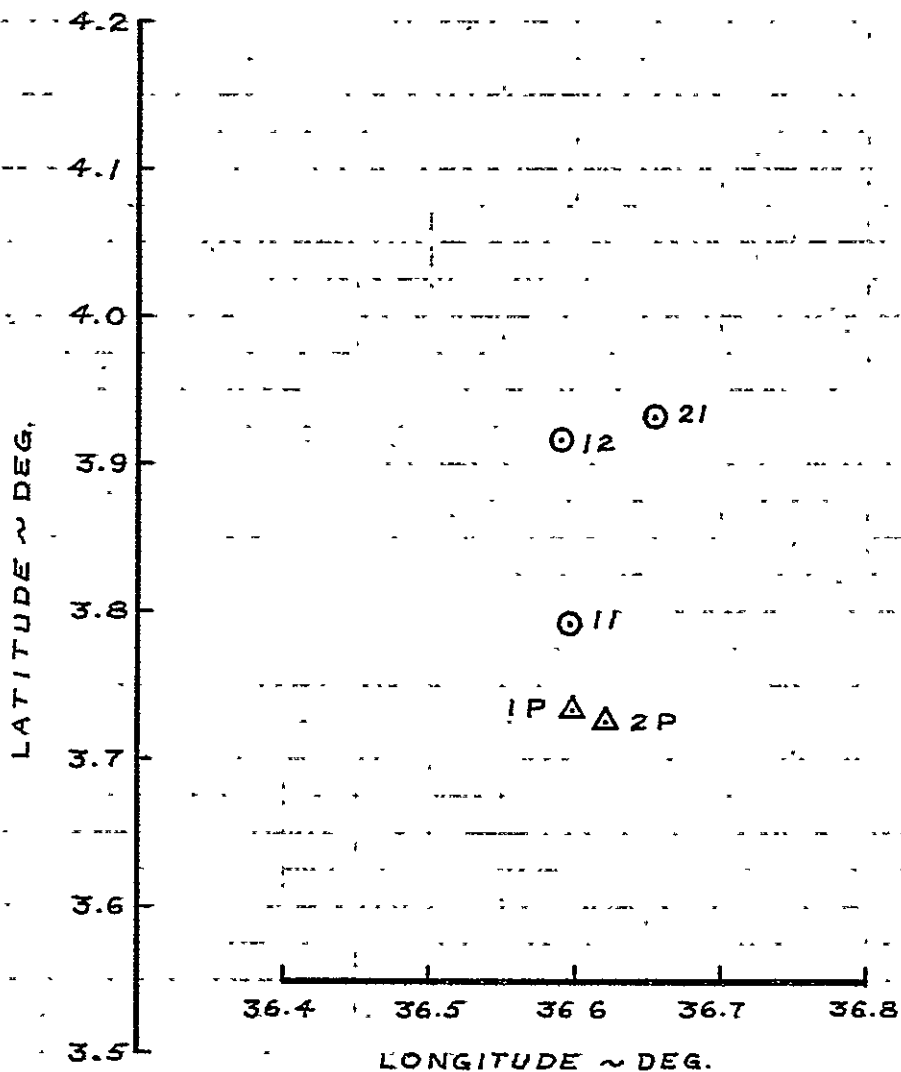


FIGURE 6.5
CHECKPOINT CONSISTENCY
AREA B
MODEL 5



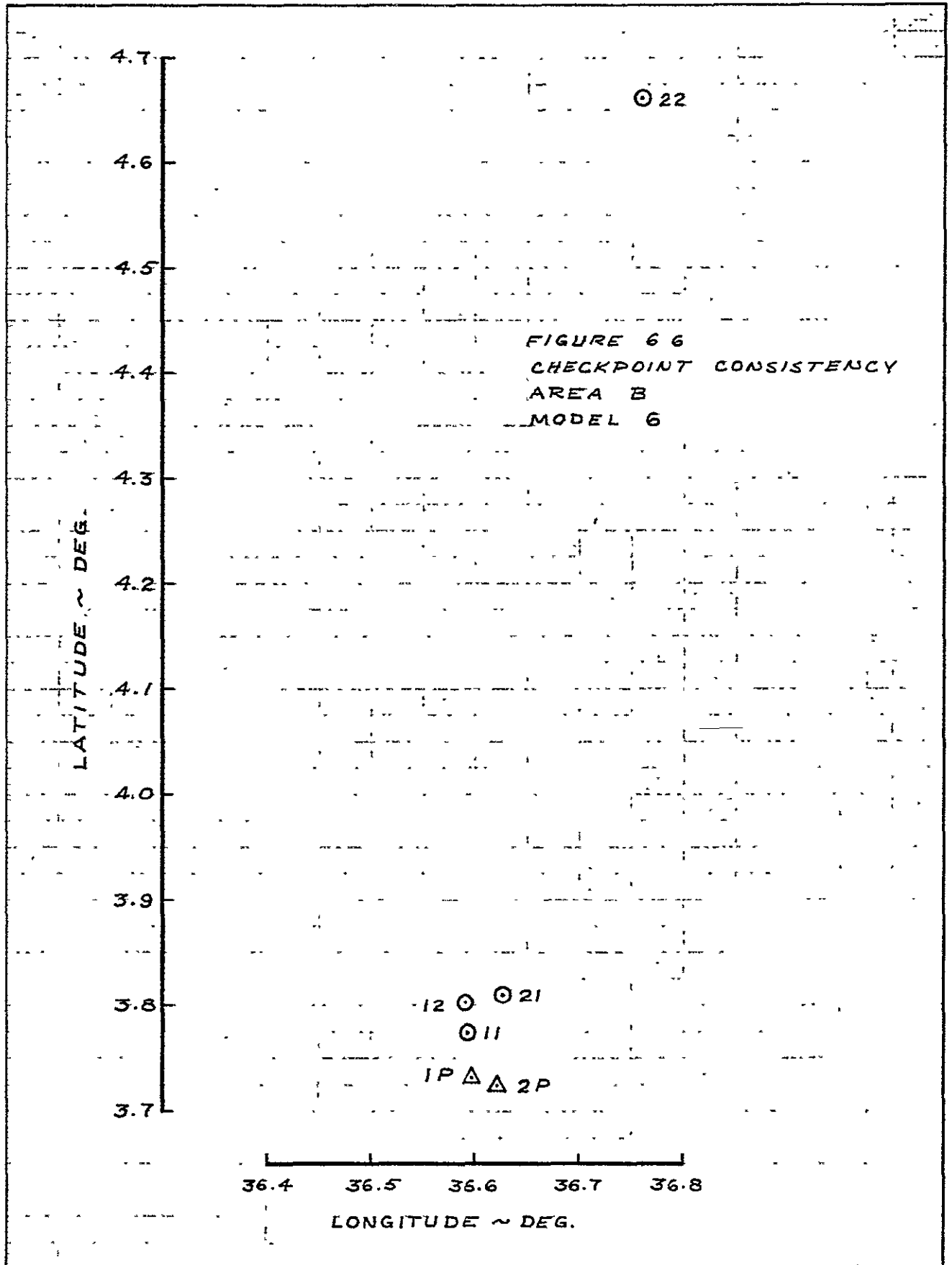
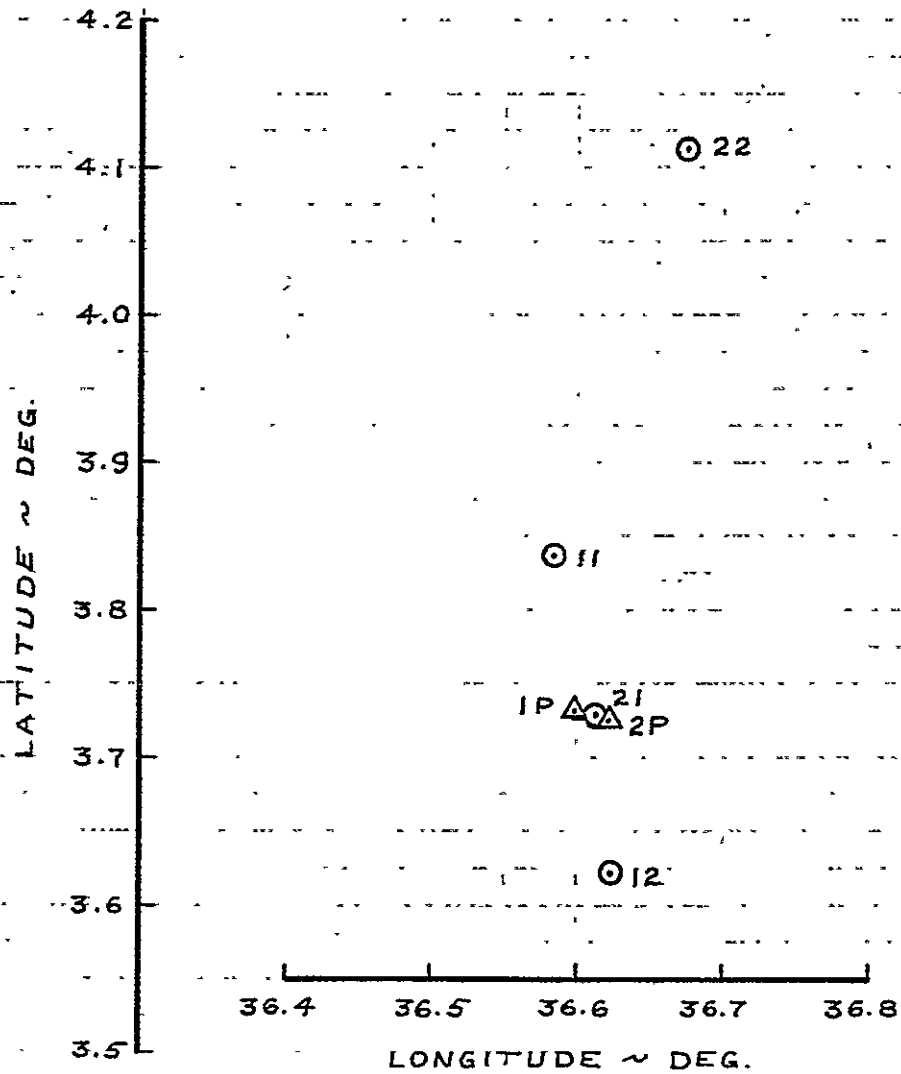
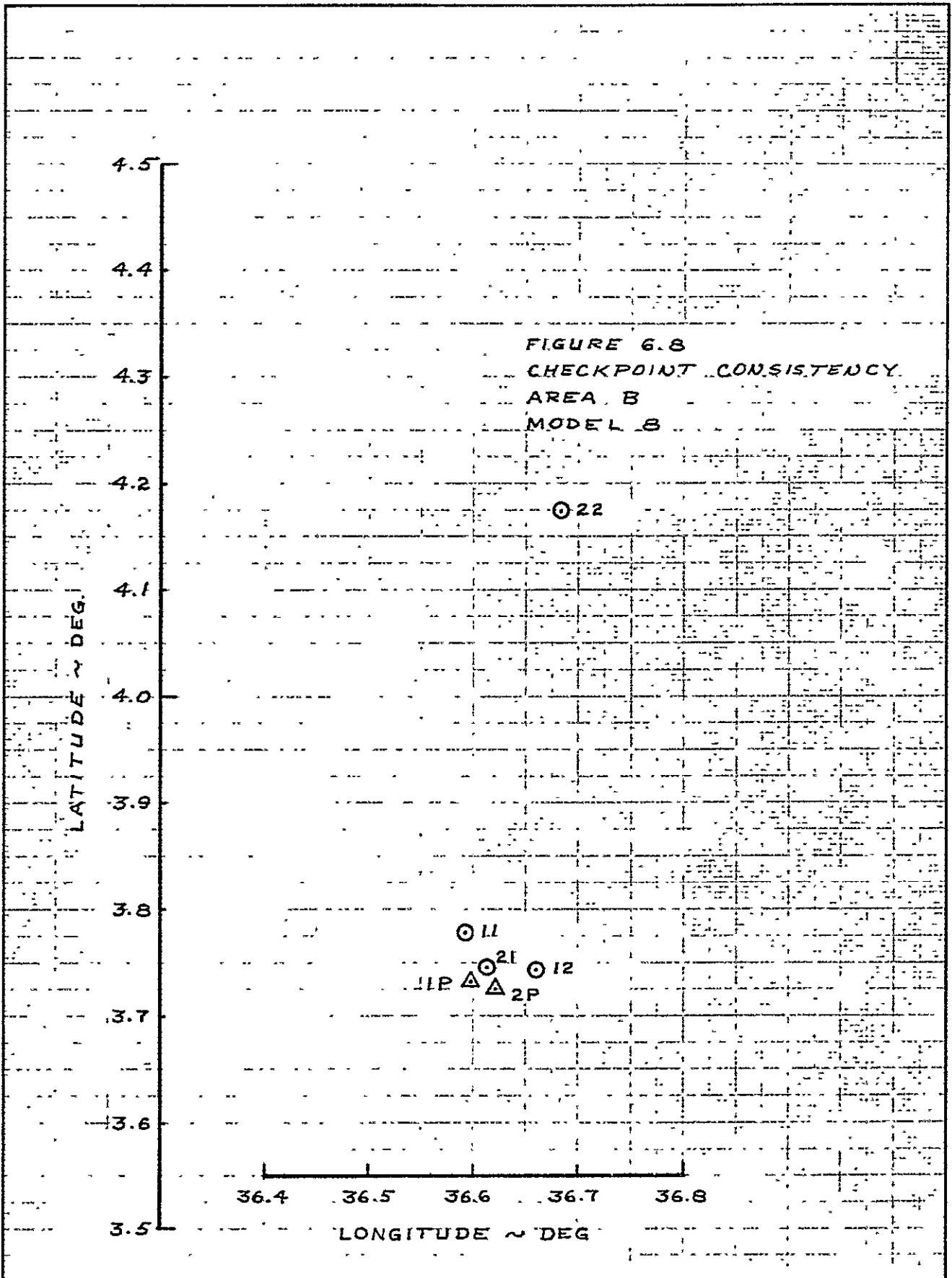


FIGURE 6 7
CHECKPOINT CONSISTENCY
AREA B
MODEL 7





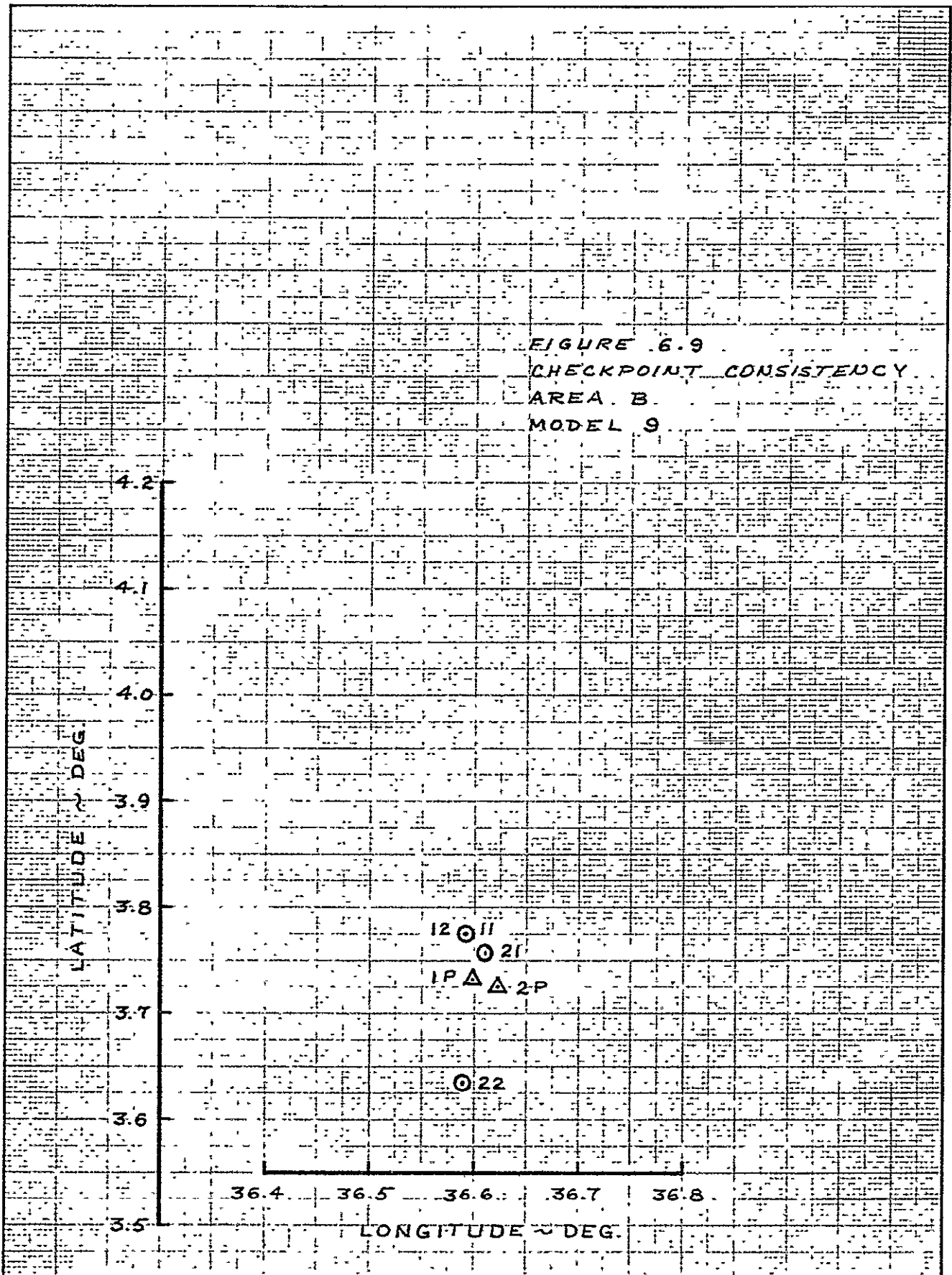
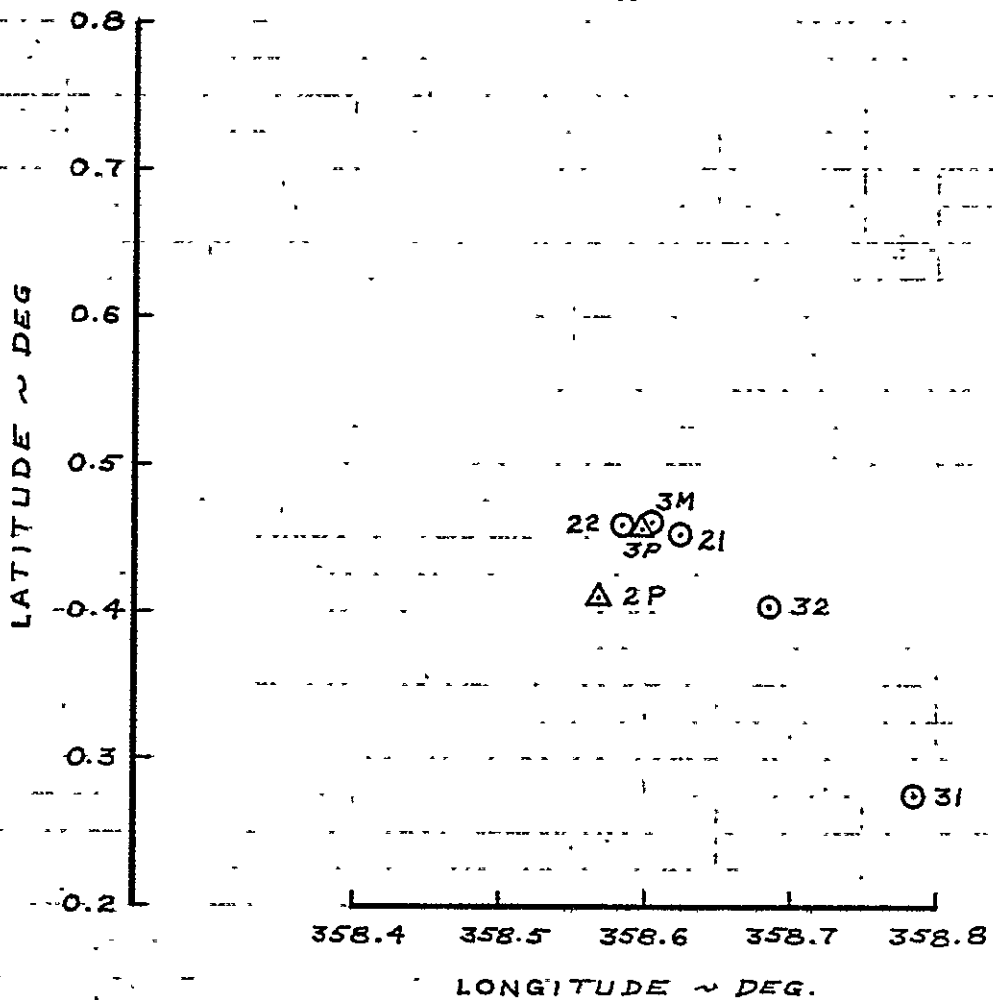
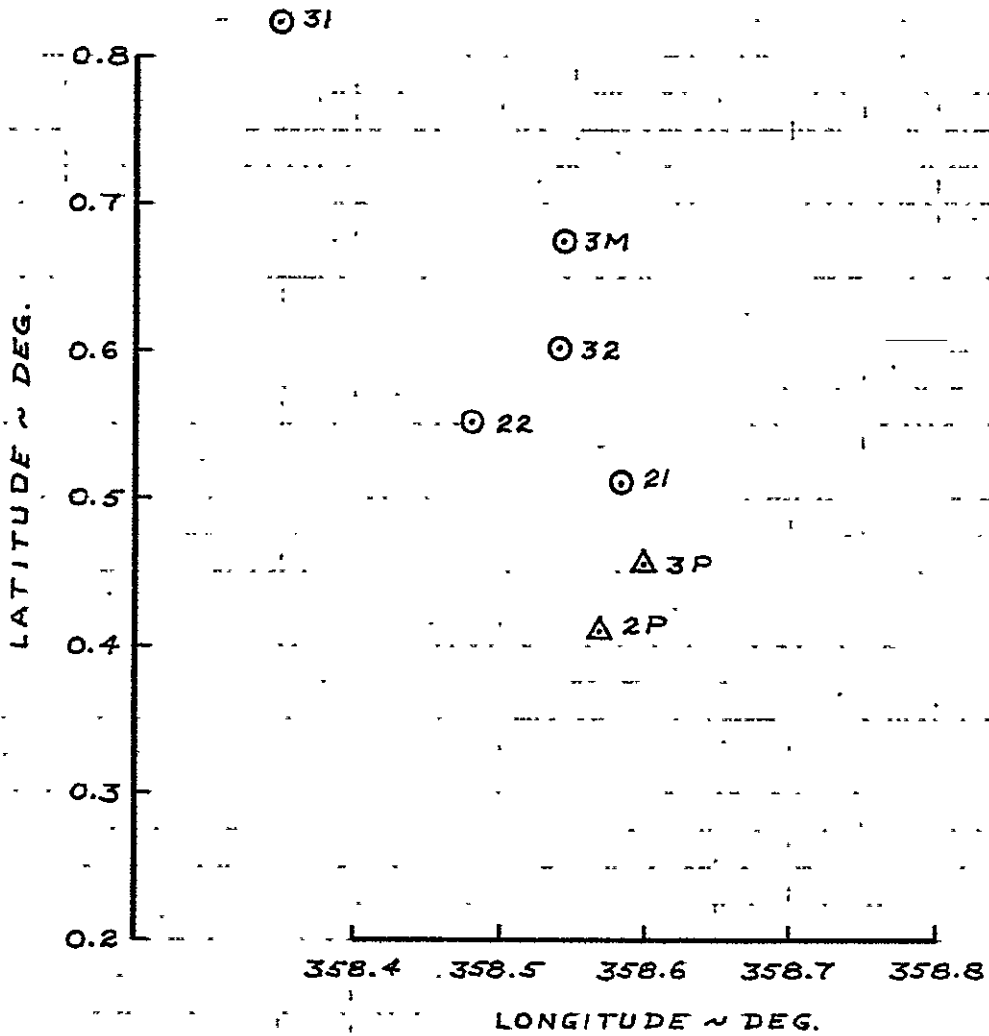


FIGURE 6.10
CHECKPOINT CONSISTENCY
AREA D
MODEL 1



BOEING

FIGURE 6.11
CHECKPOINT CONSISTENCY
AREA D
MODEL 2



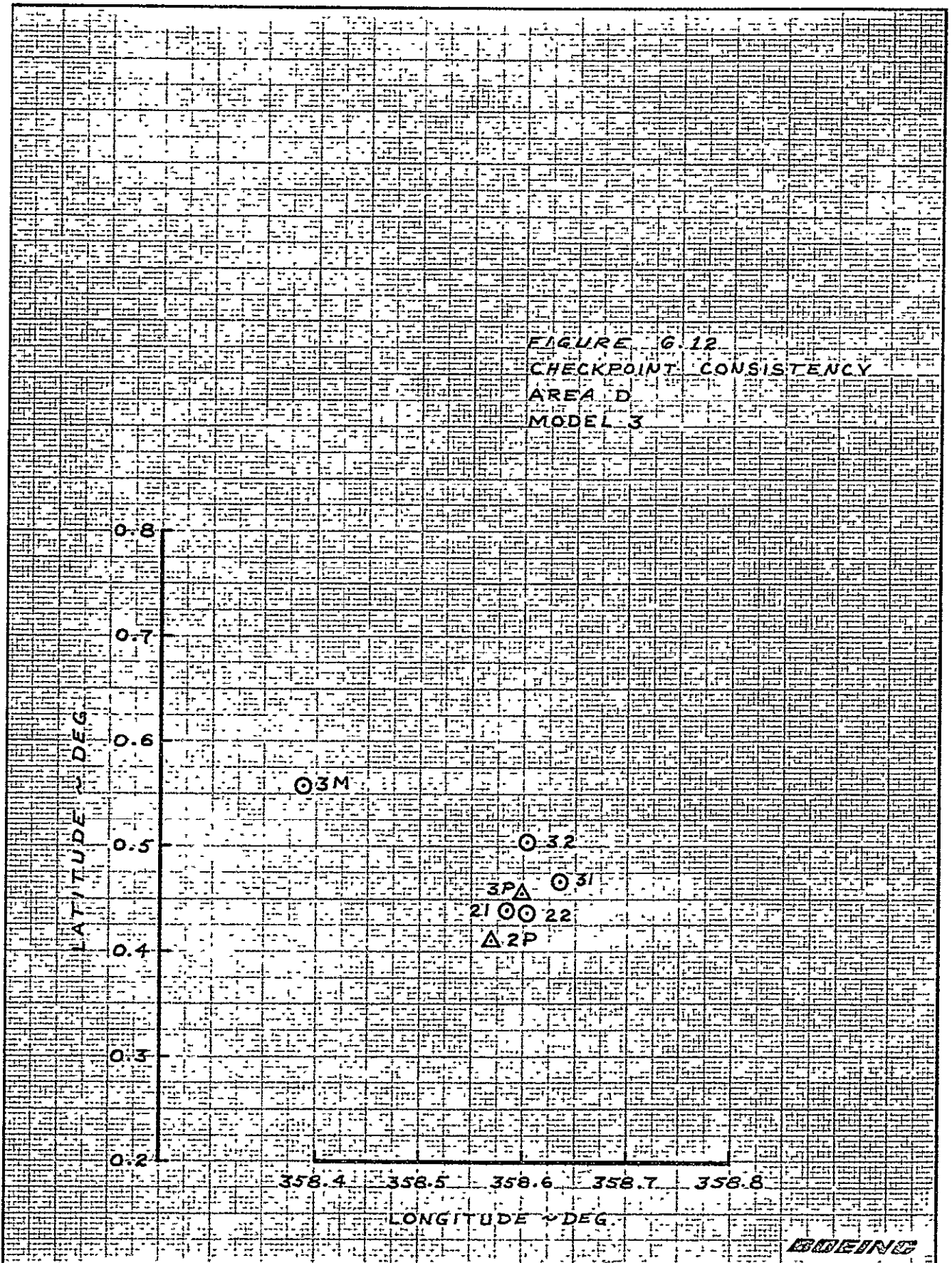
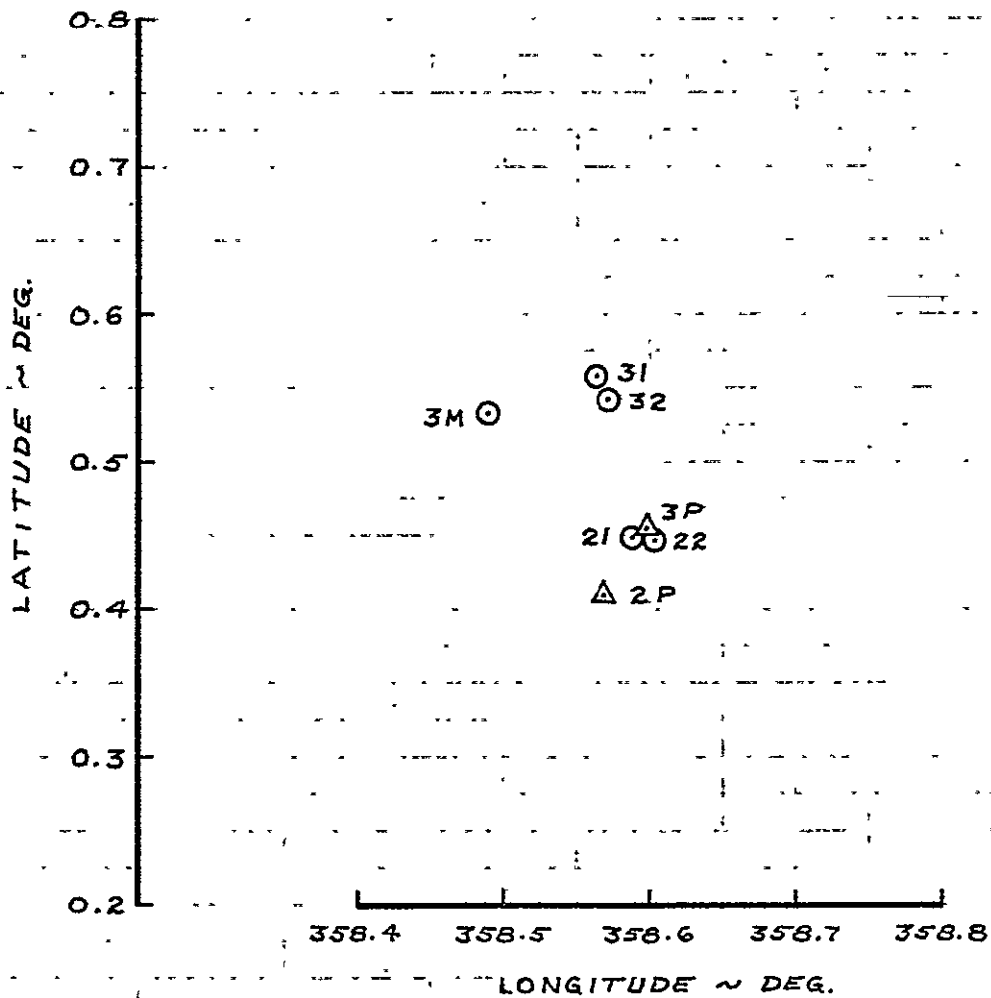
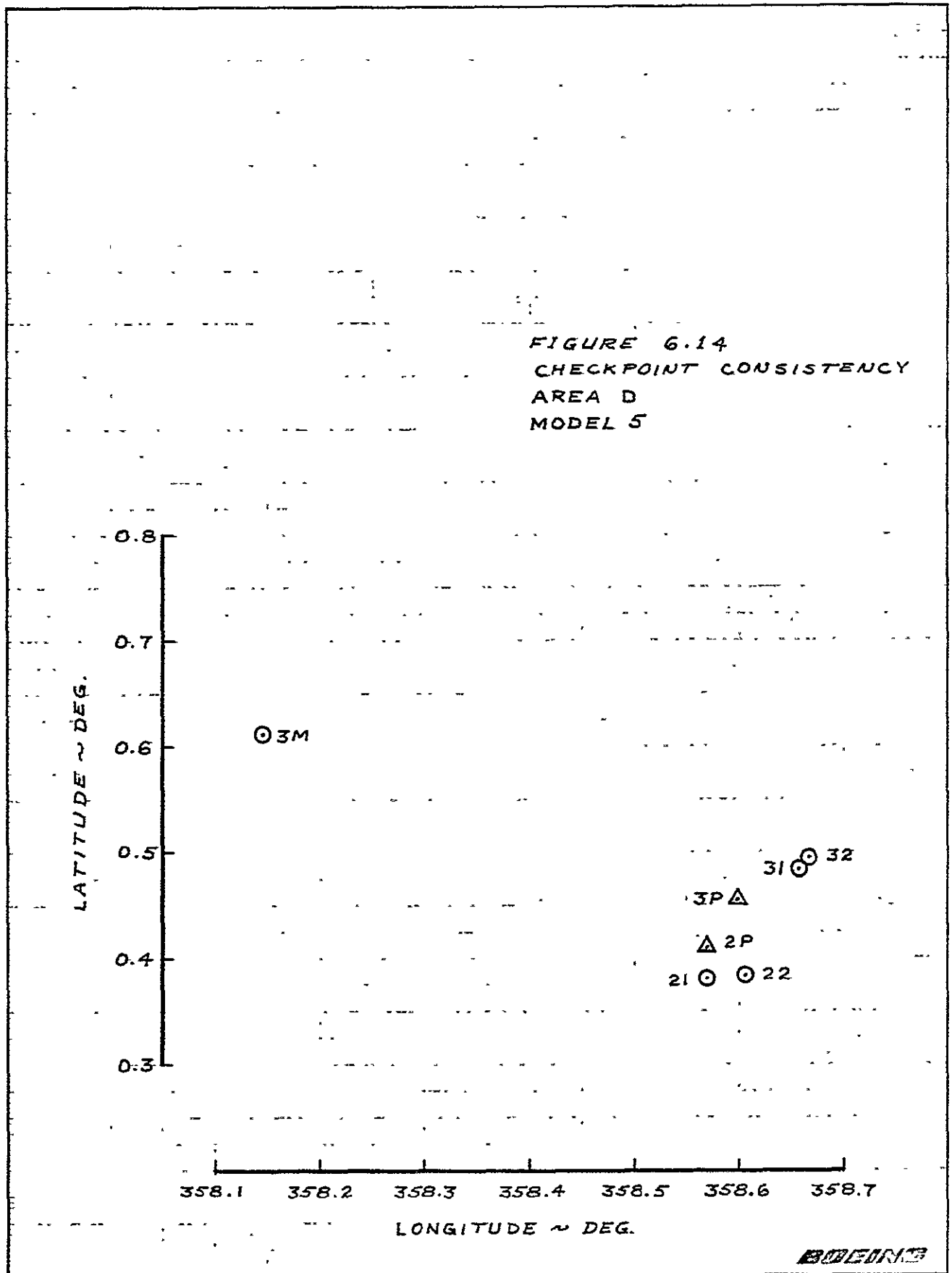


FIGURE 6.13
CHECKPOINT CONSISTENCY
AREA D
MODEL 4



BOEING

FIGURE 6.14
CHECKPOINT CONSISTENCY
AREA D
MODEL 5



BOEING

FIGURE 6.15
CHECKPOINT CONSISTENCY
AREA D
MODEL 6

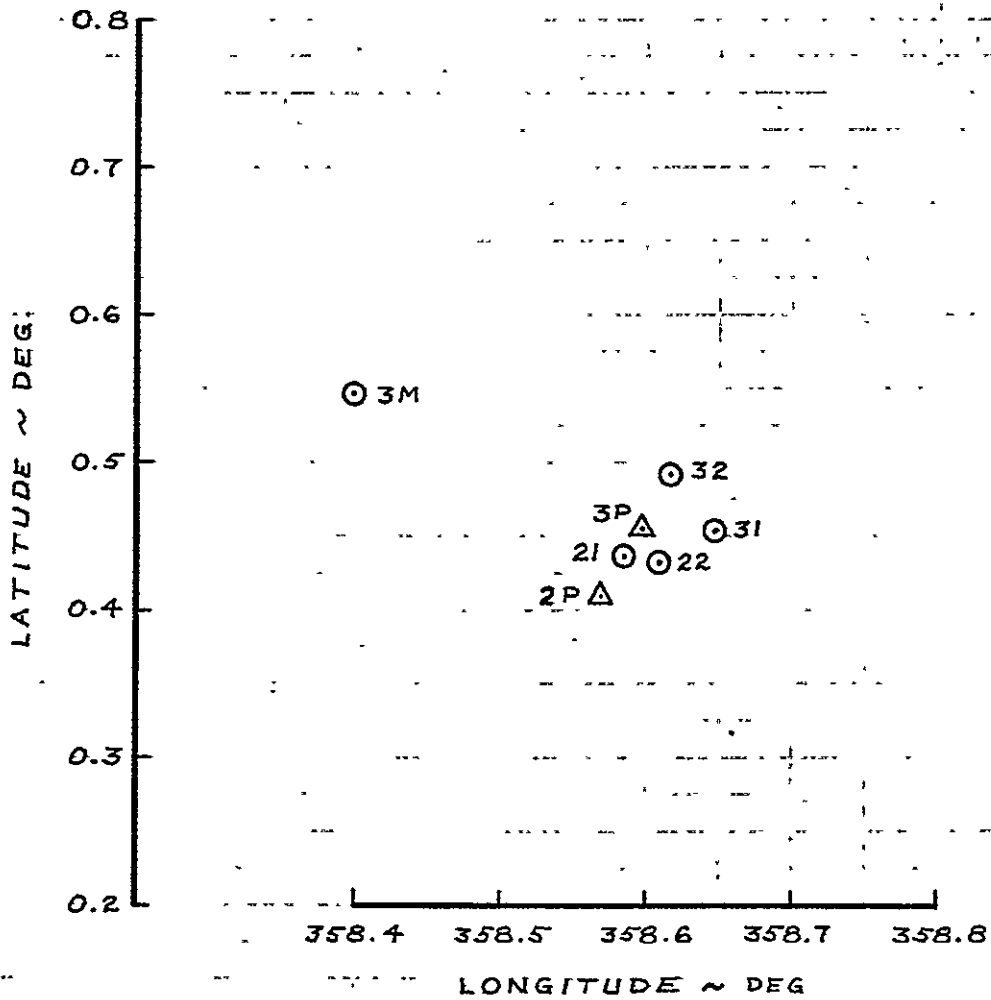
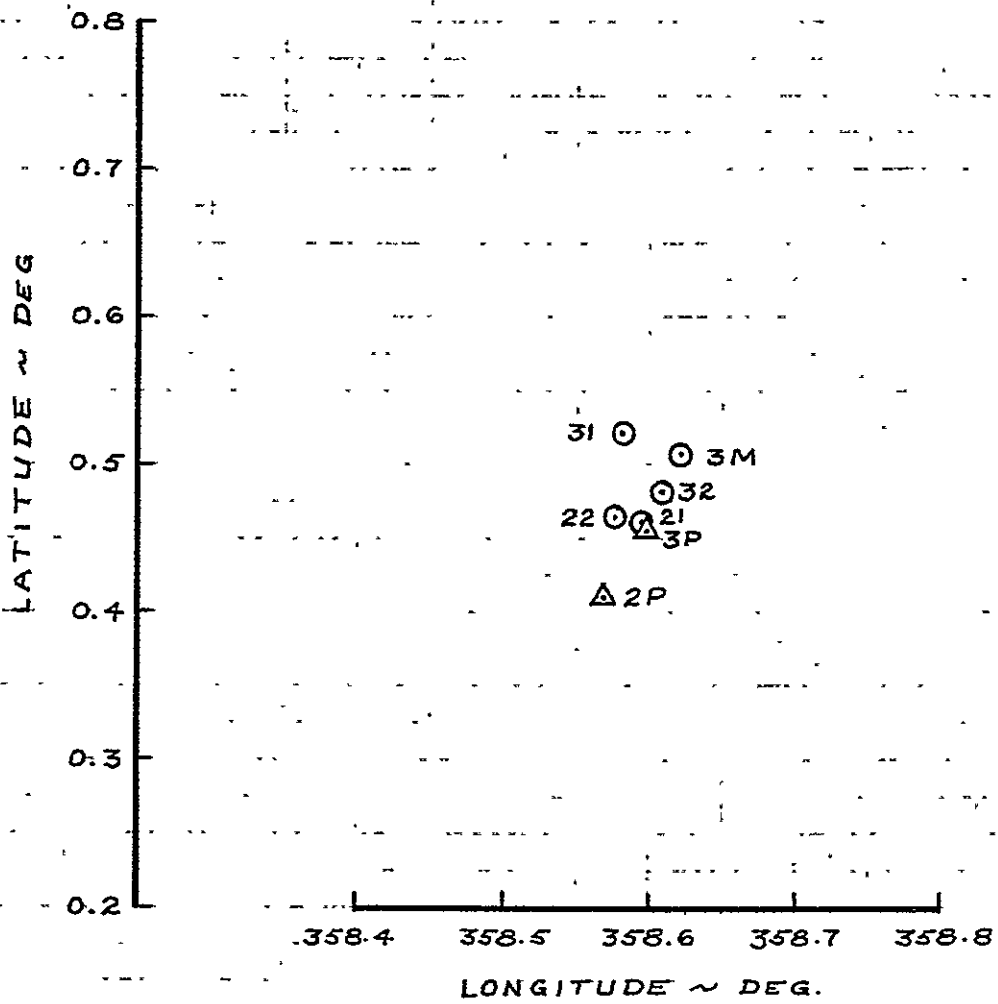
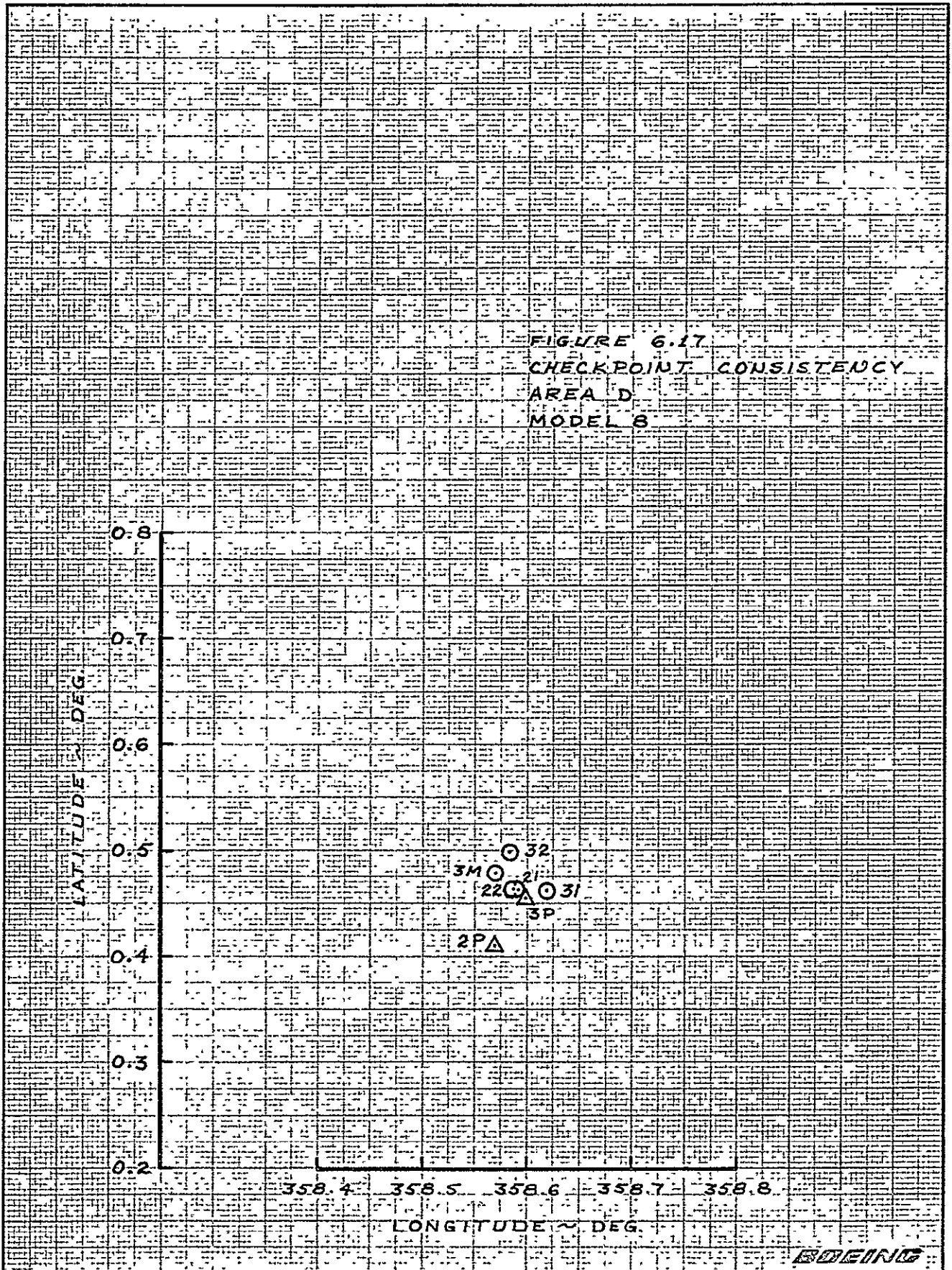
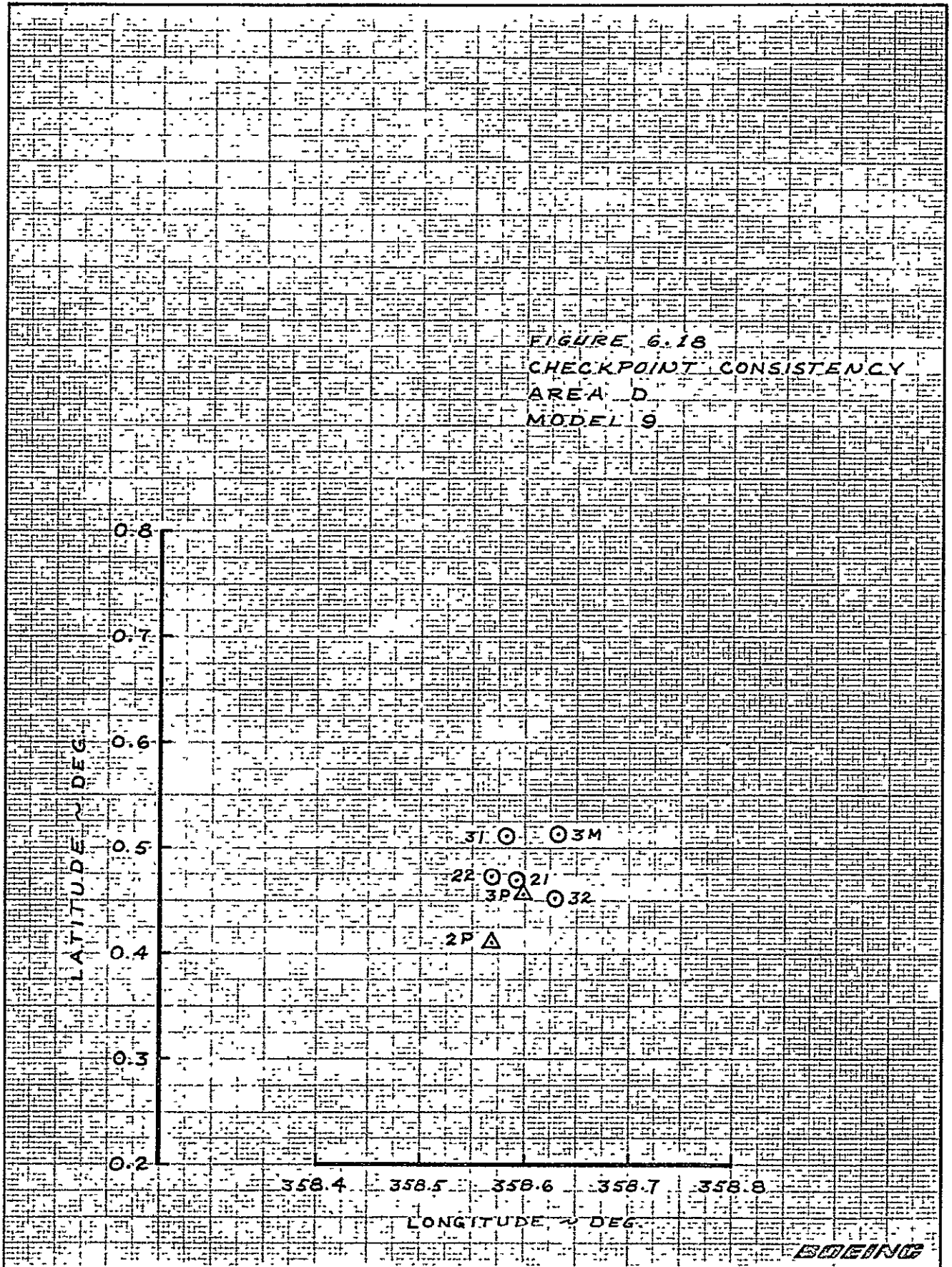


FIGURE 6.16
CHECKPOINT CONSISTENCY
AREA D
MODEL T

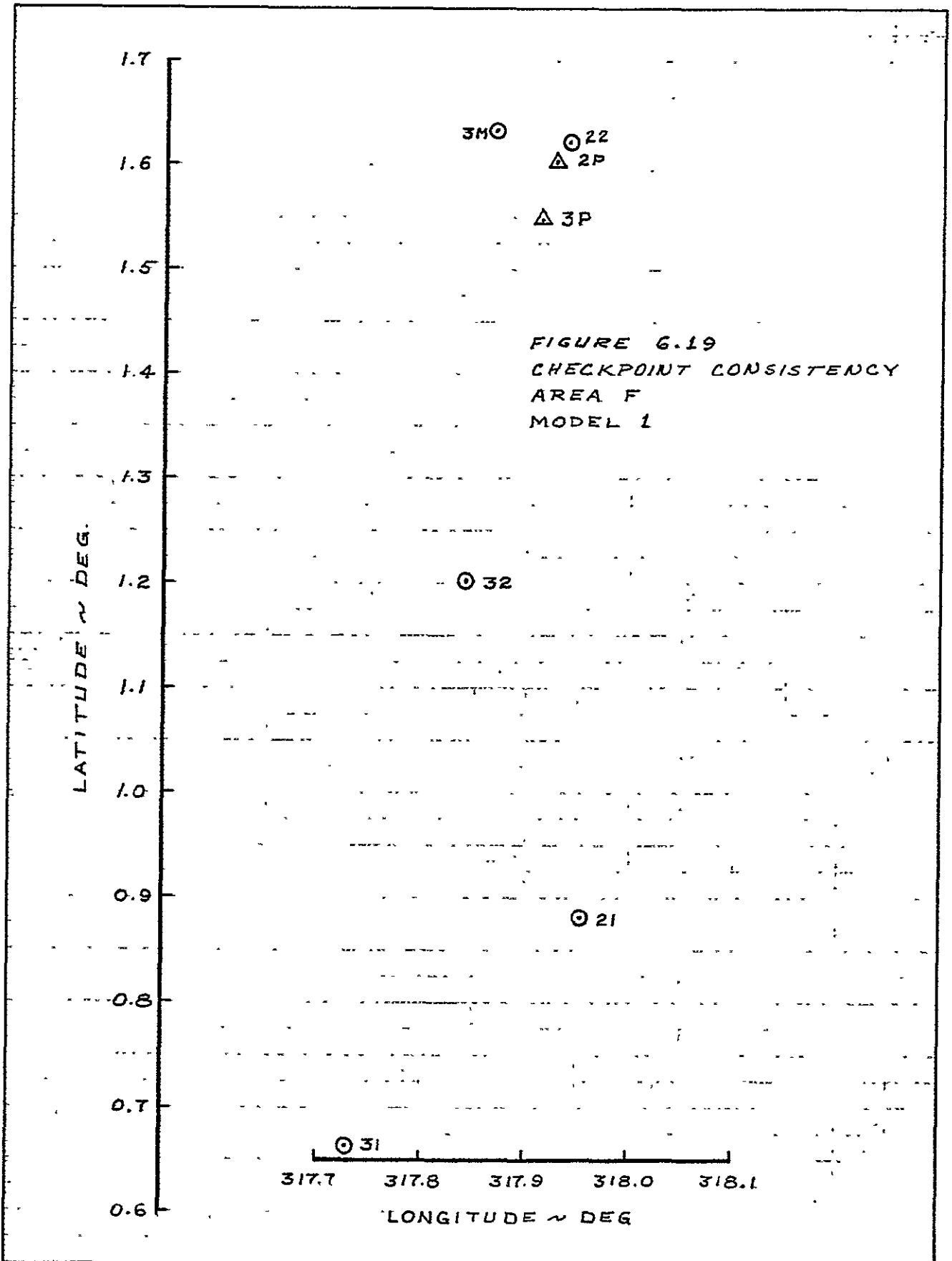


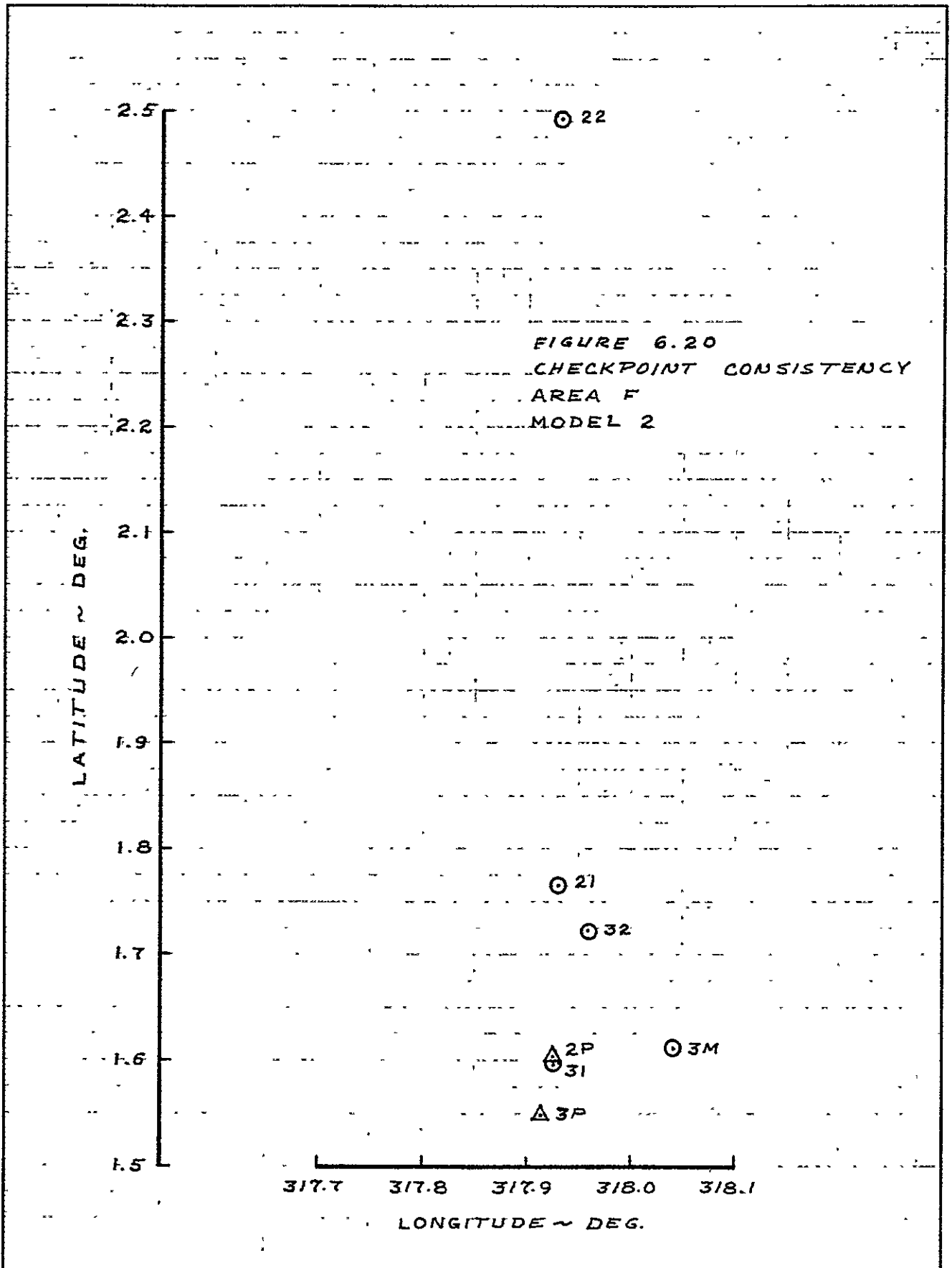
BOEING

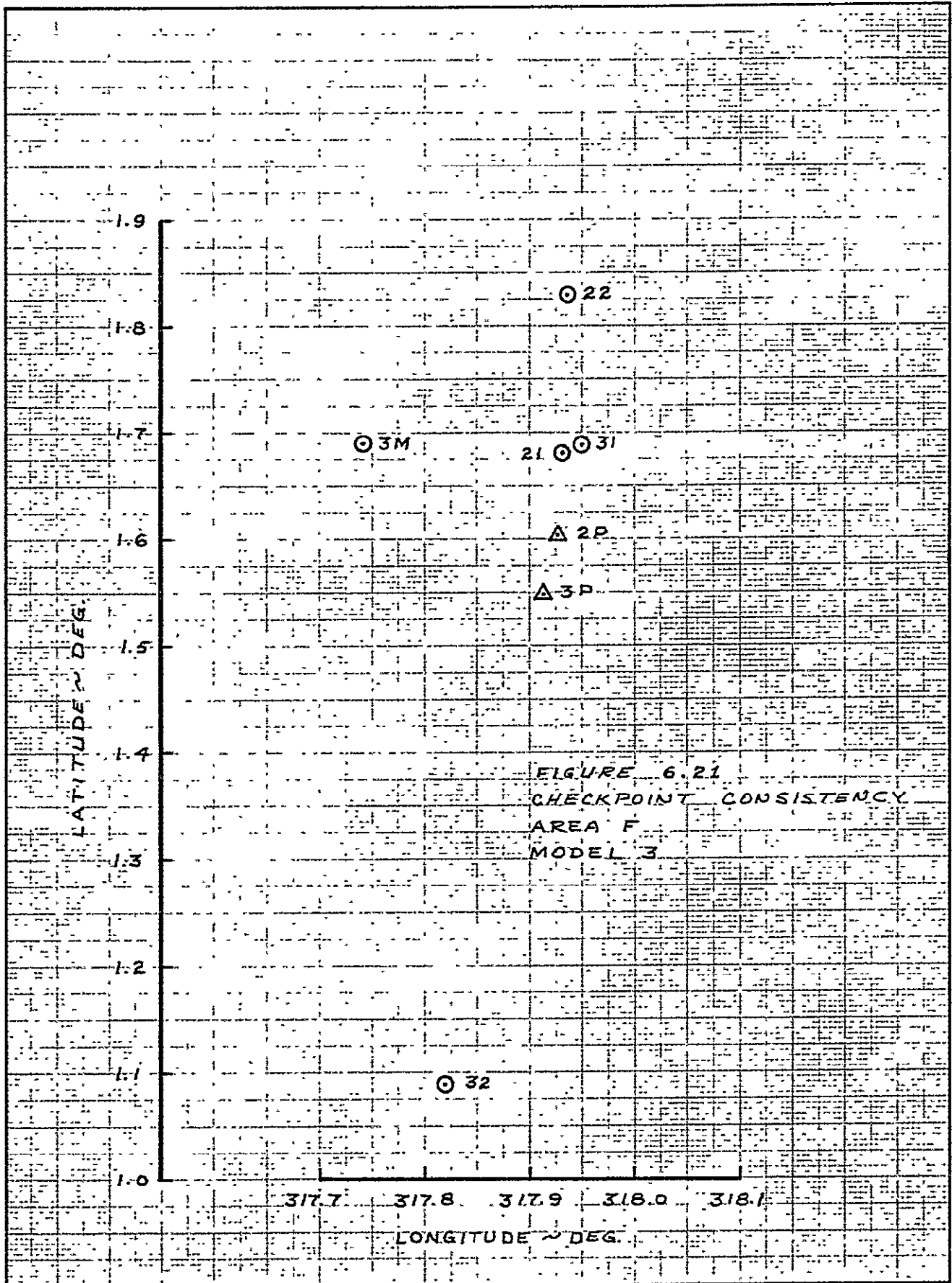


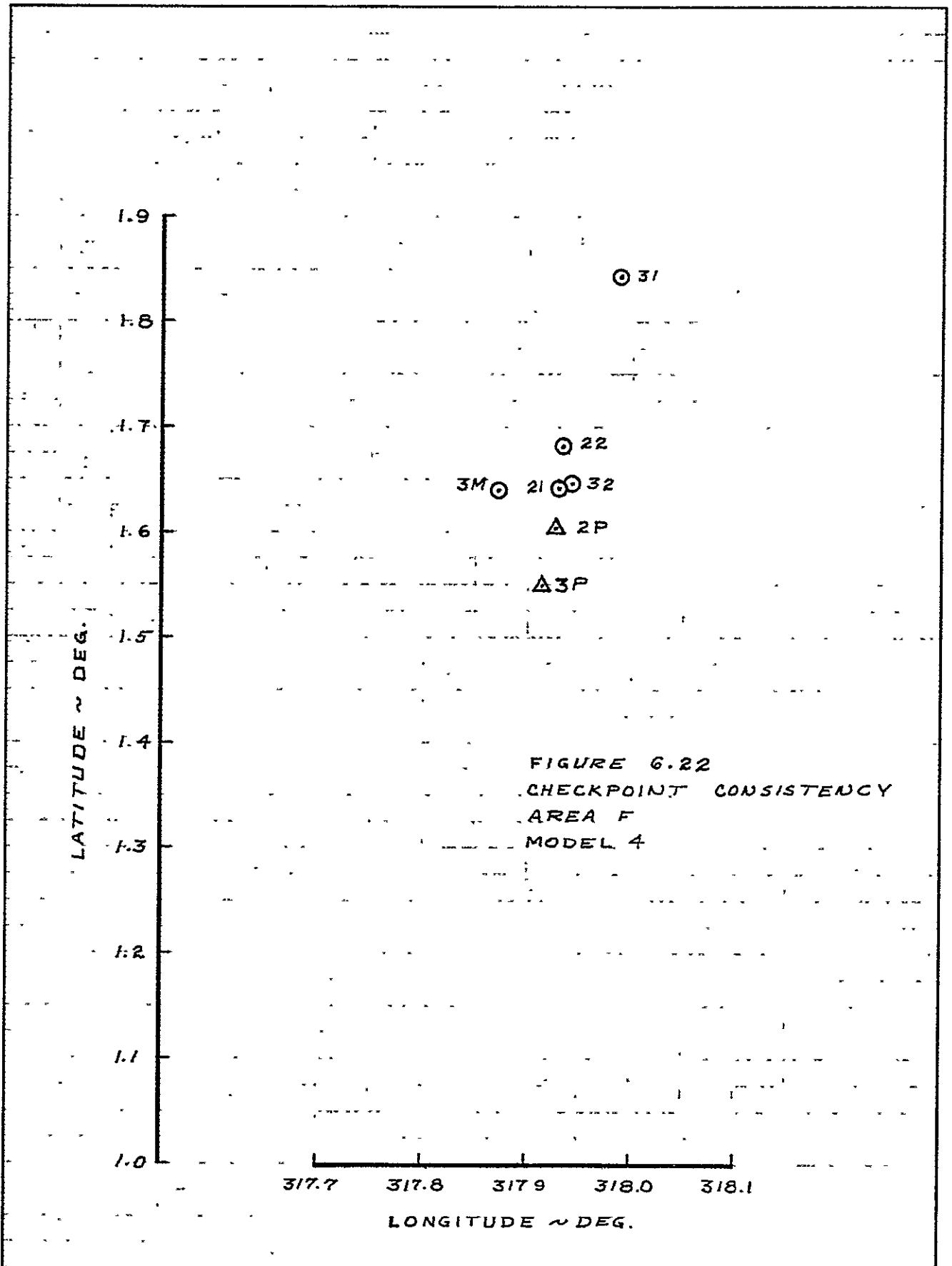


BOEING









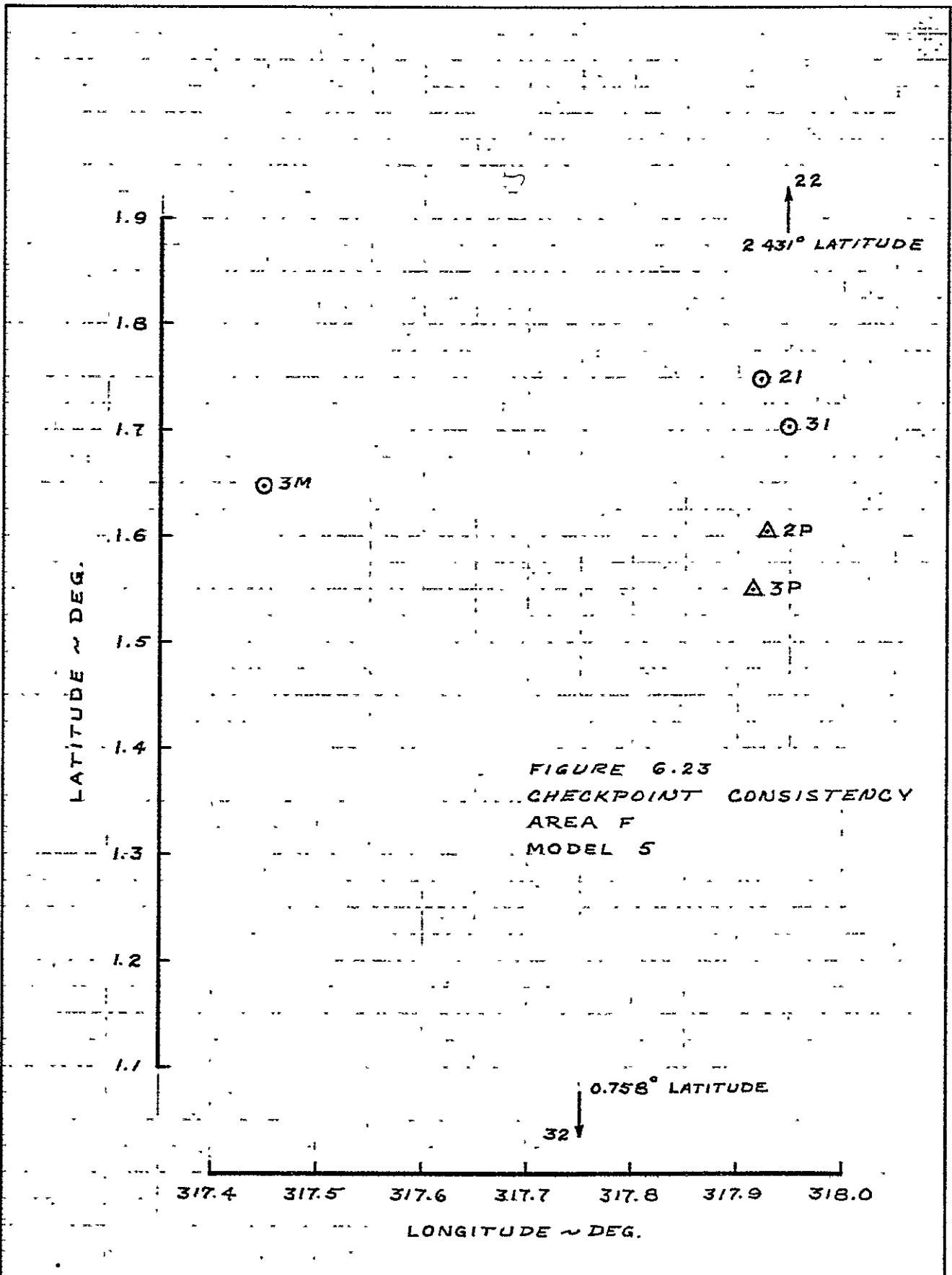


FIGURE 6.23
CHECKPOINT CONSISTENCY
AREA F
MODEL 5

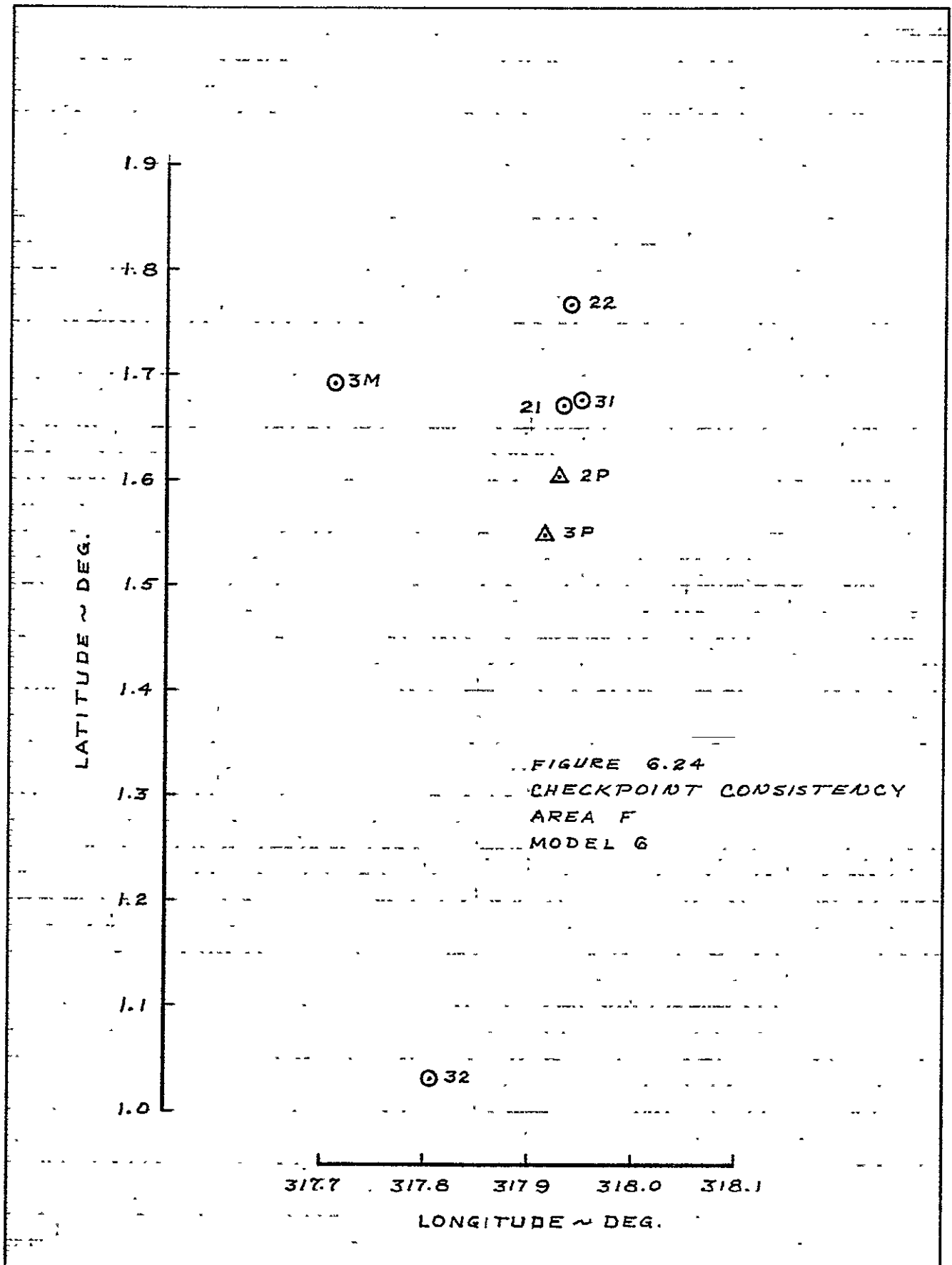
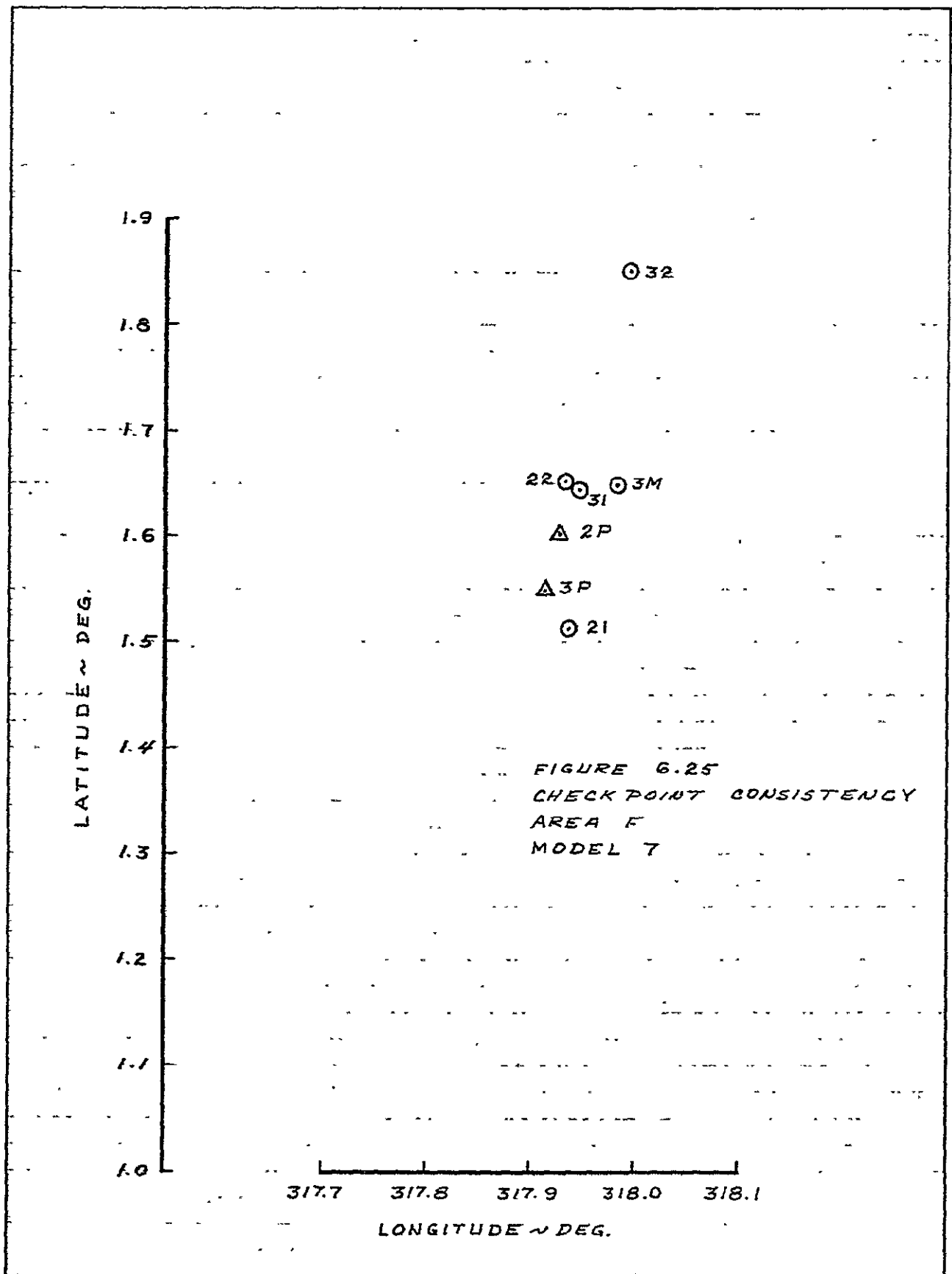


FIGURE 6.24
CHECKPOINT CONSISTENCY
AREA F
MODEL 6



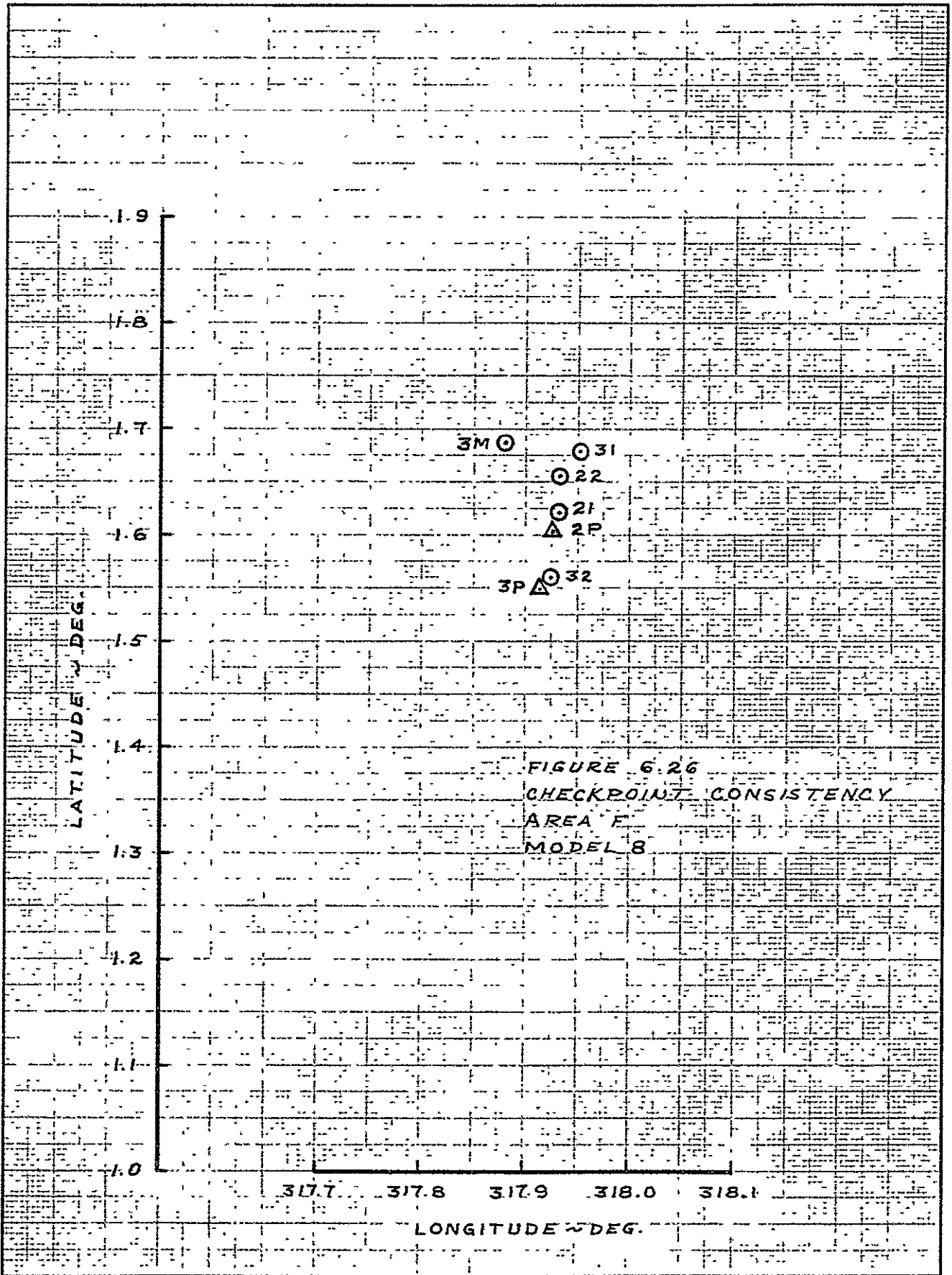


FIGURE 6.26
CHECKPOINT CONSISTENCY
AREA F
MODEL 8

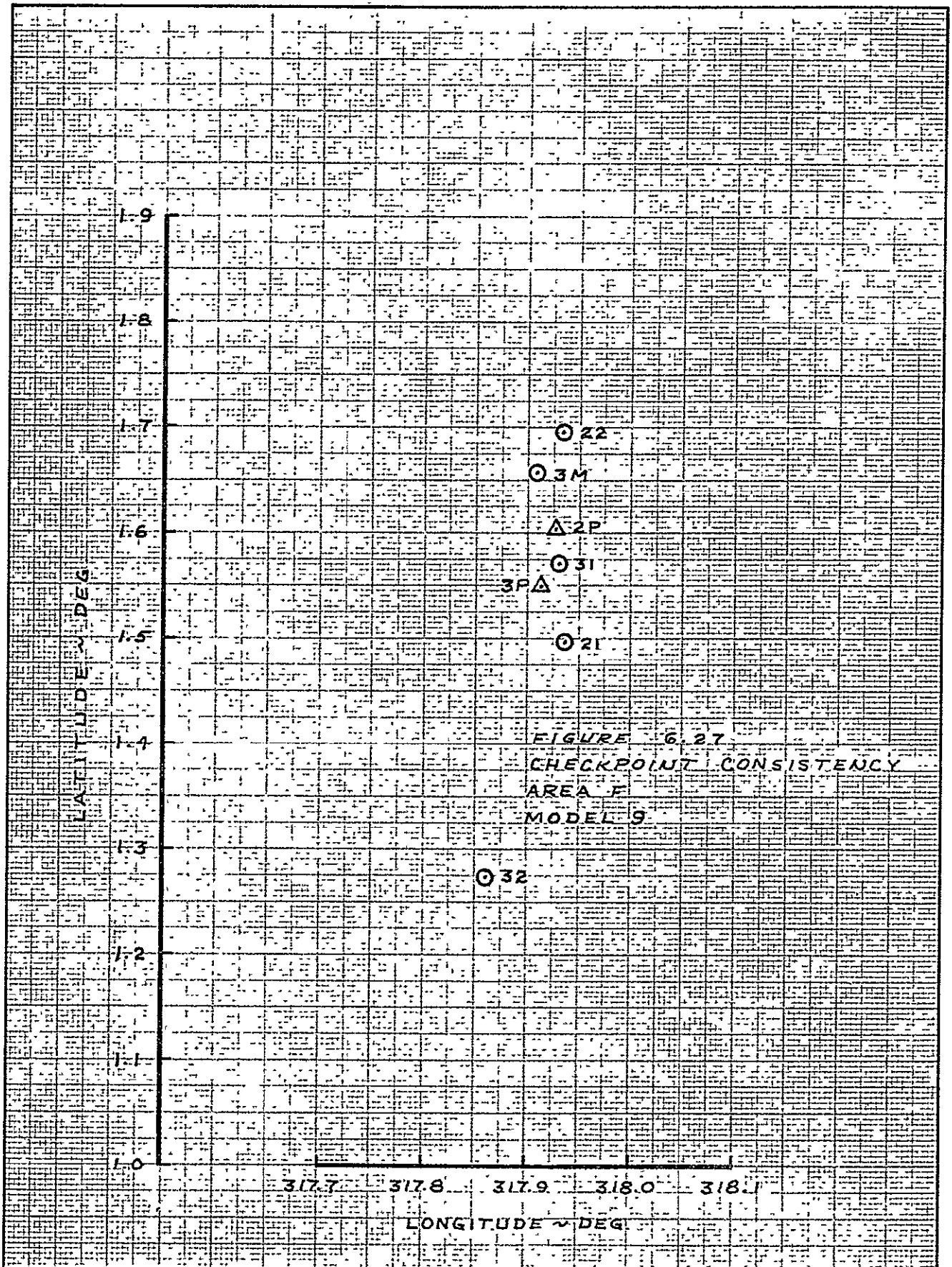


TABLE 6.2
CHECKPOINT LOCATION

LO MISSION I AREA B

<u>Model</u>	<u>Number of Orbits</u>	<u>Checkpoint Location</u>		<u>OD Sum of Squares</u>
		<u>Lat - Deg.</u>	<u>Long - Deg.</u>	
1	1	3.75	36.59	7.880000E+02
1	2	3.80	36.58	2.222200E+04
2	1	3.83	36.59	1.769000E+02
2	2	4.45	36.47	1.126150E+05
3	1	3.78	36.59	6.578000E+02
3	2	3.84	36.59	2.077500E+04
4	1	3.81	36.59	6.709500E+01
4	2	3.86	36.59	7.009900E+04
5	1	3.79	36.60	5.650000E+02
5	2	3.92	36.59	1.525160E+05
6	1	3.77	36.59	6.256300E+02
6	2	3.80	36.59	1.662700E+04
7	1	3.84	36.58	9.437000E+02
7	2	3.62	36.62	5.007000E+03
8	1	3.78	36.59	4.895400E+02
8	2	3.74	36.60	2.155500E+03
9	1	3.78	36.59	1.667200E+02
9	2	3.78	36.59	2.978600E+03

USE FOR TYPEWRITTEN MATERIAL ONLY

TABLE 6.3
CHECKPOINT LOCATION
LO MISSION II AREA B

<u>Model</u>	<u>Number of Orbits</u>	<u>Checkpoint Location</u>		<u>OD Sum of Squares</u>
		<u>Lat - Deg.</u>	<u>Long - Deg.</u>	
1	1	3.50	36.57	7.520000E+03
1	2	2.73	36.42	3.492600E+04
2	1	4.17	36.67	1.862000E+03
2	2	4.77	36.75	1.007340E+05
3	1	3.82	36.63	2.579300E+03
3	2	4.58	36.75	4.946000E+04
4	1	3.83	36.63	9.730000E+02
4	2	DIVERGED		
5	1	3.93	36.65	6.051400E+03
5	2	DIVERGED		
6	1	3.81	36.63	2.588300E+03
6	2	4.66	36.76	4.217100E+04
7	1	3.73	36.61	1.386200E+03
7	2	4.11	36.68	7.926500E+03
8	1	3.75	36.61	1.971000E+03
8	2	4.17	36.68	8.250800E+03
9	1	3.76	36.61	2.730000E+02
9	2	3.64	36.59	1.677000E+03

USE FOR TYPEWRITTEN MATERIAL ONLY

TABLE 6.4
CHECKPOINT LOCATION
LO MISSION II AREA D

<u>Model</u>	<u>Number of Orbits</u>	<u>Checkpoint Location</u>		<u>OD Sum of Squares</u>
		<u>Lat - Deg.</u>	<u>Long - Deg.</u>	
1	1	0.451	358.62	2.491300E+04
1	2	0.459	358.59	6.263400E+04
2	1	0.511	358.58	8.636700E+03
2	2	0.552	358.48	1.827060E+05
3	1	0.439	358.58	1.392100E+03
3	2	0.436	358.60	1.883300E+04
4	1	0.449	358.59	1.583100E+03
4	2	0.446	358.60	6.479800E+03
5	1	0.380	358.57	2.109500E+03
5	2	0.384	358.61	3.100300E+05
6	1	0.437	358.59	1.288600E+03
6	2	0.431	358.61	2.239700E+04
7	1	0.461	358.60	9.600900E+02
7	2	0.465	358.58	9.831000E+03
8	1	0.462	358.59	1.412400E+03
8	2	0.464	358.59	7.346800E+03
9	1	0.468	358.59	2.094500E+03
9	2	0.473	358.57	2.113900E+04

USE FOR TYPEWRITTEN MATERIAL ONLY

TABLE 6.5
CHECKPOINT LOCATION

LO MISSION III AREA D

<u>Model</u>	<u>Number of Orbits</u>	<u>Checkpoint Location</u>		<u>OD Sum of Squares</u>
		<u>Lat - Deg.</u>	<u>Long - Deg.</u>	
1	1	0.275	358.79	1.663300E+04
1	2	0.405	358.69	8.033000E+04
2	1	0.824	358.35	1.277700E+04
2	2	0.601	358.54	3.424430E+05
3	1	0.467	358.64	1.191600E+03
3	2	0.505	358.60	3.301500E+03
4	1	0.558	358.56	1.175800E+03
4	2	0.542	358.57	1.017800E+04
5	1	0.483	358.66	8.289600E+02
5	2	0.495	358.67	6.990900E+04
6	1	0.452	358.65	1.152600E+03
6	2	0.491	358.62	6.592500E+03
7	1	0.521	358.58	1.737000E+03
7	2	0.481	358.61	3.190000E+04
8	1	0.461	358.62	1.543300E+03
8	2	0.499	358.58	4.153800E+04
9	1	0.512	358.58	9.866500E+02
9	2	0.452	358.63	2.206800E+04

USE FOR TYPEWRITTEN MATERIAL ONLY

TABLE 6.6
- CHECKPOINT LOCATION
LO MISSION II AREA F

<u>Model</u>	<u>Number of Orbits</u>	<u>Checkpoint Location</u>		<u>OD Sum of Squares</u>
		<u>Lat - Deg.</u>	<u>Long - Deg.</u>	
1	1	0.88	317.95	1.250000E+04
1	2	1.62	317.94	2.740300E+04
2	1	1.77	317.93	3.003600E+03
2	2	2.49	317.93	1.289020E+05
3	1	1.68	317.93	1.367700E+03
3	2	1.83	317.94	3.797100E+04
4	1	1.64	317.93	1.906800E+03
4	2	1.68	317.93	1.052600E+04
5	1	1.75	317.92	3.280000E+03
5	2	2.43	317.95	3.593320E+05
6	1	1.67	317.93	1.279400E+03
6	2	1.77	317.94	4.572200E+04
7	1	1.51	317.94	1.060400E+03
7	2	1.65	317.93	3.541600E+03
8	1	1.62	317.93	8.888000E+02
8	2	1.65	317.93	2.432700E+03
9	1	1.50	317.94	3.490100E+03
9	2	1.70	317.93	8.618200E+03

USE FOR TYPEWRITTEN MATERIAL ONLY

TABLE 6.7
CHECKPOINT LOCATION

LO MISSION III AREA F

<u>Model</u>	<u>Number of Orbits</u>	<u>Checkpoint Location</u>		<u>OD Sum of Squares</u>
		<u>Lat - Deg.</u>	<u>Long - Deg.</u>	
1	1	0.67	317.73	2.484300E+04
1	2	1.20	317.84	5.414200E+04
2	1	1.60	317.93	1.109600E+04
2	2	1.72	317.96	2.653030E+05
3	1	1.69	317.95	2.482800E+03
3	2	1.09	317.82	3.570600E+04
4	1	1.84	317.99	5.820800E+03
4	2	1.65	317.94	1.021800E+04
5	1	1.70	317.95	3.943100E+03
5	2	0.76	317.75	2.308000E+05
6	1	1.68	317.95	2.402200E+03
6	2	1.03	317.81	3.717500E+04
7	1	1.65	317.95	1.858600E+03
7	2	1.85	317.99	5.467500E+03
8	1	1.68	317.95	1.834500E+03
8	2	1.56	317.92	4.759800E+03
9	1	1.57	317.93	4.725300E+03
9	2	1.27	317.96	3.806300E+04

USE FOR TYPEWRITTEN MATERIAL ONLY

TABLE 6.8
MAPPING
CHECKPOINT LOCATION
LO MISSION III AREA D

<u>Model</u>	<u>Number of Orbits</u>	<u>Checkpoint Location</u>		<u>OD Sum of Squares</u>
		<u>Lat - Deg.</u>	<u>Long - Deg.</u>	
1	1	0.460	358.61	1.602500E+04
2	1	0.674	358.54	8.944600E+03
3	1	0.558	358.39	2.579300E+03
4	1	0.533	358.49	1.147000E+03
5	1	0.611	358.15	2.703400E+03
6	1	0.547	358.40	2.844800E+03
7	1	0.507	358.62	3.237200E+03
8	1	0.479	358.57	2.787700E+03
9	1	0.513	358.63	7.493700E+02

USE FOR TYPEWRITTEN MATERIAL ONLY

TABLE 6.9
MAPPING
CHECKPOINT LOCATION
LO MISSION III AREA F

<u>Model</u>	<u>Number of Orbits</u>	<u>Checkpoint Location</u>		<u>OD Sum of Squares</u>
		<u>Lat - Deg.</u>	<u>Long - Deg.</u>	
1	1	1.63	317.87	2.532800E+04
2	1	1.61	318.04	8.831700E+03
3	1	1.69	317.74	1.714400E+03
4	1	1.64	317.87	5.815700E+03
5	1	1.65	317.45	3.052000E+03
6	1	1.69	317.71	1.564000E+03
7	1	1.65	317.98	1.134000E+03
8	1	1.69	317.88	1.391600E+03
9	1	1.66	317.91	3.252000E+03

USE FOR TYPEWRITTEN MATERIAL ONLY

7.0 MODEL EVALUATION SUMMARY

7.1 CONVERGENCE

The method of convergence to a solution (spacecraft position and velocity) using an orbit determination program (ODP) is a measure of model acceptability. During a situation of real time mission control it is necessary that the ODP converge to a solution with certainty and rapidity to guarantee mission success.

Table 7.1 is a summary of the number of iterations necessary to obtain a solution for each of the orbit determinations accomplished in this study. The two columns of numbers under the one and two orbit headings are for the two missions which contain photographs in that checkpoint area. The column titled "Mappings" is the result of the one orbit fits which are mapped forward 3 1/2 orbits to the camera on-time. The average number of iterations to converge is shown in the column on the right. A serious problem exists in Models 4 and 5 in that the two orbit arc for checkpoint area B, Mission II, did not converge. This in necessity eliminates these two models from consideration for Apollo mission control. Based on the information in this table the last three models (7, 8 and 9) are the obvious choice concerning the convergence criteria.

7.2 DISPERSIONS

An important consideration for the tasking of lunar model effectiveness is checkpoint consistency. This consistency for each of the models tested is shown in Table 7.2 in the column titled "Maximum Dispersions" (see Figure 7.1). The dispersion tabulated is the distance on the lunar surface between the extreme points on the checkpoint plot which indicate predicted locations of the same lunar feature. The dispersions listed for Models 4 and 5 in checkpoint area B are not realistic values since the orbit determination program did not converge to a solution for the Mission II, two orbit case.

Another test of model effectiveness was to compare the deviations in the mean (see Figure 7.1) between the checkpoint plots generated by each model tested and the results of the photo site accuracy analysis conducted to determine the most accurate estimate of Lunar Orbiter photo locations. This comparison is tabulated in Table 7.2 under the column headed "Deviation in Mean."

The ability of each model to map solutions forward in time is also a serious requirement for the study of model effectiveness. An orbit determination solution was mapped forward 3 1/2 orbits to the camera-on time in order to investigate this mapping capability. The information tabulated in the column titled "Mapping Deviations" (see Figure 7.1) in Table 7.2 is the distance on the lunar surface between the predicted checkpoint location based on the mapping and the best estimate of the checkpoint location resulting from the photo site accuracy analysis.

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MODEL EVALUATION SUMMARY

~ CONVERGENCE

TABLE 7.1

MODEL	CHECKPOINT	ITERATIONS TO CONVERGE					
		ONE ORBIT		TWO ORBIT	MAPPINGS	AVERAGE	
1	B	3	4	4	8	4	5
	D	3	7	3	6		
	F	4	8	4	7		
2	B	3	4	5	22	6	7
	D	3	6	5	6		
	F	8	6	7	15		
3	B	3	5	4	13	4	5
	D	3	3	4	4		
	F	5	7	5	7		
4	B	2	4	4	*	4	*
	D	3	4	4	5		
	F	5	5	5	4		
5	B	3	4	5	*	4	*
	D	3	4	4	4		
	F	4	5	6	13		
6	B	5	4	4	9	4	4.5
	D	4	4	4	4		
	F	5	4	4	6		
7	B	3	3	4	7	5	4
	D	3	6	3	4		
	F	4	5	4	5		
8	B	3	3	3	8	5	4
	D	3	4	3	4		
	F	4	5	4	5		
9	B	3	3	4	5	5	4
	D	3	4	4	4		
	F	4	4	5	5		

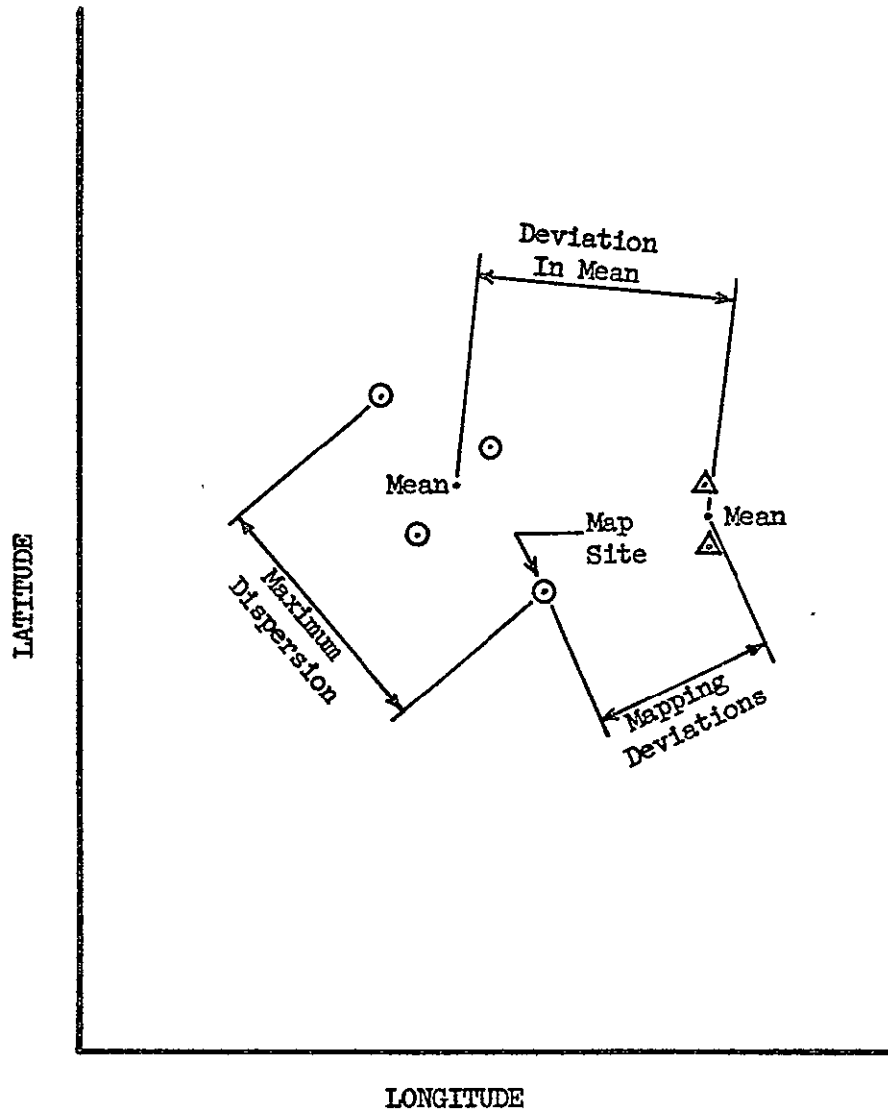
* OD DID NOT CONVERGE

BOEING

BOEING
 NO. 57
 D2-100820-1

FIGURE 7.1

DEFINITION OF EVALUATION TERMINOLOGY



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MODEL EVALUATION SUMMARY

~ DISPERSIONS

TABLE 7.2

MODEL	CHECKPOINT	MAXIMUM DISPERSION~km	DEVIATION IN MEAN~km	MAPPING DEVIATIONS~km
1	B	9.0	1.6	
	D	8.2	2.3	1.0
	F	29.4	11.4	2.3
2	B	19.0	12.6	
	D	11.8	6.5	7.4
	F	27.0	7.9	3.8
3	B	1.8	2.4	
	D	7.9	1.6	7.0
	F	22.5	1.5	6.4
4	B	1.5	3.1	
	D	4.3	2.3	4.1
	F	7.1	3.4	2.4
5	B	4.6	4.6	
	D	16.1	2.0	14.2
	F	50.5	4.3	1.4
6	B	1.5	2.1	
	D	8.0	1.3	6.5
	F	22.5	1.6	7.2
7	B	6.5	0.1	
	D	1.9	1.7	2.5
	F	10.3	2.8	2.9
8	B	2.2	0.9	
	D	1.6	1.2	1.5
	F	4.1	1.9	4.0
9	B	0.8	1.3	
	D	2.3	1.6	2.8
	F	12.9	1.2	2.4

BOEING

BOEING
 SH NO D2-100820-1
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7.2 DISPERSIONS (Continued)

The requirement for an acceptable lunar gravitational model is that the numbers tabulated in all three columns must be small. Any large number indicates some deficiency in the model and therefore its inadequacy for Apollo mission control. Again, Models 7, 8 and 9 appear to stand out as superior to the other models tested.

7.3 RANKING

The objective of this study was to determine the best lunar gravitational model (of the nine investigated) for Apollo mission control. The ranking of the models was accomplished using the data discussed in the preceding sections. Table 7.3 presents the ranking of the nine candidate models based on the data available concerning checkpoint consistency, mapping ability and rapidity of convergence.

The last four models in the table are not ranked due to their poor performance and therefore cannot be considered for mission control. This applies especially to the last two models (Model numbers 4 and 5) for which the orbit determination program would not converge to a solution. Model numbers six and three were ranked in fourth and third place respectively due to their poor mapping performance. Models seven and nine were ranked second since they were fair in checkpoint consistency and mapping and also allowed rapid convergence to a solution.

Model number 8 (Boeing R-2) was ranked as the best model considering all the evaluation criteria and also the fact that it consists of only four elements which allows its use in the Apollo onboard computer.

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MODEL EVALUATION SUMMARY

~ RANKING

TABLE 7.3

RANK	MODEL		CONSISTENCY	COMMENTS	
	NUMBER	DESCRIPTION		MAPPING	OD CONVERGENCE
1	8	BOEING R-2	GOOD	FAIR	RAPID
2	9	LRC 10/25/68	FAIR	GOOD	RAPID
2	7	LRC 11/11/66	FAIR	FAIR	RAPID
3	3	TRIAxIAL	FAIR	POOR	MODERATE
4	6	BOEING R-1	FAIR	POOR	MODERATE
-	1	BELLCOMM 1	POOR	FAIR	SLOW
-	2	BELLCOMM 2	POOR	POOR	SLOW
-	4	MOD 4 TH ORDER	POOR	POOR	DIVERGED (2 ORBIT)
-	5	MSC ONBOARD	POOR	POOR	DIVERGED (2 ORBIT)

BOEING
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BOEING

8.0 REFERENCES

1. Hansen, T. J., "Lunar Orbiter Photo Site Accuracy Analysis - Final Report - Photo Site Analysis," Document D2-100814-1, October 1968, The Boeing Company, Seattle, Washington.
2. Risdal, R. E., "Development of a Simple Lunar Model for Apollo - Final Report," Document D2-100819-1, December 1968, The Boeing Company, Seattle, Washington.

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APPENDIX A

This section contains the reports generated by the orbit determination program (ODPL). For each case there are two reports: one at the epoch of the data arc and the other at the photo time. Section 5.10 of each report specifies the type of report.

The following key will be helpful to determine which case is associated with a given report. In Section 5.1 of the OD report the identification number specifies the case.

An example format of the ID number is:

1B11P

where

- . number in first position specifies the Lunar Orbiter mission number
- . letter in second position indicates the checkpoint area
- . number in third position specifies the Lunar model used
- . number in fourth position indicates the number of orbits in the data arc:
- . letter in the fifth position indicates whether the report is for:

P - photo time within OD data arc

M - OD data arc 3 orbits prior to photo time..

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5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

: 100120-1

5.1 O.D. IDENTIFICATION NO. 1811P

TAPE NO.

5.2 EPOCH DAY 232 , 19 45 0.000 GMT
HR MIN SECITEM NO. 1811P
SEQ. NO. 1
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1281.0401	KM	DX	.85285631	KM/SEC
Y	-3090.8486	KM	DY	.43457269	KM/SEC
Z	-872.34513	KM	DZ	.38298634	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	37.75 M	CX	.02865 M/S	X	.0000 M	DX	.0000 M/S
Y	275.2 M	DY	.05262 M/S	Y	.0000 M	DY	.0000 M/S
Z	925.9 M	DZ	.00587 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.31	KM	ECC	.296489	APF	184.482	DEG
LAN	242.331	DEG	INC	12.1564	TFP	-5020.78	SEC
RCA	1945.42	KM	PALT	207.335	KM	PER	217.486
APD	3585.20	KM	AALT	1847.11	KM	TA	204.150
LAT	5.79138	DEG	LONG	270.420	DEG		

5.6 LUNAR HARMONICS USED BELLCOMM NUM. 1

5.7 DATA ARC LENGTH 2 HRS 0 MIN SOS= 787.59

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2364	.0336
61	C3	232/1945	232/2058	71	.1976	-.0175

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS ***EPOCH REPORT

TIME OF REPORT

DAY 285 , 03 HR , 56 MIN

PREPARED BY

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1B11P

TAPE NO.
ITEM NO. 1B11P5.2 EPOCH DAY 232 , 21 0 36.930 GMT
HR MIN SECSEQ. NO. 1
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.17670	KM	DX	-1.6096606	KM/SEC
Y	1576.2408	KM	DY	.74212202	KM/SEC
Z	832.07391	KM	DZ	-.11882284	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	32.17	M	CX	.05215	M/S	X	32.17	M	DX	.0521	M/S
Y	161.7	M	DY	.04865	M/S	Y	161.7	M	DY	.0487	M/S
Z	272.0	M	DZ	.39171	M/S	Z	272.0	M	DZ	.3917	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2766.31	KM	ECC	.296614	APF	184.496	DEG	
LAN	241.602	DEG	INC	12.1578	DEG	TFP	-483.644	SEC
RCA	1945.78	KM	PALT	207.691	KM	PER	217.604	MIN
APO	3586.83	KM	AALT	1848.74	KM	TA	334.642	DEG
LAT	4.30119	DEG	LONG	41.1691	DEG			

5.6 LUNAR HARMONICS USED BELLCOMP NUM. 1

5.7 DATA ARC LENGTH 1 HRS 12 MIN. SOS= 784.81

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2364	.0336
61	C3	232/1945	232/2058	71	.1976	-.0175

5.9 RESIDUAL PLCTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT	PREPARED BY	GEO.S.GOODWIN
DAY 285 , 03 HR , 59 MIN	GMT	O.D. ANALYST

ODPL 1B11P	SEQ 1
ITERATION	NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DO-100220-1

5.1 O.D. IDENTIFICATION NO. 1812P

TAPE NO.

5.2 EPOCH DAY 232 , 19 45 0.000 GMT
HR MIN SECITEM NO. 1812P
SEQ. NO. 2
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1281.2958	KM	DX	.85299573	KM/SEC
Y	-3089.3437	KM	DY	.43423035	KM/SEC
Z	-876.86277	KM	DZ	.38303367	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.71	M	DX	.01421	M/S	X	.0000	M	DX	.0000	M/S
Y	132.7	M	DY	.02471	M/S	Y	.0000	M	DY	.0000	M/S
Z	441.4	M	DZ	.00397	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.14	KM	ECC	.296477	APF	184.176	DEG	
LAN	242.643	DEG	INC	12.1145	DEG	TFP	-5021.15	SEC
RCA	1945.34	KM	PALT	207.248	KM	PER	217.466	MIN
APD	3584.94	KM	AALT	1846.85	KM	TA	204.136	DEG
LAT	5.71242	DEG	LONG	270.420	DEG			

5.6 LUNAR HARMONICS USED BELLCOMM NUM. 1

5.7 DATA ARC LENGTH 5 HRS 40 MIN SOS= 22222

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.8212	.3415
61	C3	232/1945	232/2058	71	.5326	-.3113

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS ***EPOCH REPORT

TIME OF REPORT	PREPARED BY	GEO. S. GODWIN
DAY 285 , 04 HR , 39 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1B12P

TAPE NO.

ITEM NO. 1B12P

5.2 EPOCH DAY 232 , 21 0 36.930 GMT
HR MIN SEC

SEQ. NO. 2

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.42886	KM	DX	-1.6098706	KM/SEC
Y	1575.2986	KM	DY	.74191774	KM/SEC
Z	833.54029	KM	DZ	-.11698266	KM/SEC

5.4 STANDARD DEVIATICS

A PRIORI

X	16.86	M	CX	.02492	M/S	X	16.86	M	DX	.0249	M/S
Y	76.79	M	DY	.02412	M/S	Y	76.79	M	DY	.0241	M/S
Z	127.7	M	DZ	.18879	M/S	Z	127.7	M	DZ	.1888	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2766.13	KM	ECC	.296601	APF	184.191	DEG	
LAN	241.914	DEG	INC	12.1158	DEG	TFP	-484.010	SEC
RCA	1945.69	KM	PALT	207.603	KM	PER	217.583	MIN
APD	3586.57	KM	AALT	1848.48	KM	TA	334.622	DEG
LAT	4.35061	DEG	LONG	41.1577	DEG			

5.6 LUNAR HARMONICS USED BELLCOMM NUM. 1

5.7 DATA ARC LENGTH 1 HRS 12 MIN SOS= 22222

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.8212	.3415
61	C3	232/1945	232/2058	71	.5326	-.3113

5.9 RESIDUAL PLCTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT	PREPARED BY	GEO.S.GCODWIN
DAY 285 , 04 HR , 42 MIN	GMT	O.D. ANALYST

ODPL 1B12P	SEQ 2
ITERATION	NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 2811P

TAPE NO.

5.2 EPOCH DAY 322 , 20 36 0.000 GMT
HR MIN SECITEM NO. 2811P
SEQ. NO. 19
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.0387	KM	DX	.29310993	KM/SEC
Y	-872.88795	KM	DY	.74323543	KM/SEC
Z	-521.49072	KM	DZ	.51836220	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	8.725	M	CX	.02514	M/S	X	.0000	M	DX	.0000	M/S
Y	573.4	M	CY	.29371	M/S	Y	.0000	M	DY	.0000	M/S
Z	921.7	M	CZ	.43273	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.68	KM	ECC	.336391	APF	166.406	DEG
LAN	232.043	DEG	INC	12.2094	TFP	6060.94	SEC
RCA	1784.89	KM	PALT	46.8036	PER	208.625	MIN
APD	3594.46	KM	AALT	1856.37	TA	176.999	DEG
LAT	356.537	DEG	LONG	215.803			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 2 HRS 50 MIN SOS= 7520.0

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.6337	.3784
61	C3	322/2037	322/2144	130	.4717	.2591

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS ***EPOCH REPORT

TIME OF REPORT	PREPARED BY	GEO.S.GOODWIN
DAY 285 , 07 HR , 57 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2B11P

TAPE NO.

ITEM NO. 2B11P

5.2 EPOCH DAY 322 , 22 23 16.600 GMT
HR MIN SEC

SEQ. NO. 19

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.6198	KM	DX	-.46995452	KM/SEC
Y	385.59361	KM	DY	-1.5257077	KM/SEC
Z	225.49144	KM	DZ	-1.0614037	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	5.077	M	DX	.04138	M/S	X	5.077	M	DX	.0414	M/S
Y	306.3	M	DY	.57077	M/S	Y	306.3	M	DY	.5708	M/S
Z	482.0	M	DZ	.83955	M/S	Z	482.0	M	DZ	.8396	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.88	KM	ECC	.337003	APF	166.452	DEG	
LAN	231.035	DEG	INC	12.2165	DEG	TFP	-17.4954	SEC
RCA	1783.38	KM	PALT	45.2948	KM	PER	208.649	MIN
APD	3596.39	KM	AALT	1858.30	KM	TA	358.922	DEG
LAT	3.06274	DEG	LONG	36.7269	DEG			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 1 HRS 44 MIN SOS= 7520.0

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.6337	.3784
61	C3	322/2037	322/2144	130	.4717	.2591

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT

DAY 285 , 08 HR , 00 MIN

PREPARED BY

GMT

GEO.S.GOODWIN

O.D. ANALYST

ODPL 2B11P SEQ 19

ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2B12P

TAPE NO.
ITEM NO. 2B12P5.2 EPOCH DAY 322 , 20 36 0.000 GMT
HR MIN SECSEQ. NO. 20
CCMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3444.5919	KM	DX	.29180074	KM/SEC
Y	-897.51658	KM	DY	.73060669	KM/SEC
Z	-482.26168	KM	DZ	.53669470	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.04	M	DX	.01987	M/S	X	.0000	M	DX	.0000	M/S
Y	374.2	M	DY	.19012	M/S	Y	.0000	M	DY	.0000	M/S
Z	573.0	M	DZ	.26979	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.80	KM	ECC	.336386	APF	171.042	DEG	
LAN	227.327	DEG	INC	13.3098	DEG	TFP	6061.62	SEC
RCA	1784.99	KM	PALT	46.9004	KM	PER	208.639	MIN
APD	3594.61	KM	AALT	1856.52	KM	TA	177.003	DEG
LAT	357.267	DEG	LONG	215.684	DEG			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 6 HRS 10 MIN SOS= 34926

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	1.0626	.5648
61	C3	322/2037	322/2144	130	.4074	.2022

5.9 RESIDUAL PLCTS NOT AVAILABLE

5.10 REMARKS ***EPOCH REPORT

TIME OF REPORT	PREPARED BY	GEO.S.GODWIN
DAY 285 , 08 HR , 35 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10020-1

5.1 O.D. IDENTIFICATION NO. 2B12P

TAPE NO.

5.2 EPOCH DAY 322 , 22 23 16.600 GMT
HR MIN SECITEM NO. 2B12P
SEQ. NO. 20
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.2196	KM	DX	-.46777964	KM/SEC
Y	398.96402	KM	DY	-1.5010198	KM/SEC
Z	205.12660	KM	DZ	-1.0968793	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	9.675	M	DX	.03870	M/S	X	9.675	M	DX	.0387	M/S
Y	198.8	M	DY	.37037	M/S	Y	198.8	M	DY	.3704	M/S
Z	300.1	M	DZ	.52284	M/S	Z	300.1	M	DZ	.5228	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.03	KM	ECC	.337003	APF	171.084	DEG
LAN	226.323	DEG	INC	13.3176	TFP	-17.6624	SEC
RCA	1783.48	KM	PALT	45.3882	PER	208.666	MIN
APO	3596.57	KM	AALT	1858.48	TA	358.912	DEG
LAT	2.29329	DEG	LONG	36.5832			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 1 HRS 44 MIN SOS= 34922

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	1.0626	.5648
61	C3	322/2037	322/2144	130	.4074	.2022

5.9 RESIDUAL PLCTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT	PREPARED BY	GEO.S.GOODWIN
DAY 285 , 08 HR , 38 MIN GMT		O.D. ANALYST

ODPL 2B12P	SEQ 20
ITERATION	NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 2011P

TAPE NO.

5.2 EPOCH DAY 326 , 22 45 0.000 GMT
HR MIN SECITEM NO. 2011P
SEQ. NO. 50
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2597.7627	KM	CX	-.89453217	KM/SEC
Y	1416.0405	KM	DY	.60363551	KM/SEC
Z	1004.2544	KM	DZ	.38867038	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	22.10	M	CX	.00867	M/S	X	.0000	M	DX	.0000	M/S
Y	171.3	M	CY	.05228	M/S	Y	.0000	M	DY	.0000	M/S
Z	188.0	M	CZ	.10043	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.89	KM	ECC	.338127	APF	167.348	DEG
LAN	179.007	DEG	INC	11.5908	TFP	-3530.38	SEC
RCA	1780.36	KM	PALT	42.2750	PER	208.650	MIN
APO	3599.42	KM	AALT	1861.33	TA	225.378	DEG
LAT	6.23604	DEG	LONG	211.200			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 2 HRS 50 MIN SOS= 24913

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.7591	.7100
61	C3	326/2250	327/0109	131	.9086	.5990

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS ***EPCCH REPORT

TIME OF REPORT	PREPARED BY	GEO.S.GCODWIN
DAY 281 , 08 HR , 13 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 2D11P

TAPE NO.

ITEM NO. 2D11P

5.2 EPOCH DAY 326 , 23 47 13.720 GMT
HR MIN SEC

SEQ. NO. 50

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1789.3127 KM

DX -.07310410 KM/SEC

Y -8.7405906 KM

DY -1.5843958 KM/SEC

Z -41.197894 KM

DZ -1.0678623 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 1.362 M

DX .02400 M/S

X 1.362 M

DX .0240 M/S

Y 20.93 M

DY .16191 M/S

Y 20.93 M

DY .1619 M/S

Z 18.83 M

DZ .23892 M/S

Z 18.83 M

DZ .2389 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2690.26 KM

ECC .338714

APF 167.437 DEG

LAN 178.428 DEG

INC 11.5910 DEG

TFP 203.316 SEC

RCA 1779.03 KM

PALT 40.9387 KM

PER 208.692 MIN

APO 3601.48 KM

AALT 1863.39 KM

TA 12.5263 DEG

LAT .007455 DEG

LONG 358.392 DEG

5.6 LUNAR HARMONICS USED

NUMBER 1 BELLCOMM

5.7 DATA ARC LENGTH

0 HRS 59 MIN

SOS= 24899

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.7591	.7100
61	C3	326/2250	327/0109	131	.9086	.5990

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS

MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT

DAY 281 , 08 HR , 16 MIN

PREPARED BY

GMT

GEO. S. GOODWIN

O.D. ANALYST

ODPL 2D11P SEC 50

ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100723-1

5.1 O.D. IDENTIFICATION NO. 2012P

TAPE NO.

ITEM NO. 2012P

5.2 EPOCH DAY 326 , 22 45 0.000 GMT

SEQ. NO. 51

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.5853	KM	DX	-.89422613	KM/SEC
Y	1408.8890	KM	DY	.60135959	KM/SEC
Z	1012.5526	KM	DZ	.39279722	KM/SEC

5.4 STANDARD DEVIATICS

A PRIORI

X	17.64	M	DX	.00697	M/S	X	.0000	M	DX	.0000	M/S
Y	135.8	M	DY	.04253	M/S	Y	.0000	M	DY	.0000	M/S
Z	145.6	M	DZ	.08070	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.99	KM	ECC	.338140	APF	167.324	DEG	
LAN	179.003	DEG	INC	11.9583	DEG	TFP	-3530.55	SEC
RCA	1780.39	KM	PALT	42.3031	KM	PER	208.661	MIN
APD	3599.58	KM	AALT	1861.49	KM	TA	225.378	DEG
LAT	6.42738	DEG	LONG	211.136	DEG			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 6 HRS 10 MIN SOS= 62634

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	1.2314	.7258
61	C3	326/2250	327/0109	131	1.1622	.4116

5.9 RESIDUAL PLGTS NOT AVAILABLE

5.10 REMARKS ***EPOCH REPORT

TIME OF REPCRT	PREPARED BY	GEO.S.GOODWIN
DAY 281 , 08 HR , 32 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 2D12P

TAPE NO.

5.2 EPOCH DAY 326 , 23 47 13.720 GMT
HR MIN SECITEM NO. 2D12P
SEQ. NO. 51
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.3482	KM	DX	-.07413768	KM/SEC
Y	-7.7118151	KM	DY	-1.5774805	KM/SEC
Z	-40.518616	KM	DZ	-1.0779895	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.9696	M	DX	.01914	M/S	X	.9696	M	DX	.0191	M/S
Y	15.26	M	DY	.13003	M/S	Y	15.26	M	DY	.1300	M/S
Z	16.89	M	DZ	.18912	M/S	Z	16.89	M	DZ	.1891	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.35	KM	ECC	.338725	APF	167.411	DEG	
LAN	178.424	DEG	INC	11.9584	DEG	TFP	203.153	SEC
RCA	1779.06	KM	PALT	40.9712	KM	PER	208.704	MIN
APO	3601.64	KM	AALT	1863.55	KM	TA	12.5161	DEG
LAT	.015063	DEG	LONG	358.353	DEG			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 0 HRS 59 MIN SOS= 62088

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	1.2314	.7258
61	C3	326/2250	327/0109	131	1.1622	.4116

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT	PREPARED BY	GEO. S. GOODWIN
DAY 281 , 08 HR , 35 MIN	GMT	O.D. ANALYST

OOPL 2D12P	SEG 51
ITERATION	NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D11P

TAPE NO.

ITEM NO. 3D11P

5.2 EPOCH DAY 49 , 6 13 0.000 GMT
HR MIN SEC

SEQ. NO. 68

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-485.58842	KM	DX	-.88358904	KM/SEC
Y	2935.5310	KM	DY	-.44774694	KM/SEC
Z	1784.1192	KM	DZ	.14815317	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	163.4	M	DX	.18557	M/S	X	.0000	M	DX	.0000	M/S
Y	555.1	M	DY	.25564	M/S	Y	.0000	M	DY	.0000	M/S
Z	955.6	M	DZ	.33381	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.16	KM	ECC	.336773	APF	182.089	DEG	
LAN	183.565	DEG	INC	22.8987	DEG	TFP	-4855.43	SEC
RCA	1783.53	KM	PALT	45.4354	KM	PER	208.565	MIN
APO	3594.80	KM	AALT	1856.71	KM	TA	201.755	DEG
LAT	9.04993	DEG	LONG	205.718	DEG			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 3 HRS 0 MIN SOS= 16633

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.7776	.5716
41	CC3	49/0705	49/0834	181	.6335	.6143
12	C3	49/0706	49/0709	4	.0116	-2.2480
12	CC3	49/0613	49/0659	43	1.0523	.3670

5.9 RESIDUAL PLCTS NOT AVAILABLE

5.10 REMARKS ***EPOCH REPORT

TIME OF REPORT	PREPARED BY	GEO.S.GOODWIN
DAY 279 , 07 HR , 03 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-160320-1

5.1 O.D. IDENTIFICATION NO. 3C11P

TAPE NO.

5.2 EPOCH DAY 49 , 7 32 25.310 GMT
HR MIN SECITEM NO. 3D11P
SEQ. NO. 68
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-529.33852	KM	DX	1.7077218	KM/SEC
Y	-1587.9929	KM	DY	-.18712369	KM/SEC
Z	-617.45808	KM	DZ	-.84957577	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	90.78	M	CX	.37886	M/S	X	90.78	M	DX	.3789	M/S
Y	17.82	M	CY	.63333	M/S	Y	17.82	M	DY	.6333	M/S
Z	123.1	M	DZ	.89920	M/S	Z	123.1	M	DZ	.8992	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.87	KM	ECC	.337477	APF	182.121	DEG	
LAN	182.844	DEG	INC	22.8979	DEG	TFP	-88.6766	SEC
RCA	1782.10	KM	PALT	44.0096	KM	PER	208.647	MIN
APD	3597.64	KM	AALT	1859.55	KM	TA	354.535	DEG
LAT	1.30025	DEG	LONG	359.764	DEG			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 1 HRS 16 MIN . SOS= 16633

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.7776	.5716
41	CC3	49/0705	49/0834	181	.6335	.6143
12	C3	49/0706	49/0709	4	.0116	-2.2480
12	CC3	49/0613	49/0659	43	1.0523	.3670

5.9 RESIDUAL PLCTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT	PREPARED BY	GEO. S. GOODWIN
DAY 279 , 07 HR , 05 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D12P

TAPE NO.

ITEM NO. 3D12P

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 69

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-491.18147	KM	DX	-.88919294	KM/SEC
Y	2952.9486	KM	DY	-.43989393	KM/SEC
Z	1754.6006	KM	DZ	.13751801	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	41.83	M	DX	.05572	M/S	X	.0000	M	DX	.0000	M/S
Y	166.3	M	DY	.07946	M/S	Y	.0000	M	DY	.0000	M/S
Z	291.6	M	DZ	.10571	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.31	KM	ECC	.336783	APF	181.607	DEG	
LAN	183.959	DEG	INC	21.8186	DEG	TFP	-4855.82	SEC
RCA	1783.59	KM	PALT	45.5034	KM	PER	208.582	MIN
APO	3595.02	KM	AALT	1856.93	KM	TA	201.755	DEG
LAT	8.47510	DEG	LONG	205.810	DEG			

5.6 LUNAR HARMONICS USED: NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 80330

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	1.1158	1.0209
41	CC3	49/0705	49/1203	412	1.3376	.8153
12	C3	49/0706	49/0709	4	.0785	-4.1484
12	CC3	49/0613	49/0659	43	1.6571	.7278

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 279 , 07 HR , 37 MINPREPARED BY:
GMTGEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100320-1

5.1 O.D. IDENTIFICATION NO. 2F11P

TAPE NO.
ITEM NO. 2F11P5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SECSEQ. NO. 100
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	493.28950	KM	DX	-1.4919805	KM/SEC
Y	1960.1717	KM	DY	-.12702396	KM/SEC
Z	1297.2595	KM	DZ	-.13509294	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	80.18	M	DX	.01197	M/S	X	.0000	M	DX	.0000	M/S
Y	309.6	M	DY	.04515	M/S	Y	.0000	M	DY	.0000	M/S
Z	441.0	M	DZ	.17865	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.64	KM	ECC	.337006	APF	172.156	DEG	
LAN	144.315	DEG	INC	10.7888	DEG	TFP	-1848.03	SEC
RCA	1783.88	KM	PALT	45.7874	KM	PER	208.737	MIN
APO	3597.40	KM	AALT	1859.31	KM	TA	266.617	DEG
LAT	10.6536	DEG	LONG	225.128	DEG			

5.6 LUNAR HARMONICS USED: NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 12500

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.4094	-.1865
12	CC3	329/0650	329/0916	190	.6678	.4464

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 281 , 05 HR , 16 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 2F11P

TAPE NO.

5.2 EPOCH DAY 329 , 7 21 15.180 GMT
HR MIN SECITEM NO. 2F11P
SEQ. NO. 100
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.6380	KM	DX	-.31309473	KM/SEC
Y	261.79716	KM	DY	-1.5783763	KM/SEC
Z	109.28433	KM	DZ	-1.0420118	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	2.037 M	DX	.06561 M/S	X	2.037 M	DX	.0656 M/S
Y	120.8 M	DY	.25455 M/S	Y	120.8 M	DY	.2545 M/S
Z	319.4 M	DZ	.36617 M/S	Z	319.4 M	DZ	.3662 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.16	KM	ECC	.336904	APF	172.249	DEG	
LAN	144.004	DEG	INC	10.7974	TFP	26.0818	SEC	
RCA	1783.17	KM	PALT	45.0804	KM	PER	208.565	MIN
APD	3595.15	KM	AALT	1857.06	KM	TA	1.60659	DEG
LAT	1.14897	DEG	LONG	317.967	DEG			

5.6 LUNAR HARMONICS USED NUMBER 1 BELLCOMM

5.7 DATA ARC LENGTH 0 HRS 28 MIN SOS= 12500

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.4094	-.1865
12	CC3	329/0650	329/0916	190	.6678	.4464

5.9 RESIDUAL PLCTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT	PREPARED BY	GEO.S.GOODWIN
DAY 281 , 05 HR , 18 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DL-100320-1

5.1 O.D. IDENTIFICATION NO. 2F12P

TAPE NO.

5.2 EPOCH DAY 329 , 6 50 0.000 GMT
HR MIN SECITEM NO. 2F12P
SEQ. NO. 101
COMPUTER 8

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	498.82167	KM	DX	-1.4927544	KM/SEC
Y	1938.9735	KM	DY	-.13013417	KM/SEC
Z	1326.6802	KM	DZ	-.12304411	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	24.38	M	DX	.00291	M/S	X	.0000	M	DX	.0000	M/S
Y	87.74	M	DY	.01485	M/S	Y	.0000	M	DY	.0000	M/S
Z	120.0	M	DZ	.05199	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.66	KM	ECC	.336998	APF	169.018	DEG	
LAN	147.353	DEG	INC	11.7762	DEG	TFP	-1848.03	SEC
RCA	1783.91	KM	PALT	45.8211	KM	PER	208.739	MIN
APD	3597.40	KM	AALT	1859.31	KM	TA	268.819	DEG
LAT	11.5082	DEG	LONG	224.936	DEG			

5.6 LUNAR HARMONICS USED NUMBER 1 BELL COMM

5.7 DATA ARC LENGTH 6 HRS 10 MIN SOS= 27403

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.3729	.2956
41	CC3	329/1023	329/1247	197	.6936	.1856
12	CC3	329/0650	329/0917	191	.8678	.3730

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS ***EPOCH REPORT

TIME OF REPORT	PREPARED BY	GEO. S. GOODWIN
DAY 281 , 05 HR , 43 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 2F12P

TAPE NO.

5.2 EPOCH DAY 329 , 7 21 15.180 GMT
HR MIN SEC

ITEM NO. 2F12P

SEQ. NO. 101

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.4499	KM	DX	-.31760833	KM/SEC
Y	253.39493	KM	DY	-1.5609956	KM/SEC
Z	130.69675	KM	DZ	-1.0664723	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.790 M	DX	.01979 M/S	X	1.790 M	DX	.0198 M/S
Y	36.80 M	DY	.07213 M/S	Y	36.80 M	DY	.0721 M/S
Z	91.03 M	DZ	.09981 M/S	Z	91.03 M	DZ	.0998 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.14	KM	ECC	.336883	APF	169.108	DEG
LAN	147.042	DEG	INC	11.7845	TFP	26.1317	SEC
RCA	1783.21	KM	PALT	45.1210	PER	208.562	MIN
APO	3595.06	KM	AALT	1856.97	TA	1.60960	DEG
LAT	1.88784	DEG	LONG	317.952			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 0 HRS 28 MIN SOS= 21172

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.3729	.2956
41	CC3	329/1023	329/1247	197	.6936	.1856
12	CC3	329/0650	329/0917	191	.8678	.3730

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT	PREPARED BY	GEO.S.GOODWIN
DAY 281 , 05 HR , 46 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100120-1

5.1 O.D. IDENTIFICATION NO. 3F11P

TAPE NO.

5.2 EPOCH DAY 52 , 0 50 0.000 GMT
HR MIN SECITEM NO. 3F11P
SEQ. NO. 118
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2093.0848	KM	DX	-.40873789	KM/SEC
Y	1253.3167	KM	DY	-1.1323223	KM/SEC
Z	1408.5862	KM	DZ	-.45666534	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	291.5	M	DX	.05491	M/S	X	.0000	M	DX	.0000	M/S
Y	302.1	M	DY	.12351	M/S	Y	.0000	M	DY	.0000	M/S
Z	709.6	M	DZ	.26001	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.51	KM	ECC	.335734	APF	185.729	DEG	
LAN	144.476	DEG	INC	19.2325	DEG	TFP	-2749.37	SEC
RCA	1786.55	KM	PALT	48.4601	KM	PER	208.606	MIN
APO	3592.47	KM	AALT	1854.38	KM	TA	242.909	DEG
LAT	17.8648	DEG	LONG	211.974	DEG			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 3 HRS 0 MIN SOS= 24843

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.4148	.7275
62	CC3	52/0052	52/0113	18	1.9849	.4943
12	C3	52/0054	52/0113	20	1.6606	1.2341
12	CC3	52/0124	52/0313	198	.4852	-.0616

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS ***EPOCH REPORT

TIME OF REPORT	PREPARED BY	GEO.S.GOODWIN
DAY 279 , 04 HR , 41 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DC-100020-1

5.1 O.D. IDENTIFICATION NO. 3F12P

TAPE NO.

5.2 EPOCH DAY 52 , 0 50 0.000 GMT
HR MIN SECITEM NO. 3F12P
SEQ. NO. 119
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2080.2125	KM	DX	-.40646596	KM/SEC
Y	1240.6132	KM	DY	-1.1374284	KM/SEC
Z	1438.6830	KM	DZ	-.44579973	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	129.5	M	DX	.02559	M/S	X	.0000	M	DX	.0000	M/S
Y	121.8	M	DY	.05347	M/S	Y	.0000	M	DY	.0000	M/S
Z	293.4	M	DZ	.11342	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.50	KM	ECC	.335751	APF	184.280	DEG	
LAN	145.942	DEG	INC	20.1999	DEG	TFP	-2749.45	SEC
RCA	1786.50	KM	PALT	48.4101	KM	PER	208.605	MIN
APO	3592.51	KM	AALT	1854.42	KM	TA	242.905	DEG
LAT	18.5589	DEG	LONG	211.798	DEG			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 6 HRS 10 MIN SOS= 52142

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.5652	.7181
62	CC3	52/0052	52/0113	18	1.7048	.6367
12	C3	52/0054	52/0113	20	1.5516	.9292
12	CC3	52/0124	52/0643	414	.8176	.3662

5.9 RESIDUAL PLCTS NOT AVAILABLE

5.10 REMARKS ***EPOCH REPORT

TIME OF REPORT	PREPARED BY	GEO.S.GOODWIN
DAY 279 , 05 HR , 16 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10722-1

5.1 O.D. IDENTIFICATION NO. 3F12P

TAPE NO.

5.2 EPOCH DAY 52 , 1 33 37.810 GMT
HR MIN SEC

ITEM NO. 3F12P

SEQ. NO. 119

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-575.40651	KM	DX	1.7267169	KM/SEC
Y	-1579.2344	KM	DY	-.24775324	KM/SEC
Z	-614.98663	KM	DZ	-.78236900	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	36.24	M	DX	.10746	M/S	X	36.24	M	DX	.1075	M/S
Y	75.04	M	DY	.11780	M/S	Y	75.04	M	DY	.1178	M/S
Z	159.4	M	DZ	.27501	M/S	Z	159.4	M	DZ	.2750	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.69	KM	ECC	.335995	APF	184.344	DEG	
LAN	145.526	DEG	INC	20.2034	DEG	TFP	-131.639	SEC
RCA	1785.30	KM	PALT	47.2149	KM	PER	208.510	MIN
APO	3592.08	KM	AALT	1853.99	KM	TA	351.922	DEG
LAT	1.28881	DEG	LONG	322.021	DEG			

5.6 LUNAR HARMONICS USED NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH 0 HRS 40 MIN SOS= 52105

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.5652	.7181
62	CC3	52/0052	52/0113	18	1.7048	.6367
12	C3	52/0054	52/0113	20	1.5516	.9292
12	CC3	52/0124	52/0643	414	.8176	.3662

5.9 RESIDUAL PLCTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT

DAY 279 , 05 HR , 18 MIN

PREPARED BY

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2-10020-1

5.1 O.D. IDENTIFICATION NO. 3D11M TAPE NO.
ITEM NO. 3D11M
5.2 EPOCH DAY 48 , 19 ' 42 ' 0.000 GMT SEQ. NO. 70
HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)
X -189.52125 KM DX -.90558030 KM/SEC
Y 3085.1837 KM DY -.32119603 KM/SEC
Z 1684.2447 KM DZ .19832801 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI
X 24.85 M DX .03949 M/S X .0000 M DX .0000 M/S
Y 121.4 M DY .06142 M/S Y .0000 M DY .0000 M/S
Z 231.7 M DZ .07736 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)
SMA 2689.41 KM ECC .336540 APF 181.182 DEG
LAN 189.866 DEG INC 21.3487 DEG TFP -5178.16 SEC
RCA 1784.32 KM PALT 46.2289 KM PER 208.594 MIN
APO 3594.51 KM AALT 1856.42 KM TA 196.601 DEG
LAT 6.38376 DEG LONG 206.499 DEG

5.6 LUNAR HARMONICS USED: NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH: 2 HRS 40 MIN SOS= 16025

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.5431	.6927
62	CC3	48/1942	48/2003	20	.7314	.9511
12	CC3	48/2013	48/2157	166	.8104	.1550

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT: DAY 287 , 08 HR , 48 MIN PREPARED BY: GEO.S. COOZWIN
GMT 0.00000000

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100323-1

5.1 O.D. IDENTIFICATION NO. 3D11M

TAPE NO.

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SECITEM NO. 3D11M
SEQ. NO. 70
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-534.54472	KM	DX	1.7239613	KM/SEC
Y	-1587.8458	KM	DY	-.21670158	KM/SEC
Z	-611.31314	KM	DZ	-.81019808	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	131.2	M	DX	.09975	M/S	X	131.2	M	DX	.0997	M/S
Y	26.64	M	DY	.13464	M/S	Y	26.64	M	DY	.1346	M/S
Z	60.62	M	DZ	.22765	M/S	Z	60.62	M	DZ	.2276	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UPDATE)

SMA	2690.12	KM	ECC	.337796	APF	181.380	DEG	
LAN	183.381	DEG	INC	21.3731	DEG	TFP	-88.4791	SEC
RCA	1781.41	KM	PALT	43.3202	KM	PER	208.677	MIN
APO	3598.84	KM	AALT	1860.75	KM	TA	354.544	DEG
LAT	1.48462	DEG	LONG	359.584	DEG			

5.6 LUNAR HARMONICS USED' NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH' 11 HRS \ 47 MIN SOS= -1173.9

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.5431	.6927
62	CC3	48/1942	48/2003	20	.7314	.9511
12	CC3	48/2013	48/2157	166	.8104	.1550

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'	PREPARED BY'	GEO. S. GOODWIN
DAY 287 , 08 HR , 53 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 3F11M

TAPE NO.

ITEM NO. 3F11M

5.2 EPOCH DAY 51 , 14 ' 25 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 120

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2077.1516	KM	DX	-.39418378	KM/SEC
Y	1206.4220	KM	DY	-1.1488737	KM/SEC
Z	1448.0568	KM	DZ	-.44469162	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	55.39	M	DX	.01159	M/S	X	.0000	M	DX	.0000	M/S
Y	61.57	M	DY	.01806	M/S	Y	.0000	M	DY	.0000	M/S
Z	131.9	M	DZ	.03684	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.57	KM	ECC	.336287	APF	182.999	DEG	
LAN	152.794	DEG	INC	20.9011	DEG	TFP	-2719.21	SEC
RCA	1785.10	KM	PALT	47.0111	KM	PER	208.612	MIN
APO	3594.04	KM	AALT	1855.95	KM	TA	243.600	DEG
LAT	19.1118	DEG	LONG	217.938	DEG			

5.6 LUNAR HARMONICS USED' NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH' 2 HRS 40 MIN

SOS= 25328

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.7578	.6622
41	C3	51/1425	51/1557	152	.9024	.1323

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 05 HR , 54 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DC-100C20-1

5.1 O.D. IDENTIFICATION NO. 3F11M

TAPE NO.

5.2 EPOCH DAY 52 , 1 , 33 , 37.810 GMT
HR MIN SECITEM NO. 3F11M
SEQ. NO. 120
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-574.82589	KM	DX	1.7183709	KM/SEC
Y	-1584.4428	KM	DY	-.24115815	KM/SEC
Z	-602.62678	KM	DZ	-.80219258	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	119.3	M	DX	.06073	M/S	X	119.3	M	DX	.0607	M/S
Y	29.38	M	DY	.10012	M/S	Y	29.38	M	DY	.1001	M/S
Z	81.84	M	DZ	.12471	M/S	Z	81.84	M	DZ	.1247	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.81	KM	ECC	.335976	APF	183.327	DEG	
LAN	146.556	DEG	INC	20.8836	DEG	TFP	-132.838	SEC
RCA	1785.44	KM	PALT	47.3466	KM	PER	208.525	MIN
APO	3592.19	KM	AALT	1654.10	KM	TA	351.849	DEG
LAT	1.71771	DEG	LONG	322.047	DEG			

5.6 LUNAR HARMONICS USED' NUMBER1 BELLCOMM

5.7 DATA ARC LENGTH' 11 HRS 5 MIN SOS= 24144

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.7578	.6622
41	C3	51/1425	51/1557	152	.9024	.1323

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'

DAY 287 , 05 HR , 59 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 1B21P

TAPE NO.
ITEM NO. 1B21P5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SECSEQ. NO. 4
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1280.8043	KM	DX	.85299245	KM/SEC
Y	-3090.5721	KM	DY	.43403695	KM/SEC
Z	-873.58012	KM	DZ	.38345468	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	37.82	M	DX	.02851	M/S	X	.0000	M	DX	.0000	M/S
Y	274.7	M	DY	.05218	M/S	Y	.0000	M	DY	.0000	M/S
Z	924.2	M	DZ	.00609	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.48	KM	ECC	.296290	APF	184.347	DEG	
LAN	242.479	DEG	INC	12.1732	DEG	TFP	-5022.84	SEC
RCA	1946.09	KM	PALT	208.004	KM	PER	217.506	MIN
APO	3584.86	KM	AALT	1846.77	KM	TA	204.132	DEG
LAT	5.77077	DEG	LONG	270.415	DEG			

5.6 LUNAR HARMONICS USED: BELLCOMM NUM. 2

5.7 DATA ARC LENGTH: 2 HRS 0 MIN SOS= 176.85

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.1194	.0036
61	C3	232/1945	232/2058	71	.0763	-.0014

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 285 , 05 HR , 04 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10900-1

5.1 O.D. IDENTIFICATION NO. 1B21P

TAPE NO.

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SECITEM NO. 000000
SEQ. NO. 000000
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.07430	KM	DX	-1.6097303	KM/SEC
Y	1574.9147	KM	DY	.74211708	KM/SEC
Z	834.41482	KM	DZ	-.11837165	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	32.38 M	DX	.05205 M/S	X	32.38 M	DX	.0520 M/S
Y	161.5 M	DY	.04869 M/S	Y	161.5 M	DY	.0487 M/S
Z	271.2 M	DZ	.39139 M/S	Z	271.2 M	DZ	.3914 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2766.03	KM	ECC	.296657	APF	184.173	DEG
LAN	241.972	DEG	INC	12.1648	TFP	-484.637	SEC
RCA	1945.47	KM	PALT	207.379	KM	PER	217.572
APO	3586.60	KM	AALT	1848.51	KM	TA	334.585
LAT	4.37859	DEG	LONG	41.1661	DEG		

5.6 LUNAR HARMONICS USED: BELLCOXM NUM. 2.

5.7 DATA ARC LENGTH: 1 HRS 12 MIN SOS= 176.85

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.1194	.0036
61	C3	232/1945	232/2058	71	.0763	-.0014

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT AREA B

TIME OF REPORT:
DAY 285 , 05 HR , 08 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYSTODPL 1B21P SEQ 4
IDENTIFICATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 1B22P

TAPE NO.

ITEM NO. 1B22P

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 5

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1283.3627	KM	DX	.85513049	KM/SEC
Y	-3070.2605	KM	DY	.43050505	KM/SEC
Z	-937.98221	KM	DZ	.38293462	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	13.01	M	DX	.01372	M/S	X	.0000	M	DX	.0000	M/S
Y	135.2	M	DY	.02376	M/S	Y	.0000	M	DY	.0000	M/S
Z	424.7	M	DZ	.00427	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.44	KM	ECC	.296167	APF	179.781	DEG	
LAN	246.919	DEG	INC	11.5412	DEG	TFP	-5023.24	SEC
RCA	1946.41	KM	PALT	208.315	KM	PER	217.501	MIN
APO	3584.47	KM	AALT	1846.38	KM	TA	204.129	DEG
LAT	4.65105	DEG	LONG	270.397	DEG			

5.6 LUNAR HARMONICS USED' BELLCOMM NUM. 2

5.7 DATA ARC LENGTH' 5 HRS 40 MIN

SOS= 112615

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	1.8637	-.5988
61	C3	232/1945	232/2058	71	1.5711	.4985

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 285 , 05 HR , 29 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10011

5.1 O.D. IDENTIFICATION NO. 1B22P

TAPE NO.

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SECITEM NO. 1B22P
SEQ. NO. 5
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	886.83434	KM	DX	-1.6129707	KM/SEC
Y	1563.7762	KM	DY	.73830934	KM/SEC
Z	853.20302	KM	DZ	-.09062857	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.43	M	DX	.02247	M/S	X	17.43	M	DX	.0225	M/S
Y	76.31	M	DY	.02639	M/S	Y	76.31	M	DY	.0264	M/S
Z	122.2	M	DZ	.18216	M/S	Z	122.2	M	DZ	.1822	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2766.07	KM	ECC	.296534	APF	179.589	DEG	
LAN	246.427	DEG	INC	11.5360	DEG	TFP	-485.070	SEC
RCA	1945.84	KM	PALT	207.748	KM	PER	217.576	MIN
APO	3586.30	KM	AALT	1848.21	KM	TA	334.571	DEG
LAT	5.00052	DEG	LONG	41.0433	DEG			

5.6 LUNAR HARMONICS USED' BELLCOMM NUM. 2

5.7 DATA ARC LENGTH' 1 HRS 12 MIN

SOS= 112615

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	1.8637	-.5988
61	C3	232/1945	232/2058	71	1.5711	.4985

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT'

DAY 285 , 05 HR , 32 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

ODPL 1B22P SEQ 5

ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100E20-1

5.1 O.D. IDENTIFICATION NO. 2B21P

TAPE NO.

5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SECITEM NO. 2B21P
SEQ. NO. 22
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.2774	KM	DX	.29348822	KM/SEC
Y	-852.79172	KM	DY	.75211968	KM/SEC
Z	-552.74518	KM	DZ	.50484294	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	18.08	M	DX	.01664	M/S	X	.0000	M	DX	.0000	M/S
Y	547.1	M	DY	.27228	M/S	Y	.0000	M	DY	.0000	M/S
Z	907.1	M	DZ	.41307	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.28	KM	ECC	.336615	APF	162.250	DEG	
LAN	236.271	DEG	INC	11.4910	DEG	TFP	6059.68	SEC
RCA	1784.03	KM	PALT	45.9365	KM	PER	208.579	MIN
APO	3594.53	KM	AALT	1856.44	KM	TA	177.001	DEG
LAT	355.953	DEG	LONG	215.904	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 2 HRS 50 MIN SOS= 1862.4

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.3044	-.2097
61	C3	322/2037	322/2144	130	.1237	.0258

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 285 , 08 HR , 57 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2B21P

TAPE NO.

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 GMT
HR MIN SEC

ITEM NO. 2B21P

SEQ. NO. 22

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.5702	KM	DX	-.47105944	KM/SEC
Y	374.57286	KM	DY	-1.5434217	KM/SEC
Z	243.48990	KM	DZ	-1.0350338	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	3.773	M	DX	.02588	M/S	X	3.773	M	DX	.0259	M/S
Y	291.6	M	DY	.52815	M/S	Y	291.6	M	DY	.5282	M/S
Z	474.0	M	DZ	.80048	M/S	Z	474.0	M	DZ	.8005	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.93	KM	ECC	.337028	APF	162.057	DEG	
LAN	235.534	DEG	INC	11.5001	DEG	TFP	-18.1623	SEC
RCA	1783.35	KM	PALT	45.2582	KM	PER	208.654	MIN
APO	3596.51	KM	AALT	1858.42	KM	TA	358.881	DEG
LAT	3.73321	DEG	LONG	36.8280	DEG			

5.6 LUNAR HARMONICS USED: NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH: 1 HRS 44 MIN

SOS= 1862.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.3044	-.2097
61	C3	322/2037	322/2144	130	.1237	.0258

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:
DAY 285 , 09 HR , 00 MIN

PREPARED BY:
GMT

GEO.S.GOODWIN
O.D. ANALYST

ODPL 2B21P SEQ 22
ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100C20-1

5.1 O.D. IDENTIFICATION NO. 2B22P

TAPE NO.

5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SEC

ITEM NO. 2B22P

SEQ. NO. 23

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3444.1042	KM	DX	.29402383	KM/SEC
Y	-834.21619	KM	DY	.76105088	KM/SEC
Z	-584.03732	KM	DZ	.49127788	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	14.25	M	DX	.00345	M/S	X	.0000	M	DX	.0000	M/S
Y	351.8	M	DY	.17174	M/S	Y	.0000	M	DY	.0000	M/S
Z	596.7	M	DZ	.26926	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.15	KM	ECC	.336486	APF	157.609	DEG	
LAN	240.977	DEG	INC	10.8325	DEG	TFP	6058.84	SEC
RCA	1784.29	KM	PALT	46.1964	KM	PER	208.563	MIN
APO	3594.00	KM	AALT	1855.91	KM	TA	176.995	DEG
LAT	355.377	DEG	LONG	215.977	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 6 HRS 10 MIN

SOS= 100734

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	1.7142	-.4502
61	C3	322/2037	322/2144	130	.7150	1.1940

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 286 , 03 HR , 05 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100323-1

5.1 O.D. IDENTIFICATION NO. 2B22P

TAPE NO.

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 GMT
HR MIN SECITEM NO. 2B22P
SEQ. NO. 23
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.5956	KM	DX	-.47171052	KM/SEC
Y	364.77530	KM	DY	-1.5603411	KM/SEC
Z	259.87195	KM	DZ	-1.0085552	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	7.751 M	DX	.00858 M/S	X	7.751 M	DX	.0086 M/S
Y	187.1 M	DY	.33418 M/S	Y	187.1 M	DY	.3342 M/S
Z	312.0 M	DZ	.52048 M/S	Z	312.0 M	DZ	.5205 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.87	KM	ECC	.336899	APF	157.403	DEG
LAN	240.252	DEG	INC	10.8458	TFP	-18.1601	SEC
RCA	1783.65	KM	PALT	45.5639	KM	PER	208.647
APO	3596.08	KM	AALT	1857.99	KM	TA	358.882
LAT	4.34030	DEG	LONG	36.9139	DEG		

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 1 HRS 44 MIN SOS= 100732

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	1.7142	-.4502
61	C3	322/2037	322/2144	130	.7150	1.1940

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 286 , 03 HR , 08 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DC-100-1

5.1 O.D. IDENTIFICATION NO. 2D21P

TAPE NO.

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR MIN SEC

ITEM NO. 2D21P

SEQ. NO. 53

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.3354	KM	DX	-.89393821	KM/SEC
Y	1407.8473	KM	DY	.60107993	KM/SEC
Z	1013.6359	KM	DZ	.39340524	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	22.18	M	DX	.00906	M/S	X	.0000	M	DX	.0000	M/S
Y	175.8	M	DY	.05328	M/S	Y	.0000	M	DY	.0000	M/S
Z	189.1	M	DZ	.10154	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.95	KM	ECC	.338106		APF	167.373	DEG
LAN	179.004	DEG	INC	12.0091	DEG	TFP	-3531.24	SEC
RCA	1779.80	KM	PALT	41.7119	KM	PER	208.541	MIN
APO	3598.10	KM	AALT	1860.01	KM	TA	225.326	DEG
LAT	6.45390	DEG	LONG	211.130	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 2 HRS 50 MIN

SOS= 8636.7

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.4983	-.4319
61	C3	326/2250	327/0109	131	.5116	-.3061

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 281 , 08 HR , 48 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DE-100C20-1

5.1 O.D. IDENTIFICATION NO. 2D21P

TAPE NO.

ITEM NO. 2D21P

5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HR MIN SEC

SEQ. NO. 53

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.3860	KM	DX	-.07409010	KM/SEC
Y	-8.2243857	KM	DY	-1.5769777	KM/SEC
Z	-38.991749	KM	DZ	-1.0786274	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.388	M	DX	.02423	M/S	X	1.388	M	DX	.0243	M/S
Y	21.13	M	DY	.16583	M/S	Y	21.13	M	DY	.1658	M/S
Z	18.88	M	DZ	.24094	M/S	Z	18.88	M	DZ	.2409	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.06	KM	ECC	.338614	APF	167.220	DEG	
LAN	178.663	DEG	INC	11.9857	DEG	TFP	202.252	SEC
RCA	1779.17	KM	PALT	41.0769	KM	PER	208.669	MIN
APO	3600.95	KM	AALT	1862.86	KM	TA	12.4594	DEG
LAT	.066520	DEG	LONG	358.350	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 0 HRS 59 MIN

SOS= 8636.7

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.4983	-.4319
61	C3	326/2250	327/0109	131	.5116	-.3061

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'

DAY 281 , 08 HR , 51 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

ODPL 2D21P SEQ 53

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100720-1

5.1 O.D. IDENTIFICATION NO. 2D22P

TAPE NO.

ITEM NO. 2D22P

5.2 EPOCH DAY 326 , 22 : 45 : 0.000 GMT
HR MIN SEC

SEQ. NO. 54

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2600.6964	KM	DX	-.89303332	KM/SEC
Y	1386.9916	KM	DY	.59427559	KM/SEC
Z	1036.5094	KM	DZ	.40563441	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.22	M	DX	.00717	M/S	X	.0000	M	DX	.0000	M/S
Y	136.8	M	DY	.04270	M/S	Y	.0000	M	DY	.0000	M/S
Z	139.8	M	DZ	.07830	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.19	KM	ECC	.338083	APF	167.209	DEG	
LAN	179.073	DEG	INC	13.0752	DEG	TFP	-3531.43	SEC
RCA	1780.02	KM	PALT	41.9310	KM	PER	208.569	MIN
APO	3598.36	KM	AALT	1860.27	KM	TA	225.333	DEG
LAT	6.98983	DEG	LONG	210.936	DEG			

5.6 LUNAR HARMONICS USED: NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 182706

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	2.4811	-.6009
61	C3	326/2250	327/0109	131	1.7620	-.4111

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 281 , 09 HR , 16 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 2D22P

TAPE NO.

ITEM NO. 2D22P

5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HR MIN SEC

SEQ. NO. 54

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.6217	KM	DX	-.07705314	KM/SEC
Y	-5.7617909	KM	DY	-1.5564679	KM/SEC
Z	-36.594926	KM	DZ	-1.1076456	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.9531	M	DX	.01881	M/S	X	.9531	M	DX	.0188	M/S
Y	14.73	M	DY	.13089	M/S	Y	14.73	M	DY	.1309	M/S
Z	16.42	M	DZ	.18261	M/S	Z	16.42	M	DZ	.1826	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.30	KM	ECC	.338599	APF	167.078	DEG	
LAN	178.712	DEG	INC	13.0518	DEG	TFP	202.061	SEC
RCA	1779.37	KM	PALT	41.2751	KM	PER	208.697	MIN
APO	3601.23	KM	AALT	1863.14	KM	TA	12.4456	DEG
LAT	.107632	DEG	LONG	358.248	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 0 HRS 59 MIN . SOS= 182123

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	2.4811	-.6009
61	C3	326/2250	327/0109	131	1.7620	-.4111

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 281 , 09 HR , 19 MIN	GMT	O.D. ANALYST

ODPL 2D22P SEQ 54

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 3D21P

TAPE NO.

ITEM NO. 3D21P

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 71

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-502.65528	KM	DX	-.90637536	KM/SEC
Y	3008.7038	KM	DY	-.41344180	KM/SEC
Z	1653.5394	KM	DZ	.10136253	KM/SEC

5.4 STANDARD DEVIATIONS

A. PRIORI

X	54.15	M	DX	.09691	M/S	X	.0000	M	DX	.0000	M/S
Y	338.9	M	DY	.15794	M/S	Y	.0000	M	DY	.0000	M/S
Z	626.2	M	DZ	.22554	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.03	KM	ECC	.336926	APF	179.725	DEG	
LAN	185.533	DEG	INC	18.2496	TFP	-4856.23	SEC	
RCA	1783.03	KM	PALT	44.9386	KM	PER	208.550	MIN
APO	3595.04	KM	AALT	1856.95	KM	TA	201.731	DEG
LAT	6.57755	DEG	LONG	206.001	DEG			

5.6 LUNAR HARMONICS USED: NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 12777

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.4044	-.3587
41	CC3	49/0705	49/0834	181	.6388	-.5429
12	C3	49/0706	49/0709	4	.2263	1.7891
12	CC3	49/0613	49/0659	43	.8996	-.3077

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 279 , 05 HR , 59 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10000-1

5.1 O.D. IDENTIFICATION NO. 3D21P

TAPE NO.

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SECITEM NO. 3D21P
SEQ. NO. 71
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-542.46143	KM	DX	1.7535781	KM/SEC
Y	-1590.1848	KM	DY	-.27216574	KM/SEC
Z	-600.13160	KM	DZ	-.72414600	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	63.77 M	DX	.18751 M/S	X	63.77 M	DX	.1875 M/S
Y	7.793 M	DY	.39183 M/S	Y	7.793 M	DY	.3918 M/S
Z	76.19 M	DZ	.60017 M/S	Z	76.19 M	DZ	.6002 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.36	KM	ECC	.337635	APF	179.651	DEG
LAN	184.953	DEG	INC	18.2320	TFP	-90.3989	SEC
RCA	1782.00	KM	PALT	43.9100	KM	PER	208.705
APO	3598.72	KM	AALT	1660.63	KM	TA	354.429
LAT	1.84940	DEG	LONG	359.327	DEG		

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 1 HRS 16 MIN SOS= 12775

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.4044	-.3587
41	CC3	49/0705	49/0834	181	.6388	-.5429
12	C3	49/0706	49/0709	4	.2263	1.7891
12	CC3	49/0613	49/0659	43	.8996	-.3077

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'

DAY 279 , 06 HR , 01 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10000-1

5.1 O.D. IDENTIFICATION NO. 3D22P

TAPE NO.

ITEM NO. 3D22P

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 72

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-496.84424	KM	DX	-.89700598	KM/SEC
Y	2975.8655	KM	DY	-.42855084	KM/SEC
Z	1711.9455	KM	DZ	.12244410	KM/SEC

5.4. STANDARD DEVIATIONS

A PRIORI

X	29.49	M	DX	.04212	M/S	X	.0000	M	DX	.0000	M/S
Y	134.5	M	DY	.06349	M/S	Y	.0000	M	DY	.0000	M/S
Z	238.7	M	DZ	.08837	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.84	KM	ECC	.336646	APF	180.931	DEG	
LAN	184.522	DEG	INC	20.3069	DEG	TFP	-4856.38	SEC
RCA	1783.65	KM	PALT	45.5603	KM	PER	208.527	MIN
APO	3594.02	KM	AALT	1855.93	KM	TA	201.731	DEG
LAT	7.68413	DEG	LONG	205.905	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS# 342443

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.3179	1.1166
41	CC3	49/0705	49/1203	412	3.9141	-.6285
12	C3	49/0706	49/0709	4	.2831	-3.5898
12	CC3	49/0613	49/0659	43	.3906	1.0411

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 279 , 06 HR , 32 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100990-1

5.1 O.D. IDENTIFICATION NO. 3D22P

TAPE NO.

ITEM NO. 3D22P

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SEC

SEQ. NO. 72

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-536.86042	KM	DX	1.7343850	KM/SEC
Y	-1589.9025	KM	DY	-.23487996	KM/SEC
Z	-607.40869	KM	DZ	-.78005306	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	25.72	M	DX	.08360	M/S	X	25.72	M	DX	.0836	M/S
Y	2.993	M	DY	.15716	M/S	Y	2.993	M	DY	.1572	M/S
Z	27.93	M	DZ	.23251	M/S	Z	27.93	M	DZ	.2325	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.12	KM	ECC	.337384	APF	180.880	DEG	
LAN	183.923	DEG	INC	20.2877	DEG	TFP	-90.4963	SEC
RCA	1782.51	KM	PALT	44.4248	KM	PER	208.676	MIN
APO	3597.72	KM	AALT	1859.63	KM	TA	354.426	DEG
LAT	1.62601	DEG	LONG	359.519	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 1 HRS 16 MIN

SOS= 341824

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.3179	1.1166
41	CC3	49/0705	49/1203	412	3.9141	-.6285
12	C3	49/0706	49/0709	4	.2831	-3.5898
12	CC3	49/0613	49/0659	43	.3906	1.0411

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'
DAY 279 , 06 HR , 35 MINPREPARED BY' GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100S23-1

5.1 O.D. IDENTIFICATION NO. 2F21P

TAPE NO.

ITEM NO. 2F21P

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 103

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	499.66646	KM	DX	-1.4925459	KM/SEC
Y	1935.1200	KM	DY	-.13019829	KM/SEC
Z	1332.3631	KM	DZ	-.12115950	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	101.3	M	DX	.01158	M/S	X	.0000	M	DX	.0000	M/S
Y	373.1	M	DY	.05579	M/S	Y	.0000	M	DY	.0000	M/S
Z	507.0	M	DZ	.20751	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.62	KM	ECC	.336652	APF	168.644	DEG	
LAN	147.750	DEG	INC	11.9615	DEG	TFP	-1849.36	SEC
RCA	1784.15	KM	PALT	46.0640	KM	PER	208.618	MIN
APO	3595.08	KM	AALT	1856.99	KM	TA	268.782	DEG
LAT	11.6705	DEG	LONG	224.906	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 3 HRS 0 MIN SOS= 3003.6

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.2860	.0729
12	CC3	329/0650	329/0916	190	.3559	-.0991

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 281 , 04 HR , 12 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100520-1

5.1 O.D. IDENTIFICATION NO. 2F21P

TAPE NO.

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SECITEM NO. 2F21P
SEQ. NO. 103
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.4825	KM	DX	-.31828090	KM/SEC
Y	251.94437	KM	DY	-1.5583385	KM/SEC
Z	134.96077	KM	DZ	-1.0702160	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	6.564	M	DX	.08260	M/S	X	6.564	M	DX	.0826	M/S
Y	148.2	M	DY	.30619	M/S	Y	148.2	M	DY	.3062	M/S
Z	369.1	M	DZ	.42158	M/S	Z	369.1	M	DZ	.4216	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.00	KM	ECC	.337037	APF	168.586	DEG	
LAN	147.599	DEG	INC	11.9436	TFP	25.1240	SEC	
RCA	1783.37	KM	PALT	45.2786	KM	PER	208.662	MIN
APO	3596.62	KM	AALT	1858.53	KM	TA	1.54743	DEG
LAT	2.03218	DEG	LONG	317.943	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 0 HRS 28 MIN SOS= 2992.8

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.2860	.0729
12	CC3	329/0650	329/0916	190	.3559	-.0991

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'

DAY 281 , 04 HR , 14 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-17000-1

5.1 O.D. IDENTIFICATION NO. 2F22P

TAPE NO.

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SECITEM NO. 2F22P
SEQ. NO. 104
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	504.86057	KM	DX	-1.4930995	KM/SEC
Y	1914.3427	KM	DY	-.13387301	KM/SEC
Z	1360.3336	KM	DZ	-.10942925	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	25.86	M	DX	.00229	M/S	X	.0000	M	DX	.0000	M/S
Y	89.16	M	DY	.01538	M/S	Y	.0000	M	DY	.0000	M/S
Z	116.5	M	DZ	.05101	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.79	KM	ECC	.336593	APF	166.083	DEG
LAN	150.222	DEG	INC	12.9470	DFG	TFP	-1849.47
RCA	1784.43	KM	PALT	46.3352	KM	PER	208.638
APO	3595.15	KM	AALT	1857.06	KM	TA	268.791
LAT	12.4911	DEG	LONG	224.721	DEG		

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS= 128902

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	1.2953	-.5708
41	CC3	329/1023	329/1247	197	2.0485	1.2927
12	CC3	329/0650	329/0917	191	1.0807	-1.1296

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'
DAY 281 , 04 HR , 53 MINPREPARED BY' GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100²⁷-1

5.1 O.D. IDENTIFICATION NO. 2F22P

TAPE NO.

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SEC

ITEM NO. 2F22P

SEQ. NO. 104

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.2585	KM	DX	-.32287740	KM/SEC
Y	243.20003	KM	DY	-1.5410309	KM/SEC
Z	155.83452	KM	DZ	-1.0933312	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	2.779	M	DX	.02090	M/S	X	2.779	M	DX	.0209	M/S
Y	38.00	M	DY	.07312	M/S	Y	38.00	M	DY	.0731	M/S
Z	88.87	M	DZ	.09703	M/S	Z	88.87	M	DZ	.0970	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.20	KM	ECC	.336987	APF	166.036	DEG	
LAN	150.061	DEG	INC	12.9305	DEG	TFP	25.0387	SEC
RCA	1783.64	KM	PALT	45.5467	KM	PER	208.686	MIN
APC	3596.76	KM	AALT	1858.67	KM	TA	1.54179	DEG
LAT	2.75914	DEG	LONG	317.944	DEG			

5.6 LUNAR HARMONICS USED: NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH: 0 HRS 28 MIN SOS= 128635

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	1.2953	-.5708
41	CC3	329/1023	329/1247	197	2.0485	1.2927
12	CC3	329/0650	329/0917	191	1.0807	-1.1296

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 281 , 04 HR , 55 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100320-1.

5.1 O.D. IDENTIFICATION NO. 3F21P

TAPE NO.

ITEM NO. 3F21P

5.2 EPOCH DAY 52 , 0 : 50 : 0.000 GMT
HR MIN SEC

SEQ. NO. 121

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2071.7509	KM	DX	-.40484929	KM/SEC
Y	1232.2623	KM	DY	-1.1406239	KM/SEC
Z	1457.9353	KM	DZ	-.43838565	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	345.6	M	DX	.06683	M/S	X	.0000	M	DX	.0000	M/S
Y	318.5	M	DY	.13104	M/S	Y	.0000	M	DY	.0000	M/S
Z	764.7	M	DZ	.28169	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.63	KM	ECC	.335580	APF	183.429	DEG	
LAN	146.857	DEG	INC	20.8369	DEG	TFP	-2750.72	SEC
RCA	1786.38	KM	PALT	48.2905	KM	PER	208.504	MIN
APO	3590.88	KM	AALT	1852.79	KM	TA	242.858	DEG
LAT	19.0066	DEG	LONG	211.684	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 3 HRS 0 MIN SOS= 11096

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.2861	-.0491
62	CC3	52/0052	52/0113	18	1.4476	-.5794
12	C3	52/0054	52/0113	20	1.2495	-.5091
12	CC3	52/0124	52/0313	198	.2621	-.3148

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 279 , 02 HR , 49 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100S20-1

5.1 O.D. IDENTIFICATION NO. 3F21P

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECITEM NO. 3F21P
SEQ. NO. 121
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-573.09988	KM	DX	1.7198601	KM/SEC
Y	-1584.5912	KM	DY	-.24026538	KM/SEC
Z	-603.89117	KM	DZ	-.79955208	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	92.11 M	DX	.28716 M/S	X	92.11 M	DX	.2872 M/S
Y	184.7 M	DY	.30178 M/S	Y	184.7 M	DY	.3018 M/S
Z	396.5 M	DZ	.70925 M/S	Z	396.5 M	DZ	.7092 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.51	KM	ECC	.336142	APF	183.401	DEG
LAN	146.533	DEG	INC	20.8140	TFP	-132.606	SEC
RCA	1785.45	KM	PALT	47.3643	PER	208.606	MIN
APO	3593.57	KM	AALT	1855.48	TA	351.863	DEG
LAT	1.68109	DEG	LONG	322.106			

5.6 LUNAR HARMONICS USED: NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH: 0 HRS 40 MIN SOS= 11073

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.2861	-.0491
62	CC3	52/0052	52/0113	18	1.4476	-.5794
12	C3	52/0054	52/0113	20	1.2495	-.5091
12	CC3	52/0124	52/0313	198	.2621	-.3148

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 279 , 02 HR , 52 MIN GMT	O.D. ANALYST	

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F22P

TAPE NO.

ITEM NO. 3F22P

5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 122

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2068.6523	KM	DX	-.40402910	KM/SEC
Y	1228.3246	KM	DY	-1.1419046	KM/SEC
Z	1465.6335	KM	DZ	-.43594542	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	157.1 M	DX	.03102 M/S	X	.0000 M	DX	.0000 M/S
Y	138.6 M	DY	.06083 M/S	Y	.0000 M	DY	.0000 M/S
Z	337.8 M	DZ	.13074 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.82	KM	ECC	.335513	APF	183.130	DEG
LAN	147.160	DEG	INC	21.0888	TFP	-2750.75	SEC
RCA	1786.68	KM	PALT	48.5929	KM	PER	208.525
APO	3590.95	KM	AALT	1852.86	KM	TA	242.872
LAT	19.1906	DEG	LONG	211.652	DEG		

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS= 265303

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	2.0845	.1136
62	CC3	52/0052	52/0113	18	.4356	-.1206
12	C3	52/0054	52/0113	20	.4326	-.2458
12	CC3	52/0124	52/0643	414	2.5698	-.2893

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 286 , 04 HR , 07 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

00-10720-1

5.1 O.D. IDENTIFICATION NO. 3F22P

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECITEM NO. 3F22P
SEQ. NO. 122
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-572.25617	KM	DX	1.7168225	KM/SEC
Y	-1586.5493	KM	DY	-.23709058	KM/SEC
Z	-600.42538	KM	DZ	-.80650922	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	45.04 M	DX	.13007 M/S	X	45.04 M	DX	.1301 M/S
Y	85.55 M	DY	.13412 M/S	Y	85.55 M	DY	.1341 M/S
Z	183.2 M	DZ	.31664 M/S	Z	183.2 M	DZ	.3166 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.71	KM	ECC	.336079	APF	183.103	DEG	
LAN	146.836	DEG	INC	21.0658	DEG	TFP	-132.622	SEC
RCA	1785.75	KM	PALT	47.6643	KM	PER	208.629	MIN
APO	3593.66	KM	AALT	1855.57	KM	TA	351.864	DEG
LAT	1.80678	DEG	LONG	322.138	DEG			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 0 HRS 40 MIN SOS= 263120

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	2.0845	.1136
62	CC3	52/0052	52/0113	18	.4356	-.1206
12	C3	52/0054	52/0113	20	.4326	-.2458
12	CC3	52/0124	52/0643	414	2.5698	-.2893

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'	PREPARED BY'	GAYLE D. BARROW
DAY 286 , 04 HR , 10 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 3D21M

TAPE NO.

ITEM NO. 3D21M

5.2 EPOCH DAY 48 , 19 : 42 : 0.000 GMT
HR MIN SEC

SEQ. NO. 73

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-192.83911	KM	DX	-.91000935	KM/SEC
Y	3099.6996	KM	DY	-.31397558	KM/SEC
Z	1656.3415	KM	DZ	.18915394	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	19.88 M	DX	.03497 M/S	X	.0000 M	DX	.0000 M/S
Y	110.3 M	DY	.05595 M/S	Y	.0000 M	DY	.0000 M/S
Z	213.8 M	DZ	.07228 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.91	KM	ECC	.336573	APF	180.467	DEG
LAN	190.539	DEG	INC	20.4395	TFP	-5178.65	SEC
RCA	1783.89	KM	PALT	45.8031	KM	PER	208.536
APO	3593.92	KM	AALT	1855.83	KM	TA	196.569
LAT	5.87243	DEG	LONG	206.560	DEG		

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 2 HRS 40 MIN

SOS= 8944.6

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.4752	-.5244
62	CC3	48/1942	48/2003	20	.0547	-.8359
12	CC3	48/2013	48/2157	166	.6253	-.0378

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'
DAY 287 , 09 HR , 12 MINPREPARED BY' GEO.S.GOODWIN.
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 3D21M

TAPE NO.

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SECITEM NO. 3D21M
SEQ. NO. 73
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-535.68462	KM	DX	1.7362014	KM/SEC
Y	-1587.4750	KM	DY	-.23483835	KM/SEC
Z	-604.03678	KM	DZ	-.78330650	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	153.0 M	DX	.10232 M/S	X	153.0 M	DX	.1023 M/S
Y	32.51 M	DY	.09783 M/S	Y	32.51 M	DY	.0978 M/S
Z	52.47 M	DZ	.22920 M/S	Z	52.47 M	DZ	.2292 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.23	KM	ECC	.338773	APF	180.685	DEG
LAN	184.109	DEG	INC	20.3566	TFP	-90.1919	SEC
RCA	1778.85	KM	PALT	40.7593	PER	208.689	MIN
APO	3601.60	KM	AALT	1863.51	TA	354.424	DEG
LAT	1.69944	DEG	LONG	359.522			

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 11 HRS 47 MIN

SOS= 8320.1

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.4752	-.5244
62	CC3	48/1942	48/2003	20	.0547	-.8359
12	CC3	48/2013	48/2157	166	.6253	-.0378

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'
DAY 287 , 09 HR , 16 MINPREPARED BY'
GMTGEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 3F21M

TAPE NO.

5.2 EPOCH DAY 51 , 14 ' 25 ' 0.000 GMT
HR MIN SECITEM NO. 3F21M
SEQ. NO. 123
COMPUTER 6

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2075.5869	KM	DX	-.39400765	KM/SEC
Y	1204.1526	KM	DY	-1.1491591	KM/SEC
Z	1452.2605	KM	DZ	-.44345519	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	56.38	M	DX	.01148	M/S	X	.0000	M	DX	.0000	M/S
Y	61.87	M	DY	.01808	M/S	Y	.0000	M	DY	.0000	M/S
Z	132.5	M	DZ	.03703	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.78	KM	ECC	.336046	APF	182.925	DEG
LAN	152.919	DEG	INC	21.0325	TFP	-2720.68	SEC
RCA	1785.23	KM	PALT	47.1387	PER	208.521	MIN
APO	3592.34	KM	AALT	1854.25	TA	243.560	DEG
LAT	19.2136	DEG	LONG	217.924			

5.6 LUNAR HARMONICS USED: NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH: 2 HRS 40 MIN SOS= 8831.7

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.4702	-.3234
41	C3	51/1425	51/1557	152	.5258	-.1764

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 287 , 06 HR , 16 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10020-1

5.1 O.D. IDENTIFICATION NO. 3F21M

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SEC

ITEM NO. 3F21M

SEQ. NO. 123

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -568.92640 KM DX 1.7215080 KM/SEC

Y -1583.7229 KM DY -.23644486 KM/SEC

Z -603.01402 KM DZ -.80178637 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 112.5 M DX .06313 M/S X 112.5 M DX .0631 M/S

Y 26.79 M DY .08913 M/S Y 26.79 M DY .0891 M/S

Z 84.71 M DZ .12955 M/S Z 84.71 M DZ .1296 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.63 KM ECC .337042 APF 183.323 DEG

LAN 146.668 DEG INC 20.9062 DEG TFP -131.396 SEC

RCA 1783.12 KM PALT 45.0258 KM PER 208.620 MIN

APO 3596.15 KM AALT 1858.06 KM TA 351.918 DEG

LAT 1.69646 DEG LONG. 322.221 DEG

5.6 LUNAR HARMONICS USED' NUMBER2 BELLCOMM

5.7 DATA ARC LENGTH' 11 HRS 5 MIN SOS= 8831.3

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.4702	-.3234
41	C3	51/1425	51/1557	152	.5258	-.1764

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 287 , 06 HR , 21 MIN GMT		O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100700-1

5.1 O.D. IDENTIFICATION NO. 1B31P

TAPE NO.

ITEM NO. 1B31P

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SECSEQ. NO. 7
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1281.1081	KM	DX	.85286698	KM/SEC
Y	-3090.5530	KM	DY	.43441609	KM/SEC
Z	-874.22153	KM	DZ	.38319991	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	37.49	M	DX	.02856	M/S	X	.0000	M	DX	.0000	M/S
Y	274.5	M	DY	.05234	M/S	Y	.0000	M	DY	.0000	M/S
Z	922.1	M	DZ	.00599	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.68	KM	ECC	.296446	APF	184.317	DEG	
LAN	242.477	DEG	INC	12.1498	DEG	TFP	-5021.09	SEC
RCA	1945.81	KM	PALT	207.718	KM	PER	217.530	MIN
APO	3585.56	KM	AALT	1847.47	KM	TA	204.164	DEG
LAT	5.76028	DEG	LONG	270.418	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MODEL

5.7 DATA ARC LENGTH: 2 HRS 0 MIN SOS= 657.82

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2400	.0134
61	C3	232/1945	232/2058	71	.1225	.0136

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 285 , 02 HR , 48 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

CD-100123-1

5.1 O.D. IDENTIFICATION NO. 1B31P

TAPE NO.
ITEM NO. 1B31P5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SECSEQ. NO. 7
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.10868	KM	DX	-1.6097464	KM/SEC
Y	1575.7985	KM	DY	.74212011	KM/SEC
Z	832.93562	KM	DZ	-.11833733	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	32.27 M	DX	.05191 M/S	X	32.27 M	DX	.0519 M/S
Y	161.2 M	DY	.04858 M/S	Y	161.2 M	DY	.0486 M/S
Z	270.7 M	DZ	.39030 M/S	Z	270.7 M	DZ	.3903 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2766.48	KM	ECC	.296661	APF	184.339	DEG
LAN	241.754	DEG	INC	12.1510	DEG	TFP	-483.553
RCA	1945.77	KM	PALT	207.679	KM	PER	217.624
APO	3587.18	KM	AALT	1849.09	KM	TA	334.646
LAT	4.32914	DEG	LONG	41.1693	DEG		

5.6 LUNAR HARMONICS USED: TRIAXIAL MODEL

5.7 DATA ARC LENGTH: 1 HRS 12 MIN

SOS= 656.50

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2400	.0134
61	C3	232/1945	232/2058	71	.1225	.0136

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 285 , 02 HR , 51 MIN	GMT	O.D. ANALYST

ODPL 1B31P SEQ 7

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100320-1

5.1 O.D. IDENTIFICATION NO. 1B32P

TAPE NO.

ITEM NO. 1B32P

5.2 EPOCH DAY 232 , 19 ' 45 ' C.000 GMT
HR MIN SEC

SEQ. NO. 8

COMPUTER B.

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1281.0001	KM	DX	.85320790	KM/SEC
Y	-3088.4286	KM	DY	.43388940	KM/SEC
Z	-879.91489	KM	DZ	.38326269	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.81	M	DX	.01422	M/S	X	.0000	M	DX	.0000	M/S
Y	133.1	M	DY	.02465	M/S	Y	.0000	M	DY	.0000	M/S
Z	441.2	M	DZ	.00410	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2765.32	KM	ECC	.296344	APF	183.926	DEG	
LAN	242.871	DEG	INC	12.0974	DEG	TFP	-5021.39	SEC
RCA	1945.83	KM	PALT	207.745	KM	PER	217.487	MIN
APO	3584.80	KM	AALT	1846.71	KM	TA	204.147	DEG
LAT	5.65997	DEG	LONG	270.413	DEG			

5.6 LUNAR HARMONICS USED' TRIAXIAL MODEL

5.7 DATA ARC LENGTH' 5 HRS 40 MIN

SOS= 20775

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.8135	-.0678
61	C3	232/1945	232/2058	71	.6972	.4107

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 285 , 03 HR , 24 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-1C0820-1

5.1 O.D. IDENTIFICATION NO. 1B32P

TAPE NO.

ITEM NO. 1B32P

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SECSEQ. NO. 8
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.28018	KM	DX	-1.6099558	KM/SEC
Y	1574.7904	KM	DY	.74176369	KM/SEC
Z	834.81092	KM	DZ	-.11604771	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.18	M	DX	.02481	M/S	X	17.18	M	DX	.0248	M/S
Y	76.95	M	DY	.02424	M/S	Y	76.95	M	DY	.0242	M/S
Z	127.6	M	DZ	.18891	M/S	Z	127.6	M	DZ	.1889	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2766.11	KM	ECC	.296559	APF	183.948	DEG	
LAN	242.148	DEG	INC	12.0986	DEG	TFP	-483.853	SEC
RCA	1945.80	KM	PALT	207.706	KM	PER	217.581	MIN
APO	3586.43	KM	AALT	1848.34	KM	TA	334.632	DEG
LAT	4.39007	DEG	LONG	41.1610	DEG			

5.6 LUNAR HARMONICS USED' TRIAXIAL MODEL

5.7 DATA ARC LENGTH' 1 HRS 12 MIN SOS= 20761

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.8135	-.0678
61	C3	232/1945	232/2058	71	.6972	.4107

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT'

DAY 285 , 03 HR , 27 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100010-1

5.1 O.D. IDENTIFICATION NO. 2B31P

TAPE NO.
ITEM NO. 2B31P5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SECSEQ. NO. 25
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.6304	KM	DX	.29304433	KM/SEC
Y	-861.95118	KM	DY	.74587364	KM/SEC
Z	-538.04789	KM	DZ	.51424078	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	12.87 M	DX	.02299 M/S	X	.0000 M	DX	.0000 M/S
Y	572.9 M	DY	.29235 M/S	Y	.0000 M	DY	.0000 M/S
Z	936.3 M	DZ	.43452 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.55	KM	ECC	.336579	APF	164.574	DEG
LAN	233.890	DEG	INC	12.0319	DEG	TFP	6061.82
RCA	1784.30	KM	PALT	46.2145	KM	PER	208.610
APO	3594.79	KM	AALT	1856.70	KM	TA	177.020
LAT	356.226	DEG	LONG	215.862	DEG		

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 2579.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.3398	.1520
61	C3	322/2037	322/2144	130	.1159	.0855

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 280 , 06 HR , 20 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 2B31P

TAPE NO.

ITEM NO. 2B31P

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 GMT
HR MIN SEC

SEQ. NO. 25

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.8106	KM	DX	-.47035218	KM/SEC
Y	380.04658	KM	DY	-1.5309149	KM/SEC
Z	233.91473	KM	DZ	-1.0537022	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.487	M	DX	.03737	M/S	X	1.487	M	DX	.0374	M/S
Y	305.9	M	DY	.56795	M/S	Y	305.9	M	DY	.5679	M/S
Z	489.7	M	DZ	.84250	M/S	Z	489.7	M	DZ	.8425	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.25	KM	ECC	.337062	APF	164.637	DEG	
LAN	232.877	DEG	INC	12.0339	DEG	TFP	-17.3620	SEC
RCA	1783.46	KM	PALT	45.3750	KM	PER	208.691	MIN
APO	3597.03	KM	AALT	1858.94	KM	TA	358.931	DEG
LAT	3.38117	DEG	LONG	36.7871	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 1 HRS 44 MIN

SOS= 2579.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.3398	.1520
61	C3	322/2037	322/2144	130	.1159	.0855

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:

DAY 280 , 06 HR , 23 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

ODPL 2B31P ITEM 25

ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 2B32P

TAPE NO.
ITEM NO. 2B32P5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN. SECSEQ. NO. 26
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3444.6010	KM	DX	.29391455	KM/SEC
Y	-838.83202	KM	DY	.75786525	KM/SEC
Z	-577.56476	KM	DZ	.49604053	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	18.72 M	DX	.00797 M/S	X	.0000 M	DX	.0000 M/S
Y	440.0 M	DY	.22177 M/S	Y	.0000 M	DY	.0000 M/S
Z	742.4 M	DZ	.34322 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.42	KM	ECC	.336526	APF	158.916	DEG
LAN	239.620	DEG	INC	11.0896	DEG	TFP	6061.19
RCA	1784.36	KM	PALT	46.2670	KM	PER	208.595
APO	3594.47	KM	AALT	1856.38	KM	TA	177.017
LAT	355.501	DEG	LONG	215.952	DEG		

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 49460

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	1.2262	.1251
61	C3	322/2037	322/2144	130	.7390	.7312

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 285 , 07 HR , 35 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100320-1

5.1 O.D. IDENTIFICATION NO. 2B32P

TAPE NO.
ITEM NO. 2B32P
SEQ. NO. 26
COMPUTER B

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 GMT

HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.7246	KM	DX	-.47147815	KM/SEC
Y	367.31977	KM	DY	-1.5541932	KM/SEC
Z	254.35359	KM	DZ	-1.0184152	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	8.049	M	DX	.01480	M/S	X	8.049	M	DX	.0148	M/S
Y	233.9	M	DY	.43100	M/S	Y	233.9	M	DY	.4310	M/S
Z	389.4	M	DZ	.66468	M/S	Z	389.4	M	DZ	.6647	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.11	KM	ECC	.337009	APF	158.980	DEG	
LAN	238.605	DEG	INC	11.0914	DEG	TFP	-17.0675	SEC
RCA	1783.52	KM	PALT	45.4255	KM	PER	208.675	MIN
APO	3596.70	KM	AALT	1858.61	KM	TA	358.949	DEG
LAT	4.14521	DEG	LONG	36.9078	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 1 HRS 44 MIN SOS= 49460

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	1.2262	.1251
61	C3	322/2037	322/2144	130	.7390	.7312

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT: PREPARED BY: GEO.S.GOODWIN
DAY 285 , 07 HR , 39 MIN GMT O.D. ANALYST

ODPL 2B32P SEQ 26

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2-100020-1

5.1 O.D. IDENTIFICATION NO. 2D31P TAPE NO.

ITEM NO. 2D31P

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT SEQ. NO. 56
HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.5193	KM	DX	-.89417881	KM/SEC
Y	1408.7926	KM	DY	.60156715	KM/SEC
Z	1012.5049	KM	DZ	.39225340	KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X	21.94	M	DX	.00871	M/S	X	.0000	M	DX	.0000	M/S
Y	171.6	M	DY	.05272	M/S	Y	.0000	M	DY	.0000	M/S
Z	185.5	M	DZ	.10006	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.43	KM	ECC	.338299	APF	167.426	DEG	
LAN	178.924	DEG	INC	11.9335	DEG	TFP	-3530.13	SEC
RCA	1779.60	KM	PALT	41.5101	KM	PER	208.596	MIN
APO	3599.26	KM	AALT	1861.17	KM	TA	225.351	DEG
LAT	6.42747	DEG	LONG	211.135	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 2 HRS 50 MIN SOS= 1392.1

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.2470	-.0805
61	C3	326/2250	327/0109	131	.2367	.0192

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 281 , 06 HR , 04 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 2D31P

TAPE NO.

ITEM NO. 2D31P

5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HR MIN SEC

SEG. NO. 56

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1789.3642 KM DX -.07403247 KM/SEC

Y -7.4378709 KM DY -1.5779244 KM/SEC

Z -41.068748 KM DZ -1.0773445 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 1.352 M DX .02399 M/S X 1.352 M DX .0240 M/S

Y 20.67 M DY .16282 M/S Y 20.67 M DY .1628 M/S

Z 19.29 M DZ .23718 M/S Z 19.29 M DZ .2372 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2690.47 KM ECC .338742 APF 167.510 DEG

LAN 178.330 DEG INC 11.9339 DEG TFP 203.094 SEC

RCA 1779.09 KM PALT 41.0047 KM PER 208.717 MIN

APO 3601.84 KM AALT 1863.75 KM TA 12.5122 DEG

LAT 359.995 DEG LONG 358.352 DEG

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 0 HRS 59 MIN

SOS= 1392.1

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.2470	-.0805
61	C3	326/2250	327/0109	131	.2367	.0192

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 281 , 06 HR , 07 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

ITEM NO. 2D32P

5.1 O.D. IDENTIFICATION NO. 2D32P

TAPE NO.

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
 HR MIN SEC

SEQ. NO. 57
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.1276	KM	DX	-.89428085	KM/SEC
Y	1411.9138	KM	DY	.60270703	KM/SEC
Z	1008.5451	KM	DZ	.39040181	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.93	M	DX	.00713	M/S	X	.0000	M	DX	.0000	M/S
Y	138.3	M	DY	.04347	M/S	Y	.0000	M	DY	.0000	M/S
Z	149.1	M	DZ	.08317	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.29	KM	ECC	.338262	APF	167.435	DEG
LAN	178.925	DEG	INC	11.7636	TFP	-3529.95	SEC
RCA	1779.61	KM	PALT	41.5194	PER	208.581	MIN
APO	3598.98	KM	AALT	1860.89	TA	225.353	DEG
LAT	6.33856	DEG	LONG	211.161			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 18833

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.8137	-.0362
61	C3	326/2250	327/0109	131	.5096	.2938

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT: DAY 281 , 06 HR , 31 MIN
 PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2D32P

TAPE NO.
ITEM NO. 2D32P5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HR MIN SECSEQ. NO. 57
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.3804	KM	DX	-.07354521	KM/SEC
Y	-7.9536041	KM	DY	-1.5810927	KM/SEC
Z	-41.411242	KM	DZ	-1.0726424	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.9817	M	DX	.01962	M/S	X	.9817	M	DX	.0196	M/S
Y	15.60	M	DY	.13275	M/S	Y	15.60	M	DY	.1327	M/S
Z	17.60	M	DZ	.19450	M/S	Z	17.60	M	DZ	.1945	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.33	KM	ECC	.338705	APF	167.518	DEG	
LAN	178.331	DEG	INC	11.7640	DEG	TFP	203.272	SEC
RCA	1779.10	KM	PALT	41.0135	KM	PER	208.701	MIN
APO	3601.56	KM	AALT	1863.47	KM	TA	12.5228	DEG
LAT	359.992	DEG	LONG	358.371	DEG			

5.6 LUNAR HARMONICS USED' TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH' 0 HRS 59 MIN SOS= 18810

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.8137	-.0362
61	C3	326/2250	327/0109	131	.5096	.2938

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 281 , 06 HR , 34 MIN	GMT	O.D. ANALYST

ODPL 2D32P	SEQ 57
ITERATION	NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D31P

TAPE NO.
ITEM NO. 3D31P5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SECSEQ. NO. 74
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-493.29566	KM	DX	-.89229730	KM/SEC
Y	2963.1811	KM	DY	-.43521053	KM/SEC
Z	1735.9724	KM	DZ	.13132468	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	115.9	M	DX	.14795	M/S	X	.0000	M	DX	.0000	M/S
Y	469.3	M	DY	.21580	M/S	Y	.0000	M	DY	.0000	M/S
Z	828.3	M	DZ	.29132	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.91	KM	ECC	.337001	APF	181.287	DEG	
LAN	184.215	DEG	INC	21.1899	DEG	TFP	-4854.31	SEC
RCA	1782.74	KM	PALT	44.6547	KM	PER	208.536	MIN
APO	3595.08	KM	AALT	1856.99	KM	TA	201.753	DEG
LAT	8.13263	DEG	LONG	205.845	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 1191.6

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0639	-.0769
41	CC3	49/0705	49/0834	181	.3198	-.0499
12	C3	49/0706	49/0709	4	.0094	.3833
12	CC3	49/0613	49/0659	43	.0852	-.0391

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 277 , 06 HR , 00 MINPREPARED BY: GEO. S. GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3D31P

TAPE NO.

ITEM NO. 3D31P

5.2 EPOCH DAY 49 , 7 , 32 , 25.310 GMT
HR MIN SEC

SEQ. NO. 74

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -533.83784 KM DX 1.7257607 KM/SEC

Y -1588.8064 KM DY -.21845210 KM/SEC

Z -611.42191 KM DZ -.80451949 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 79.72 M DX .29782 M/S X 79.72 M DX .2978 M/S

Y 14.40 M DY .53606 M/S Y 14.40 M DY .5361 M/S

Z 106.0 M DZ .78248 M/S Z 106.0 M DZ .7825 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.97 KM ECC .337509 APF 181.338 DEG

LAN 183.467 DEG INC 21.1918 DEG TFP -88.7354 SEC

RCA 1782.08 KM PALT 43.9926 KM PER 208.660 MIN

APO 3597.87 KM AALT 1859.78 KM TA 354.532 DEG

LAT 1.49212 DEG LONG 359.614 DEG

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 1 HRS 16 MIN

SOS= 1190.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0639	-.0769
41	CC3	49/0705	49/0834	181	.3198	-.0499
12	C3	49/0706	49/0709	4	.0094	.3833
12	CC3	49/0613	49/0659	43	.0852	-.0391

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 277 , 06 HR , 02 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

ODPL 2D31P

ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

'D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3D32P

TAPE NO.
ITEM NO. 3D32P5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SECSEQ. NO. 75
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-494.54931	KM	DX	-.89397513	KM/SEC
Y	2968.3888	KM	DY	-.43274821	KM/SEC
Z	1726.6104	KM	DZ	.12804637	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	34.82	M	DX	.05147	M/S	X	.0000	M	DX	.0000	M/S
Y	158.5	M	DY	.07578	M/S	Y	.0000	M	DY	.0000	M/S
Z	282.2	M	DZ	.10240	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.88	KM	ECC	.336989	APF	181.124	DEG	
LAN	184.350	DEG	INC	20.8592	DEG	TFP	-4854.41	SEC
RCA	1782.75	KM	PALT	44.6635	KM	PER	208.532	MIN
APO	3595.00	KM	AALT	1856.91	KM	TA	201.751	DEG
LAT	7.95579	DEG	LONG	205.866	DEG			

5.6 LUNAR HARMONICS USED' TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS= 3301.5

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0562	-.1298
41	CC3	49/0705	49/1203	412	.3750	-.0051
12	C3	49/0706	49/0709	4	.0174	.3010
12	CC3	49/0613	49/0659	43	.0908	-.0887

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 277 , 06 HR , 37 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100E20-1

5.1 O.D. IDENTIFICATION NO. 3D32P

TAPE NO.

ITEM NO. 3D32P

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SEC

SEQ. NO. 75

COMPUTER B

5.3 STATE VECTOR (SFLENOCENTRIC 1950.0)

X -534.78001 KM

DX 1.7290627 KM/SEC

Y -1588.9581 KM

DY -.22450817 KM/SEC

Z -610.23534 KM

DZ -.79567739 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 29.35 M DX .10144 M/S X 29.35 M DX .1014 M/S

Y 3.690 M DY .18553 M/S Y 3.690 M DY .1855 M/S

Z 33.10 M DZ .27246 M/S Z 33.10 M DZ .2725 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.94 KM ECC .337498 APF 181.175 DEG

LAN 183.602 DEG INC 20.8610 DEG TFP -88.8319 SEC

RCA 1782.09 KM PALT 43.9992 KM PER 208.655 MIN

APO 3597.79 KM AALT 1859.70 KM TA 354.526 DEG

LAT 1.52976 DEG LONG 359.583 DEG

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 1 HRS 16 MIN

SOS= 3196.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0562	-.1298
41	CC3	49/0705	49/1203	412	.3750	-.0051
12	C3	49/0706	49/0709	4	.0174	.3010
12	CC3	49/0613	49/0659	43	.0908	-.0887

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:
DAY 277 , 06 HR , 39 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

ODPL 3D32P

ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100520-1

5.1 O.D. IDENTIFICATION NO. 2F31P

TAPE NO.

ITEM NO. N.A.

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 106

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	499.45936	KM	DX	-1.4925780	KM/SEC
Y	1936.4487	KM	DY	-.12998332	KM/SEC
Z	1330.0229	KM	DZ	-.12213260	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	96.09 M	DX	.01124 M/S	X	.0000 M	DX	.0000 M/S
Y	354.8 M	DY	.05362 M/S	Y	.0000 M	DY	.0000 M/S
Z	483.5 M	DZ	.19853 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.35	KM	ECC	.336794	APF	168.871	DEG
LAN	147.539	DEG	INC	11.8864	DEG	TFP	-1849.00
RCA	1783.59	KM	PALT	45.5038	KM	PER	208.587
APO	3595.11	<M	AALT	1857.02	KM	TA	268.766
LAT	11.6069	DEG	LONG	224.914	DEG		

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 1367.7

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.2249	.0250
12	CC3	329/0650	329/0916	190	.2292	-.1239

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 277 , 02 HR , 55 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100320-1

5.1 O.D. IDENTIFICATION NO. 2F31P

TAPE NO.

ITEM NO. 2F31P

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SEC

SEQ. NO. 106

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.5103	KM	DX	-.31801010	KM/SEC
Y	252.94487	KM	DY	-1.5591697	KM/SEC
Z	132.49246	KM	DZ	-1.0690836	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	5.947	M	DX	.07847	M/S	X	5.947	M	DX	.0785	M/S
Y	141.2	M	DY	.29146	M/S	Y	141.2	M	DY	.2915	M/S
Z	353.3	M	DZ	.40199	M/S	Z	353.3	M	DZ	.4020	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.92	KM	ECC	.337026	APF	168.924	DEG	
LAN	147.235	DEG	INC	11.8877	DEG	TFP	25.7230	SEC
RCA	1783.34	KM	PALT	45.2548	KM	PER	208.653	MIN
APO	3596.49	KM	AALT	1858.40	KM	TA	1.58434	DEG
LAT	1.94662	DEG	LONG	317.943	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 0 HRS 28 MIN

SOS= 1365.0

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.2249	.0250
12	CC3	329/0650	329/0916	190	.2292	-.1239

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:
DAY 277 , 02 HR , 58 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYSTODPL 2F31P MODEL CHEK RUN
ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-1C032C-1

5.1 O.D. IDENTIFICATION NO. 2F32P

TAPE NO.
ITEM NO. N.A.5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SECSEQ. NO. 107
COMPUTER B.

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	500.85466	KM	DX	-1.4928270	KM/SEC
Y	1932.1403	KM	DY	-.13056941	KM/SEC
Z	1335.4012	KM	DZ	-.11951377	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	26.58 M	DX	.00302 M/S	X	.0000 M	DX	.0000 M/S
Y	95.08 M	DY	.01616 M/S	Y	.0000 M	DY	.0000 M/S
Z	128.2 M	DZ	.05592 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.25	KM	ECC	.336797	APF	168.278	DEG
LAN	148.099	DEG	INC	12.0798	DEG	TFP	-1848.68
RCA	1783.52	KM	PALT	45.4312	KM	PER	208.576
APO	3594.98	KM	AALT	1856.89	KM	TA	268.773
LAT	11.7682	DEG	LONG	224.867	DEG		

5.6 LUNAR HARMONICS USED' TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH' 6 HRS 10 MIN

SOS= 37971

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.7067	.5966
41	CC3	329/1023	329/1247	197	1.0894	-.6995
12	CC3	329/0650	329/0917	191	.7828	.4508

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 277 , 03 HR , 26 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100920-1

5.1 O.D. IDENTIFICATION NO. 2F32P

TAPE NO.

ITEM NO. 2F32P

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SEC

SEQ. NO. 107

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1760.3997 KM

DX -.31891353 KM/SEC

Y 250.98490 KM

DY -1.5558446 KM/SEC

Z 136.71346 KM

DZ -1.0737142 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 2.055 M

DX .02159 M/S

X 2.055 M

DX .0216 M/S

Y 40.05 M

DY .07814 M/S

Y 40.05 M

DY .0781 M/S

Z 97.63 M

DZ .10686 M/S

Z 97.63 M

DZ .1069 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.82 KM

ECC .337028

APF 168.332 DEG

LAN 147.795 DEG

INC 12.0812 DEG

TFP 26.0457 SEC

RCA 1783.27 KM

PALT 45.1829 KM

PER 208.641 MIN

APO 3596.36 KM

AALT 1858.27 KM

TA 1.60431 DEG

LAT 2.09605 DEG

LONG 317.949 DEG

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 0 HRS 28 MIN

SOS= 37109

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.7067	.5966
41	CC3	329/1023	329/1247	197	1.0894	-.6995
12	CC3	329/0650	329/0917	191	.7828	.4508

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:

DAY 277 , 03 HR , 28 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

ODPL	2F32P	MODEL	CHEK	RUN
ITERATION	NUMBER			
				0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3F31P

TAPE NO.
ITEM NO. N.A.5.2 EPOCH DAY 52 , 0 : 50 : 0.000 GMT
HR MIN SECSEQ. NO. 124
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2068.3065	KM	DX	-.40413269	KM/SEC
Y	1229.5695	KM	DY	-1.1419038	KM/SEC
Z	1464.7545	KM	DZ	-.43597953	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	324.4	M	DX	.06487	M/S	X	.0000	M	DX	.0000	M/S
Y	295.1	M	DY	.12264	M/S	Y	.0000	M	DY	.0000	M/S
Z	711.6	M	DZ	.26357	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.67	KM	ECC	.335797	APF	183.120	DEG	
LAN	147.158	DEG	INC	21.0628	DEG	TFP	-2749.67	SEC
RCA	1785.83	KM	PALT	47.7360	KM	PER	208.508	MIN
APO	3591.52	KM	AALT	1853.43	KM	TA	242.863	DEG
LAT	19.1641	DEG	LONG	211.634	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 2482.8

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.3020	.0529
62	CC3	52/0052	52/0113	18	.3007	-.0002
12	C3	52/0054	52/0113	20	.2373	-.2386
12	CC3	52/0124	52/0313	198	.2851	-.1000

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 277 , 08 HR , 07 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3F31P

TAPE NO.

ITEM NO. 3F31P

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SEC

SEQ. NO. 124

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-572.41042	KM	DX	1.7169464	KM/SEC
Y	-1585.8205	KM	DY	-.23723606	KM/SEC
Z	-601.26883	KM	DZ	-.80665372	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	87.57 M	DX	.27155 M/S	X	87.57 M	DX	.2715 M/S
Y	172.5 M	DY	.28043 M/S	Y	172.5 M	DY	.2804 M/S
Z	371.7 M	DZ	.66149 M/S	Z	371.7 M	DZ	.6615 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.37	KM	ECC	.336098	APF	183.164	DEG
LAN	146.740	DEG	INC	21.0645	DEG	TFP	-132.060
RCA	1785.48	KM	PALT	47.3876	KM	PER	208.589
APO	3593.26	KM	AALT	-1855.17	KM	TA	351.897
LAT	1.77334	DEG	LONG	322.129	DEG		

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 0 HRS 40 MIN SOS= 2482.8

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.3020	.0529
62	CC3	52/0052	52/0113	18	.3007	-.0002
12	C3	52/0054	52/0113	20	.2373	-.2386
12	CC3	52/0124	52/0313	198	.2851	-.1000

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:	PREPARED BY:	GEO.S.GOODWIN
DAY 277 , 08 HR , 10 MIN	GMT	O.D. ANALYST

ODPL 3F31P	
ITERATION	NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10720-F

5.1 O.D. IDENTIFICATION NO. 3F32P

TAPE NO.
ITEM NO. N.A.5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SECSEQ. NO. 125
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2082.2249	KM	DX	-.40708381	KM/SEC
Y	1242.9390	KM	DY	-1.1362623	KM/SEC
Z	1433.0109	KM	DZ	-.44800684	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	143.7	M	DX	.02604	M/S	X	.0000	M	DX	.0000	M/S
Y	136.7	M	DY	.06023	M/S	Y	.0000	M	DY	.0000	M/S
Z	327.9	M	DZ	.12747	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.55	KM	ECC	.335767	APF	184.608	DEG	
LAN	145.640	DEG	INC	20.0149	DEG	TFP	-2749.38	SEC
RCA	1785.83	KM	PALT	47.7361	KM	PER	208.494	MIN
APO	3591.28	KM	AALT	1853.19	KM	TA	242.869	DEG
LAT	18.4308	DEG	LONG	211.826	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 35706

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.8039	.9305
62	CC3	52/0052	52/0113	18	.5410	-.1461
12	C3	52/0054	52/0113	20	.6023	.1405
12	CC3	52/0124	52/0643	414	1.1387	-.3702

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 277 , 08 HR , 50 MINPREPARED BY: GEO.S.GOODWIN
GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2-100000-1

5.1 O.D. IDENTIFICATION NO. 3F32P TAPE NO.
 ITEM NO. 3F32P
 5.2 EPOCH DAY 52 , 1 33 37.810 GMT SEQ. NO. 125
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -576.15057 KM DX 1.7287923 KM/SEC
 Y -1577.8641 KM DY -.24991708 KM/SEC
 Z -618.30286 KM DZ -.77697947 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 39.75 M DX .11923 M/S X 39.75 M DX .1192 M/S
 Y 84.50 M DY .13237 M/S Y 84.50 M DY .1324 M/S
 Z 178.9 M DZ .30818 M/S Z 178.9 M DZ .3082 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.24 KM ECC .336070 APF 184.654 DEG
 LAN 145.222 DEG INC 20.0166 DEG TFP -131.778 SEC
 RCA 1785.47 KM PALT 47.3785 KM PER 208.575 MIN
 APO 3593.02 KM AALT 1854.93 KM TA 351.914 DEG
 LAT 1.17423 DEG LONG 321.997 DEG

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 0 HRS 40 MIN SOS= 35705

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.8039	.9305
62	CC3	52/0052	52/0113	18	.5410	-.1461
12	C3	52/0054	52/0113	20	.6023	.1405
12	CC3	52/0124	52/0643	414	1.1387	-.3702

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT: DAY 277 , 08 HR , 52 MIN PREPARED BY: GEO.S.GOODWIN
 GMT O.D. ANALYST

ODPL 3F32P
 ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 3D31M

TAPE NO.

5.2 EPOCH DAY 48 , 19 ' 42 ' 0.000 GMT
HR MIN SECITEM NO. 3D31M
SEQ. NO. 76
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-191.17659	KM	DX	-.90679255	KM/SEC
Y	3090.6111	KM	DY	-.31910723	KM/SEC
Z	1674.3505	KM	DZ	.19538053	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	23.52	M	DX	.03831	M/S	X	.0000	M	DX	.0000	M/S
Y	119.4	M	DY	.06010	M/S	Y	.0000	M	DY	.0000	M/S
Z	228.7	M	DZ	.07632	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.12	KM	ECC	.336767	APF	180.892	DEG	
LAN	190.137	DEG	INC	21.0565	DEG	TFP	-5176.78	SEC
RCA	1783.51	KM	PALT	45.4240	KM	PER	208.560	MIN
APO	3594.73	KM	AALT	1856.64	KM	TA	196.603	DEG
LAT	6.20040	DEG	LONG	206.528	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 2 HRS 40 MIN

SOS= 2579.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.2965	.1557
62	CC3	48/1942	48/2003	20	.1994	.1699
12	CC3	48/2013	48/2157	166	.3484	-.0318

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 287 , 09 HR , 30 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3D31M

TAPE NO.

ITEM NO. 3D31M

5.2 EPOCH DAY 49 , 7 : 32 : 25.310 GMT
HR MIN SEC

SEQ. NO. 76

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-541.29607	KM	DX	1.7251318	KM/SEC
Y	-1587.8717	KM	DY	-.22614580	KM/SEC
Z	-608.12941	KM	DZ	-.80327532	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	130.1	M	DX	.09748	M/S	X	130.1	M	DX	.0975	M/S
Y	26.75	M	DY	.13248	M/S	Y	26.75	M	DY	.1325	M/S
Z	59.77	M	DZ	.22467	M/S	Z	59.77	M	DZ	.2247	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.18	KM	ECC	.337528	APF	181.322	DEG	
LAN	183.480	DEG	INC	21.0671	DEG	TFP	-92.9760	SEC
RCA	1782.17	KM	PALT	44.0822	KM	PER	208.684	MIN
APO	3598.20	KM	AALT	1860.11	KM	TA	354.271	DEG
LAT	1.58258	DEG	LONG	359.367	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 11 HRS 47 MIN

SOS= -6.4560

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.2965	.1557
62	CC3	48/1942	48/2003	20	.1994	.1699
12	CC3	48/2013	48/2157	166	.3484	-.0318

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:
DAY 287 , 09 HR , 34 MINPREPARED BY:
GMTGEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3F31M

TAPE NO.

5.2 EPOCH DAY 51 , 14 ' 25 ' 0.000 GMT
HR MIN SEC

ITEM NO. 3F31M

SEQ. NO. 126

COMPUTER 8

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2075.8011	KM	DX	-.39404614	KM/SEC
Y	1204.8212	KM	DY	-1.1489761	KM/SEC
Z	1450.9906	KM	DZ	-.44412558	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	55.60	M	DX	.01168	M/S	X	.0000	M	DX	.0000	M/S
Y	61.26	M	DY	.01824	M/S	Y	.0000	M	DY	.0000	M/S
Z	131.3	M	DZ	.03724	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2686.70	KM	ECC	.336263	APF	182.990	DEG	
LAN	152.847	DEG	INC	20.9894	DEG	TFP	-2719.67	SEC
RCA	1784.59	KM	PALT	46.4995	KM	PER	208.511	MIN
APO	3592.81	KM	AALT	1854.72	KM	TA	243.558	DEG
LAT	19.1842	DEG	LONG	217.925	DEG			

5.6 LUNAR HARMONICS USED: TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH: 2 HRS 40 MIN

SOS= 1714.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.2944	-.0598
41	C3	51/1425	51/1557	152	.4014	-.1372

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 287 , 06 HR , 38 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10082C-1

5.1 O.D. IDENTIFICATION NO. 3F31M

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SEC

ITEM NO. 3F31M

SEQ. NO. 126

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-578.72151	KM	DX	1.7165154	KM/SEC
Y	-1584.0990	KM	DY	-.24216672	KM/SEC
Z	-600.60219	KM	DZ	-.80560360	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	115.4	M	DX	.06130	M/S	X	115.4	M	DX	.0613	M/S
Y	28.74	M	DY	.09609	M/S	Y	28.74	M	DY	.0961	M/S
Z	82.69	M	DZ	.12575	M/S	Z	82.69	M	DZ	.1257	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.44	KM	ECC	.330134	APF	183.428	DEG	
LAN	146.557	DEG	INC	20.9744	DEG	TFP	-136.795	SEC
RCA	1785.43	KM	PALT	47.3407	KM	PER	208.598	MIN
APO	3593.46	KM	AALT	1855.37	KM	TA	351.607	DEG
LAT	1.77543	DEG	LONG	321.919	DEG			

5.6 LUNAR HARMONICS USED' TRIAXIAL MOON MODL

5.7 DATA ARC LENGTH' 11 HRS 5 MIN

SOS= -301.86

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.2944	-.0598
41	C3	51/1425	51/1557	152	.4014	-.1372

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MA' TIME REPORT FOR SITE 'F'

TIME OF REPORT'
DAY 287 , 06 HR , 42 MINPREPARED BY' GEO.S.GJODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100720-1

5.1 O.D. IDENTIFICATION NO. 1B41P

TAPE NO.

ITEM NO. 1B41P

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 010

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 1281.1161 KM DX .85293853 KM/SEC

Y -3089.8932 KM DY .43422572 KM/SEC

Z -876.10724 KM DZ .38330749 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 37.17 M DX .02844 M/S X .0000 M DX .0000 M/S

Y 273.6 M DY .05204 M/S Y .0000 M DY .0000 M/S

Z 917.9 M DZ .00607 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2765.60 KM ECC .296421 APF 184.176 DEG

LAN 242.619 DEG INC 12.1370 DEG TFP -5021.18 SEC

RCA 1945.82 KM PALT 207.731 KM PER 217.521 MIN

APO 3585.39 KM AALT 1847.30 KM TA 204.160 DEG

LAT 5.72723 DEG LONG 270.417 DEG

5.6 LUNAR HARMONICS USED: MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH: 2 HRS 0 MIN

SOS= 67.095

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2123	104	.0763	-.0022
61	C3	232/1945	232/2058	71	.0388	-.0019

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 287 , 05 HR , 21 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 1841P

TAPE NO.

ITEM NO. 1841P

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SEC

SEQ. NO. 010

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.14060	KM	DX	-1.6098283	KM/SEC
Y	1575.3032	KM	DY	.74196652	KM/SEC
Z	833.95770	KM	DZ	-.11746375	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	32.33	M	DX	.05160	M/S	X	32.33	M	DX	.0516	M/S
Y	160.7	M	DY	.04860	M/S	Y	160.7	M	DY	.0486	M/S
Z	269.2	M	DZ	.38868	M/S	Z	269.2	M	DZ	.3887	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2766.40	KM	ECC	.296638	APF	184.152	DEG
LAN	241.947	DEG	INC	12.1333	TFP	-483.779	SEC
RCA	1945.78	KM	PALT	207.693	KM	PER	217.615
APO	3587.02	KM	AALT	1848.93	KM	TA	334.635
LAT	4.36175	DEG	LONG	41.1670	DEG		

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 1 HRS 12 MIN

SOS= 66.752

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.0763	-.0022
61	C3	232/1945	232/2058	71	.0388	-.0019

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT'

DAY 287 , 05 HR , 23 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1B42P

TAPE NO.

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SECITEM NO. 1B42P
SEQ. NO. 011
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1280.6530	KM	DX	.85319856	KM/SEC
Y	-3088.4283	KM	DY	.43375688	KM/SEC
Z	-880.91794	KM	DZ	.38338261	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.72	M	DX	.01415	M/S	X	.0000	M	DX	.0000	M/S
Y	132.5	M	DY	.02448	M/S	Y	.0000	M	DY	.0000	M/S
Z	438.6	M	DZ	.00413	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.42	KM	ECC	.296399	APF	183.833	DEG	
LAN	242.943	DEG	INC	12.0968	DEG	TFP	-5020.84	SEC
RCA	1945.75	KM	PALT	207.664	KM	PER	217.499	MIN
APO	3585.09	KM	AALT	1847.00	KM	TA	204.158	DEG
LAT	5.64449	DEG	LONG	270.405	DEG			

5.6 LUNAR HARMONICS USED: MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH: 5 HRS 40 MIN SOS= 70099

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	1.5303	.0665
61	C3	232/1945	232/2058	71	.9666	.9623

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 287 , 05 HR , 40 MIN GMT	O.D. ANALYST	

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10320-1

5.1 O.D. IDENTIFICATION NO. 1B42P

TAPE NO.

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SECITEM NO. 1B42P
SEQ. NO. 011
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	883.96763	KM	DX	-1.6101418	KM/SEC
Y	1574.4480	KM	DY	.74169841	KM/SEC
Z	835.45055	KM	DZ	-.11569340	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.18 M	DX	.02465 M/S	X	17.18 M	DX	.0246 M/S
Y	76.54 M	DY	.02416 M/S	Y	76.54 M	DY	.0242 M/S
Z	126.8 M	DZ	.18791 M/S	Z	126.8 M	DZ	.1879 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2766.22	KM	ECC	.296616	APF	183.809	DEG	
LAN	242.272	DEG	INC	12.0930	DEG	TFP	-483.441	SEC
RCA	1945.72	KM	PALT	207.626	KM	PER	217.594	MIN
APO	3586.73	KM	AALT	1848.64	KM	TA	334.651	DEG
LAT	4.41140	DEG	LONG	41.1678	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 1 HRS 12 MIN SOS= 69937

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	1.5303	.0665
61	C3	232/1945	232/2058	71	.9666	.9623

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT'

DAY 287 , 05 HR , 43 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DQ-100820-1

5.1 O.D. IDENTIFICATION NO. 2B41P

TAPE NO.

ITEM NO. 2B41P

5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 028

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.6764	KM	DX	.29301694	KM/SEC
Y	-861.67314	KM	DY	.74507678	KM/SEC
Z	-538.45255	KM	DZ	.51546490	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	13.01	M	DX	.02351	M/S	X	.0000	M	DX	.0000	M/S
Y	569.6	M	DY	.29054	M/S	Y	.0000	M	DY	.0000	M/S
Z	931.5	M	DZ	.43065	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.67	KM	ECC	.336529	APF	164.668	DEG	
LAN	233.793	DEG	INC	12.1180	DEG	TFP	6062.35	SEC
RCA	1784.52	KM	PALT	46.4306	KM	PER	208.625	MIN
APO	3594.83	KM	AALT	1856.74	KM	TA	177.021	DEG
LAT	356.218	DEG	LONG	215.864	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 3 HRS 0 MIN

SOS= 973.03

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.1995	.1377
61	C3	322/2037	322/2144	130	.0662	.0078

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 06 HR , 00 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

02-100020-1

5.1 O.D. IDENTIFICATION NO. 2841P

TAPE NO.

ITEM NO. 2841P

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 GMT
HR MIN SEC

SEQ. NO. 028

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.8717	KM	DX	-.47021499	KM/SEC
Y	379.75779	KM	DY	-1.5294892	KM/SEC
Z	234.22457	KM	DZ	-1.0557808	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.454 M	DX	.03823 M/S	X	1.454 M	DX	.0382 M/S
Y	304.2 M	DY	.56420 M/S	Y	304.2 M	DY	.5642 M/S
Z	487.2 M	DZ	.83487 M/S	Z	487.2 M	DZ	.8349 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.26	KM	ECC	.337052	APF	164.681	DEG
LAN	232.837	DEG	INC	12.1100	TFP	-17.4039	SEC
RCA	1783.50	KM	PALT	45.4129	KM	PER	208.693
APO	3597.02	KM	AALT	1858.93	KM	TA	358.928
LAT	3.39389	DEG	LONG	36.7922	DEG		

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 1 HRS 44 MIN

SOS= 973.02

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.1995	.1377
61	C3	322/2037	322/2144	130	.0662	.0078

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT'

DAY 287 , 06 HR , 03 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-103020-1

5.1 O.D. IDENTIFICATION NO. 2D41P

TAPE NO.

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR MIN SEC

ITEM NO. 2D41P

SEQ. NO. 059

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.5128	KM	DX	-.89418022	KM/SEC
Y	1409.2484	KM	DY	.60149358	KM/SEC
Z	1012.0209	KM	DZ	.39232396	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	21.95	M	DX	.00873	M/S	X	.0000	M	DX	.0000	M/S
Y	171.9	M	DY	.05291	M/S	Y	.0000	M	DY	.0000	M/S
Z	185.9	M	DZ	.10033	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.45	KM	ECC	.338288	APF	167.378	DEG
LAN	178.977	DEG	INC	11.9282	TFP	-3530.28	SEC
RCA	1779.64	KM	PALT	41.5504	PER	208.599	MIN
APO	3599.26	KM	AALT	1861.17	TA	225.350	DEG
LAT	6.41593	DEG	LONG	211.139	DEG		

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 3 HRS 0 MIN SOS= 1583.1

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.2665	-.0296
61	C3	326/2250	327/0109	131	.2579	.0397

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 09 HR , 03 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2D41P

TAPE NO.

5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
 HR MIN SEC

ITEM NO. 2D41P
 SEQ. NO. 059
 COMPUTER G

5.3 STATE VECTOR (SELENUCENTRIC 1950.0)

X	-1789.3043	KM	DX	-.07395130	KM/SEC
Y	-7.6610247	KM	DY	-1.5782505	KM/SEC
Z	-40.851405	KM	DZ	-1.0769215	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.355 M	DX	.02402 M/S	X	1.355 M	DX	.0240 M/S
Y	20.61 M	DY	.16315 M/S	Y	20.61 M	DY	.1632 M/S
Z	19.37 M	DZ	.23779 M/S	Z	19.37 M	DZ	.2378 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.34	KM	ECC	.338731	APF	167.468	DEG	
LAN	178.377	DEG	INC	11.9185	TFP	203.043	SEC	
RCA	1779.04	KM	PALT	40.9459	KM	PER	208.702	MIN
APO	3601.64	KM	AALT	1863.55	KM	TA	12.5096	DEG
LAT	.004566	DEG	LONG	358.356	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' U HRS 59 MIN SOS= 1583.1

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.2665	-.0296
61	C3	326/2250	327/0109	131	.2579	.0397

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'

DAY. 287 , 09 HR , 06 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2D42P

TAPE NO.

ITEM NO. 2D42P

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 060

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.1605	KM	DX	-.89428632	KM/SEC
Y	1412.0732	KM	DY	.60243863	KM/SEC
Z	1008.6360	KM	DZ	.39069679	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.90	M	DX	.00713	M/S	X	.0000	M	DX	.0000	M/S
Y	138.1	M	DY	.04353	M/S	Y	.0000	M	DY	.0000	M/S
Z	148.9	M	DZ	.08309	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.36	KM	ECC	.338266	APF	167.386	DEG	
LAN	178.981	DEG	INC	11.7808	DEG	TFP	-3530.20	SEC
RCA	1779.64	KM	PALT	41.5537	KM	PER	208.588	MIN
APO	3599.08	KM	AALT	1860.99	KM	TA	225.350	DEG
LAT	6.33871	DEG	LONG	211.164	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 6 HRS 10 MIN

SOS= 6479.8

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.4564	.0287
61	C3	326/2250	327/0109	131	.3704	.1387

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 09 HR , 23 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2D42P

TAPE NO.

ITEM NO. 2D42P

5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HR MIN SEC

SEQ. NO. 060

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.3051	KM	DX	-.07353909	KM/SEC
Y	-8.0809393	KM	DY	-1.5810133	KM/SEC
Z	-41.110319	KM	DZ	-1.0728495	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.9738	M	DX	.01959	M/S	X	.9738	M	DX	.0196	M/S
Y	15.51	M	DY	.13265	M/S	Y	15.51	M	DY	.1327	M/S
Z	17.64	M	DZ	.19433	M/S	Z	17.64	M	DZ	.1943	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.25	KM	ECC	.338709	APF	167.476	DEG	
LAN	178.381	DEG	INC	11.7711	DEG	TFP	203.121	SEC
RCA	1779.04	KM	PALT	40.9469	KM	PER	208.691	MIN
APO	3601.46	KM	AALT	1863.37	KM	TA	12.5143	DEG
LAT	.002014	DEG	LONG	358.371	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 0 HRS 59 MIN SOS= 6479.5

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.4564	.0287
61	C3	326/2250	327/0109	131	.3704	.1387

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'

DAY 287 , 09 HR , 26 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DL-100C20-1

5.1 O.D. IDENTIFICATION NO. 3D41P

TAPE NO.

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SEC

ITEM NO. 3D41P

SEQ. NO. 077

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-496.30997	KM	DX	-.89622244	KM/SEC
Y	2975.8271	KM	DY	-.42936136	KM/SEC
Z	1713.5133	KM	DZ	.12341001	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	100.3 M	DX	.13755 M/S	X	.0000 M	DX	.0000 M/S
Y	447.8 M	DY	.20630 M/S	Y	.0000 M	DY	.0000 M/S
Z	800.3 M	DZ	.28258 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.94	KM	ECC	.337013	APF	180.820	DEG	
LAN	184.552	DEG	INC	20.3967	TFP	-4854.51	SEC	
RCA	1782.73	KM	PALT	44.6408	KM	PER	208.539	MIN
APO	3595.15	KM	AALT	1857.06	KM	TA	201.751	DEG
LAT	7.70692	DEG	LONG	205.895	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 3 HRS 0 MIN SOS= 1175.8

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.1734	-.0966
41	CC3	49/0705	49/0834	181	.2867	-.0515
12	C3	49/0706	49/0709	4	.1309	.6301
12	CC3	49/0613	49/0659	43	.1402	-.0665

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 09 HR , 45 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-

5.1 O.D. IDENTIFICATION NO. 3D41P

TAPE NO.

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SECITEM NO. 3D41P
SEQ. NO. 077
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-536.00008	KM	DX	1.7337637	KM/SEC
Y	-1589.1609	KM	DY	-.23309365	KM/SEC
Z	-608.56150	KM	DZ	-.78293732	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	77.78	M	DX	.27425	M/S	X	77.78	M	DX	.2743	M/S
Y	13.12	M	DY	.51247	M/S	Y	13.12	M	DY	.5125	M/S
Z	101.5	M	DZ	.75783	M/S	Z	101.5	M	DZ	.7578	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.96	KM	ECC	.337514	APF	180.928	DEG	
LAN	183.806	DEG	INC	20.3872	DEG	TFP	-88.8533	SEC
RCA	1782.06	KM	PALT	43.9731	KM	PER	208.659	MIN
APO	3597.87	KM	AALT	1859.78	KM	TA	354.524	DEG
LAT	1.58270	DEG	LONG	359.542	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 1 HRS 16 MIN

SCS= 1173.9

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.1734	-.0966
41	CC3	49/0705	49/0834	181	.2867	-.0515
12	C3	49/0706	49/0709	4	.1309	.6301
12	CC3	49/0613	49/0659	43	.1402	-.0665

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'

DAY 287 , 09 HR , 47 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3D42P

TAPE NO.

ITEM NO. 3D42P

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 078

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-495.94436	KM	DX	-.89560551	KM/SEC
Y	2973.8197	KM	DY	-.43025832	KM/SEC
Z	1717.1525	KM	DZ	.12460368	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	32.69 M	DX	.05015 M/S	X	.0000 M	DX	.0000 M/S
Y	156.2 M	DY	.07470 M/S	Y	.0000 M	DY	.0000 M/S
Z	279.6 M	DZ	.10152 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UPDATE)

SMA	2688.91	KM	ECC	.337024	APF	180.957	DEG
LAN	184.491	DEG	INC	20.5193	TFP	-4854.62	SEC
RCA	1782.68	KM	PALT	44.5945	KM	PER	208.536
APO	3595.14	KM	AALT	1857.05	KM	TA	201.747
LAT	7.77563	DEG	LONG	205.889	DEG		

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS= 10178

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.3003	-.3457
41	CC3	49/0705	49/1203	412	.7383	-.0260
12	C3	49/0706	49/0709	4	.1598	.3284
12	CC3	49/0613	49/0659	43	.2066	-.3317

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 288 , 02 HR , 42 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3D42P

TAPE NO.

ITEM NO. 3D42P

5.2 EPOCH DAY 49 , 7 , 32 , 25.310 GMT
HR MIN SEC

SEQ. NO. 078

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-535.74438	KM	DX	1.7325884	KM/SEC
Y	-1589.0272	KM	DY	-.23087351	KM/SEC
Z	-609.02168	KM	DZ	-.78625504	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	29.09	M	DX	.09835	M/S	X	29.09	M	DX	.0983	M/S
Y	3.612	M	DY	.18287	M/S	Y	3.612	M	DY	.1829	M/S
Z	32.66	M	DZ	.27007	M/S	Z	32.66	M	DZ	.2701	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.94	KM	ECC	.337524	APF	181.005	DEG	
LAN	183.745	DEG	INC	20.5098	DEG	TFP	-88.9621	SEC
RCA	1782.02	KM	PALT	43.9292	KM	PER	208.656	MIN
APO	3597.86	KM	AALT	1859.77	KM	TA	354.517	DEG
LAT	1.56728	DEG	LONG	359.550	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 1 HRS 16 MIN

SOS= 10141

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.3003	-.3457
41	CC3	49/0705	49/1203	412	.7383	-.0260
12	C3	49/0706	49/0709	4	.1598	.3284
12	CC3	49/0613	49/0659	43	.2066	-.3317

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'

DAY 288 , 02 HR , 44 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2F41P

TAPE NO.

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 2F41P
 SEQ. NO. 109
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	499.06619	KM	DX	-1.4924954	KM/SEC
Y	1938.0774	KM	DY	-.13003276	KM/SEC
Z	1327.9962	KM	DZ	-.12261597	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	96.31 M	DX	.01132 M/S	X	.0000 M	DX	.0000 M/S
Y	356.7 M	DY	.05396 M/S	Y	.0000 M	DY	.0000 M/S
Z	487.4 M	DZ	.19999 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.46	KM	ECC	.336806	APF	168.990	DEG
LAN	147.432	DEG	INC	11.8185	DEG	TFP	-1849.14
RCA	1783.63	KM	PALT	45.5437	KM	PER	208.600
APO	3595.29	KM	AALT	1857.20	KM	TA	268.763
LAT	11.5458	DEG	LONG	224.928	DEG		

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 3 HRS 0 MIN SOS= 1906.8

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.2824	-.0030
12	CC3	329/0650	329/0916	190	.2647	-.1007

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'	PREPARED BY'	GAYLE D. BARROW
DAY 287 , 07 HR , 44 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

02-00820-1

5.1 O.D. IDENTIFICATION NO. 2F41P

TAPE NO.

ITEM NO. 2F41P

5.2 EPOCH DAY 329 , 7 : 21 : 15.180 GMT
HR MIN SEC

SEQ. NO. 109

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.4619	KM	DX	-.31770866	KM/SEC
Y	253.39302	KM	DY	-1.5604389	KM/SEC
Z	131.40975	KM	DZ	-1.0674127	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	5.806 M	DX	.07871 M/S	X	5.806 M	DX	.0787 M/S
Y	141.9 M	DY	.29299 M/S	Y	141.9 M	DY	.2930 M/S
Z	356.0 M	DZ	.40519 M/S	Z	356.0 M	DZ	.4052 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.92	KM	ECC	.337049	APF	169.069	DEG	
LAN	147.108	DEG	INC	11.8198	TFP	25.5160	SEC	
RCA	1783.28	KM	PALT	45.1933	KM	PER	208.653	MIN
APO	3596.55	KM	AALT	1858.46	KM	TA	1.57169	DEG
LAT	1.90900	DEG	LONG	317.943	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 0 HRS 28 MIN SOS= 1905.3

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.2824	-.0030
12	CC3	329/0650	329/0916	190	.2647	-.1007

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'

DAY 287 , 07 HR , 47 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-107220-1

5.1 O.D. IDENTIFICATION NO. 2F42P

TAPE NO.

5.2 EPOCH DAY 329 , 6 : 50 : 0.000 GMT
HR MIN SECITEM NO. 2F42P
SEQ. NO. 110
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	499.45249	KM	DX	-1.4925952	KM/SEC
Y	1936.9512	KM	DY	-.13017760	KM/SEC
Z	1329.2767	KM	DZ	-.12186207	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	25.53 M	DX	.00301 M/S	X	.0000 M	DX	.0000 M/S
Y	91.87 M	DY	.01555 M/S	Y	.0000 M	DY	.0000 M/S
Z	124.9 M	DZ	.05440 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.38	KM	ECC	.336794	APF	168.819	DEG
LAN	147.590	DEG	INC	11.8668	TFP	-1848.96	SEC
RCA	1783.61	KM	PALT	45.5241	KM	PER	208.591
APO	3595.15	KM	AALT	1857.06	KM	TA	268.768
LAT	11.5855	DEG	LONG	224.915	DEG		

5.6 LUNAR HARMONICS USED: MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 10526

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.4277	.2212
41	CC3	329/1023	329/1247	197	.5574	-.2573
12	CC3	329/0650	329/0917	191	.4470	.1600

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:
DAY 287 , 08 HR , 48 MIN	GAYLE D. BARROW
	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2F42P

TAPE NO.

ITEM NO. 2F42P

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SEC

SEQ. NO. 110

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.4467	KM	DX	-.31792660	KM/SEC
Y	252.80565	KM	DY	-1.5596122	KM/SEC
Z	132.51741	KM	DZ	-1.0685552	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.855	M	DX	.02073	M/S	X	1.855	M	DX	.0207	M/S
Y	38.57	M	DY	.07550	M/S	Y	38.57	M	DY	.0755	M/S
Z	95.03	M	DZ	.10408	M/S	Z	95.03	M	DZ	.1041	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.84	KM	ECC	.337037	APF	168.698	DEG	
LAN	147.266	DEG	INC	11.8681	DEG	TFP	25.7009	SEC
RCA	1783.26	KM	PALT	45.1743	KM	PER	208.644	MIN
APO	3596.42	KM	AALT	1858.33	KM	TA	1.58309	DEG
LAT	1.94911	DEG	LONG	317.947	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 0 HRS 28 MIN

SOS= 10457

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.4277	.2212
41	CC3	329/1023	329/1247	197	.5574	-.2573
12	CC3	329/0650	329/0917	191	.4470	.1600

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'

DAY 287 , 08 HR , 51 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DC-100220-1

5.1 O.D. IDENTIFICATION NO. 3F41P

TAPE NO.

ITEM NO. 3F41P

5.2 EPOCH DAY 52 , 0 , 50 , 0.000 GMT
HR MIN SEC

SEQ. NO. 127

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2065.8887	KM	DX	-.40307276	KM/SEC
Y	1227.1980	KM	DY	-1.1433690	KM/SEC
Z	1470.4276	KM	DZ	-.43278027	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	332.5 M	DX	.06760 M/S	X	.0000 M	DX	.0000 M/S
Y	298.9 M	DY	.12411 M/S	Y	.0000 M	DY	.0000 M/S
Z	722.3 M	DZ	.26767 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.52	KM	ECC	.335830	APF	182.750	DEG	
LAN	147.562	DEG	INC	21.2751	TFP	-2750.06	SEC	
RCA	1785.64	KM	PALT	47.5452	KM	PER	208.490	MIN
APC	3591.40	KM	AALT	1853.31	KM	TA	242.844	DEG
LAT	19.2945	DEG	LONG	211.600	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 3 HRS 0 MIN SOS= 5820.8

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.5055	.0287
62	CC3	52/0052	52/0113	18	.0471	-.1203
12	C3	52/0054	52/0113	20	.0831	-.4442
12	CC3	52/0124	52/0313	198	.4755	-.0751

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 288 , 03 HR , 05 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F41P

TAPE NO.

ITEM NO. 3F41P

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SEC

SEQ. NO. 127

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-571.28237	KM	DX	1.7145818	KM/SEC
Y	-1587.8188	KM	DY	-.23476429	KM/SEC
Z	-596.83008	KM	DZ	-.81251447	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	91.32 M	DX	.27884 M/S	X	91.32 M	DX	.2788 M/S
Y	174.8 M	DY	.28386 M/S	Y	174.8 M	DY	.2839 M/S
Z	377.7 M	DZ	.67148 M/S	Z	377.7 M	DZ	.6715 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.34	KM	ECC	.336125	APF	182.798	DEG
LAN	147.129	DEG	INC	21.2751	DEG	TFP	-132.310
RCA	1785.39	KM	PALT	47.2953	KM	PER	208.586
APO	3593.29	KM	AALT	1855.20	KM	TA	351.881
LAT	1.92857	DEG	LONG	322.168	DEG		

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 0 HRS 40 MIN SOS= 5817.2

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.5055	.0287
62	CC3	52/0052	52/0113	18	.0471	-.1203
12	C3	52/0054	52/0113	20	.0831	-.4442
12	CC3	52/0124	52/0313	198	.4755	-.0751

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'

DAY 288 , 03 HR , 08 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DB-100020-1

5.1 O.D. IDENTIFICATION NO. 3F42P

TAPE NO.

ITEM NO. 3F42P

5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 128

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2070.8252	KM	DX	-.40409722	KM/SEC
Y	1231.8010	KM	DY	-1.1415288	KM/SEC
Z	1459.4207	KM	DZ	-.43672900	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	151.7	M	DX	.03106	M/S	X	.0000	M	DX	.0000	M/S
Y	136.1	M	DY	.06013	M/S	Y	.0000	M	DY	.0000	M/S
Z	330.7	M	DZ	.12876	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2686.44	KM	ECC	.335803		APF	183.211	DEG
LAN	147.094	DEG	INC	20.9130	DEG	TFP	-2750.00	SEC
RCA	1785.65	KM	PALT	47.5623	KM	PER	208.481	MIN
APD	3591.22	KM	AALT	1853.13	KM	TA	242.845	DEG
LAT	19.0402	DEG	LONG	211.669	DEG			

5.6 LUNAR HARMONICS USED: MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 10218

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.5614	.0502
62	CC3	52/0052	52/0113	18	.0997	-.1503
12	C3	52/0054	52/0113	20	.0892	-.2910
12	CC3	52/0124	52/0643	414	.4936	-.1088

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 288 , 03 HR , 27 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F42P

TAPE NO.

ITEM NO. 3F42P

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
 HR MIN SEC

SEQ. NO. 128
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-572.59180	KM	DX	1.7187410	KM/SEC
Y	-1585.2325	KM	DY	-.23909057	KM/SEC
Z	-602.43346	KM	DZ	-.80235760	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	43.98 M	DX	.12657 M/S	X	43.98 M	DX	.1266 M/S
Y	84.43 M	DY	.13190 M/S	Y	84.43 M	DY	.1319 M/S
Z	180.8 M	DZ	.31086 M/S	Z	180.8 M	DZ	.3109 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.25	KM	ECC	.336100	APF	183.259	DEG	
LAN	146.661	DEG	INC	20.9131	DEG	TFP	-132.257	SEC
RCA	1785.39	KM	PALT	47.3024	KM	PER	208.575	MIN
APO	3593.10	KM	AALT	1855.01	KM	TA	351.884	DEG
LAT	1.73186	DEG	LONG	322.122	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 0 HRS 40 MIN SOS= 10213

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.5614	.0502
62	CC3	52/0052	52/0113	18	.0997	-.1503
12	C3	52/0054	52/0113	20	.0892	-.2910
12	CC3	52/0124	52/0643	414	.4936	-.1088

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'

DAY 288 , 03 HR , 29 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

POL-00020-1

5.1 O.D. IDENTIFICATION NO. 3D41M

TAPE NO.

ITEM NO. 3D41M

5.2 EPOCH DAY 48 , 19 ' 42 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 79

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-191.55122	KM	DX	-.90739168	KM/SEC
Y	3092.5448	KM	DY	-.31815351	KM/SEC
Z	1670.5531	KM	DZ	.19424675	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	22.96	M	DX	.03793	M/S	X	.0000	M	DX	.0000	M/S
Y	118.6	M	DY	.05970	M/S	Y	.0000	M	DY	.0000	M/S
Z	227.8	M	DZ	.07601	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.08	KM	ECC	.336742	APF	180.790	DEG	
LAN	190.232	DFG	INC	20.9392	DEG	TFP	-5176.93	SEC
RCA	1783.55	KM	PALT	45.4626	KM	PER	208.555	MIN
APO	3594.60	KM	AALT	1856.51	KM	TA	196.599	DEG
LAT	6.13106	DEG	LONG	206.535	DEG			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 2 HRS 40 MIN SOS= 1147.0

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.2242	-.0306
62	CC3	48/1942	48/2003	20	.0920	-.0101
12	CC3	48/2013	48/2157	166	.1961	-.0680

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'
DAY 287 , 09 HR , 47 MINPREPARED BY' GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10000-1

5.1 O.D. IDENTIFICATION NO. 3D41M

TAPE NO.

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SECITEM NO. 3D41M
SEQ. NO. 79
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-538.32080	KM	DX	1.7280710	KM/SEC
Y	-1588.6822	KM	DY	-.22727281	KM/SEC
Z	-609.21503	KM	DZ	-.79620914	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	131.3 M	DX	.09662 M/S	X	131.3 M	DX	.0966 M/S
Y	27.16 M	DY	.13083 M/S	Y	27.16 M	DY	.1308 M/S
Z	59.29 M	DZ	.22452 M/S	Z	59.29 M	DZ	.2245 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.11	KM	ECC	.337398	APF	181.209	DEG
LAN	183.566	DEG	INC	20.8477	TFP	-90.7654	SEC
RCA	1782.47	KM	PALT	44.3810	PER	208.675	MIN
APO	3597.75	KM	AALT	1859.66	TA	354.409	DEG
LAT	1.55833	DEG	LONG	359.469			DEG

5.6 LUNAR HARMONICS USED: MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH: 11 HRS 47 MIN SOS= -1078.7

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.2242	-.0306
62	CC3	48/1942	48/2003	20	.0920	-.0101
12	CC3	48/2013	48/2157	166	.1961	-.0680

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:	DAY 287 , 09 HR , 51 MIN	PREPARED BY:	GEO.S.GOODWIN
			O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F41M

TAPE NO:

ITEM NO. 3F41M

5.2 EPOCH DAY 51 , 14 ' 25 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 129

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2076.4323	KM	DX	-.39348039	KM/SEC
Y	1205.4588	KM	DY	-1.1495586	KM/SEC
Z	1449.6935	KM	DZ	-.44288583	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	55.54 M	DX	.01184 M/S	X	.0000 M	DX	.0000 M/S
Y	61.34 M	DY	.01828 M/S	Y	.0000 M	DY	.0000 M/S
Z	131.4 M	DZ	.03737 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.52	KM	ECC	.336282	APF	182.835	DEG
LAN	153.031	DEG	INC	20.9832	TFP	-2719.93	SEC
RCA	1784.42	KM	PALT	46.3311	PER	208.491	MIN
APO	3592.62	KM	AALT	1854.53	TA	243.543	DEG
LAT	19.1528	DEG	LONG	217.933			

5.6 LUNAR HARMONICS USED' MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH' 2 HRS 40 MIN SOS= 5815.7

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.5331	-.0951
41	C3	51/1425	51/1557	152	.6582	-.0153

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 06 HR , 54 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) 7-130000-1

5.1 O.D. IDENTIFICATION NO. 3F41M TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
 HR MIN SEC
 ITEM NO. 3F41M
 SEQ. NO. 129
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-574.71972	KM	DX	1.7184548	KM/SEC
Y	-1584.4693	KM	DY	-.24070233	KM/SEC
Z	-602.40411	KM	DZ	-.80254852	KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X	118.2 M	DX	.06174 M/S	X	118.2 M	DX	.0617 M/S
Y	28.89 M	DY	.09776 M/S	Y	28.89 M	DY	.0978 M/S
Z	83.48 M	DZ	.12652 M/S	Z	83.48 M	DZ	.1265 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.37	KM	ECC	.336160	APF	183.344	DEG
LAN	146.573	DEG	INC	20.8980	TFP	-133.352	SEC
RCA	1785.31	KM	PALT	47.2228	PER	208.590	MIN
APO	3593.43	KM	AALT	1855.34	TA	351.816	DEG
LAT	1.72465	DEG	LONG	322.050			

5.6 LUNAR HARMONICS USED: MOD 4TH ORDER - 10

5.7 DATA ARC LENGTH: 11 HRS 5 MIN SOS= 5813.0

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.5331	-.0951
41	C3	51/1425	51/1557	152	.6582	-.0153

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT: PREPARED BY: GEO.S.GOODWIN
 DAY 287 , 06 HR , 58 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2- 123-1

5.1 O.D. IDENTIFICATION NO. 1851P

TAPE NO.

ITEM NO. 1851P

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 013

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 1281.2662 KM DX .85284935 KM/SEC

Y -3090.1914 KM DY .43438358 KM/SEC

Z -876.01044 KM DZ .38337259 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 37.33 M DX .02856 M/S X .0000 M DX .0000 M/S

Y 274.7 M DY .05233 M/S Y .0000 M DY .0000 M/S

Z 921.9 M DZ .00602 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2766.04 KM ECC .296430 APF 184.158 DEG

LAN 242.612 DEG INC 12.1399 DEG TFP -5020.78 SEC

RCA 1946.10 KM PALT 208.013 KM PER 217.572 MIN

APO 3585.97 KM AALT 1847.88 KM TA 204.186 DEG

LAT 5.73008 DEG LONG 270.417 DEG

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 2 HRS 0 MIN

SOS= 564.96

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2226	.0045
61	C3	232/1945	232/2058	71	.1144	.0159

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 04 HR , 42 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

7-100000-1

5.1 O.D. IDENTIFICATION NO. 1851P

TAPE NO.

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SECITEM NO. 1851P
SEQ. NO. 013
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.07431	KM	DX	-1.6098182	KM/SEC
Y	1575.6490	KM	DY	.74211026	KM/SEC
Z	833.51855	KM	DZ	-.11792147	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	32.38 M	DX	.05186 M/S	X	32.38 M	DX	.0519 M/S
Y	161.4 M	DY	.04865 M/S	Y	161.4 M	DY	.0486 M/S
Z	270.6 M	DZ	.39025 M/S	Z	270.6 M	DZ	.3903 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2767.09	KM	ECC	.296758	APF	184.220	DEG
LAN	241.854	DEG	INC	12.1435	TFP	-483.220	SEC
RCA	1945.93	KM	PALT	207.842	KM	PER	217.696
APO	3588.24	KM	AALT	1850.15	KM	TA	334.665
LAT	4.34612	DEG	LONG	41.1710	DEG		

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 1 HRS 12 MIN

SOS= 563.87

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2226	.0045
61	C3	232/1945	232/2058	71	.1144	.0159

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:

DAY 287 , 04 HR , 45 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D-103000-1

5.1 O.D. IDENTIFICATION NO. 1B52P

TAPE NO.

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SECITEM NO. 1B52P
SEQ. NO. 014
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1280.5643	KM	DX	.85346888	KM/SEC
Y	-3086.3799	KM	DY	.43326617	KM/SEC
Z	-887.36650	KM	DZ	.38359520	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	16.72	M	DX	.01387	M/S	X	.0000	M	DX	.0000	M/S
Y	130.0	M	DY	.02396	M/S	Y	.0000	M	DY	.0000	M/S
Z	427.8	M	DZ	.00412	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.46	KM	ECC	.296317	APF	183.348	DEG	
LAN	243.402	DEG	INC	12.0453	DEG	TFP	-5020.63	SEC
RCA	1946.01	KM	PALT	207.917	KM	PER	217.504	MIN
APO	3584.91	KM	AALT	1846.82	KM	TA	204.167	DEG
LAT	5.53249	DEG	LONG	270.398	DEG			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 5 HRS 40 MIN SOS= 152516

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	2.2669	.0281
61	C3	232/1945	232/2058	71	1.2494	1.4832

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 287 , 05 HR , 07 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5.1 O.D. IDENTIFICATION NO. 1B52P

TAPE NO.

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SEC

ITEM NO. 1B52P
SEQ. NO. 014
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	883.97163	KM	DX	-1.6104062	KM/SEC
Y	1573.5595	KM	DY	.74147519	KM/SEC
Z	837.23990	KM	DZ	-.11366339	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	16.85	M	DX	.02393	M/S	X	16.85	M	DX	.0239	M/S
Y	74.94	M	DY	.02382	M/S	Y	74.94	M	DY	.0238	M/S
Z	123.6	M	DZ	.18331	M/S	Z	123.6	M	DZ	.1833	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2766.50	KM	ECC	.296645	APF	183.411	DEG
LAN	242.643	DEG	INC	12.0488	TFP	-483.069	SEC
RCA	1945.83	KM	PALT	207.744	PER	217.627	MIN
APO	3587.17	KM	AALT	1849.08	TA	334.672	DEG
LAT	4.46885	DEG	LONG	41.1649			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 1 HRS 12 MIN SOS= 151412

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	2.2669	.0281
61	C3	232/1945	232/2058	71	1.2494	1.4832

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:
DAY 287 , 05 HR , 10 MIN

PREPARED BY: GAYLE D. BARROW
J.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2B51P

TAPE NO.

ITEM NO. 2B51P

5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 031

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.9324	KM	DX	.29291014	KM/SEC
Y	-857.30989	KM	DY	.74461947	KM/SEC
Z	-545.15865	KM	DZ	.51613741	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	15.54 M	DX	.02384 M/S	X	.0000 M	DX	.0000 M/S
Y	574.1 M	DY	.29132 M/S	Y	.0000 M	DY	.0000 M/S
Z	944.8 M	DZ	.43124 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.84	KM	ECC	.336517	APF	164.167	DEG	
LAN	234.288	DEG	INC	12.2084	TFP	6063.94	SEC	
RCA	1784.66	KM	PALT	46.5733	KM	PER	208.644	MIN
APO	3595.02	KM	AALT	1856.93	KM	TA	177.037	DEG
LAT	356.093	DEG	LONG	215.887	DEG			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 6051.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.5074	.3001
61	C3	322/2037	322/2144	130	.2486	.0797

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 286 , 06 HR , 49 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10020-1

5.1 O.D. IDENTIFICATION NO. 2B51P

TAPE NO.

ITEM NO. 2B51P

5.2 EPOCH DAY 322 , 22 : 23 : 16.600 GMT
HR MIN SEC

SEQ. NO. 031

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1727.0375	KM	DX	-.47016268	KM/SEC
Y	377.88903	KM	DY	-1.5280506	KM/SEC
Z	236.96367	KM	DZ	-1.0579227	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.944 M	DX	.03945 M/S	X	1.944 M	DX	.0394 M/S
Y	307.0 M	DY	.56583 M/S	Y	307.0 M	DY	.5658 M/S
Z	493.8 M	DZ	.83531 M/S	Z	493.8 M	DZ	.8353 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.98	KM	ECC	.337182	APF	164.307	DEG
LAN	233.218	DEG	INC	12.2138	TFP	-17.3729	SEC
RCA	1783.63	KM	PALT	45.5387	PER	208.776	MIN
APO	3598.33	KM	AALT	1860.24	TA	358.930	DEG
LAT	3.49811	DEG	LONG	36.8145			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 1 HRS 44 MIN

SOS= 6051.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.5074	.3001
61	C3	322/2037	322/2144	130	.2486	.0797

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:

DAY 286 , 06 HR , 52 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-110(20-1)

5.1 O.D. IDENTIFICATION NO. 2B52P

TAPE NO.

ITEM NO. 2B52P

5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 032

COMPUTER B

5.3 STATE VECTOR (SELENGENTRIC 1950.0)

X	3446.5637	KM	DX	.29963369	KM/SEC
Y	-768.78454	KM	DY	.76726778	KM/SEC
Z	-680.84392	KM	DZ	.48801469	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	61.47 M	DX	.00437 M/S	X	149.5 M	DX	.0312 M/S
Y	392.3 M	DY	.21345 M/S	Y	201.1 M	DY	.1296 M/S
Z	744.6 M	DZ	.33758 M/S	Z	598.2 M	DZ	.2656 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	3424.67	KM	ECC	.207637	APF	112.702	DEG
LAN	335.379	DEG	INC	30.0947	TFP	5675.48	SEC
RCA	2713.58	KM	PALT	975.493	PER	299.740	MIN
APO	4135.76	KM	AALT	2397.67	TA	132.982	DEG
LAT	332.810	DEG	LONG	217.823			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= +.0E+

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	1314.6152	230.7231
61	C3	322/2037	322/2144	130	40.5406	-89.1043

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT
THE ONBOARD LUNAR MODEL FAILS THE TWO ORBIT TEST
DIVERGENCE IN FIVE EASY ITERATIONS

TIME OF REPORT:

DAY 286 , 08 HR , 26 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-1092027

5.1 O.D. IDENTIFICATION NO. 2D51P

TAPE NO.

5.2 EPOCH DAY 326 , 22 , 45 , 0.000 GMT
HR MIN SECITEM NO. 2D51P
SEQ. NO. 062
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.7178	KM	DX	-.89421963	KM/SEC
Y	1407.1565	KM	DY	.60205733	KM/SEC
Z	1014.3682	KM	DZ	.39175410	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	21.66	M	DX	.00859	M/S	X	.0000	M	DX	.0000	M/S
Y	169.5	M	DY	.05246	M/S	Y	.0000	M	DY	.0000	M/S
Z	182.8	M	DZ	.09943	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.88	KM	ECC	.338276	APF	167.627	DEG	
LAN	178.684	DEG	INC	11.9396	TFP	-3529.72	SEC	
RCA	1779.96	KM	PALT	41.8688	KM	PER	208.649	MIN
APO	3599.80	KM	AALT	1861.71	KM	TA	225.379	DEG
LAT	6.47059	DEG	LONG	211.120	DEG			

5.6 LUNAR HARMONICS USED: MSC ONBOARD. - 11

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 2109.5

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.3018	-.1099
61	C3	326/2250	327/0109	131	.2938	-.0097

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 287 , 03 HR , 08 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-170-100-1

5.1 O.D. IDENTIFICATION NO. 2D51P

TAPE NO.

5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HR MIN SECITEM NO. 2D51P
SEQ. NO. 062
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.5180	KM	DX	-.07407432	KM/SEC
Y	-6.3158442	KM	DY	-1.5776578	KM/SEC
Z	-42.616626	KM	DZ	-1.0777593	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.354	M	DX	.02378	M/S	X	1.354	M	DX	.0238	M/S
Y	20.36	M	DY	.16139	M/S	Y	20.36	M	DY	.1614	M/S
Z	19.74	M	DZ	.23497	M/S	Z	19.74	M	DZ	.2350	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2691.39	KM	ECC	.338898	APF	167.802	DEG
LAN	178.035	DEG	INC	11.9455	TFP	203.020	SEC
RCA	1779.29	KM	PALT	41.1956	PER	208.825	MIN
APO	3603.50	KM	AALT	1865.41	TA	12.5063	DEG
LAT	359.936	DEG	LONG	358.337			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 0 HRS 59 MIN

SOS= 2109.2

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.3018	-.1099
61	C3	326/2250	327/0109	131	.2938	-.0097

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 287 , 03 HR , 11 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-17-30-1

5.1 O.D. IDENTIFICATION NO. 2D52P

TAPE NO.

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR MIN SECITEM NO. 2D52P
SEQ. NO. 063
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.2968	KM	DX	-.89422311	KM/SEC
Y	1410.8696	KM	DY	.60376805	KM/SEC
Z	1008.1536	KM	DZ	.38962775	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.57	M	DX	.00694	M/S	X	.0000	M	DX	.0000	M/S
Y	135.2	M	DY	.04306	M/S	Y	.0000	M	DY	.0000	M/S
Z	146.3	M	DZ	.08211	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.46	KM	ECC	.338154	APF	167.566	DEG
LAN	178.736	DEG	INC	11.7130	TFP	-3528.98	SEC
RCA	1780.01	KM	PALT	41.9203	PER	208.600	MIN
APO	3598.91	KM	AALT	1860.82	TA	225.387	DEG
LAT	6.34007	DEG	LONG	211.142	DEG		

5.6 LUNAR HARMONICS USED' MSC UNBOARD - 11

5.7 DATA ARC LENGTH' 6 HRS 10 MIN

SOS= 310030

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	3.3701	-.1525
61	C3	326/2250	327/0109	131	1.7608	1.2694

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 03 HR , 27 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 2D52P

TAPE NO.

ITEM NO. 2D52P

5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HR MIN SEC

SEQ. NO. 063

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.6260	KM	DX	-.07335795	KM/SEC
Y	-7.4406704	KM	DY	-1.5818064	KM/SEC
Z	-42.936109	KM	DZ	-1.0714070	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.9578	M	DX	.01934	M/S	X	.9578	M	DX	.0193	M/S
Y	15.34	M	DY	.13049	M/S	Y	15.34	M	DY	.1305	M/S
Z	17.84	M	DZ	.19161	M/S	Z	17.84	M	DZ	.1916	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.98	KM	ECC	.338778	APF	167.743	DEG	
LAN	178.087	DEG	INC	11.7188	DEG	TFP	203.755	SEC
RCA	1779.33	KM	PALT	41.2423	KM	PER	208.776	MIN
APO	3602.62	KM	AALT	1864.53	KM	TA	12.5503	DEG
LAT	359.940	DEG	LONG	358.374	DEG			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 0 HRS 59 MIN

SOS= 310029

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	3.3701	~.1525
61	C3	326/2250	327/0109	131	1.7608	1.2694

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 287 , 03 HR , 29 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DL-10020-1

5.1 O.D. IDENTIFICATION NO. 3D51P

TAPE NO.

ITEM NO. 3D51P

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 080

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-493.46099	KM	DX	-.89177236	KM/SEC
Y	2962.9660	KM	DY	-.43604457	KM/SEC
Z	1736.4554	KM	DZ	.13247185	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	115.4	M	DX	.14666	M/S	X	.0000	M	DX	.0000	M/S
Y	465.2	M	DY	.21299	M/S	Y	.0000	M	DY	.0000	M/S
Z	820.4	M	DZ	.28696	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.15	KM	ECC	.336987	APF	181.203	DEG
LAN	184.292	DEG	INC	21.2742	TFP	-4853.91	SEC
RCA	1782.94	KM	PALT	44.8479	KM	PER	208.563
APO	3595.35	KM	AALT	1857.26	KM	TA	201.771
LAT	8.14135	DEG	LONG	205.848	DEG		

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 828.96

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.1075	-.0939
41	CC3	49/0705	49/0834	181	.2377	-.0655
12	C3	49/0706	49/0709	4	.0312	.2504
12	CC3	49/0613	49/0659	43	.1138	-.0232

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 286 , 09 HR , 26 MIN

PREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 3D51P

TAPE NO.

ITEM NO. 3D51P

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SEC

SEQ. NO. 080

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-533.24040	KM	DX	1.7248547	KM/SEC
Y	-1589.3198	KM	DY	-.21682717	KM/SEC
Z	-611.07746	KM	DZ	-.80689128	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	78.47	M	DX	.29559	M/S	X	78.47	M	DX	.2956	M/S
Y	14.97	M	DY	.52979	M/S	Y	14.97	M	DY	.5298	M/S
Z	106.3	M	DZ	.77217	M/S	Z	106.3	M	DZ	.7722	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.69	KM	ECC	.337621	APF	181.294	DEG	
LAN	183.512	DEG	INC	21.2821	DEG	TFP	-88.4811	SEC
RCA	1782.25	KM	PALT	44.1646	KM	PER	208.743	MIN
APO	3599.12	KM	AALT	1861.03	KM	TA	354.548	DEG
LAT	1.50814	DEG	LONG	359.636	DEG			

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 1 HRS 16 MIN

SOS= 828.96

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.1075	-.0939
41	CC3	49/0705	49/0834	181	.2377	-.0655
12	C3	49/0706	49/0709	4	.0312	.2504
12	CC3	49/0613	49/0659	43	.1138	-.0232

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'

DAY 286 , 09 HR , 29 MIN GMT

PREPARED BY'

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10000-1

5.1 O.D. IDENTIFICATION NO. 3D52P

TAPE NO.

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SECITEM NO. 3D52P
SEQ. NO. 081
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-492.93612	KM	DX	-.89210869	KM/SEC
Y	2963.9028	KM	DY	-.43556916	KM/SEC
Z	1734.3645	KM	DZ	.13229923	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	33.98	M	DX	.J4990	M/S	X	.0000	M	DX	.0000	M/S
Y	151.5	M	DY	.07237	M/S	Y	.0000	M	DY	.0000	M/S
Z	268.9	M	DZ	.09672	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.97	KM	ECC	.336944	APF	.181.138	DEG	
LAN	184.339	DEG	INC	21.2311	DEG	TFP	-4853.52	SEC
RCA	1782.94	KM	PALT	44.8452	KM	PER	208.542	MIN
APO	3595.00	KM	AALT	1856.91	KM	TA	201.771	DEG
LAT	8.10368	DEG	LONG	205.839	DEG			

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS= 69909

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	1.2689	-.5933
41	CC3	49/0705	49/1203	412	1.7783	-.2459
12	C3	49/0706	49/0709	4	.0866	2.2773
12	CC3	49/0613	49/0659	43	1.3683	-.3548

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 02 HR , 45 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST.

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-107000-1

5.1 O.D. IDENTIFICATION NO. 3D52P

TAPE NO.

5.2 EPOCH DAY 49 , 7 : 32 : 25.310 GMT
HR MIN SECITEM NO. 3D52P
SEQ. NO. 081
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-532.99050	KM	DX	1.7253114	KM/SEC
Y	-1589.5048	KM	DY	-.21754340	KM/SEC
Z	-610.75039	KM	DZ	-.80568781	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	27.64 M	DX	.09842 M/S	X	27.64 M	DX	.0984 M/S
Y	3.885 M	DY	.17690 M/S	Y	3.885 M	DY	.1769 M/S
Z	32.07 M	DZ	.25829 M/S	Z	32.07 M	DZ	.2583 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.51	KM	ECC	.337578	APF	181.229	DEG
LAN	183.559	DEG	INC	21.2390	DEG	TFP	-88.0953
RCA	1782.25	KM	PALT	44.1608	KM	PER	208.722
APO	3598.77	KM	AALT	1860.68	KM	TA	354.572
LAT	1.51999	DEG	LONG	359.645	DEG		

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 1 HRS 16 MIN SOS= 69499

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	1.2689	-.5933
41	CC3	49/0705	49/1203	412	1.7783	-.2459
12	C3	49/0706	49/0709	4	.0866	2.2773
12	CC3	49/0613	49/0659	43	1.3683	-.3548

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'
DAY 287 , 02 HR , 48 MINPREPARED BY' GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 2F51P

TAPE NO.

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SECITEM NO. 2F51P
SEQ. NO. 112
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	500.49900	KM	DX	-1.4928643	KM/SEC
Y	1932.9226	KM	DY	-.12976108	KM/SEC
Z	1334.4387	KM	DZ	-.12093931	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	95.97	M	DX	.01079	M/S	X	.0000	M	DX	.0000	M/S
Y	352.9	M	DY	.05444	M/S	Y	.0000	M	DY	.0000	M/S
Z	478.4	M	DZ	.19780	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.66	KM	ECC	.336766	APF	168.574	DEG	
LAN	147.777	DEG	INC	12.0344	DEG	TFP	-1848.39	SEC
RCA	1783.88	KM	PALT	45.7858	KM	PER	208.623	MIN
APO	3595.45	KM	AALT	1857.36	KM	TA	268.801	DEG
LAT	11.7393	DEG	LONG	224.878	DEG			

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 3 HRS 0 MIN SOS= 3280.0

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.3240	.0185
12	CC3	329/0650	329/0916	190	.3658	-.1983

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 03 HR , 53 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2F51P

TAPE NO.

ITEM NO. 2F51P

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SEC

SEQ. NO. 112

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.5938	KM	DX	-.31875869	KM/SEC
Y	252.36991	KM	DY	-1.5563179	KM/SEC
Z	134.56722	KM	DZ	-1.0730204	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	6.269 M	DX	.07873 M/S	X	6.269 M	DX	.0787 M/S
Y	141.2 M	DY	.29036 M/S	Y	141.2 M	DY	.2904 M/S
Z	351.3 M	DZ	.39800 M/S	Z	351.3 M	DZ	.3980 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.67	KM	ECC	.337154	APF	168.698	DEG
LAN	147.429	DEG	INC	12.0419	TFP	25.9452	SEC
RCA	1783.50	KM	PALT	45.4081	PER	208.740	MIN
APO	3597.83	KM	AALT	1859.74	TA	1.59789	DEG
LAT	2.01518	DEG	LONG	317.935			

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 0 HRS 28 MIN SOS= 3250.7

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.3240	.0185
12	CC3	329/0650	329/0916	190	.3658	-.1983

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'

DAY 287 , 03 HR , 55 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10022)-1

5.1 O.D. IDENTIFICATION NO. 2F52P

TAPE NO.

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SECITEM NO. 2F52P
SEQ. NO. 113
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	506.34016	KM	DX	-1.4937537	KM/SEC
Y	1913.4960	KM	DY	-.13289833	KM/SEC
Z	1358.9870	KM	DZ	-.10925655	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	26.02	M	DX	.00228	M/S	X	.0000	M	DX	.0000	M/S
Y	90.43	M	DY	.01621	M/S	Y	.0000	M	DY	.0000	M/S
Z	118.4	M	DZ	.05237	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.41	KM	ECC	.336754	APF	166.081	DEG	
LAN	150.145	DEG	INC	12.9269	DEG	TFP	-1847.43	SEC
RCA	1783.74	KM	PALT	45.6489	KM	PER	208.594	MIN
APO	3595.08	KM	AALT	1856.99	KM	TA	268.827	DEG
LAT	12.4737	DEG	LONG	224.679	DEG			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 359332

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	2.0483	1.3669
41	CC3	329/1023	329/1247	197	3.4101	-1.4134
12	CC3	329/0650	329/0917	191	2.4877	1.1142

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 287 , 04 HR , 22 MINPREPARED BY: GAYLE D. BARROW
GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2F52P

TAPE NO.

ITEM NO. 2F52P

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SEC

SEQ. NO. 113

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.1597	KM	DX	-.32296628	KM/SEC
Y	243.48706	KM	DY	-1.5408743	KM/SEC
Z	153.86973	KM	DZ	-1.0939129	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	2.718 M	DX	.02128 M/S	X	2.718 M	DX	.0213 M/S
Y	38.88 M	DY	.07453 M/S	Y	38.88 M	DY	.0745 M/S
Z	91.10 M	DZ	.09876 M/S	Z	91.10 M	DZ	.0988 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.41	KM	ECC	.337133	APF	166.203	DEG
LAN	149.797	DEG	INC	12.9345	TFP	26.9443	SEC
RCA	1783.38	KM	PALT	45.2917	PER	208.710	MIN
APO	3597.43	KM	AALT	1859.34	TA	1.65956	DEG
LAT	2.69749	DEG	LONG	317.959			

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 0 HRS 26 MIN SOS= 359200

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	2.0483	1.3669
41	CC3	329/1023	329/1247	197	3.4101	-1.4134
12	CC3	329/0650	329/0917	191	2.4877	1.1142

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'	PREPARED BY'	GAYLE D. BARROW
DAY 287 , 04 HR , 24 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-1005

5.1 O.D. IDENTIFICATION NO. 3F51P

TAPE NO.

5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SECITEM NO. 3F51P
SEQ. NO. 130
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2066.0606	KM	DX	-.40422396	KM/SEC
Y	1227.5776	KM	DY	-1.1421572	KM/SEC
Z	1469.4590	KM	DZ	-.43549454	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	319.9	M	DX	.06491	M/S	X	.0000	M	DX	.0000	M/S
Y	288.4	M	DY	.12122	M/S	Y	.0000	M	DY	.0000	M/S
Z	696.4	M	DZ	.26061	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.89	KM	ECC	.335793	APF	183.061	DEG	
LAN	147.189	DEG	INC	21.1914	DEG	TFP	-2749.32	SEC
RCA	1785.98	KM	PALT	47.8891	KM	PER	208.534	MIN
APO	3591.80	KM	AALT	1853.71	KM	TA	242.880	DEG
LAT	19.2737	DEG	LONG	211.603	DEG			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 3943.1

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.3991	.0264
62	CC3	52/0052	52/0113	18	.3360	-.0363
12	C3	52/0054	52/0113	20	.2436	-.3666
12	CC3	52/0124	52/0313	198	.3827	-.1082

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 286 , 04 HR , 58 MIN GMT	O.D. ANALYST	

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220

5.1 O.D. IDENTIFICATION NO. 3F51P

TAPE NO.

5.2 EPOCH DAY 52 , 1 , 33 , 37.810 GMT
HR MIN SECITEM NO. 3F51P
SEQ. NO. 130
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-572.54908	KM	DX	1.7153350	KM/SEC
Y	-1586.0993	KM	DY	-.23558506	KM/SEC
Z	-600.86564	KM	DZ	-.81055868	KM/SEC

5.4 STANDARD DEVIATIONS.

A PRIORI

X	87.11 M	DX	.26863 M/S	X	87.11 M	DX	.2686 M/S
Y	170.6 M	DY	.27458 M/S	Y	170.6 M	DY	.2746 M/S
Z	367.6 M	DZ	.64914 M/S	Z	367.6 M	DZ	.6491 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.08	KM	ECC	.336210	APF	183.139	DEG
LAN	146.744	DEG	INC	21.2002	TFP	-131.861	SEC
RCA	1785.65	KM	PALT	47.5564	PER	208.672	MIN
APO	3594.51	KM	AALT	1856.42	TA	351.910	DEG
LAT	1.78859	DEG	LONG	322.127			

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 0 HRS 40 MIN SOS= 3943.1

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.3991	.0264
62	CC3	52/0052	52/0113	18	.3360	-.0363
12	C3	52/0054	52/0113	20	.2436	-.3666
12	CC3	52/0124	52/0313	198	.3827	-.1082

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'	PREPARED BY'	GAYLE D. BARROW
DAY 286 , 05 HR , 01 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 3F52P

TAPE NO.

5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SECITEM NO. 3F52P
SEQ. NO. 131
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2087.7325	KM	DX	-.40899243	KM/SEC
Y	1249.4681	KM	DY	-1.1332957	KM/SEC
Z	1418.4276	KM	DZ	-.45436427	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	151.1 M	DX	.02944 M/S	X	.0000 M	DX	.0000 M/S
Y	149.2 M	DY	.06610 M/S	Y	.0000 M	DY	.0000 M/S
Z	355.0 M	DZ	.13911 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.62	KM	ECC	.335729	APF	185.435	DEG
LAN	144.752	DEG	INC	19.5227	TFP	-2748.46	SEC
RCA	1785.98	KM	PALT	47.8856	PER	208.503	MIN
APO	3591.27	KM	AALT	1853.18	TA	242.898	DEG
LAT	18.0935	DEG	LONG	211.896			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 230800

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	1.7085	2.0267
62	CC3	52/0052	52/0113	18	1.7364	1.1989
12	C3	52/0054	52/0113	20	1.6632	1.8347
12	CC3	52/0124	52/0643	414	2.9190	-.7546

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 286 , 06 HR , 21 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F52P

TAPE NO.

ITEM NO. 3F52P

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT

SEQ. NO. 131

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-578.01927	KM	DX	1.7341473	KM/SEC
Y	-1573.5246	KM	DY	-.25592178	KM/SEC
Z	-627.75539	KM	DZ	-.76307068	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	40.83	M	DX	.12575	M/S	X	40.83	M	DX	.1258	M/S
Y	92.75	M	DY	.14450	M/S	Y	92.75	M	DY	.1445	M/S
Z	195.2	M	DZ	.33455	M/S	Z	195.2	M	DZ	.3346	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.81	KM	ECC	.336164	APF	185.519	DEG	
LAN	144.306	DEG	INC	19.5313	DEG	TFP	-131.039	SEC
RCA	1785.59	KM	PALT	47.5004	KM	PER	208.640	MIN
APO	3594.03	KM	AALT	1855.94	KM	TA	351.960	DEG
LAT	.842588	DEG	LONG	321.930	DEG			

5.6 LUNAR HARMONICS USED' MSC.ONBOARD - 11

5.7 DATA ARC LENGTH' 0 HRS 40 MIN SOS= 230600

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	1.7085	2.0267
62	CC3	52/0052	52/0113	18	1.7364	1.1989
12	C3	52/0054	52/0113	20	1.6632	1.8347
12	CC3	52/0124	52/0643	414	2.9190	-.7546

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'

PREPARED BY' GAYLE D. BARROW

DAY 286 , 06 HR , 23 MIN

GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-110101

5.1 O.D. IDENTIFICATION NO. 3D51M

TAPE NO.

5.2 EPOCH DAY 48 , 19 ' 42 ' 0.000 GMT
HR MIN SECITEM NO. 3D51M
SEQ. NO. 81
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-191.56234	KM	DX	-.90660916	KM/SEC
Y	3091.3659	KM	DY	-.31944988	KM/SEC
Z	1673.1875	KM	DZ	.19582517	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	23.51	M	DX	.03827	M/S	X	.0000	M	DX	.0000	M/S
Y	119.5	M	DY	.05994	M/S	Y	.0000	M	DY	.0000	M/S
Z	229.0	M	DZ	.07608	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.36	KM	ECC	.336753	APF	180.791	DEG	
LAN	190.225	DEG	INC	21.0791	DEG	TFP	-5176.40	SEC
RCA	1783.71	KM	PALT	45.6226	KM	PER	208.589	MIN.
APO	3595.01	KM	AALT	1856.92	KM	TA	196.620	DEG
LAT	6.17796	DEG	LONG	206.534	DEG			

5.6 LUNAR HARMONICS USED: MSC ONBOARD - 11

5.7 DATA ARC LENGTH: 2 HRS 40 MIN

SGS= 2703.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.2879	.1762
62	CC3	48/1942	48/2003	20	.2928	.1474
12	CC3	48/2013	48/2157	166	.3399	-.0315

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 287 , 10 HR , 04 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-160211

5.1 O.D. IDENTIFICATION NO. 3D51M

TAPE NO.

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SECITEM NO. 3D51M
SEQ. NO. 81
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-548.76545	KM	DX	1.7227546	KM/SEC
Y	-1587.0146	KM	DY	-.23018630	KM/SEC
Z	-606.08730	KM	DZ	-.80594715	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	124.3	M	DX	.09478	M/S	X	124.3	M	DX	.0948	M/S
Y	25.53	M	DY	.13714	M/S	Y	25.53	M	DY	.1371	M/S
Z	60.71	M	DZ	.22066	M/S	Z	60.71	M	DZ	.2207	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.90	KM	ECC	.337505	APF	181.537	DEG	
LAN	183.369	DEG	INC	21.1032	TFP	-98.8335	SEC	
RCA	1782.71	KM	PALT	44.6160	KM	PER	208.767	MIN
APO	3599.09	KM	AALT	1861.00	KM	TA	353.914	DEG
LAT	1.63632	DEG	LONG	359.124	DEG			

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 11 HRS 47 MIN

SOS= -3751.2

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.2879	.1762
62	CC3	48/1942	48/2003	20	.2928	.1474
12	CC3	48/2013	48/2157	166	.3399	-.0315

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'
DAY 287 , 10 HR , 08 MINPREPARED BY'
GMTGEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3F51M

TAPE NO.

5.2 EPOCH DAY 51 , 14 ' 25 ' 0.000 GMT
HR MIN SECITEM NO. 3F51M
SEQ. NO. 132
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2074.9495	KM	DX	-.39469641	KM/SEC
Y	1203.9234	KM	DY	-1.1482912	KM/SEC
Z	1452.8009	KM	DZ	-.44559183	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	55.40 M	DX	.01169 M/S	X	.0000 M	DX	.0000 M/S
Y	60.83 M	DY	.01841 M/S	Y	.0000 M	DY	.0000 M/S
Z	130.4 M	DZ	.03757 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.91	KM	ECC	.336252	APF	183.174	DEG	
LAN	152.628	DEG	INC	21.0043	TFP	-2719.32	SEC	
RCA	1784.76	KM	PALT	46.6696	KM	PER	208.536	MIN
APO	3593.07	KM	AALT	1854.98	KM	TA	243.576	DEG
LAT	19.2281	DEG	LONG	217.916	DEG			

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 2 HRS 40 MIN

SOS= 3052.0

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.4143	-.0764
41	C3	51/1425	51/1557	152	.6064	-.2769

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'
DAY 287 , 07 HR , 11 MINPREPARED BY'
GMTGEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10020-1

5.1 O.D. IDENTIFICATION NO. 3F51M

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECITEM NO. 3F51M
SEQ. NO. 132
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-587.64265	KM	DX	1.7139329	KM/SEC
Y	-1581.6653	KM	DY	-.24645359	KM/SEC
Z	-601.20747	KM	DZ	-.80827560	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	113.0	M	DX	.06081	M/S	X	113.0	M	DX	.0608	M/S
Y	29.27	M	DY	.09497	M/S	Y	29.27	M	DY	.0950	M/S
Z	82.19	M	DZ	.12460	M/S	Z	82.19	M	DZ	.1246	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.14	KM	ECC	.336112	APF	183.923	DEG	
LAN	146.145	DEG	INC	21.0035	DEG	TFP	-142.867	SEC
RCA	1785.95	KM	PALT	47.8648	KM	PER	208.679	MIN
APO	3594.33	KM	AALT	1856.24	KM	TA	351.239	DEG
LAT	1.73200	DEG	LONG	321.627	DEG			

5.6 LUNAR HARMONICS USED' MSC ONBOARD - 11

5.7 DATA ARC LENGTH' 11 HRS 5 MIN SOS= 109.50

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.4143	-.0764
41	C3	51/1425	51/1557	152	.6064	-.2769

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'
DAY 287 , 07 HR , 15 MINPREPARED BY' GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 1B61P

TAPE NO.

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SECITEM NO. 1B61P
SEQ. NO. 16
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1281.1203	KM	DX	.85286852	KM/SEC
Y	-3090.5192	KM	DY	.43442266	KM/SEC
Z	-874.34927	KM	DZ	.38317500	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	37.45 M	DX	.02856 M/S	X	.0000 M	DX	.0000 M/S
Y	274.4 M	DY	.05234 M/S	Y	.0000 M	DY	.0000 M/S
Z	921.8 M	DZ	.00599 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.67	KM	ECC	.296454	APF	184.312	DEG
LAN	242.482	DEG	INC	12.1472	TFP	-5021.04	SEC
RCA	1945.76	KM	PALT	207.689	KM	PER	217.529
APO	3585.57	KM	AALT	1847.48	KM	TA	204.164
LAT	5.75807	DEG	LONG	270.418	DEG		

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 2 HRS 0 MIN SOS= 625.63

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2343	.0128
61	C3	232/1945	232/2058	71	.1189	.0131

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 314 , 08 HR , 37 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10) 20-1

5.1 O.D. IDENTIFICATION NO. 1B61P

TAPE NO.

ITEM NO. 1B61P

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT

SEQ. NO. 16

HR MIN SEC

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	894.11628	KM	DX	-1.6097539	KM/SEC
Y	1575.8110	KM	DY	.74211467	KM/SEC
Z	832.88935	KM	DZ	-.11828119	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	32.27	M	DX	.05189	M/S	X	32.27	M	DX	.0519	M/S
Y	161.2	M	DY	.04858	M/S	Y	161.2	M	DY	.0486	M/S
Z	270.6	M	DZ	.39017	M/S	Z	270.6	M	DZ	.3902	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2766.46	KM	ECC	.296656	APF	184.340	DEG	
LAN	241.750	DEG	INC	12.1490	DEG	TFP	-483.514	SEC
RCA	1945.77	KM	PALT	207.681	KM	PER	217.622	MIN
APO	3587.14	KM	AALT	1849.05	KM	TA	334.648	DEG
LAT	4.32778	DEG	LONG	41.1691	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 1 HRS 12 MIN

SOS= 624.93

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2343	.0128
61	C3	232/1945	232/2058	71	.1189	.0131

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT'
DAY 314 , 08 HR , 39 MIN

PREPARED BY' GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100720-1

5.1 O.D. IDENTIFICATION NO. 1B62P

TAPE NO.

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SECITEM NO. 1B62P
SEQ. NO. 17
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1280.8577	KM	DX	.85309190	KM/SEC
Y	-3089.4561	KM	DY	.43408519	KM/SEC
Z	-876.68151	KM	DZ	.38325637	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	18.06	M	DX	.01420	M/S	X	.0000	M	DX	.0000	M/S
Y	132.6	M	DY	.02461	M/S	Y	.0000	M	DY	.0000	M/S
Z	440.8	M	DZ	.00409	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.32	KM	ECC	.296366	APF	184.149	DEG	
LAN	242.654	DEG	INC	12.1291	DEG	TFP	-5021.29	SEC
RCA	1945.78	KM	PALT	207.686	KM	PER	217.488	MIN
APO	3584.87	KM	AALT	1846.78	KM	TA	204.148	DEG
LAT	5.71624	DEG	LONG	270.414	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 5 HRS 40 MIN

SOS= 16627

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.7352	-.0273
61	C3	232/1945	232/2058	71	.5679	.4064

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 314 , 08 HR , 59 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 1B62P

TAPE NO.

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SECITEM NO. 1B62P
SEQ. NO. 17
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.13842	KM	DX	-1.6098016	KM/SEC
Y	1575.3718	KM	DY	.74194752	KM/SEC
Z	833.76291	KM	DZ	-.11743641	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.13	M	DX	.02486	M/S	X	17.13	M	DX	.0249	M/S
Y	76.74	M	DY	.02405	M/S	Y	76.74	M	DY	.0241	M/S
Z	127.5	M	DZ	.18874	M/S	Z	127.5	M	DZ	.1887	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2766.11	KM	ECC	.296569	APF	184.177	DEG	
LAN	241.922	DEG	INC	12.1310	DEG	TFP	-483.760	SEC
RCA	1945.77	KM	PALT	207.678	KM	PER	217.580	MIN
APO	3586.44	KM	AALT	1848.35	KM	TA	334.636	DEG
LAT	4.35586	DEG	LONG	41.1670	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 1 HRS 12 MIN

SOS= 16609

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.7352	-.0273
61	C3	232/1945	232/2058	71	.5679	.4064

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT'
DAY 314 , 09 HR , 02 MINPREPARED BY' GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2B61P

TAPE NO.

5.2 EPOCH DAY 322 , 20 ' 30 ' 0.000 GMT
HR MIN SECITEM NO. 2B61P
SEQ. NO. 34
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.6251	KM	DX	.29305290	KM/SEC
Y	-862.05910	KM	DY	.74603321	KM/SEC
Z	-537.89986	KM	DZ	.51399580	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	12.84	M	DX	.02296	M/S	X	.0000	M	DX	.0000	M/S
Y	574.5	M	DY	.29340	M/S	Y	.0000	M	DY	.0000	M/S
Z	938.7	M	DZ	.43630	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.53	KM	ECC	.336586	APF	164.561	DEG	
LAN	233.904	DEG	INC	12.0141	DEG	TFP	6061.74	SEC
RCA	1784.28	KM	PALT	46.1860	KM	PER	208.608	MIN
APO	3594.79	KM	AALT	1856.70	KM	TA	177.019	DEG
LAT	356.229	DEG	LONG	215.862	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 3 HRS 0 MIN

SOS= 2588.3

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.3399	.1489
61	C3	322/2037	322/2144	130	.1138	.0944

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 281 , 02 HR , 40 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2B61P

TAPE NO.

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 GMT
HR MIN SECITEM NO. 2B61P
SEQ. NO. 34
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.8075	KM	DX	-.47037286	KM/SEC
Y	380.11581	KM	DY	-1.5312259	KM/SEC
Z	233.78894	KM	DZ	-1.0532376	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.488 M	DX	.03730 M/S	X	1.488 M	DX	.0373 M/S
Y	306.7 M	DY	.57001 M/S	Y	306.7 M	DY	.5700 M/S
Z	491.0 M	DZ	.84600 M/S	Z	491.0 M	DZ	.8460 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UDATE)

SMA	2690.21	KM	ECC	.937056	APF	164.633	DEG	
LAN	232.879	DEG	INC	12.0166	TFP	-17.3070	SEC	
RCA	1783.46	KM	PALT	45.3707	KM	PER	208.688	MIN
APO	3596.97	KM	AALT	1858.88	KM	TA	358.934	DEG
LAT	3.37659	DEG	LONG	36.7866	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 1 HRS 44 MIN SOS= 2588.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.3399	.1489
61	C3	322/2037	322/2144	130	.1138	.0944

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:

DAY 281 , 02 HR , 45 MIN

PREPARED BY: GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2B62P

TAPE NO.

ITEM NO. 2B62P

5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 35

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3444.5779	KM	DX	.29392963	KM/SEC
Y	-836.22483	KM	DY	.75941804	KM/SEC
Z	-581.89891	KM	DZ	.49360121	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	20.65	M	DX	.00703	M/S	X	.0000	M	DX	.0000	M/S
Y	438.4	M	DY	.22097	M/S	Y	.0000	M	DY	.0000	M/S
Z	743.0	M	DZ	.34372	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.42	KM	ECC	.336549	APF	158.173	DEG	
LAN	240.373	DEG	INC	10.9668	DEG	TFP	6061.23	SEC
RCA	1784.30	KM	PALT	46.2088	KM	PER	208.595	MIN
APO	3594.54	KM	AALT	1856.45	KM	TA	177.017	DEG
LAT	355.421	DEG	LONG	215.963	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 42171

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	1.1328	.1299
61	C3	322/2037	322/2144	130	.5703	.7204

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 281 , 03 HR , 24 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2B62P

TAPE NO.

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 GMT
HR MIN SECITER NO. 28022
SEC. NO. 22
COUNT 5

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.6408	KM	DX	-0.47153461	KM/SEC
Y	365.97035	KM	DY	-1.5572455	KM/SEC
Z	256.58735	KM	DZ	-1.0137393	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	8.945 M	DX	.61275 M/S	X	8.945 M	DX	.0127 M/S
Y	233.1 M	DY	.42944 M/S	Y	233.1 M	DY	.4294 M/S
Z	389.6 M	DZ	.66575 M/S	Z	389.6 M	DZ	.6657 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.09	KM	ECC	.337019	APF	158.249	DEG	
LAN	239.343	DEG	INC	10.9687	TFP	-17.0147	SEC	
RCA	1783.48	KM	PALT	45.3874	KM	PER	205.673	MIN
APO	3596.70	KM	AALT	1858.61	KM	TA	358.902	DEG
LAT	4.22830	DEG	LONG	36.9193	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 1 HRS 44 MIN SOS= 42165

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	1.1328	.1299
61	C3	322/2037	322/2144	130	.5703	.7204

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 281 , 03 HR , 27 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10020-1

5.1 O.D. IDENTIFICATION NO. 2D61P

TAPE NO.

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR MIN SEC

ITEM NO. N.A.

SEQ. NO. 65

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.5066	KM	DX	-.89419820	KM/SEC
Y	1408.9996	KM	DY	.60160173	KM/SEC
Z	1012.3186	KM	DZ	.39213505	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	21.91 M	DX	.00868 M/S	X	.0000 M	DX	.0000 M/S
Y	171.3 M	DY	.05266 M/S	Y	.0000 M	DY	.0000 M/S
Z	185.3 M	DZ	.09991 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.44	KM	ECC	.338314	APF	167.428	DEG
LAN	178.924	DEG	INC	11.9243	TFP	-3530.09	SEC
RCA	1779.56	KM	PALT	41.4732	KM	PER	208.597
APO	3599.32	KM	AALT	1861.23	KM	TA	225.351
LAT	6.42279	DEG	LONG	211.137	DEG		

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 2 HRS 50 MIN SOS= 1288.6

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.2380	-.0607
61	C3	326/2250	327/0109	131	.2294	.0357

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 279 , 07 HR , 28 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100C20-1

5.1 O.D. IDENTIFICATION NO. 2D61P

TAPE NO.

5.2 EPOCH DAY 326 , 23 : 47 : 13.720 GMT

ITEM NO. 2D61P

SEQ. NO. 65

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.3662	KM	DX	-.07401391	KM/SEC
Y	-7.4356390	KM	DY	-1.5780646	KM/SEC
Z	-41.163581	KM	DZ	-1.0771437	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.351	M	DX	.02395	M/S	X	1.351	M	DX	.0240	M/S
Y	20.63	M	DY	.16256	M/S	Y	20.63	M	DY	.1626	M/S
Z	19.28	M	DZ	.23687	M/S	Z	19.28	M	DZ	.2369	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.50	KM	ECC	.338750	APF	167.520	DEG	
LAN	178.318	DEG	INC	11.9264	DEG	TFP	203.152	SEC
RCA	1779.09	KM	PALT	41.0024	KM	PER	208.720	MIN
APO	3601.90	KM	AALT	1863.81	KM	TA	12.5158	DEG
LAT	359.993	DEG	LONG	358.353	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 0 HRS 59 MIN

SOS= 1288.6

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.2380	-.0607
61	C3	326/2250	327/0109	131	.2294	.0357

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

PREPARED BY:

GEO.S.GOODWIN

DAY 279 , 07 HR , 31 MIN

GMT

O.D. ANALYST

ODPL 2D61P

ITERATION NUMBER 0

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2D62P

TAPE NO.

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR MIN SECITEM NO. 2D62P
SEQ. NO. 66
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.0164	KM	DX	-.89433988	KM/SEC
Y	1413.1133	KM	DY	.60306348	KM/SEC
Z	1007.2374	KM	DZ	.38967890	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI.

X	17.90	M	DX	.00710	M/S	X	.0000	M	DX	.0000	M/S
Y	137.8	M	DY	.04332	M/S	Y	.0000	M	DY	.0000	M/S
Z	149.0	M	DZ	.08303	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.29	KM	ECC	.338283	APF	167.447	DEG	
LAN	178.919	DEG	INC	11.7025	DEG	TFP	-3529.91	SEC
RCA	1779.55	KM	PALT	41.4624	KM	PER	208.580	MIN
APO	3599.04	KM	AALT	1860.95	KM	TA	225.352	DEG
LAT	6.30781	DEG	LONG	211.172	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 6 HRS 10 MIN

SOS= 22397

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.8905	-.0114
61	C3	326/2250	327/0109	131	.5570	.3143

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 279 , 07 HR , 11 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100920-1

5.1 O.D. IDENTIFICATION NO. 2D62P

TAPE NO.

5.2 EPOCH DAY 326 , 23 : 47 : 13.720 GMT
HR MIN SEC

ITEM NO. 2D62P

SEQ. NO. 66

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.3583	KM	DX	-.07338291	KM/SEC
Y	-8.0690931	KM	DY	-1.5822201	KM/SEC
Z	-41.625555	KM	DZ	-1.0710196	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.9774	M	DX	.01958	M/S	X	.9774	M	DX	.0196	M/S
Y	15.57	M	DY	.13226	M/S	Y	15.57	M	DY	.1323	M/S
Z	17.58	M	DZ	.19424	M/S	Z	17.58	M	DZ	.1942	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UPDATE)

SMA	2690.35	KM	ECC	.338718	APF	167.539	DEG	
LAN	178.313	DEG	INC	11.7046	DEG	TFP	203.329	SEC
RCA	1779.08	KM	PALT	40.9903	KM	PER	208.704	MIN
APO	3601.62	KM	AALT	1863.53	KM	TA	12.5266	DEG
LAT	359.987	DEG	LONG	358.377	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 0 HRS 59 MIN

SOS= 22397

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.8905	-.0114
61	C3	326/2250	327/0109	131	.5570	.3143

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 279 , 07 HR , 14 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100920-1

5.1 O.D. IDENTIFICATION NO. 3D61P

TAPE NO.

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SECITEM NO. 3D61P
SEQ. NO. 83
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-492.84507	KM	DX	-.89169775	KM/SEC
Y	2961.3311	KM	DY	-.43607565	KM/SEC
Z	1739.2594	KM	DZ	.13246617	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	120.3 M	DX	.15210 M/S	X	.0000 M	DX	.0000 M/S
Y	480.5 M	DY	.22095 M/S	Y	.0000 M	DY	.0000 M/S
Z	846.7 M	DZ	.29758 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.89	KM	ECC	.337015	APF	181.344	DEG	
LAN	184.168	DEG	INC	21.3061	TFP	-4854.22	SEC	
RCA	1782.69	KM	PALT	44.6048	KM	PER	208.534	MIN
APO	3595.09	KM	AALT	1857.00	KM	TA	201.753	DEG
LAT	8.19494	DEG	LONG	205.838	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 3 HRS 0 MIN

SOS= 1152.6

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0664	-.0594
41	CC3	49/0705	49/0834	181	.3129	-.0264
12	C3	49/0706	49/0709	4	.0178	.3374
12	CC3	49/0613	49/0659	43	.0926	-.0276

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 281 , 03 HR , 49 MIN

PREPARED BY' GAYLE D. BARROW

GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10020-1

5.1 O.D. IDENTIFICATION NO. 3D61P

TAPE NO.

5.2 EPOCH DAY 49 , 7 : 32 : 25.310 GMT
HR MIN SECITEM NO. 3D61P
SEQ. NO. 83
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-533.49482	KM	DX	1.7245668	KM/SEC
Y	-1588.7379	KM	DY	-.21630588	KM/SEC
Z	-611.89951	KM	DZ	-.80764894	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	81.36 M	DX	.30654 M/S	X	81.36 M	DX	.3065 M/S
Y	14.81 M	DY	.54878 M/S	Y	14.81 M	DY	.5488 M/S
Z	108.4 M	DZ	.79954 M/S	Z	108.4 M	DZ	.7995 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.96	KM	ECC	.337505	APF	181.394	DEG	
LAN	183.416	DEG	INC	21.3091	DEG	TFP	-88.6251	SEC
RCA	1782.09	KM	PALT	43.9978	KM	PER	208.658	MIN
APO	3597.84	KM	AALT	1859.75	KM	TA	354.538	DEG
LAT	1.47690	DEG	LONG	359.626	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 1 HRS 16 MIN SOS= 1152.0

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0664	-.0594
41	CC3	49/0705	49/0834	181	.3129	-.0264
12	C3	49/0706	49/0709	4	.0178	.3374
12	CC3	49/0613	49/0659	43	.0926	-.0276

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:
DAY 281 , 03 HR , 52 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10000

5.1 O.D. IDENTIFICATION NO. 3D62P

TAPE NO.

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SECITEM NO. 3D62P
SEQ. NO. 84
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-494.13870	KM	DX	-.89337268	KM/SEC
Y	2966.6859	KM	DY	-.43359223	KM/SEC
Z	1729.8017	KM	DZ	.12915712	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	35.49	M	DX	.05199	M/S	X	.0000	M	DX	.0000	M/S
Y	159.3	M	DY	.07624	M/S	Y	.0000	M	DY	.0000	M/S
Z	283.4	M	DZ	.10272	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UDATE)

SMA	2688.88	KM	ECC	.337027	APF	181.178	DEG	
LAN	184.305	DEG	INC	20.9720	DEG	TFP	-4854.30	SEC
RCA	1782.65	KM	PALT	44.5632	KM	PER	208.532	MIN
APO	3595.10	KM	AALT	1857.01	KM	TA	201.751	DEG
LAT	8.01550	DEG	LONG	205.859	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 6 HRS 10 MIN

SOS= 6592.5

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0984	-.3101
41	CC3	49/0705	49/1203	412	.5468	.0141
12	C3	49/0706	49/0709	4	.0389	.5879
12	CC3	49/0613	49/0659	43	.1445	-.2600

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'
DAY 281 , 04 HR , 11 MINPREPARED BY' GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3D62P

TAPE NO.

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SECITEM NO. 3D62P
SEQ. NO. 84
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-534.41248	KM	DX	1.7279642	KM/SEC
Y	-1588.8598	KM	DY	-.22242829	KM/SEC
Z	-610.66348	KM	DZ	-.79874536	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	29.45	M	DX	.10255	M/S	X	29.45	M	DX	.1025	M/S
Y	3.724	M	DY	.18656	M/S	Y	3.724	M	DY	.1866	M/S
Z	33.26	M	DZ	.27349	M/S	Z	33.26	M	DZ	.2735	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.95	KM	ECC	.337517	APF	181.229	DEG	
LAN	183.553	DEG	INC	20.9750	DEG	TFP	-88.7056	SEC
RCA	1782.04	KM	PALT	43.9537	KM	PER	208.657	MIN
APO	3597.85	KM	AALT	1859.76	KM	TA	354.533	DEG
LAT	1.51567	DEG	LONG	359.595	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 1 HRS 16 MIN

SOS= 6415.1

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0984	-.3101
41	CC3	49/0705	49/1203	412	.5468	.0141
12	C3	49/0706	49/0709	4	.0389	.5879
12	CC3	49/0613	49/0659	43	.1445	-.2600

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 281 , 04 HR , 13 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100F20-1

5.1 O.D. IDENTIFICATION NO. 2F61P

TAPE NO.

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SECITEM NO. 2F61P
SEQ. NO. 115
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	499.41174	KM	DX	-1.4925703	KM/SEC
Y	1936.6271	KM	DY	-.12996604	KM/SEC
Z	1329.7763	KM	DZ	-.12225122	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	95.62	M	DX	.01118	M/S	X	.0000	M	DX	.0000	M/S
Y	353.3	M	DY	.05348	M/S	Y	.0000	M	DY	.0000	M/S
Z	481.7	M	DZ	.19776	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.35	KM	ECC	.336806	APF	168.898	DEG	
LAN	147.514	DEG	INC	11.8779	DEG	TFP	-1849.00	SEC
RCA	1783.56	KM	PALT	45.4709	KM	PER	208.587	MIN
APO	3595.14	KM	AALT	1857.05	KM	TA	268.764	DEG
LAT	11.5997	DEG	LONG	224.915	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 1279.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.2207	.0246
12	CC3	329/0650	329/0916	190	.2210	-.1172

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 281 , 06 HR , 06 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-

5.1 O.D. IDENTIFICATION NO. 2F61P

TAPE NO.

5.2 EPOCH DAY 329 , 7 : 21 : 15.180 GMT
HR MIN SECITEM NO. 2F61P
SEQ. NO. 115
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.5150	KM	DX	-.31798135	KM/SEC
Y	253.03936	KM	DY	-1.5592812	KM/SEC
Z	132.25291	KM	DZ	-1.0689335	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	5.900 M	DX	.07813 M/S	X	5.900 M	DX	.0781 M/S
Y	140.6 M	DY	.29024 M/S	Y	140.6 M	DY	.2902 M/S
Z	352.0 M	DZ	.40041 M/S	Z	352.0 M	DZ	.4004 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.93	KM	ECC	.337030	APF	166.956	DEG	
LAN	147.201	DEG	INC	11.8809	TFP	25.7781	SEC	
RCA	1783.34	KM	PALT	45.2542	KM	PER	208.655	MIN
APO	3596.52	KM	AALT	1058.43	KM	TA	1.58773	DEG
LAT	1.93834	DEG	LONG	317.944	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 0 HRS 28 MIN SOS= 1277.6

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.2207	.0246
12	CC3	329/0650	329/0916	190	.2210	-.1172

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE, 'F'

TIME OF REPORT:
DAY 281 , 06 HR , 08 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100920-1

5.1 O.D. IDENTIFICATION NO. 2F62P

TAPE NO.

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SECITEM NO. 2F62P
SEQ. NO. 116
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	500.45692	KM	DX	-1.4927794	KM/SEC
Y	1933.8362	KM	DY	-.13028482	KM/SEC
Z	1333.0631	KM	DZ	-.12048213	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	26.26	M	DX	.00303	M/S	X	.0000	M	DX	.0000	M/S
Y	94.20	M	DY	.01600	M/S	Y	.0000	M	DY	.0000	M/S
Z	127.5	M	DZ	.05555	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.23	KM	ECC	.336815	APF	168.503	DEG	
LAN	147.883	DEG	INC	11.9991	DEG	TFP	-1848.66	SEC
RCA	1783.46	KM	PALT	45.3701	KM	PER	208.573	MIN
APO	3595.01	KM	AALT	1856.92	KM	TA	268.771	DEG
LAT	11.7001	DEG	LONG	224.881	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 45722

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.7688	.6735
41	CC3	329/1023	329/1247	197	1.1826	-.8271
12	CC3	329/0650	329/0917	191	.8315	.5686

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 281 , 06 HR , 26 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100920-1

5.1 O.D. IDENTIFICATION NO. 2F62P

TAPE NO.

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SECITEM NO. 2F62P
SEQ. NO. 116
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.4067	KM	DX	-.31855596	KM/SEC
Y	251.69934	KM	DY	-1.5572329	KM/SEC
Z	134.93862	KM	DZ	-1.0718454	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.976 M	DX	.02134 M/S	X	1.976 M	DX	.0213 M/S
Y	39.63 M	DY	.07743 M/S	Y	39.63 M	DY	.0774 M/S
Z	97.01 M	DZ	.10619 M/S	Z	97.01 M	DZ	.1062 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.82	KM	ECC	.337039	APF	163.561	DEG	
LAN	147.569	DEG	INC	12.0021	DEG	TFP	26.1197	SEC
RCA	1783.24	KM	PALT	45.1543	KM	PER	208.641	MIN
APO	3596.39	KM	AALT	1858.30	KM	TA	1.60891	DEG
LAT	2.03459	DEG	LONG	317.950	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 0 HRS 28 MIN SOS= 45719

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.7688	.6735
41	CC3	329/1023	329/1247	197	1.1826	-.8271
12	CC3	329/0650	329/0917	191	.8315	.5686

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'	PREPARED BY'	GAYLE D. BARROW
DAY 281 , 06 HR , 29 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100920-1

5.1 O.D. IDENTIFICATION NO. 3F61P

TAPE NO.

ITEM NO. 3F61P

5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 133

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2068.4359	KM	DX	-.40416649	KM/SEC
Y	1229.6555	KM	DY	-1.1418027	KM/SEC
Z	1464.5176	KM	DZ	-.43620896	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	322.1	M	DX	.06451	M/S	X	.0000	M	DX	.0000	M/S
Y	293.4	M	DY	.12197	M/S	Y	.0000	M	DY	.0000	M/S
Z	707.2	M	DZ	.26201	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.69	KM	ECC	.335819		APF	183.147	DEG
LAN	147.130	DEG	INC	21.0522	DEG	TFP	-2749.62	SEC
RCA	1785.77	KM	PALT	47.6845	KM	PER	208.510	MIN
APO	3591.60	KM	AALT	1853.51	KM	TA	242.862	DEG
LAT	19.1587	DEG	LONG	211.636	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 3 HRS 0 MIN

SOS= 2402.2

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.2986	.0646
62	CC3	52/0052	52/0113	18	.2465	.0213
12	C3	52/0054	52/0113	20	.1961	-.2208
12	CC3	52/0124	52/0313	198	.2833	-.0959

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'
DAY 279 , 04 HR , 00 MINPREPARED BY'
GMTGEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 3F61P

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECITEM NO. 3F61P
SEQ. NO. 133
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-572.47759	KM	DX	1.7170531	KM/SEC
Y	-1585.6650	KM	DY	-.23734266	KM/SEC
Z	-601.61320	KM	DZ	-.80640778	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	86.94	M	DX	.26976	M/S	X	86.94	M	DX	.2698	M/S
Y	171.6	M	DY	.27873	M/S	Y	171.6	M	DY	.2787	M/S
Z	369.7	M	DZ	.65745	M/S	Z	369.7	M	DZ	.6574	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.40	KM	ECC	.336102	APF	183.190	DEG	
LAN	146.709	DEG	INC	21.0553	DEG	TFP	-131.965	SEC
RCA	1785.48	KM	PALT	47.3934	KM	PER	208.592	MIN
APO	3593.31	KM	AALT	1855.22	KM	TA	351.902	DEG
LAT	1.76128	DEG	LONG	322.127	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 0 HRS 40 MIN SOS= 2393.4

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.2986	.0646
62	CC3	52/0052	52/0113	18	.2465	.0213
12	C3	52/0054	52/0113	20	.1961	-.2208
12	CC3	52/0124	52/0313	198	.2833	-.0959

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 279 , 04 HR , 05 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-1C0820-1

5.1 O.D. IDENTIFICATION NO. 3F62P

TAPE NO.
ITEM NO. 3F62P5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SECSEQ. NO. 134
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2083.3826	KM	DX	-.40736352	KM/SEC
Y	1244.2324	KM	DY	-1.1357100	KM/SEC
Z	1430.1837	KM	DZ	-.44915296	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	143.0	M	DX	.02787	M/S	X	.0000	M	DX	.0000	M/S
Y	136.9	M	DY	.06036	M/S	Y	.0000	M	DY	.0000	M/S
Z	328.1	M	DZ	.12758	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.54	KM	ECC	.335796	APF	184.759	DEG	
LAN	145.486	DEG	INC	19.9206	DEG	TFP	-2749.29	SEC
RCA	1785.74	KM	PALT	47.6479	KM	PER	208.493	MIN
APO	3591.34	KM	AALT	1853.25	KM	TA	242.867	DEG
LAT	18.3649	DEG	LONG	211.841	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS= 37175

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.7085	1.0198
62	CC3	52/0052	52/0113	18	.7248	-.1231
12	C3	52/0054	52/0113	20	.7783	.2182
12	CC3	52/0124	52/0643	414	1.1610	-.3981

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 279 , 04 HR , 31 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D9-10000-1

5.1 O.D. IDENTIFICATION NO. 3F62P

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECITEM NO. 3F62P.
SEQ. NO. 134
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-576.47507	KM	DX	1.7298434	KM/SEC
Y	-1577.0491	KM	DY	-.25107877	KM/SEC
Z	-619.95438	KM	DZ	-.77434646	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	39.40 M	DX	.11866 M/S	X	39.40 M	DX	.1187 M/S
Y	84.68 M	DY	.13261 M/S	Y	84.68 M	DY	.1326 M/S
Z	179.1 M	DZ	.30841 M/S	Z	179.1 M	DZ	.3084 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UDATE)

SMA	2689.25	KM	ECC	.336084	APF	184.803	DEG
LAN	145.065	DEG	INC	19.9237	TFP	-131.647	SEC
RCA	1785.43	KM	PALT	47.3445	PER	208.575	MIN
APO	3593.06	KM	AALT	1854.97	TA	351.922	DEG
LAT	1.11563	DEG	LONG	321.985			DEG

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 0 HRS 40 MIN. SOS= 20351

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.7085	1.0198
62	CC3	52/0052	52/0113	18	.7248	-.1231
12	C3	52/0054	52/0113	20	.7783	.2182
12	CC3	52/0124	52/0643	414	1.1610	-.3981

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:

PREPARED BY: GEO.S.GOODWIN

DAY 279 , 04 HR , 35 MIN

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 3D61M

TAPE NO.

5.2 EPOCH DAY 48 , 19 ' 42 ' 0.000 GMT
HR MIN SECITEM NO. 3D61M
SEQ. NO. 84
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-191.12324	KM	DX	-.90667504	KM/SEC
Y	3090.2751	KM	DY	-.31928264	KM/SEC
Z	1675.0323	KM	DZ	.19557485	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	23.68	M	DX	.03850	M/S	X	.0000	M	DX	.0000	M/S
Y	119.8	M	DY	.06036	M/S	Y	.0000	M	DY	.0000	M/S
Z	229.6	M	DZ	.07660	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.12	KM	ECC	.336784	APF	180.910	DEG	
LAN	190.121	DEG	INC	21.0774	DEG	TFP	-5176.70	SEC
RCA	1783.46	KM	PALT	45.3743	KM	PER	208.560	MIN
APO	3594.77	KM	AALT	1856.68	KM	TA	196.603	DEG
LAT	6.21274	DEG	LONG	206.527	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 2 HRS 40 MIN SOS= 2844.8

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.2964	.1861
62	CC3	48/1942	48/2003	20	.2246	.2174
12	CC3	48/2013	48/2157	166	.3639	-.0311

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 288 , 03 HR , 57 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100920-

5.1 O.D. IDENTIFICATION NO. 3D61M

TAPE NO.

5.2 EPOCH DAY 49 , 7 : 32 : 25.310 GMT
HR MIN SEC

ITEM NO. 3D61M

SEQ. NO. 84

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-541.05486	KM	DX	1.7246853	KM/SEC
Y	-1588.1280	KM	DY	-.22538197	KM/SEC
Z	-608.57703	KM	DZ	-.80385916	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	129.3 M	DX	.09715 M/S	X	129.3 M	DX	.0971 M/S
Y	26.46 M	DY	.13471 M/S	Y	26.46 M	DY	.1347 M/S
Z	60.47 M	DZ	.22444 M/S	Z	60.47 M	DZ	.2244 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.18	KM	ECC	.337410	APF	181.344	DEG
LAN	183.457	DEG	INC	21.0957	DEG	TFP	-92.7900
RCA	1782.49	KM	PALT	44.4003	KM	PER	208.664
APO	3597.88	KM	AALT	1859.79	KM	TA	354.284
LAT	1.57199	DEG	LONG	359.378	DEG		

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 11 HRS 47 MIN SOS= 2836.9

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.2964	.1861
62	CC3	48/1942	48/2003	20	.2246	.2174
12	CC3	48/2013	48/2157	166	.3639	-.0311

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'	PREPARED BY'	GEO.S.GOODWIN
DAY 288 , 04 HR , 01 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 3F61M

TAPE NO.

5.2 EPOCH DAY 51 , 14 ' 25 ' 0.000 GMT
HR MIN SEC

ITEM NO. 3F61M

SEQ. NO. 135

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2075.7833	KM	DX	-.39407059	KM/SEC
Y	1204.7805	KM	DY	-1.1489073	KM/SEC
Z	1451.0626	KM	DZ	-.44427973	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	55.56	M	DX	.01168	M/S	X	.0000	M	DX	.0000	M/S
Y	61.23	M	DY	.01824	M/S	Y	.0000	M	DY	.0000	M/S
Z	131.2	M	DZ	.03724	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.71	KM	ECC	.336284	APF	183.010	DEG	
LAN	152.826	DEG	INC	20.9881	DEG	TFP	-2719.61	SEC
RCA	1784.54	KM	PALT	46.4471	KM	PER	209.512	MIN
APO	3592.88	KM	AALT	1854.79	KM	TA	243.558	DEG
LAT	19.1860	DEG	LONG	217.925	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-1

5.7 DATA ARC LENGTH' 2 HRS 40 MIN

SOS= 1564.0

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.2842	-.0466
41	C3	51/1425	51/1557	152	.3921	-.1373

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 287 , 07 HR , 26 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3F61M

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECITEM NO. 3F61M
SEQ. NO. 135
COMPUTER 8

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-579.71639	KM	DX	1.7159751	KM/SEC
Y	-1584.1500	KM	DY	-.24268777	KM/SEC
Z	-600.55214	KM	DZ	-.80594322	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	115.6 M	DX	.06115 M/S	X	115.6 M	DX	.0611 M/S
Y	28.90 M	DY	.09654 M/S	Y	28.90 M	DY	.0965 M/S
Z	82.52 M	DZ	.12539 M/S	Z	82.52 M	DZ	.1254 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.47	KM	ECC	.336021	APF	183.451	DEG
LAN	146.532	DEG	INC	20.9810	TFP	-137.294	SEC
RCA	1785.75	KM	PALT	47.6590	PER	208.601	MIN
APO	3593.19	KM	AALT	1855.10	TA	351.579	DEG
LAT	1.77774	DEG	LONG	321.889			

5.6 LUNAR HARMONICS USED: BOEING R-1

5.7 DATA ARC LENGTH: 11 HRS 5 MIN

SOS= 1444.9

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.2842	-.0466
41	C3	51/1425	51/1557	152	.3921	-.1373

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:

DAY 287 , 07 HR , 30 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST.

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100E20-1

5.1 O.D. IDENTIFICATION NO. 1B71P

TAPE NO.

ITEM NO. 1B71P

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 150

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1281.2581	KM	DX	.85305348	KM/SEC
Y	-3088.7427	KM	DY	.43404917	KM/SEC
Z	-880.44554	KM	DZ	.38307726	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	26.58	M	DX	.02839	M/S	X	.0000	M	DX	.0000	M/S
Y	274.6	M	DY	.05193	M/S	Y	.0000	M	DY	.0000	M/S
Z	917.2	M	DZ	.00613	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2765.56	KM	ECC	.296499	APF	183.912	DEG	
LAN	242.874	DEG	INC	12.0836	DEG	TFP	-5020.97	SEC
RCA	1945.57	KM	PALT	207.481	KM	PER	217.515	MIN
APO	3585.54	KM	AALT	1847.45	KM	TA	204.158	DEG
LAT	5.65292	DEG	LONG	270.414	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 2 HRS 0 MIN SOS= 943.73

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2388	-.0397
61	C3	232/1945	232/2058	71	.2559	.0075

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 290 , 02 HR , 36 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10020-1

5.1 O.D. IDENTIFICATION NO. 1B71P

TAPE NO.

ITEM NO. 1B71P

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR . MIN SEC

SEQ. NO. 150

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 884.25104 KM DX -1.6100595 KM/SEC

Y 1574.6176 KM DY .74182048 KM/SEC

Z 834.70450 KM DZ -.11569765 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 32.41 M DX .05130 M/S X 32.41 M DX .0513 M/S

Y 160.7 M DY .04906 M/S Y 160.7 M DY .0491 M/S

Z 268.9 M DZ .38857 M/S Z 268.9 M DZ .3886 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2765.89 KM EGC .296552 APF 183.917 DEG

LAN 242.162 DEG INC 12.0887 DEG TFP -483.512 SEC

RCA 1945.66 KM PALT 207.567 KM PER 217.554 MIN

APO 3586.12 KM AALT 1848.03 KM TA 334.647 DEG

LAT 4.38958 DEG LONG 41.1592 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 1 HRS 12 MIN

SOS= 942.21

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2388	-.0397
61	C3	232/1945	232/2058	71	.2559	.0075

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:

DAY 290 , 02 HR , 38 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100-20-1

5.1 O.D. IDENTIFICATION NO. 1B72P

TAPE NO.

ITEM NO. 1B72P

5.2 EPOCH DAY 232 , 19 : 45 : 0.000 GMT
HR MIN SEC

SEQ. NO. 151

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1280.1825	KM	DX	.85242476	KM/SEC
Y	-3095.2137	KM	DY	.43519756	KM/SEC
Z	-858.19344	KM	DZ	.38322368	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	19.45	M	DX	.01427	M/S	X	.0000	M	DX	.0000	M/S
Y	131.2	M	DY	.02476	M/S	Y	.0000	M	DY	.0000	M/S
Z	444.3	M	DZ	.00400	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.35	KM	ECC	.296472	APF	185.402	DEG	
LAN	241.439	DEG	INC	12.3137	DEG	TFP	-5021.12	SEC
RCA	1945.50	KM	PALT	207.413	KM	PER	217.491	MIN
APO	3585.20	KM	AALT	1847.11	KM	TA	204.147	DEG
LAT	6.03726	DEG	LONG	270.420	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 5. HRS 40 MIN SOS= 5006.7

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.4210	.0476
61	C3	232/1945	232/2058	71	.2948	-.0498

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 290 , 02 HR , 53 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

/O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1B72P

Tape No. ^{DO 10000-1}
ITEM NO. 1B72P5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SECSEQ. NO. 151
COMPUTER - G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

IX	883.44080	KM	DX	-1.6088121	KM/SEC
Y	1578.4257	KM	DY	.74297106	KM/SEC
Z	828.23776	KM	DZ	-.12520575	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	16.85 M	DX	.02552 M/S	X	16.85 M	DX	.0255 M/S
Y	76.56 M	DY	.02327 M/S	Y	76.56 M	DY	.0233 M/S
Z	128.6 M	DZ	.19011 M/S	Z	128.6 M	DZ	.1901 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2765.69	KM	EGC	.296526	APF	185.407	DEG
LAN	240.728	DEG	INC	12.3189	TFP	-483.654	SEC
RCA	1945.59	KM	PALT	207.498	PER	217.531	MIN
APO	3585.79	KM	AALT	1847.70	TA	334.638	DEG
LAT	4.17557	DEG	LONG	41.1975			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 1 HRS 12 MIN SOS= 4958.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.4210	.0476
61	C3	232/1945	232/2058	71	.2948	-.0498

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 290 , 02 HR , 55 MIN	GMT	/O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

DOL-00820-1

5.1 O.D. IDENTIFICATION NO. 2B71P

TAPE NO.
ITEM NO. 2B71P5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SECSEQ. NO. 152
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.6108	KM	DX	.29305631	KM/SEC
Y	-865.14336	KM	DY	.74602037	KM/SEC
Z	-533.06811	KM	DZ	.51399567	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	11.03 M	DX	.02262 M/S	X	.0000 M	DX	.0000 M/S
Y	565.1 M	DY	.29010 M/S	Y	.0000 M	DY	.0000 M/S
Z	919.1 M	DZ	.43144 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.52	KM	ECC	.336001	APF	164.977	DEG	
LAN	233.489	DEG	INC	11.9838	DEG	TFP	6061.25	SEC
RCA	1784.22	KM	PALT	46.1333	KM	PER	208.606	MIN
APO	3594.81	KM	AALT	1856.72	KM	TA	177.013	DEG
LAT	356.319	DEG	LONG	215.847	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 1386.2

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.2621	.0359
61	C3	322/2037	322/2144	130	.1177	.0126

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 290 , 03 HR , 06 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 2B71P

TAPE NO.

ITEM NO. 2B71P

5.2 EPOCH DAY 322 , 22 , 23 , 16.600 GMT
HR MIN SECSEQ. NO. 152
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.6841	KM	DX	-.47037205	KM/SEC
Y	381.48790	KM	DY	-1.5312449	KM/SEC
Z	231.60874	KM	DZ	-1.0531516	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	2.113	M	DX	.03678	M/S	X	2.113	M	DX	.0368	M/S
Y	301.9	M	DY	.56368	M/S	Y	301.9	M	DY	.5637	M/S
Z	480.9	M	DZ	.83688	M/S	Z	480.9	M	DZ	.8369	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.53	KM	ECC	.336927	APF	164.996	DEG	
LAN	232.499	DEG	INC	11.9915	DEG	TFP	-17.1521	SEC
RCA	1783.35	KM	PALT	45.2611	KM	PER	208.607	MIN
APO	3595.70	KM	AALT	1857.61	KM	TA	358.944	DEG
LAT	3.29506	DEG	LONG	36.7723	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 11 HRS 44 MIN

SOS= 1386.2

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.2621	.0359
61	C3	322/2037	322/2144	130	.1177	.0126

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:
DAY 290 , 03 HR , 09 MINPREPARED BY: GAYLE D. BARROW
/O.D. ANALYST

235

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100100-1

5.1 O.D. IDENTIFICATION NO. 2B72P

TAPE NO.
ITEM NO. 2B72P5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SECSEQ. NO. 153
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.4559	KM	DX	.29347095	KM/SEC
Y	-853.30370	KM	DY	.75230630	KM/SEC
Z	-552.73547	KM	DZ	.50449672	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	7.974	M	DX	.01073	M/S	X	.0000	M	DX	.0000	M/S
Y	420.5	M	DY	.21310	M/S	Y	.0000	M	DY	.0000	M/S
Z	691.7	M	DZ	.32392	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.49	KM	ECC	.336612	APF	162.214	DEG	
LAN	236.289	DEG	INC	11.4675	DEG	TFP	6061.17	SEC
RCA	1784.18	KM	PALT	46.0853	KM	PER	208.603	MIN
APO	3594.80	KM	AALT	1856.71	KM	TA	177.013	DEG
LAT	355.957	DEG	LONG	215.897	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 7926.5

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	.4868	.0562
61	C3	322/2037	322/2144	130	.1173	.1858

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 290 , 03 HR , 35 MINPREPARED BY: GAYLE D. BARROW
/ O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100520-1

5.1 O.D. IDENTIFICATION NO. 2B72P

TAPE NO.

ITEM NO. 2B72P

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 GMT
HR MIN SEC

SEQ. NO. 153

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1726.6467 KM DX -.47107210 KM/SEC

Y 375.04243 KM DY -1.5435446 KM/SEC

Z 241.84249 KM DZ -1.0347746 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 2.968 M DX .02041 M/S X 2.968 M DX .0204 M/S

Y 223.5 M DY .41455 M/S Y 223.5 M DY .4145 M/S

Z 362.7 M DZ .62768 M/S Z 362.7 M DZ .6277 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.48 KM ECC .336933 APF 162.235 DEG

LAN 235.298 DEG INC 11.4753 DEG TFP -17.0279 SEC

RCA 1783.31 KM PALT 45.2173 KM PER 208.602 MIN

APO 3595.66 KM AALT 1857.57 KM TA 358.951 DEG

LAT 3.67857 DEG LONG 36.8348 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 1 HRS 44 MIN SOS= 7924.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	.4868	.0562
61	C3	322/2037	322/2144	130	.1173	.1858

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:

DAY 290 , 03 HR , 38 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100S20-1

5.1 O.D. IDENTIFICATION NO. 2D71P

TAPC NO.

ITEM NO. 2D71P

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR, MIN SEC

SEQ. NO. 154

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.3944	KM	DX	-.89418285	KM/SEC
Y	1410.0627	KM	DY	.60159503	KM/SEC
Z	1011.0252	KM	DZ	.39214477	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	21.99 M	DX	.00873 M/S	X	.0000 M	DX	.0000 M/S
Y	172.2 M	DY	.05274 M/S	Y	.0000 M	DY	.0000 M/S
Z	186.5 M	DZ	.10022 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.35	KM	ECC	.338265	APF	167.338	DEG
LAN	179.025	DEG	INC	11.9002	DEG	TFP	-3530.39
RCA	1779.64	KM	PALT	41.5460	KM	PER	208.587
APO	3599.06	KM	AALT	1860.97	KM	TA	225.346
LAT	6.39337	DEG	LONG	211.146	DEG		

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 960.09

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.1967	.0109
61	C3	326/2250	327/0109	131	.1947	.0914

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 290 , 03 HR , 49 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

:O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100C20-1

5.1 O.D. IDENTIFICATION NO. 2D71P

TAPE NO.
ITEM NO. 2D71P5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HR MIN SECSEQ. NO. 154
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.2830	KM	DX	-.07392520	KM/SEC
Y	-8.0276858	KM	DY	-1.5787211	KM/SEC
Z	-40.567660	KM	DZ	-1.0761727	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.370 M	DX	.02403 M/S	X	1.370 M	DX	.0240 M/S
Y	20.80 M	DY	.16307 M/S	Y	20.80 M	DY	.1631 M/S
Z	19.05 M	DZ	.23785 M/S	Z	19.05 M	DZ	.2379 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.03	KM	ECC	.338673	APF	167.391	DEG	
LAN	178.446	DEG	INC	11.8928	DEG	TFP	203.288	SEC
RCA	1778.99	KM	PALT	40.8951	KM	PER	208.666	MIN
APC	3601.06	KM	AALT	1862.97	KM	TA	12.5249	DEG
LAT	.017415	DEG	LONG	358.363	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 0 HRS 59 MIN

SOS= 960.08

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.1967	.0109
61	C3	326/2250	327/0109	131	.1947	.0914

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 290 , 03 HR , 51 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

/O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE).

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 2D72P

TAPE NO.
ITEM NO. 2D72P5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR MIN SECSEQ. NO. 155
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.8032	KM	DX	-.89403806	KM/SEC
Y	1406.6960	KM	DY	.60048933	KM/SEC
Z	1014.9686	KM	DZ	.39408491	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.82	M	DX	.00710	M/S	X	.0000	M	DX	.0000	M/S
Y	138.2	M	DY	.04340	M/S	Y	.0000	M	DY	.0000	M/S
Z	147.3	M	DZ	.08201	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE CFDATE)

SMA	2689.41	KM	ECC	.338282	APF	167.329	DEG	
LAN	179.023	DEG	INC	12.0741	DEG	TFP	-3530.51	SEC
RCA	1779.63	KM	PALT	41.5391	KM	PER	208.594	MIN
APO	3599.19	KM	AALT	1861.10	KM	TA	225.344	DEG
LAT	6.48381	DEG	LONG	211.116	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 6. HRS 10 MIN

SOS= 9831.0

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.6050	.0295
61	C3	326/2250	327/0109	131	.3752	-.0526

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 290 , 04 HR , 04 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10000-1

5.1 O.D. IDENTIFICATION NO. 2D72P

TAPE NO.
ITEM NO. 2D72P5.2 EPOCH DAY 326 , 23 : 47 : 13.720 GMT
HR MIN SECSEQ. NO. 155
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.2753	KM	DX	-.07441936	KM/SEC
Y	-7.5246079	KM	DY	-1.5754507	KM/SEC
Z	-40.231855	KM	DZ	-1.0809635	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.9850 M	DX	.01945 M/S	X	.9850 M	DX	.0195 M/S
Y	15.43 M	DY	.13250 M/S	Y	15.43 M	DY	.1325 M/S
Z	17.27 M	DZ	.19189 M/S	Z	17.27 M	DZ	.1919 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.08	KM	ECC	.338689	APF	167.381	DEG
LAN	178.443	DEG	INC	12.0666	DEG	TFP	203.164
RCA	1778.98	KM	PALT	40.8902	KM	PER	208.672
APO	3601.19	KM	AALT	1863.10	KM	TA	12.5175
LAT	.021228	DEG	LONG	358.344	DEG		

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: U HRS 59 MIN

SOS= 7425.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.6050	.0295
61	C3	326/2250	327/0109	131	.3752	-.0526

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 290 , 04 HR , 07 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 3D71P

TAPE NO. .
ITEM NO. 3D71P5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SECSEQ. NO. 156
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-495.20245	KM	DX	-.89505444	KM/SEC
Y	2971.3989	KM	DY	-.43112227	KM/SEC
Z	1721.3300	KM	DZ	.12583089	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	106.7	M	DX	.14297	M/S	X	.0000	M	DX	.0000	M/S
Y	460.7	M	DY	.21270	M/S	Y	.0000	M	DY	.0000	M/S
Z	819.8	M	DZ	.29011	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.88	KM	ECC	.336981	APF	181.059	DEG	
LAN	184.400	DEG	INC	20.6432	DEG	TFP	-4854.77	SEC
RCA	1782.78	KM	PALT	44.6866	KM	PER	208.532	MIN
APO	3594.96	KM	AALT	1856.89	KM	TA	201.745	DEG
LAT	7.85540	DEG	LONG	205.876	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 1737.0

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.1589	-.0396
41	CC3	49/0705	49/0634	181	.3136	-.0040
12	C3	49/0706	49/0709	4	.1667	.6653
12	CC3	49/0613	49/0659	43	.0800	-.0407

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 290 , 05 HR , 10 MINPREPARED BY: GAYLE J. DAVIS
U.S. AIR FORCE

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100320-1

5.1 O.D. IDENTIFICATION NO. 3D71P

TAPE NO.
ITEM NO. 3D71P5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SECSEQ. NO. 156
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-535.44454	KM	DX	1.7312205	KM/SEC
Y	-1588.8857	KM	DY	-.22848678	KM/SEC
Z	-609.66803	KM	DZ	-.78979816	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	79.66	M	DX	.28604	M/S	X	79.66	M	DX	.2860	M/S
Y	13.09	M	DY	.52779	M/S	Y	13.09	M	DY	.5278	M/S
Z	103.4	M	DZ	.77744	M/S	Z	103.4	M	DZ	.7774	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.59	KM	ECC	.337435	APF	181.088	DEG	
LAN	183.669	DEG	INC	20.6418	DEG	TFP	-88.8830	SEC
RCA	1782.03	KM	PALT	43.9381	KM	PER	208.615	MIN
APO	3597.15	KM	AALT	1859.06	KM	TA	354.522	DEG
LAT	1.54617	DEG	LONG	359.560	DEG			

5.6 LUNAR HARMONICS USED' LRC 11/11/66

5.7 DATA ARC LENGTH' 1 HRS 16 MIN

SOS= 1736.2

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.1589	-.0396
41	CC3	49/0705	49/0834	181	.3136	-.0040
12	C3	49/0706	49/0709	4	.1667	.6653
12	CC3	49/0613	49/0659	43	.0800	-.0407

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'	DAY 290 , 05 HR , 13 MIN	PREPARED BY'	GAYLE D. BARROW
			O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 3D72P

TAPE NO.

ITEM NO. 3D72P

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 157

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-494.39808	KM	DX	-.89316097	KM/SEC
Y	2965.6307	KM	DY	-.43389955	KM/SEC
Z	1731.8421	KM	DZ	.12932054	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	36.69 M	DX	.05264 M/S	X	.0000 M	DX	.0000 M/S
Y	161.6 M	DY	.07716 M/S	Y	.0000 M	DY	.0000 M/S
Z	286.6 M	DZ	.10419 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.96	KM	EGC	.337010	APF	181.258	DEG
LAN	184.245	DEG	INC	21.0092	TFP	-4855.02	SEC
RCA	1782.75	KM	PALT	44.6618	PER	208.541	MIN
APO	3595.16	KM	AALT	1857.07	TA	201.743	DEG
LAT	8.05329	DEG	LONG	.205.863			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 31900

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.9367	-.1248
41	CC3	49/0705	49/1203	412	1.1448	.0871
12	C3	49/0706	49/0709	4	.1985	-1.0381
12	CC3	49/0613	49/0659	43	1.0254	-.2344

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 290 , 05 HR , 28 MINPREPARED BY: /
GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 3D72P

TAPE NO.

ITEM NO. 3D72P

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SEC

SEG. NO. 157

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-534.64566	KM	DX	1.7276397	KM/SEC
Y	-1588.6686	KM	DY	-.22194502	KM/SEC
Z	-610.90358	KM	DZ	-.79949983	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X'	29.89	M	DX	.10409	M/S	X	29.89	M	DX	.1041	M/S
Y	3.643	M	DY	.18910	M/S	Y	3.643	M	DY	.1891	M/S
Z	33.51	M	DZ	.27699	M/S	Z	33.51	M	DZ	.2770	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.67	KM	ECC	.337464	APF	181.287	DEG	
LAN	183.514	DEG	INC	21.0027	DEG	TFP	-89.1362	SEC
RCA	1782.01	KM	PALT	43.9157	KM	PER	208.625	MIN
APO	3597.34	KM	AALT	1859.25	KM	TA	354.507	DEG
LAT	1.50636	DEG	LONG	359.587	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 1 HRS 16 MIN

SOS= 31675

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.9367	-.1248
41	CC3	49/0705	49/1203	412	1.1448	.0871
12	C3	49/0706	49/0709	4	.1985	-1.0381
12	CC3	49/0613	49/0659	43	1.0254	-.2344

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:
DAY 290 , 05 HR , 31 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100C20-1

5.1 O.D. IDENTIFICATION NO. 2F71P

TAPE NO.

ITEM NO. 2F71P

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 158

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	497.98071	KM	DX	-1.4923707	KM/SEC
Y	1942.0290	KM	DY	-.12959578	KM/SEC
Z	1322.6153	KM	DZ	-.12469450	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	93.61	M	DX	.01153	M/S	X	.0000	M	DX	.0000	M/S
Y	349.3	M	DY	.05236	M/S	Y	.0000	M	DY	.0000	M/S
Z	480.6	M	DZ	.19639	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.50	KM	ECC	.336827	APF	169.488	DEG	
LAN	146.954	DEG	INC	11.6357	DEG	TFP	-1849.11	SEC
RCA	1783.60	KM	PALT	45.5111	KM	PER	208.604	MIN
APO	3595.39	KM	AALT	1857.30	KM	TA	268.763	DEG
LAT	11.3886	DEG	LONG	224.965	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 1060.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.1936	.0185
12	CC3	329/0650	329/0916	190	.2117	.0437

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 290 , 04 HR , 23 MIN

PREPARED BY: GAYLE D. BARROW
/O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2F71P TAPE NO. ITEM NO. 2F71P

5.2 EPOCH DAY 329 , 7 , 21 , 15.180 GMT SEQ. NO. 158
HR , MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1760.4722 KM DX -.31680835 KM/SEC
Y 254.75643 KM DY -1.5636733 KM/SEC
Z 127.60000 KM DZ -1.0629044 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 5.007 M DX .07646 M/S X 5.007 M DX .0765 M/S
Y 138.3 M DY .28678 M/S Y 138.3 M DY .2868 M/S
Z 350.0 M DZ .39945 M/S Z 350.0 M DZ .3994 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.48 KM EGC .336970 APF 169.566 DEG
LAN 146.625 DEG INC 11.6359 DEG TFP 25.6362 SEC
RCA 1783.21 KM PALT 45.1193 KM PER 208.603 MIN
APO 3595.76 KM AALT 1857.67 KM TA 1.57926 DEG
LAT 1.77918 DEG LONG 317.950 DEG

5.6 LUNAR HARMONICS USED LRC 11/11/66

5.7 DATA ARC LENGTH 0 HRS 28 MIN SOS= 1055.7

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.1936	.0185
12	CC3	329/0650	329/0916	190	.2117	.0437

5.9 RESIDUAL PLOTS NOT AVAILABLE

5.10 REMARKS MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT DAY 290 , 04 HR , 26 MIN PREPARED BY GAYLE D. BARROW /O.D. ANALYST
GMT

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2-10082A-1

5.1 O.D. IDENTIFICATION NO. 2F72P TAPE NO.
ITEM NO. 2F72P

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT SEQ. NO. 159
HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	499.01091	KM	DX	-1.4924799	KM/SEC
Y	1937.9566	KM	DY	-.13021781	KM/SEC
Z	1328.2758	KM	DZ	-.12246115	KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X	25.65	M	DX	.00307	M/S	X	.0000	M	DX	.0000	M/S
Y	92.37	M	DY	.01554	M/S	Y	.0000	M	DY	.0000	M/S
Z	125.8	M	DZ	.05459	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.52	KM	ECC	.336825	APF	168.945	DEG	
LAN	147.481	DEG	INC	11.8280	DEG	TFP	-1849.18	SEC
RCA	1783.62	KM	PALT	45.5338	KM	PER	208.607	MIN
APO	3595.42	KM	AALT	1857.33	KM	TA	268.762	DEG
LAT	11.5530	DEG	LONG	224.929	DEG			

5.6 LUNAR HARMONICS USED' LRC 11/11/66

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS= 3541.6

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.2479	-.0060
41	CC3	329/1023	329/1247	197	.3071	.1587
12	CC3	329/0650	329/0917	191	.2746	-.1118

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT' PREPARED BY' GAYLE D. BARROW
DAY 290 , 04 HR , 47 MIN GMT O.D. ANALYST

2188

740

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) UZ-100820-1

5.1 O.D. IDENTIFICATION NO. 2F72P TAPE NO.
 ITEM NO. 2F72P
 5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT SEQ. NO. 159
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.4250	KM	DX	-.31770154	KM/SEC
Y	253.18891	KM	DY	-1.5602863	KM/SEC
Z	131.66464	KM	DZ	-1.0675778	KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X	1.826	M	DX	.02079	M/S	X	1.826	M	DX	.0208	M/S
Y	38.69	M	DY	.07584	M/S	Y	38.69	M	DY	.0758	M/S
Z	95.48	M	DZ	.10475	M/S	Z	95.48	M	DZ	.1047	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.52	KM	EGC	.336968	APF	169.022	DEG
LAN	147.153	DEG	INC	11.6282	TFP	25.5636	SEC
RCA	1783.24	KM	PALT	45.1459	PER	208.606	MIN
APO	3595.80	KM	AALT	1657.71	TA	1.57463	DEG
LAT	1.91909	DEG	LONG	317.946	DEG		

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: U HRS 28 MIN SOS= 3541.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.2479	-.0060
41	CC3	329/1023	329/1247	197	.3071	.1587
12	CC3	329/0650	329/0917	191	.2746	-.1118

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT: DAY 290 , 04 HR , 50 MIN
 PREPARED BY: GAYLE D. BARROW
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D3-100520-1

5.1 O.D. IDENTIFICATION NO. 3F71P

TAPE NO.

ITEM NO. 3F71P

5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 160

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2070.4767	KM	DX	-.40411500	KM/SEC
Y	1231.4119	KM	DY	-1.1415444	KM/SEC
Z	1460.3039	KM	DZ	-.43678975	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	328.5	M	DX	.06575	M/S	X	.0000	M	DX	.0000	M/S
Y	302.2	M	DY	.12474	M/S	Y	.0000	M	DY	.0000	M/S
Z	726.9	M	DZ	.26774	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.65	KM	ECC	.335822	APF	183.210	DEG	
LAN	147.083	DEG	INC	20.9340	DEG	TFP	-2749.83	SEC
RCA	1785.74	KM	PALT	47.6498	KM	PER	208.505	MIN
APO	3591.55	KM	AALT	1853.46	KM	TA	242.855	DEG
LAT	19.0606	DEG	LONG	211.664	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 1858.6

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.2184	.1450
62	CC3	52/0052	52/0113	18	.2712	.1649
12	C3	52/0054	52/0113	20	.2623	.0076
12	CC3	52/0124	52/0313	198	.2217	-.0498

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 290 , 06 HR , 08 MIN

PREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2-100-20-1

5.1 O.D. IDENTIFICATION NO. 3F71P TAPE NO.
ITEM NO. 3F71P

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT SEQ. NO. 160
HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-572.48376	KM	DX	1.7185131	KM/SEC
Y	-1585.2051	KM	DY	-.23883436	KM/SEC
Z	-602.47758	KM	DZ	-.80286784	KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X	88.43	M	DX	.27481	M/S	X	88.43	M	DX	.2748	M/S
Y	175.7	M	DY	.28654	M/S	Y	175.7	M	DY	.2865	M/S
Z	377.9	M	DZ	.67460	M/S	Z	377.9	M	DZ	.6746	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UDATE)

SMA	2688.92	KM	ECC	.336029	APF	183.253	DEG	
LAN	146.655	DEG	INC	26.9314	DEG	TFP	-132.014	SEC
RCA	1785.37	KM	PALT	47.2757	KM	PER	208.537	MIN
APO	3592.48	KM	AALT	1854.39	KM	TA	351.899	DEG
LAT	1.73020	DEG	LONG	322.125	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 0 HRS 40 MIN SOS= 1858.2

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.2184	.1450
62	CC3	52/0052	52/0113	18	.2712	.1649
12	C3	52/0054	52/0113	20	.2623	.0076
12	CC3	52/0124	52/0313	198	.2217	-.0498

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT: DAY 290 , 06 HR , 10 MIN PREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3F72P TAPE NO.
ITEM NO. 3F72P
5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT SEQ. NO. 161
HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -2065.3811 KM DX -.40308616 KM/SEC
Y 1226.8279 KM DY -1.1434753 KM/SEC
Z 1471.4147 KM DZ -.43262436 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 142.7 M DX .02941 M/S X .0000 M DX .0000 M/S
Y 124.7 M DY .05507 M/S Y .0000 M DY .0000 M/S
Z 305.0 M DZ .11829 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2688.66 KM ECC .335834 APF 182.724 DEG
LAN 147.577 DEG INC 21.3033 DEG TFP -2749.87 SEC
RCA 1785.72 KM PALT 47.6271 KM PER 208.507 MIN
APO 3591.61 KM AALT 1853.52 KM TA 242.853 DEG
LAT 19.3171 DEG LONG 211.592 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 5467.5

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.3157	-.0023
62	CC3	52/0052	52/0113	18	.1738	.2681
12	C3	52/0054	52/0113	20	.2320	-.0549
12	CC3	52/0124	52/0643	414	.3745	.0450

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT: DAY 290 , 06 HR , 30 MIN PREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 3F72P

TAPE NO.
ITEM NO. 3F72P5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECSEQ. NO. 161
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-571.09431	KM	DX	1.7142600	KM/SEC
Y	-1587.9161	KM	DY	-.23444948	KI'/SEC
Z	-596.59817	KM	DZ	-.81321651	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	41.76	M	DX	.11906	M/S	X	41.76	M	DX	.1191	M/S
Y	77.31	M	DY	.12090	M/S	Y	77.31	M	DY	.1209	M/S
Z	166.2	M	DZ	.28629	M/S	Z	166.2	M	DZ	.2863	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.95	KM	ECC	.336041	APF	182.766	DEG	
LAN	147.149	DEG	INC	21.3005	DEG	TFP	-132.058	SEC
RCA	1785.35	KM	PALT	47.2625	KM	PER	208.540	MIN
APO	3592.54	KM	AALT	1854.45	KM	TA	351.896	DEG
LAT	1.93657	DEG	LONG	322.174	DEG			

5.6 LUNAR HARMONICS USED' LRC 11/11/66

5.7 DATA ARC LENGTH' 0 HRS 40 MIN SOS= 5013.5

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.3157	-.0023
62	CC3	52/0052	52/0113	18	.1738	.2681
12	C3	52/0054	52/0113	20	.2320	-.0549
12	CC3	52/0124	52/0643	414	.3745	.0450

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'
DAY 290 , 06 HR , 33 MINPREPARED BY' GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D71M

TAPE NO.
ITEM NO. 3D71M5.2 EPOCH DAY 48 , 19 ' 42 ' 0.000 GMT
HR MIN SECSEQ. NO. 162
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-191.13074	KM	DX	-.90709515	KM/SEC
Y	3090.9443	KM	DY	-.31862410	KM/SEC
Z	1673.5107	KM	DZ	.19484340	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	23.36	M	DX	.03823	M/S	X	.0000	M	DX	.0000	M/S
Y	119.1	M	DY	.06009	M/S	Y	.0000	M	DY	.0000	M/S
Z	228.4	M	DZ	.07643	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.04	KM	ECC	.336730	APF	180.898	DEG	
LAN	190.134	DEG	INC	21.0077	DEG	TFP	-5177.22	SEC
RCA	1783.56	KM	PALT	45.4703	KM	PER	208.551	MIN
APO	3594.52	KM	AALT	1856.43	KM	TA	196.593	DEG
LAT	6.18567	DEG	LONG	206.528	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 2 HRS 40 MIN SOS= 3237.2

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.3324	.0283
62	CC3	48/1942	48/2003	20	.0289	.1072
12	CC3	48/2013	48/2157	166	.3348	-.0774

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 290 , 05 HR , 50 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D71M	TAPE NO.
	ITEM NO. 3D71M
5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT	SEQ. NO. 162
HR MIN SEC	COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -534.26339 KM	DX 1.7275181 KM/SEC
Y -1589.1494 KM	DY -.22237741 KM/SEC
Z -610.22821 KM	DZ -.79951998 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 132.6 M	DX .09829 M/S	X 132.6 M	DX .0983 M/S
Y 27.26 M	DY .12962 M/S	Y 27.26 M	DY .1296 M/S
Z 59.02 M	DZ .22635 M/S	Z 59.02 M	DZ .2263 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.76 KM	ECC .337436	APF 181.149 DEG
LAN 183.596 DEG	INC 21.0003 DEG	TFP -88.0783 SEC
RCA 1782.14 KM	PALT 44.0476 KM	PER 208.635 MIN
APO 3597.38 KM	AALT 1859.29 KM	TA 354.572 DEG
LAT 1.53200 DEG	LONG 359.601 DEG	

5.6 LUNAR HARMONICS USED: LFC 11/11/66

5.7 DATA ARC LENGTH: 11 HRS 47 MIN SOS= 3237.1

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.3324	.0283
62	CC3	48/1942	48/2003	20	.0289	.1072
12	CC3	48/2013	48/2157	166	.3348	-.0774

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 290 , 05 HR , 54 MIN GMT	O.D. ANALYST	

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F71M	TAPE NO.
	ITEM NO. 3F71M
5.2 EPOCH DAY 51 , 14 ' 25 ' 0.000 GMT	SEQ. NO. 163
HR MIN SEC	COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -2076.3993 KM	DX -.39363154 KM/SEC
Y 1205.4378 KM	DY -1.1494004 KM/SEC
Z 1449.7016 KM	DZ -.44329232 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 55.61 M	DX .01173 M/S	X .0000 M	DX .0000 M/S
Y 61.48 M	DY .01816 M/S	Y .0000 M	DY .0000 M/S
Z 131.7 M	DZ .03708 M/S	Z .0000 M	DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2688.64 KM	ECC .336289	APF 182.878 DEG
LAN 152.976 DEG	INC 20.9752 DEG	TFP -2719.74 SEC
RCA 1784.48 KM	PALT 46.3905 KM	PER 208.504 MIN
APO 3592.80 KM	AALT 1854.71 KM	TA 243.552 DEG
LAT 19.1534 DEG	LONG 217.932 DEG	

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 2 HRS 40 MIN SOS= 1134.0

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.2119	.0272
41	C3	51/1425	51/1557	152	.2386	.0327

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 290 , .06 HR , 42 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F71M

TAPE NO.
ITEM NO. 3F71M5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECSEQ. NO. 163
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-571.39417	KM	DX	1.7187671	KM/SEC
Y	-1585.5903	KM	DY	-.23824897	KM/SEC
Z	-602.47582	KM	DZ	-.80253790	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	117.8 M	DX	.06102 M/S	X	117.8 M	DX	.0610 M/S
Y	28.88 M	DY	.09830 M/S	Y	28.88 M	DY	.0983 M/S
Z	82.21 M	DZ	.12560 M/S	Z	82.21 M	DZ	.1256 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.98	KM	ECC	.336028	APF	183.195	DEG	
LAN	146.703	DEG	INC	20.9291	DEG	TFP	-131.264	SEC
RCA	1785.41	KM	PALT	47.3193	KM	PER	208.544	MIN
APC	3592.55	KM	AALT	1854.46	KM	TA	351.945	DEG
LAT	1.73433	DEG	LONG	322.162	DEG			

5.6 LUNAR HARMONICS USED: LRC 11/11/66

5.7 DATA ARC LENGTH: 11 HRS 5 MIN SOS= 727.32

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.2119	.0272
41	C3	51/1425	51/1557	152	.2386	.0327

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:
DAY 290 , 06 HR , 46 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2=100820-1

5.1 O.D. IDENTIFICATION NO. 1B81P

TAPE NO.

ITEM NO. 1B81P

5.2 EPOCH DAY 232 , 19 : 45 : 0.000 GMT
HR MIN SEC

SEQ. NO. 164

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1281.0626	KM	DX	.85289864	KM/SEC
Y	-3090.3897	KM	DY	.43438230	KM/SEC
Z	-874.69456	KM	DZ	.38310502	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	37.37	M	DX	.02854	M/S	X	.0000	M	DX	.0000	M/S
Y	274.4	M	DY	.05229	M/S	Y	.0000	M	DY	.0000	M/S
Z	921.2	M	DZ	.00600	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.55	KM	ECC	.296473	APF	184.302	DEG	
LAN	242.497	DEG	INC	12.1408	DEG	TFP	-5021.04	SEC
RCA	1945.64	KM	PALT	207.551	KM	PER	217.515	MIN
APO	3585.46	KM	AALT	1847.37	KM	TA	204.158	DEG
LAT	5.75199	DEG	LONG	270.417	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 2 HRS .0 MIN

SOS= 489.54

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2077	.0086
61	C3	232/1945	232/2058	71	.1043	.0120

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 300 , 02 HR , 41 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 1881P

TAPE NO.

ITEM NO. 1881P

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SEC

SEQ. NO. 164

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.10204	KM	DX	-1.6097836	KM/SEC
Y	1575.6928	KM	DY	.74206961	KM/SEC
Z	832.97317	KM	DZ	-.11799485	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	32.25	M	DX	.05182	M/S	X	32.25	M	DX	.0518	M/S
Y	161.1	M	DY	.04864	M/S	Y	161.1	M	DY	.0486	M/S
Z	270.4	M	DZ	.38993	M/S	Z	270.4	M	DZ	.3899	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2766.15	KM	ECC	.296597	APF	184.308	DEG	
LAN	241.782	DEG	INC	12.1414	DEG	TFP	-483.504	SEC
RCA	1945.71	KM	PALT	207.624	KM	PER	217.585	MIN
APO	3586.58	KM	AALT	1848.49	KM	TA	334.648	DEG
LAT	4.33147	DEG	LONG	41.1684	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 1 HRS 12 MIN SOS= 487.73

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.2077	.0086
61	C3	232/1945	232/2058	71	.1043	.0120

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:

DAY 300 , 02 HR , 44 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100E20-1

5.1 O.D. IDENTIFICATION NO. 1B82P

TAPE NO.

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SECITEM NO. 1B82P
SEQ. NO. 165
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1280.7321	KM	DX	.85283739	KM/SEC
Y	-3091.4217	KM	DY	.43448530	KM/SEC
Z	-870.57568	KM	DZ	.38319218	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	18.53	M	DX	.01422	M/S	X	.0000	M	DX	.0000	M/S
Y	132.2	M	DY	.02468	M/S	Y	.0000	M	DY	.0000	M/S
Z	442.4	M	DZ	.00404	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.33	KM	ECC	.296435	APF	184.577	DEG	
LA	242.242	DEG	INC	12.1868	DEG	TFP	-5021.24	SEC
RCA	1945.59	KM	PALT	207.498	KM	PER	217.488	MIN
APO	3585.07	KM	AALT	1846.98	KM	TA	204.145	DEG
LAT	5.82247	DEG	LONG	270.417	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 5 HRS 40 MIN SOS= 2155.5

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.2701	.0541
61	C3	232/1945	232/2058	71	.2024	.0629

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 300 , 02 HR , 56 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100320-1

5.1 O.D. IDENTIFICATION NO. 1B82P

TAPE NO.

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SECITEM NO. 1B82P
SEQ. NO. 165
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	883.93768	KM	DX	-1.6095197	KM/SEC
Y	1576.3331	KM	DY	.74228087	KM/SEC
Z	831.88831	KM	DZ	-.11984618	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.03 M	DX	.02511 M/S	X	17.03 M	DX	.0251 M/S
Y	76.75 M	DY	.02383 M/S	Y	76.75 M	DY	.0238 M/S
Z	128.0 M	DZ	.18935 M/S	Z	128.0 M	DZ	.1894 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.92	KM	ECC	.296559	APF	184.582	DEG
LAN	241.527	DEG	INC	12.1875	TFP	-483.711	SEC
RCA	1945.66	KM	PALT	207.571	PER	217.558	MIN
APO	3586.18	KM	AALT	1848.09	TA	334.636	DEG
LAT	4.29559	DEG	LONG	41.1755			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 1 HRS 12 MIN SOS= 2153.6

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.2701	.0541
61	C3	232/1945	232/2058	71	.2024	.0629

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:

PREPARED BY:

GAYLE D. BARROW

DAY 300 , 02 HR , 58 MIN

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 2B81P

TAPE NO.

5.2 EPOCH DAY 322 , 20 , 36 , 0.000 GMT
HR MIN SEC

ITEM NO. 2B81P

SEQ. NO. 166

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.5686	KM	DX	.29308444	KM/SEC
Y	-864.49547	KM	DY	.74647210	KM/SEC
Z	-534.13916	KM	DZ	.51331320	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	11.49	M	DX	.02266	M/S	X	.0000	M	DX	.0000	M/S
Y	575.8	M	DY	.29420	M/S	Y	.0000	M	DY	.0000	M/S
Z	937.4	M	DZ	.43813	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.46	KM	ECC	.336615	APF	164.814	DEG	
LAN	233.654	DEG	INC	11.9436	TFP	6061.07	SEC	
RCA	1784.15	KM	PALT	46.0567	KM	PER	208.600	MIN
APO	3594.77	KM	AALT	1856.68	KM	TA	177.013	DEG
LAT	356.299	DEG	LONG	215.849	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 1971.0

5.8 DATA SUMMARY

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.2997	.0942
61	C3	322/2037	322/2144	130	.0955	.1033

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 300 , 03 HR , 09 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2B81P

TAPE NO.

ITEM NO. 2B81P

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 GMT

SEQ. NO. 166

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.7014	KM	DX	-.47044180	KM/SEC
Y	381.22366	KM	DY	-1.5322829	KM/SEC
Z	232.07549	KM	DZ	-1.0516746	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.959 M	DX	.03654 M/S	X	1.959 M	DX	.0365 M/S
Y	307.4 M	DY	.57157 M/S	Y	307.4 M	DY	.5716 M/S
Z	490.4 M	DZ	.84978 M/S	Z	490.4 M	DZ	.8498 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.82	KM	ECC	.336993	APF	164.847	DEG
LAN	232.652	DEG	INC	11.9444	TFP	-17.1612	SEC
RCA	1783.37	KM	PALT	45.2820	PER	208.642	MIN
APO	3596.27	KM	AALT	1858.18	TA	358.943	DEG
LAT	3.31216	DEG	LONG	36.7744			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 1 HRS 44 MIN

SOS= 1971.0

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.2997	.0942
61	C3	322/2037	322/2144	130	.0955	.1033

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:

DAY 300 , 03 HR , 12 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100000-1

5.1 O.D. IDENTIFICATION NO. 2B82P

TAPE NO.

5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SECITEM NO. 2B82P
SEQ. NO. 167
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.3430	KM	DX	.29353604	KM/SEC
Y	-851.29622	KM	DY	.75340886	KM/SEC
Z	-556.07108	KM	DZ	.50281888	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	9.627 M	DX	.01031 M/S	X	.0000 M	DX	.0000 M/S
Y	426.3 M	DY	.21468 M/S	Y	.0000 M	DY	.0000 M/S
Z	703.6 M	DZ	.32740 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.42	KM	ECC	.336619	APF	161.711	DEG
LAN	236.800	DEG	INC	11.3781	TFP	6060.92	SEC
RCA	1784.11	KM	PALT	46.0222	PER	208.595	MIN
APO	3594.73	KM	AALT	1856.64	TA	177.013	DEG
LAT	355.895	DEG	LONG	215.906			

5.6 LUNAR HARMONICS USED' BOEING R-2

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS= 8250.8

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	.4825	.0804
61	C3	322/2037	322/2144	130	.0939	.3130

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'

DAY 300 , 03 HR , 56 MIN

PREPARED BY'

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2B82P

TAPE NO.

5.2 EPX H DAY 322 , 22 ' 23 ' 16.600 GMT
HR MIN SECITEM NO. 2B82P
SEQ. NO. 167
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.6563	KM	DX	-.47118532	KM/SEC
Y	374.06362	KM	DY	-1.5458363	KM/SEC
Z	243.50455	KM	DZ	-1.0313506	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	3.580	M	DX	.01933	M/S	X	3.580	M	DX	.0193	M/S
Y	226.3	M	DY	.41738	M/S	Y	226.3	M	DY	.4174	M/S
Z	368.9	M	DZ	.63441	M/S	Z	368.9	M	DZ	.6344	M/S

5.5. CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.78	KM	ECC	.336996	APF	161.745	DEG
LAN	235.797	DEG	INC	11.3789	TFP	-17.0601	SEC
RCA	1783.34	KM	PALT	45.2469	PER	208.637	MIN
APO	3596.23	KM	AALT	1858.14	TA	358.949	DEG
LAT	3.73997	DEG	LONG	36.8432			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 1 HRS 44 MIN SOS= 8250.7

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	.4825	.0804
61	C3	322/2037	322/2144	130	.0939	.3130

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 300 , 04 HR , 00 MIN GMT		O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 2D81P

TAPE NO.

ITEM NO. 2D81P

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 168

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.4561	KM	DX	-.89418016	KM/SEC
Y	1409.8475	KM	DY	.60138352	KM/SEC
Z	1011.3695	KM	DZ	.39236857	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	21.98	M	DX	.00872	M/S	X	.0000	M	DX	.0000	M/S
Y	71.9	M	DY	.05277	M/S	Y	.0000	M	DY	.0000	M/S
Z	186.1	M	DZ	.10015	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.32	KM	ECC	.338312	APF	167.325	DEG	
LAN	179.043	DEG	INC	11.9196	DEG	TFP	-3530.36	SEC
RCA	1779.49	KM	PALT	41.4048	KM	PER	208.584	MIN
APO	3599.15	KM	AALT	1861.06	KM	TA	225.341	DEG
LAT	6.40061	DEG	LONG	211.144	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 1412.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.2480	-.0318
61	C3	326/2250	327/0109	131	.2416	.0612

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 300 , 04 HR , 11 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10022C-1

5.1 O.D. IDENTIFICATION NO. 2D81P

TAPE NO.

5.2 EPOCH DAY 326 , 23 , 47 , 13.720 GMT
HR MIN SECITEM NO. 2D81P
SEQ. NO. 168
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.2510	KM	DX	-.07399276	KM/SEC
Y	-7.9109558	KM	DY	-1.5782317	KM/SEC
Z	-40.491449	KM	DZ	-1.0769118	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.353	M	DX	.02402	M/S	X	1.353	M	DX	.0240	M/S
Y	20.67	M	DY	.16301	M/S	Y	20.67	M	DY	.1630	M/S
Z	19.17	M	DZ	.23758	M/S	Z	19.17	M	DZ	.2376	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.95	KM	ECC	.338663	APF	167.395	DEG
LAN	178.445	DEG	INC	11.9193	TFP	203.159	SEC
RCA	1778.96	KM	PALT	40.8745	PER	208.657	MIN
APO	3600.94	KM	AALT	1862.85	TA	12.5172	DEG
LAT	.018230	DEG	LONG	358.359			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 0 HRS 59 MIN SOS= 1412.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.2480	-.0318
61	C3	326/2250	327/0109	131	.2416	.0612

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 300 , 04 HR , 14 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2D82P

TAPE NO.

5.2 EPOCH DAY 326 , 22 : 45 : 0.000 GMT
 HR MIN SEC

ITEM NO. 2D82P
 SEQ. NO. 169
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.4917	KM	DX	-.89415557	KM/SEC
Y	1409.4698	KM	DY	.60123283	KM/SEC
Z	1011.8521	KM	DZ	.39262094	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.88	M	DX	.00712	M/S	X	.0000	M	DX	.0000	M/S
Y	138.3	M	DY	.04348	M/S	Y	.0000	M	DY	.0000	M/S
Z	148.2	M	DZ	.08257	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.31	KM	ECC	.338310		APF	167.323	DEG
LAN	179.046	DEG	INC	11.9416	DEG	TFP	-3530.44	SEC
RCA	1779.49	KM	PALT	41.3986	KM	PER	208.582	MIN
APO	3599.13	KM	AALT	1861.04	KM	TA	225.339	DEG
LAT	6.41145	DEG	LONG	211.141	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 7346.8

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.5061	.0540
61	C3	326/2250	327/0109	131	.3592	-.0493

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 300 , 04 HR , 26 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-10082(-1)

5.1 O.D. IDENTIFICATION NO. 2D82P

TAPE NO.

5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HR MIN SECITEM NO. 2D82P
SEQ. NO. 169
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.2390	KM	DX	-.07406616	KM/SEC
Y	-7.8280931	KM	DY	-1.5778240	KM/SEC
Z	-40.404354	KM	DZ	-1.0775191	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.9765	M	DX	.01955	M/S	X	.9765	M	DX	.0195	M/S
Y	15.44	M	DY	.13273	M/S	Y	15.44	M	DY	.1327	M/S
Z	17.45	M	DZ	.19316	M/S	Z	17.45	M	DZ	.1932	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.94	KM	ECC	.338662	APF	167.392	DEG	
LAN	178.449	DEG	INC	11.9413	DEG	TFP	203.080	SEC
RCA	1778.96	KM	PALT	40.8685	KM	PER	208.655	MIN
APO	3600.91	KM	AALT	1862.82	KM	TA	12.5124	DEG
LAT	.019793	DEG	LONG	358.355	DEG			

5.6 LUNAR HARMONICS USED' BOEING R-2

5.7 DATA ARC LENGTH' 0 HRS 59 MIN SOS= 7344.2

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.5061	.0540
61	C3	326/2250	327/0109	131	.3592	-.0493

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT'

DAY 300 , 04 HR , 29 MIN GMT

PREPARED BY' GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3D81P

TAPE NO.

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SEC

ITEM NO. 3D81P

SEQ. NO. 170

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-493.47667	KM	DX	-.89286237	KM/SEC
Y	2964.3225	KM	DY	-.43433031	KM/SEC
Z	1733.9579	KM	DZ	.13011681	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	117.6	M	DX	.15095	M/S	X	.0000	M	DX	.0000	M/S
Y	480.2	M	DY	.22112	M/S	Y	.0000	M	DY	.0000	M/S
Z	848.7	M	DZ	.29910	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.80	KM	ECC	.337021	APF	181.297	DEG	
LAN	184.202	DEG	INC	21.0847	DEG	TFP	-4854.51	SEC
RCA	1782.61	KM	PALT	44.5247	KM	PER	208.523	MIN
APO	3594.98	KM	AALT	1856.89	KM	TA	201.744	DEG
LAT	8.09444	DEG	LONG	205.848	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 1543.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0578	-.0767
41	CC3	49/0705	49/0834	181	.3635	-.0562
12	C3	49/0706	49/0709	4	.0176	.5137
12	CC3	49/0613	49/0659	43	.0864	-.0584

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 300 , 05 HR , 19 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3D81P

TAPE NO.

ITEM NO. 3D81P

5.2 EPOCH DAY 49 , 7 : 32 : 25.310 .GMT

SEQ. NO. 170

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -534.28171 KM

DX 1.7268326 KM/SEC

Y -1588.4939 KM

DY -.22039459 KM/SEC

Z -611.51682 KM

DZ -.80168097 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 81.70 M

DX .30361 M/S

X 81.70 M

DX .3036 M/S

Y 14.43 M

DY .54899 M/S

Y 14.43 M

DY .5490 M/S

Z 108.0 M

DZ .80279 M/S

Z 108.0 M

DZ .8028 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.45 KM

ECC .337423

APF 181.335 DEG

LAN 183.456 DEG

INC 21.0845 DEG

TFP -88.7318 SEC

RCA 1781.97 KM

PALT 43.8801 KM

PER 208.599 MIN

APO 3596.93 KM

AALT 1858.84 KM

TA 354.532 DEG

LAT 1.48584 DEG

LONG 359.598 DEG

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 1 HRS 16 MIN

SOS= 1543.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.0578	-.0767
41	CC3	49/0705	49/0834	181	.3635	-.0562
12	C3	49/0706	49/0709	4	.0176	.5137
12	CC3	49/0613	49/0659	43	.0864	-.0584

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 300 , 05 HR , 22 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-106820-1

5.1 O.D. IDENTIFICATION NO. 3D82P

TAPE NO.

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 .GMT
 HR MIN SEC

ITEM NO. 3D82P
 SEQ. NO. 171
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-495.27694	KM	DX	-.89440334	KM/SEC
Y	2969.5283	KM	DY	-.43200252	KM/SEC
Z	1724.9767	KM	DZ	.12672414	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	35.01	M	DX	.05193	M/S	X	.0000	M	DX	.0000	M/S
Y	160.4	M	DY	.07677	M/S	Y	.0000	M	DY	.0000	M/S
Z	286.0	M	DZ	.10394	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.88	KM	ECC	.337061	APF	181.150	DEG
LAN	184.333	DEG	INC	20.7555	TFP	-4854.89	SEC
RCA	1782.56	KM	PALT	44.4720	PER	208.532	MIN
APO	3595.19	KM	AALT	1857.10	TA	201.740	DEG
LAT	7.92295	DEG	LONG	205.877			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 41538

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.9239	-.2793
41	CC3	49/0705	49/1203	412	1.4030	.1264
12	C3	49/0706	49/0709	4	.1194	-.8662
12	CC3	49/0613	49/0659	43	.9102	-.3552

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
 DAY 300 , 05 HR , 37 MIN

PREPARED BY: GAYLE D. BARROW
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100...

5.1 O.D. IDENTIFICATION NO. 3D82P

TAPE NO.

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
 HR MIN SEC

ITEM NO. 3D82P
 SEQ. NO. 171
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-535.39784	KM	DX	1.7301370	KM/SEC
Y	-1588.5526	KM	DY	-.22647690	KM/SEC
Z	-610.27830	KM	DZ	-.79291883	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	29.78	M	DX	.10226	M/S	X	29.78	M	DX	.1023	M/S
Y	3.629	M	DY	.18793	M/S	Y	3.629	M	DY	.1879	M/S
Z	33.32	M	DZ	.27645	M/S	Z	33.32	M	DZ	.2764	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.53	KM	ECC	.337463	APF	181.188	DEG	
LAN	183.586	DEG	INC	20.7554	DEG	TFP	-89.1095	SEC
RCA	1781.92	KM	PALT	43.8251	KM	PER	208.608	MIN
APO	3597.15	KM	AALT	1859.06	KM	TA	354.508	DEG
LAT	1.52403	DEG	LONG	359.561	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 1 HRS 16 MIN SOS= 41530

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.9239	-.2793
41	CC3	49/0705	49/1203	412	1.4030	.1264
12	C3	49/0706	49/0709	4	.1194	-.8662
12	CC3	49/0613	49/0659	43	.9102	-.3552

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:

DAY 300 , 05 HR , 40 MIN GMT

PREPARED BY: GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 00200

5.1 O.D. IDENTIFICATION NO. 2F81P

TAPE NO.

5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SEC

ITEM NO. 2F81P

SEQ. NO. 172

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	498.84910	KM	DX	-1.4924452	KM/SEC
Y	1938.7918	KM	DY	-.12997176	KM/SEC
Z	1327.0150	KM	DZ	-.12300562	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.95.14	M	DX	.01134	M/S	X	.0000	M	DX	.0000	M/S
Y	352.7	M	DY	.05309	M/S	Y	.0000	M	DY	.0000	M/S
Z	482.5	M	DZ	.19766	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2589.33	KM	ECC	.336807	APF	169.087	DEG
LAN	147.346	DEG	INC	11.7853	TFP	-1849.23	SEC
RCA	1783.55	KM	PALT	45.4554	PER	208.585	MIN
APO	3595.11	KM	AALT	1857.02	TA	268.756	DEG
LAT	11.5173	DEG	LONG	224.935			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 888.80

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.2020	.0207
12	CC3	329/0650	329/0916	190	.1870	-.0732

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 300 , 04 HR , 44 MIN

PREPARED BY:

GAYLE D. BARROW

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 2F81P

TAPE NO.

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SEC

ITEM NO. 2F81P

SEQ. NO. 172

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.4657	KM	DX	-.31752748	KM/SEC
Y	253.58508	KM	DY	-1.5609825	KM/SEC
Z	130.78319	KM	DZ	-1.0665769	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	5.637	M	DX	.07766	M/S	X	5.637	M	DX	.0777	M/S
Y	140.1	M	DY	.28962	M/S	Y	140.1	M	DY	.2896	M/S
Z	352.0	M	DZ	.40103	M/S	Z	352.0	M	DZ	.4010	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.55	KM	ECC	.336965	APF	169.145	DEG	
LAN	147.034	DEG	INC	11.7872	DEG	TFP	25.5468	SEC
RCA	1783.27	KM	PALT	45.1779	KM	PER	208.610	MIN
APO	3595.84	KM	AALT	1857.75	KM	TA	1.57355	DEG
LAT	1.88804	DEG	LONG	317.945	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 0 HRS 28 MIN

SOS= 884.93

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.0202	.0207
12	CC3	329/0650	329/0916	190	.1870	-.0732

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:

DAY 300 , 04 HR , 47 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100220-1

5.1 O.D. IDENTIFICATION NO. 2F82P

TAPE NO.

5.2 EPOCH DAY 329 , 6 : 50 : 0.000 GMT
HR MIN SEC

ITEM NO. 2F82P

SEQ. NO. 173

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	499.16100	KM	DX	-1.4924982	KM/SEC
Y	1937.7933	KM	DY	-.13009237	KM/SEC
Z	1328.2841	KM	DZ	-.12242272	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	26.10	M	DX	.00314	M/S	X	.0000	M	DX	.0000	M/S
Y	94.08	M	DY	.01581	M/S	Y	.0000	M	DY	.0000	M/S
Z	128.1	M	DZ	.05565	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.30	KM	ECC	.336804	APF	168.952	DEG	
LAN	147.474	DEG	INC	11.8301	DEG	TFP	-1849.17	SEC
RCA	1783.53	KM	PALT	45.4425	KM	PER	208.581	MIN
APO	3595.07	KM	AALT	1856.98	KM	TA	268.757	DEG
LAT	11.5551	DEG	LONG	224.925	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 2432.7

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.2365	.1428
41	CC3	329/1023	329/1247	197	.2545	-.1445
12	CC3	329/0650	329/0917	191	.2274	.0373

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 300 , 05 HR , 04 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

C2-100820-1

5.1 O.D. IDENTIFICATION NO. 2F82P

TAPE NO.

5.2 EPOCH DAY 329 , 7 ' 21 ' 15.180 GMT
HR MIN SECITEM NO. 2F82P
SEQ. NO. 173
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.4428	KM	DX	-.31773848	KM/SEC
Y	253.16249	KM	DY	-1.5602043	KM/SEC
Z	131.74452	KM	DZ	-1.0676598	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.845	M	DX	.02116	M/S	X	1.845	M	DX	.0212	M/S
Y	39.44	M	DY	.07727	M/S	Y	39.44	M	DY	.0773	M/S
Z	97.27	M	DZ	.10668	M/S	Z	97.27	M	DZ	.1067	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.52	KM	ECC	.336962	APF	.169.010	DEG
LAN	147.162	DEG	INC	11.8320	TFP	25.6039	SEC
RCA	1783.26	KM	PALT	45.1652	PER	208.607	MIN
APO	3595.79	KM	AALT	1857.70	TA	1.57708	DEG
LAT	1.92178	DEG	LONG	317.946			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 0 HRS 28 MIN SOS= 2398.7

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.2365	.1428
41	CC3	329/1023	329/1247	197	.2545	-.1445
12	CC3	329/0650	329/0917	191	.2274	.0373

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:
DAY 300 , 05 HR , 07 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST217
268

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3F81P

TAPE NO.

ITEM NO. 3F81P

5.2 EPOCH DAY 52 , 0 : 50 : 0.000 GMT
HR MIN SEC

SEQ. NO. 174

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2069.4493	KM	DX	-.40402560	KM/SEC
Y	1230.5785	KM	DY	-1.1418203	KM/SEC
Z	1462.4225	KM	DZ	-.43614612	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	324.1	M	DX	.06493	M/S	X	.0000	M	DX	.0000	M/S
Y	296.5	M	DY	.12281	M/S	Y	.0000	M	DY	.0000	M/S
Z	714.1	M	DZ	.26384	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.60	KM	ECC	.335818	APF	183.137	DEG	
LAN	147.155	DEG	INC	21.0007	DEG	TFP	-2749.83	SEC
RCA	1785.72	KM	PALT	47.6312	KM	PER	208.500	MIN
APO	3591.49	KM	AALT	1853.40	KM	TA	242.854	DEG
LAT	19.1095	DEG	LONG	211.649	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 1834.5

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.2610	.0755
62	CC3	52/0052	52/0113	18	.1957	.0469
12	C3	52/0054	52/0113	20	.1624	-.1592
12	CC3	52/0124	52/0313	198	.2432	-.0847

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 300 , 06 HR , 18 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100E20-1

5.1 O.D. IDENTIFICATION NO. 3F81P

TAPE NO.

5.2 EPOCH DAY 52 , 1 : 33 : 37.810 GMT
HR MIN SECITEM NO. 3F81P
SEQ. NO. 174
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-572.36860	KM	DX	1.7176780	KM/SEC
Y	-1585.6482	KM	DY	-.23799008	KM/SEC
Z	-601.50282	KM	DZ	-.80487514	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	87.58	M	DX	.27136	M/S	X	87.58	M	DX	.2714	M/S
Y	172.8	M	DY	.28146	M/S	Y	172.8	M	DY	.2815	M/S
Z	372.2	M	DZ	.66336	M/S	Z	372.2	M	DZ	.6634	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.98	KM	ECC	.336037	APF	183.182	DEG
LAN	146.732	DEG	INC	21.0025	TFP	-132.157	SEC
RCA	1785.38	KM	PALT	47.2938	PER	208.544	MIN
APO	3592.58	KM	AALT	1854.49	TA	351.890	DEG
LAT	1.76437	DEG	LONG	322.130			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 0 HRS 40 MIN SOS= 1815.7

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.2610	.0755
62	CC3	52/0052	52/0113	18	.1957	.0469
12	C3	52/0054	52/0113	20	.1624	-.1592
12	CC3	52/0124	52/0313	198	.2432	-.0847

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:

PREPARED BY:

GAYLE D. BARROW

DAY 300 , 06 HR , 20 MIN

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3F82P

TAPE NO.

5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT

ITEM NO. 3F82P

SEQ. NO. 175

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -2072.2165 KM

DX -.40464581 KM/SEC

Y 1233.1801 KM

DY -1.1407067 KM/SEC

Z 1456.1865 KM

DZ -.43853248 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 143.3 M

DX .02897 M/S

X .0000 M

DX .0000 M/S

Y 129.4 M

DY .05715 M/S

Y .0000 M

DY .0000 M/S

Z 314.1 M

DZ .12206 M/S

Z .0000 M

DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2688.57 KM

ECC .335806

APF 183.423 DEG

LAN 146.863 DEG

INC 20.7929 DEG

TFP -2749.76 SEC

RCA 1785.73 KM

PALT 47.6402 KM

PER 208.496 MIN

APO 3591.40 KM

AALT 1853.31 KM

TA 242.856 DEG

LAT 18.9655 DEG

LONG 211.688 DEG

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 4759.8

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.3236	.2888
62	CC3	52/0052	52/0113	18	.2418	.0204
12	C3	52/0054	52/0113	20	.2327	-.0815
12	CC3	52/0124	52/0643	414	.3630	-.1281

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 300 , 06 HR , 41 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-1

5.1 O.D. IDENTIFICATION NO. 3F82P

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECITEM NO. 3F82P
SEQ. NO. 175
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-573.14158	KM	DX	1.7200513	KM/SEC
Y	-1584.0790	KM	DY	-.24047170	KM/SEC
Z	-604.89661	KM	DZ	-.79902861	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	41.16	M	DX	.11936	M/S	X	41.16	M	DX	.1194	M/S
Y	80.18	M	DY	.12544	M/S	Y	80.18	M	DY	.1254	M/S
Z	171.4	M	DZ	.29507	M/S	Z	171.4	M	DZ	.2951	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.94	KM	ECC	.336025	APF	183.467	DEG
LAN	146.440	DEG	INC	20.7947	TFP	-132.091	SEC
RCA	1785.39	KM	PALT	47.3001	KM	PER	208.539
APO	3592.49	KM	AALT	1854.40	KM	TA	351.894
LAT	1.64520	DEG	LONG	322.103	DEG		

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 0 HRS 40 MIN SOS= 4725.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	.175	.3236	.2888
62	CC3	52/0052	52/0113	18	.2418	.0204
12	C3	52/0054	52/0113	20	.2327	-.0815
12	CC3	52/0124	52/0643	414	.3630	-.1281

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:

DAY 300 , 06 HR , 44 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100820-1

5.1 O.D. IDENTIFICATION NO. 3D81M

TAPE NO.

5.2 EPOCH DAY 48 , 19 ' 42 ' 0.000 GMT
HR MIN SEC

ITEM NO. 3D81M

SEQ. NO. 176

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -191.03321 KM

DX -.90692928 KM/SEC

Y 3090.4412 KM

DY -.31884606 KM/SEC

Z 1674.6044 KM

DZ .19503359 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 23.61 M

DX .03845 M/S

X .0000 M

DX .0000 M/S

Y 119.8 M

DY .06039 M/S

Y .0000 M

DY .0000 M/S

Z 229.7 M

DZ .07672 M/S

Z .0000 M

DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.00 KM

ECC .336786

APF 180.934 DEG

LAN 190.101 DEG

INC 21.0334 DEG

TFP -5176.97 SEC

RCA 1783.38 KM

PALI 45.2930 KM

PER 208.546 MIN

APO 3594.62 KM

AALT 1856.53 KM

TA 196.594 DEG

LAT 6.20517 DEG

LONG 206.526 DEG

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 2 HRS 40 MIN

SOS= 2787.7

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.3178	.1270
62	CC3	48/1942	48/2003	20	.1531	.1601
12	CC3	48/2013	48/2157	166	.3645	-.0342

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 300 , 05 HR , 57 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST
GMT

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100020-

5.1 O.D. IDENTIFICATION NO. 3D81M

TAPE NO.

5.2 EPOCH DAY 49 , 7 : 32 : 25.310 GMT
HR MIN SEC

ITEM NO. 3D81M

SEQ. NO. 176

COMPUTER B

5.3 STATE VECTOR (SELENOGRAPHIC RIC 1950.0)

X -535.82794 KM

DX 1.7265619 KM/SEC

Y -1588.5414 KM

DY -.22264457 KM/SEC

Z -610.94112 KM

DZ -.80113502 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 132.6 M DX .09787 M/S

X 132.6 M DX .0979 M/S

Y 27.08 M DY .13382 M/S

Y 27.08 M DY .1338 M/S

Z 60.72 M DZ .22594 M/S

Z 60.72 M DZ .2259 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.66 KM

ECC .337353

APF 181.259 DEG

LAN 183.463 DEG

INC 21.0444 DEG

TFP -88.4801 SEC

RCA 1782.29 KM

PALT 44.2017 KM

PER 208.623 MIN

APO 3597.02 KM

AALT 1858.93 KM

TA 354.549 DEG

LAT 1.50415 DEG

LONG 359.549 DEG

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 11 HRS 47 MIN

SOS= 2475.8

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.3178	.1270
62	CC3	48/1942	48/2003	20	.1531	.1601
12	CC3	48/2013	48/2157	166	.3645	-.0342

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:
DAY 300 , 06 HR , 01 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100920-1

5.1 O.D. IDENTIFICATION NO. 3F81M

TAPE NO.

5.2 EPOCH DAY 51 , 14 ' 25 ' 0.000 GMT
HR MIN SEC

ITEM NO. 3F81M

SEQ. NO. 177

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2076.3297	KM	DX	-.39366859	KM/SEC
Y	1205.3704	KM	DY	-1.1493416	KM/SEC
Z	1449.9089	KM	DZ	-.44335787	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	55.57	M	DX	.01175	M/S	X	.0000	M	DX	.0000	M/S
Y	61.37	M	DY	.01821	M/S	Y	.0000	M	DY	.0000	M/S
Z	131.5	M	DZ	.03719	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.62	KM	ECC	.336289	APF	182.892	DEG	
LAN	152.964	DEG	INC	20.9783	TFP	-2719.82	SEC	
RCA	1784.46	KM	PALT	46.3745	KM	PER	208.502	MIN
APO	3592.77	KM	AALT	1854.68	KM	TA	243.549	DEG
LAT	19.1579	DEG	LONG	217.931	DEG			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 2 HRS 40 MIN

SOS= 1391.6

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.2452	-.0374
41	C3	51/1425	51/1557	152	.3391	-.0612

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 300 , 06 HR , 55 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

72-100320-1

5.1 O.D. IDENTIFICATION NO. 3F81M

TAPE NO.

5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT
HR MIN SECITEM NO. 3F81M
SEQ. NO. 177
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-574.46199	KM	DX	1.7175732	KM/SEC
Y	-1585.0758	KM	DY	-.23978594	KM/SEC
Z	-601.09032	KM	DZ	-.80454695	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	117.2	M	DX	.06139	M/S	X	117.2	M	DX	.0614	M/S
Y	28.77	M	DY	.09745	M/S	Y	28.77	M	DY	.0974	M/S
Z	82.74	M	DZ	.12592	M/S	Z	82.74	M	DZ	.1259	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.05	KM	ECC	.336082	APF	183.246	DEG
LAN	146.686	DEG	INC	20.9710	TFP	-133.612	SEC
RCA	1785.31	KM	PALT	47.2186	PER	208.552	MIN
APO	3592.79	KM	AALT	1854.70	TA	351.801	DEG
LAT	1.77079	DEG	LONG	322.059			

5.6 LUNAR HARMONICS USED: BOEING R-2

5.7 DATA ARC LENGTH: 11 HRS 5 MIN SOS= 1015.1

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.2452	-.0374
41	C3	51/1425	51/1557	152	.3391	-.0612

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:

DAY 300 , 06 HR , 59 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

70-100820-1

5.1 O.D. IDENTIFICATION NO. 1B91P

TAPE NO.

5.2 EPOCH DAY 232 , 19 ' 45 ' 0.000 GMT
HR MIN SEC

ITEM NO. 1B91P

SEQ. NO. 178

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1280.9480	KM	DX	.85293590	KM/SEC
Y	-3090.3800	KM	DY	.43428957	KM/SEC
Z	-874.15514	KM	DZ	.38315684	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	37.62	M	DX	.02860	M/S	X	.0000	M	DX	.0000	M/S
Y	275.0	M	DY	.05241	M/S	Y	.0000	M	DY	.0000	M/S
Z	924.1	M	DZ	.00600	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.35	KM	ECC	.296438	APF	184.340	DEG	
LAN	242.473	DEG	INC	12.1496	DEG	TFP	-5021.40	SEC
RCA	1945.59	KM	PALT	207.503	KM	PER	217.491	MIN
APO	3585.10	KM	AALT	1847.01	KM	TA	204.144	DEG
LAT	5.76063	DEG	LONG	270.416	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 2 HRS 0 MIN

SOS= 166.72

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.1117	.0138
61	C3	232/1945	232/2058	71	.0869	-.0076

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:

DAY 301 , 02 HR , 59 MIN

PREPARED BY:

GMT

GAYLE D. BARROW

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1B91P

TAPE NO.
ITEM NO. 1B91P5.2 EPOCH DAY 232 , 21 : 0 : 36.930 GMT
HR MIN SECSEQ. NO. 178
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.13001	KM	DX	-1.6097223	KM/SEC
Y	1575.6607	KM	DY	.74210109	KM/SEC
Z	832.83852	KM	DZ	-.11835408	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	32.32	M	DX	.05202	M/S	X	32.32	M	DX	.0520	M/S
Y	161.5	M	DY	.04871	M/S	Y	161.5	M	DY	.0487	M/S
Z	271.3	M	DZ	.39121	M/S	Z	271.3	M	DZ	.3912	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2765.77	KM	ECC	.296554	APF	184.364	DEG	
LAN	241.747	DEG	INC	12.1511	DEG	TFP	-483.905	SEC
RCA	1945.57	KM	PALT	207.484	KM	PER	217.541	MIN
APO	3585.97	KM	AALT	1847.88	KM	TA	334.625	DEG
LAT	4.32837	DEG	LONG	41.1666	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 1 HRS 12 MIN SOS= 166.18

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	232/2133	104	.1117	.0138
61	C3	232/1945	232/2058	71	.0869	-.0076

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 301 , 03 HR , 02 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1892P

TAPE NO.
ITEM NO. 1892P
SEQ. NO. 179
COMPUTER B

5.2 EPOCH DAY 232 , 19 , 45 , 0.000 GMT
HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	1281.0490	KM	DX	.85293451	KM/SEC
Y	-3090.3311	KM	DY	.43430810	KM/SEC
Z	-874.14254	KM	DZ	.38314125	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	18.28	M	DX	.01432	M/S	X	.0000	M	DX	.0000	M/S
Y	133.5	M	DY	.02487	M/S	Y	.0000	M	DY	.0000	M/S
Z	445.4	M	DZ	.00403	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2765.34	KM	ECC	.296429	APF	184.345	DEG	
LAN	242.473	DEG	INC	12.1483	DEG	TFP	-5021.52	SEC
RCA	1945.61	KM	PALT	207.521	KM	PER	217.490	MIN
APO	3585.07	KM	AALT	1846.98	KM	TA	204.142	DEG
LAT	5.76050	DEG	LONG	270.418	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 5 HRS 40 MIN SOS= 2978.6

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.3171	-.0104
61	C3	232/1945	232/2058	71	.2249	-.1592

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 301 , 03 HR , 34 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1B92P

TAPE NO.

ITEM NO. 1B92P

5.2 EPOCH DAY 232 , 21 ' 0 ' 36.930 GMT
HR MIN SEC

SEQ. NO. 179

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	884.20683	KM	DX	-1.6096980	KM/SEC
Y	1575.6659	KM	DY	.74209511	KM/SEC
Z	832.83593	KM	DZ	-.11830880	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	17.10 M	DX	.02520 M/S	X	17.10 M	DX	.0252 M/S
Y	77.39 M	DY	.02418 M/S	Y	77.39 M	DY	.0242 M/S
Z	128.9 M	DZ	.19059 M/S	Z	128.9 M	DZ	.1906 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2765.77	KM	ECC	.296545	APF	184.368	DEG
LAN	241.746	DEG	INC	12.1498	IFP	-484.025	SEC
RCA	1945.59	KM	PALT	207.502	KM	PER	217.540
APO	3585.94	KM	AALT	1847.85	KM	TA	334.619
LAT	4.32811	DEG	LONG	41.1647	DEG		

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 1 HRS 12 MIN SOS= 2889.1

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	232/1947	233/0111	259	.3171	-.0104
61	C3	232/1945	232/2058	71	.2249	-.1592

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:
DAY 301 , 03 HR , 36 MINPREPARED BY: GAYLE D. BARROW
GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2B91P

TAPE NO.
ITEM NO. 2B91P5.2 EPOCH DAY 322 , 20 , 36 , 0.000 GMT
HR MIN SECSEQ. NO. 180
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.4740	KM	DX	.29315459	KM/SEC
Y	-864.21391	KM	DY	.74728990	KM/SEC
Z	-534.52352	KM	DZ	.51207849	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	11.53	M	DX	.02177	M/S	X	.0000	M	DX	.0000	M/S
Y	571.1	M	DY	.29146	M/S	Y	.0000	M	DY	.0000	M/S
Z	930.0	M	DZ	.43522	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.34	KM	ECC	.336640	APF	164.653	DEG	
LAN	233.824	DEG	INC	11.8615	DEG	TFP	6060.29	SEC
RCA	1784.00	KM	PALT	45.9114	KM	PER	208.586	MIN
APO	3594.68	KM	AALT	1856.59	KM	TA	177.008	DEG
LAT	356.292	DEG	LONG	215.851	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 273.00

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.1168	-.0403
61	C3	322/2037	322/2144	130	.0611	.0300

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 301 , 03 HR , 53 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2891P

TAPE NO.

ITEM NO. 2891P

5.2 EPOCH DAY 322 , 22 ' 23 ' 16.600 . GMT
HR MIN SEC

SEQ. NO. 180

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.5954	KM	DX	-.47052863	KM/SEC
Y	381.18887	KM	DY	-1.5338781	KM/SEC
Z	232.42459	KM	DZ	-1.0493128	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.906	M	DX	.03497	M/S	X	1.906	M	DX	.0350	M/S
Y	304.9	M	DY	.56633	M/S	Y	304.9	M	DY	.5663	M/S
Z	486.4	M	DZ	.84442	M/S	Z	486.4	M	DZ	.8444	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.54	KM	ECC	.336949	APF	164.701	DEG	
LAN	232.813	DEG	INC	11.8653	DEG	TFP	-17.4575	SEC
RCA	1783.30	KM	PALT	45.2146	KM	PER	208.610	MIN
APO	3595.78	KM	AALT	1857.69	KM	TA	358.925	DEG
LAT	3.32303	DEG	LONG	36.7704	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 1 HRS 44 MIN

SOS= 272.98

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	322/2300	226	.1168	-.0403
61	C3	322/2037	322/2144	130	.0611	.0300

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT:
DAY 301 , 03 HR , 56 MIN

PREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2B92P

TAPE NO.
ITEM NO. 2B92P5.2 EPOCH DAY 322 , 20 ' 36 ' 0.000 GMT
HR MIN SECSEQ. NO. 181
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	3445.4322	KM	DX	.29303087	KM/SEC
Y	-868.05190	KM	DY	.74541106	KM/SEC
Z	-528.27311	KM	DZ	.51490563	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	2.850	M	DX	.01288	M/S	X	.0000	M	DX	.0000	M/S
Y	382.9	M	DY	.19273	M/S	Y	.0000	M	DY	.0000	M/S
Z	613.7	M	DZ	.28658	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.34	KM	ECC	.336629	APF	165.479	DEG
LAN	232.987	DEG	INC	12.0170	TFP	6060.20	SEC
RCA	1784.03	KM	PALT	45.9384	PER	208.585	MIN
APO	3594.64	KM	AALT	1856.55	TA	177.006	DEG
LAT	356.408	DEG	LONG	215.833	DEG		

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 1677.0

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	.2296	-.0646
61	C3	322/2037	322/2144	130	.0757	.0464

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 301 , 04 HR , 16 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

02007

5.1 O.D. IDENTIFICATION NO. 2B92P

TAPE NO.
ITEM NO. 2B92P

5.2 EPOCH DAY 322 , 22 , 23 , 16.600 GMT
HR MIN SEC

SEQ. NO. 181
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1726.5941	KM	DX	-.47028939	KM/SEC
Y	383.27392	KM	DY	-1.5301861	KM/SEC
Z	229.18910	KM	DZ	-1.0547560	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	2.162	M	DX	.02543	M/S	X	2.162	M	DX	.0254	M/S
Y	203.2	M	DY	.37517	M/S	Y	203.2	M	DY	.3752	M/S
Z	321.6	M	DZ	.55536	M/S	Z	321.6	M	DZ	.5554	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.54	KM	ECC	.336939	APF	165.526	DEG	
LAN	231.977	DEG	INC	12.0209	DEG	TFP	-17.5115	SEC
RCA	1783.33	KM	PALT	45.2411	KM	PER	208.609	MIN
APO	3595.75	KM	AALT	1857.66	KM	TA	358.921	DEG
LAT	3.20120	DEG	LONG	36.7492	DEG			

5.6 LUNAR HARMONICS USED' LRC 10/25/68

5.7 DATA ARC LENGTH' 1 HRS 44 MIN SOS= 1676.8

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	322/2036	323/0229	431	.2296	-.0646
61	C3	322/2037	322/2144	130	.0757	.0464

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10REMARKS' MAP TIME REPORT FOR SITE 'B'

TIME OF REPORT'	PREPARED BY'
DAY 301 , 04 HR , 19 MIN	GAYLE D. BARROW
	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2D91P

TAPE NO.
ITEM NO. 2D91P
SEQ. NO. 182
COMPUTER B

5.2 EPOCH DAY 326 , 22 ' 45 ' 0.000 GMT
HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 2598.3160 KM DX -.89412052 KM/SEC
Y 1409.7504 KM DY .60134660 KM/SEC
Z 1011.3436 KM DZ .39252980 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 22.04 M DX .00872 M/S X .0000 M DX .0000 M/S
Y 172.5 M DY .05280 M/S Y .0000 M DY .0000 M/S
Z 186.9 M DZ .10012 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.04 KM ECC .338276 APF 167.317 DEG
LAN 179.061 DEG INC 11.9269 DEG TFP -3530.47 SEC
RCA 1779.40 KM PALT 41.3097 KM PER 208.551 MIN
APO 3598.68 KM AALT 1860.59 KM TA 225.331 DEG
LAT 6.40124 DEG LONG 211.144 DEG

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 2094.5

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.3111	-.0676
61	C3	326/2250	327/0109	131	.2898	.0327

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT: DAY 301 , 04 HR , 31 MIN
PREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2D91P

TAPE NO.

ITEM NO. 2D91P

5.2 EPOCH DAY 326 , 23 , 47 , 13.720 GMT
HR MIN SEC

SEQ. NO. 182

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.3698	KM	DX	-.07396460	KM/SEC
Y	-7.9802563	KM	DY	-1.5780953	KM/SEC
Z	-40.333469	KM	DZ	-1.0770220	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.367	M	DX	.02404	M/S	X	1.367	M	DX	.0240	M/S
Y	20.81	M	DY	.16327	M/S	Y	20.81	M	DY	.1633	M/S
Z	18.93	M	DZ	.23786	M/S	Z	18.93	M	DZ	.2379	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2690.18	KM	ECC	.338673	APF	167.375	DEG	
LAN	178.472	DEG	INC	11.9247	DEG	TFP	203.060	SEC
RCA	1779.09	KM	PALT	41.0017	KM	PER	208.684	MIN
APO	3601.28	KM	AALT	1863.19	KM	TA	12.5098	DEG
LAT	.023823	DEG	LONG	358.359	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 0 HRS 59 MIN SOS= 2094.5

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0109	113	.3111	-.0676
61	C3	326/2250	327/0109	131	.2898	.0327

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:
DAY 301 , 04 HR , 34 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO.	2D92P	TAPE NO.	
		ITEM NO.	2D92P
5.2 EPOCH	DAY 326 , 22 ' 45 ' 0.000 GMT	SEQ. NO.	183
	HR MIN SEC	COMPUTER	B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	2598.8351 KM	DX	-.89396948 KM/SEC
Y	1405.7867 KM	DY	.59994945 KM/SEC
Z	1016.1708 KM	DZ	.39484993 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X	17.68 M	DX	.00704 M/S	X	.0000 M	DX	.0000 M/S
Y	137.0 M	DY	.04294 M/S	Y	.0000 M	DY	.0000 M/S
Z	145.8 M	DZ	.08096 M/S	Z	.0000 M	DZ	.0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.17 KM	ECC	.338320	APF	167.306 DEG
LAN	179.060 DEG	INC	12.1378 DEG	TFP	-3530.65 SEC
RCA	1779.37 KM	PALT	41.2814 KM	PER	208.566 MIN
APO	3598.97 KM	AALT	1860.88 KM	TA	225.329 DEG
LAT	6.51082 DEG	LONG	211.109 DEG		

5.6 LUNAR HARMONICS USED' LRC 10/25/68

5.7 DATA ARC LENGTH' 6 HRS 10 MIN SOS= 21139

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.8776	-.0990
61	C3	326/2250	327/0109	131	.5223	-.2181

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' ***EPOCH REPORT

TIME OF REPORT'	DAY 301 , 04 HR , 50 MIN	PREPARED BY'	GAYLE D. BARROW
			O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2D92P

TAPE NO.
ITEM NO. 2D92P5.2 EPOCH DAY 326 , 23 ' 47 ' 13.720 GMT
HP MIN SECSEQ. NO. 183
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1789.3390	KM	DX	-.07456499	KM/SEC
Y	-7.3730852	KM	DY	-1.5741479	KM/SEC
Z	-39.904200	KM	DZ	-1.0828454	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	.9724	M	DX	.01924	M/S	X	.9724	M	DX	.0192	M/S
Y	15.24	M	DY	.13122	M/S	Y	15.24	M	DY	.1312	M/S
Z	16.99	M	DZ	.18954	M/S	Z	16.99	M	DZ	.1895	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2690.32	KM	ECC	.338716	APF	167.363	DEG	
LAN	178.471	DEG	INC	12.1355	DEG	TFP	202.872	SEC
RCA	1779.07	KM	PALT	40.9766	KM	PER	208.700	MIN
APO	3601.57	KM	AALT	1863.48	KM	TA	12.4988	DEG
LAT	.029122	DEG	LONG	358.336	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 0 HRS 59 MIN SOS= 21114

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
12	CC3	326/2252	327/0439	229	.8776	-.0990
61	C3	326/2250	327/0109	131	.5223	-.2181

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:
DAY 301 , 04 HR , 53 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

D.P.L.

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D91P TAPE NO. ITEM NO. 3D91P

5.2 EPOCH DAY 49 , 6 , 13 , 0.000 GMT SEQ. NO. 184
HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -495.03998 KM DX -.89477494 KM/SEC
Y 2970.3749 KM DY -.43149986 KM/SEC
Z 1723.0195 KM DZ .12630056 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 112.2 M DX .15021 M/S X .0000 M DX .0000 M/S
Y 481.5 M DY .22309 M/S Y .0000 M DY .0000 M/S
Z 856.9 M DZ .30386 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2688.72 KM ECC .337020 APF 181.105 DEG
LAN 184.365 DEG INC 20.7005 DEG TFP -4854.58 SEC
RCA 1782.57 KM PALT 44.4767 KM PER 208.514 MIN
APO 3594.87 KM AALT 1856.78 KM TA 201.740 DEG
LAT 7.88795 DEG LONG 205.874 DEG

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 3 HRS 0 MIN SOS= 986.65

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.1191	-.0793
41	CC3	49/0705	49/0834	181	.2617	-.1138
12	C3	49/0706	49/0709	4	.0263	.0836
12	CC3	49/0613	49/0659	43	.1859	-.0529

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT: DAY 301 , 06 HR , 14 MIN PREPARED BY: GAYLE L. BARROW O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D91P

TAPE NO.

ITEM NO. 3D91P

5.2 EPOCH DAY 49 , 7 , 32 , 25.310 GMT
HR MIN SEC

SEQ. NO. 184

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -535.43656 KM DX 1.7306770 KM/SEC

Y -1588.8385 KM DY -.22742026 KM/SEC

Z -609.95634 KM DZ -.79130784 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 83.72 M DX .30036 M/S X 83.72 M DX .3004 M/S

Y 13.26 M DY .55290 M/S Y 13.26 M DY .5529 M/S

Z 107.2 M DZ .81382 M/S Z 107.2 M DZ .8138 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.87 KM ECC .337487 APF 181.141 DEG

LAN 183.633 DEG INC 20.6982 DEG TFP -89.1437 SEC

RCA 1782.07 KM PALT 43.9799 KM PER 208.647 MIN

APO 3597.66 KM AALT 1859.57 KM TA 354.507 DEG

LAT 1.53697 DEG LONG 359.561 DEG

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 1 HRS 16 MIN

SOS= 986.11

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.1191	-.0793
41	CC3	49/0705	49/0834	181	.2617	-.1138
12	C3	49/0706	49/0709	4	.0263	.0836
12	CC3	49/0613	49/0659	43	.1859	-.0529

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:
DAY 301 , 06 HR , 16 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D92P

TAPE NO.
ITEM NO. 3D92P

5.2 EPOCH DAY 49 , 6 ' 13 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 185
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-493.40974	KM	DX	-.89187034	KM/SEC
Y	2961.4340	KM	DY	-.43577623	KM/SEC
Z	1739.0247	KM	DZ	.13185122	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	38.59	M	DX	.05313	M/S	X	.0000	M	DX	.0000	M/S
Y	161.9	M	DY	.07727	M/S	Y	.0000	M	DY	.0000	M/S
Z	285.7	M	DZ	.10416	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.78	KM	ECC	.337032	APF	181.391	DEG	
LAN	184.140	DEG	INC	21.2646	DEG	TFP	-4854.75	SEC
RCA	1782.58	KM	PALT	44.4878	KM	PER	208.521	MIN
APO	3594.99	KM	AALT	1856.90	KM	TA	201.739	DEG
LAT	8.19076	DEG	LONG	205.847	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 22068

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.6288	-.1648
41	CC3	49/0705	49/1203	412	.9160	-.0397
12	C3	49/0706	49/0709	4	.0161	-1.7539
12	CC3	49/0613	49/0659	43	.7675	-.2398

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT: DAY 301 , 06 HR , 32 MIN
PREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D92P

TAPE NO.

ITEM NO. 3D92P

5.2 EPOCH DAY 49 , 7 ' 32 ' 25.310 GMT
HR MIN SEC

SEQ. NO. 185

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -534.02546 KM

DX 1.7250155 KM/SEC

Y -1588.6098 KM

DY -.21715187 KM/SEC

Z -611.83822 KM

DZ -.80640315 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 30.06 M

DX .10563 M/S

X 30.06 M

DX .1056 M/S

Y 3.561 M

DY .18963 M/S

Y 3.561 M

DY .1896 M/S

Z 33.42 M

DZ .27649 M/S

Z 33.42 M

DZ .2765 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.93 KM

ECC .337500

APF 181.428 DEG

LAN 183.409 DEG

INC 21.2623 DEG

TFP -89.3288 SEC

RCA 1782.08 KM

PALT 43.9890 KM

PER 208.654 MIN

APO 3597.78 KM

AALT 1859.69 KM

TA 354.495 DEG

LAT 1.47744 DEG

LONG 359.608 DEG

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 1 HRS 16 MIN

SOS= 22048

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	49/0614	49/0652	39	.6288	-.1648
41	CC3	49/0705	49/1203	412	.9160	-.0397
12	C3	49/0706	49/0709	4	.0161	-1.7539
12	CC3	49/0613	49/0659	43	.7675	-.2398

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'D'

TIME OF REPORT:
DAY 301 , 06 HR , 35 MINPREPARED BY: GAYLE D. JARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2F91P

TAPE NO.
ITEM NO. 2F91P
SEQ. NO. 186
COMPUTER B5.2 EPOCH DAY 329 , 6 ' 50 ' 0.000 GMT
HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	497.88651	KM	DX	-1.4923542	KM/SEC
Y	1942.2242	KM	DY	-.12939110	KM/SEC
Z	1322.2630	KM	DZ	-.12492001	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	92.12	M	DX	.01122	M/S	X	.0000	M	DX	.0000	M/S
Y	344.2	M	DY	.05208	M/S	Y	.0000	M	DY	.0000	M/S
Z	474.5	M	DZ	.19389	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.29	KM	ECC	.336754	APF	169.554	DEG	
LAN	146.889	DEG	INC	11.6232	DEG	TFP	-1849.17	SEC
RCA	1783.66	KM	PALT	45.5704	KM	PER	208.580	MIN
APO	3594.91	KM	AALT	1856.82	KM	TA	268.763	DEG
LAT	11.3792	DEG	LONG	224.968	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 3 HRS , 0 MIN SOS= 3490.1

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.3667	.0031
12	CC3	329/0650	329/0916	190	.3809	.0562

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 301 , 05 HR , 07 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

50820-1

5.1 O.D. IDENTIFICATION NO. 2F91P TAPE NO.
 ITEM NO. 2F91P
 5.2 EPOCH DAY 329 , 7 , 21 , 15.180 GMT SEQ. NO. 186
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1760.5457 KM DX -.31690170 KM/SEC
 Y 254.95266 KM DY -1.5636897 KM/SEC
 Z 127.21922 KM DZ -1.0627704 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 4.995 M DX .07542 M/S X 4.995 M DX .0754 M/S
 Y 136.6 M DY .28285 M/S Y 136.6 M DY .2828 M/S
 Z 345.6 M DZ .39403 M/S Z 345.6 M DZ .3940 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.56 KM ECC .336963 APF 169.610 DEG
 LAN 146.562 DEG INC 11.6301 DEG TFP 25.9619 SEC
 RCA 1783.28 KM PALT 45.1884 KM PER 208.612 MIN
 APO 3595.84 KM AALT 1857.75 KM TA 1.59910 DEG
 LAT 1.76544 DEG LONG 317.949 DEG

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 0 HRS 28 MIN SOS= 3487.1

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0916	159	.3667	.0031
12	CC3	329/0650	329/0916	190	.3809	.0562

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT: DAY 301 , 05 HR , 10 MIN PREPARED BY: GAYLE D. BARROW
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2F92P

TAPE NO.
ITEM NO. 2F92P
SEQ. NO. 187
COMPUTER B

5.2 EPOCH DAY 329 , 6 HR 50 MIN 0.000 SEC GMT

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	499.40182	KM	DX	-1.4925383	KM/SEC
Y	1936.5785	KM	DY	-0.13028617	KM/SEC
Z	1329.9874	KM	DZ	-0.12170464	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	24.26	M	DX	.00279	M/S	X	.0000	M	DX	.0000	M/S
Y	86.94	M	DY	.01482	M/S	Y	.0000	M	DY	.0000	M/S
Z	118.3	M	DZ	.05141	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.32	KM	ECC	.336764	APF	168.780	DEG	
LAN	147.637	DEG	INC	11.8884	DEG	TFP	-1849.18	SEC
RCA	1783.65	KM	PALT	45.5647	KM	PER	208.584	MIN
APO	3594.99	KM	AALT	1856.90	KM	TA	268.763	DEG
LAT	11.6045	DEG	LONG	224.916	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 6 HRS 10 MIN SOS= 8618.2

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.4175	.1051
41	CC3	329/1023	329/1247	197	.4614	-.0019
12	CC3	329/0650	329/0917	191	.4389	.0282

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT: DAY 301 , 05 HR , 51 MIN GMT
PREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2F92P

TAPE NO.
ITEM NO. 2F92P

5.2 EPOCH DAY 329 , 7 , 21 , 15.180 GMT
HR MIN SEC

SEQ. NO. 187
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-1760.4591	KM	DX	-.31813011	KM/SEC
Y	252.64626	KM	DY	-1.5590588	KM/SEC
Z	132.91242	KM	DZ	-1.0691961	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	1.861	M	DX	.01969	M/S	X	1.861	M	DX	.0197	M/S
Y	36.54	M	DY	.07144	M/S	Y	36.54	M	DY	.0714	M/S
Z	89.91	M	DZ	.09845	M/S	Z	89.91	M	DZ	.0985	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.60	KM	ECC	.336971	APF	168.835	DEG	
LAN	147.310	DEG	INC	11.8951	DEG	TFP	25.9689	SEC
RCA	1783.28	KM	PALT	45.1899	KM	PER	208.616	MIN
APO	3595.91	KM	AALT	1857.82	KM	TA	1.59954	DEG
LAT	1.96278	DEG	LONG	317.947	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 0 HRS 28 MIN SOS= 8617.4

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
41	C3	329/0706	329/0917	160	.4175	.1051
41	CC3	329/1023	329/1247	197	.4614	-.0019
12	CC3	329/0650	329/0917	191	.4389	.0282

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 301 , 05 HR , 54 MIN GMT		O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F91P

TAPE NO.

ITEM NO. 3F91P

5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 188

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -2071.5079 KM DX -.40445824 KM/SEC

Y 1232.1142 KM DY -1.1407920 KM/SEC

Z 1458.1766 KM DZ -.43826780 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 323.2 M DX .06458 M/S X .0000 M DX .0000 M/S

Y 299.5 M DY .12324 M/S Y .0000 M DY .0000 M/S

Z 719.3 M DZ .26410 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2688.36 KM ECC .335846 APF 183.414 DEG

LAN 146.891 DEG INC 20.8499 DEG TFP -2749.93 SEC

RCA 1785.49 KM PALT 47.3984 KM PER 208.472 MIN

APO 3591.24 KM AALT 1853.15 KM TA 242.840 DEG

LAT 19.0132 DEG LONG 211.682 DEG

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 3 HRS 0 MIN

SOS= 4725.3

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.3139	.1235
62	CC3	52/0052	52/0113	18	.4584	.0084
12	C3	52/0054	52/0113	20	.4288	-.0426
12	CC3	52/0124	52/0313	198	.3324	-.1372

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 300 , 07 HR , 28 MINPREPARED BY: GAYLE L. BIRROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F91P

TAPE NO.
ITEM NO. 3F91P5.2 EPOCH DAY 52 , 1 , 33 , 37.810 GMT
HR MIN SECSEQ. NO. 188
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-572.97073	KM	DX	1.7193873	KM/SEC
Y	-1584.3041	KM	DY	-.23985779	KM/SEC
Z	-604.60323	KM	DZ	-.80067052	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	86.47 M	DX	.27027 M/S	X	86.47 M	DX	.2703 M/S
Y	173.6 M	DY	.28343 M/S	Y	173.6 M	DY	.2834 M/S
Z	373.2 M	DZ	.66654 M/S	Z	373.2 M	DZ	.6665 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS' (SELENOGRAPHIC TRUE OF DATE)

SMA	2689.22	KM	ECC	.336062	APF	183.412	DEG
LAN	146.464	DEG	INC	20.8509	DEG	TFP	-131.522
RCA	1785.47	KM	PALT	47.3841	KM	PER	208.572
APO	3592.96	KM	AALT	1854.87	KM	TA	351.930
LAT	1.65649	DEG	LONG	322.109	DEG		

5.6 LUNAR HARMONICS USED' LRC 10/25/68

5.7 DATA ARC LENGTH' 0 HRS 40 MIN SOS= 4725.1

5.8 DATA SUMMARY'

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.3139	.1235
62	CC3	52/0052	52/0113	18	.4584	.0084
12	C3	52/0054	52/0113	20	.4288	-.0426
12	CC3	52/0124	52/0313	198	.3324	-.1372

5.9 RESIDUAL PLOTS' NOT AVAILABLE

5.10 REMARKS' MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT'	PREPARED BY'	GAYLE J. BARROW
DAY 300 , 07 HR , 31 MIN	GMT	O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F92P

TAPE NO.

ITEM NO. 3F92P

5.2 EPOCH DAY 52 , 0 ' 50 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 189

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2078.4444	KM	DX	-.40595683	KM/SEC
Y	1239.0097	KM	DY	-1.1379357	KM/SEC
Z	1442.3707	KM	DZ	-.44423926	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	136.3	M	DX	.02705	M/S	X	.0000	M	DX	.0000	M/S
Y	126.8	M	DY	.05577	M/S	Y	.0000	M	DY	.0000	M/S
Z	306.4	M	DZ	.11853	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.32	KM	ECC	.335876	APF	184.154	DEG	
LAN	146.138	DEG	INC	20.3250	DEG	TFP	-2749.88	SEC
RCA	1785.38	KM	PALT	47.2895	KM	PER	208.467	MIN
APO	3591.26	KM	AALT	1853.17	KM	TA	242.836	DEG
LAT	18.6454	DEG	LONG	211.774	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 6 HRS 10 MIN

SOS= 38063

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.6845	.4009
62	CC3	52/0052	52/0113	18	.8803	-.4951
12	C3	52/0054	52/0113	20	.8708	-.2827
12	CC3	52/0124	52/0643	414	.9102	-.2353

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 300 , 07 HR , 51 MINPREPARED BY: GAYLE L. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F92P TAPE NO.
ITEM NO. 3F92P
 5.2 EPOCH DAY 52 , 1 ' 33 ' 37.810 GMT SEQ. NO. 189
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-574.91238	KM	DX	1.7253948	KM/SEC
Y	-1580.2103	KM	DY	-.24624968	KM/SEC
Z	-613.02512	KM	DZ	-.78590140	KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X	38.32 M	DX	.11300 M/S	X	38.32 M	DX	.1130 M/S
Y	78.25 M	DY	.12279 M/S	Y	78.25 M	DY	.1228 M/S
Z	166.6 M	DZ	.28723 M/S	Z	166.6 M	DZ	.2872 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2689.17	KM	ECC	.336098	APF	184.155	DEG
LAN	145.710	DEG	INC	20.3267	DEG	TFP	-131.481
RCA	1785.34	KM	PALT	47.2541	KM	PER	208.566
APO	3592.99	KM	AALT	1854.90	KM	TA	351.931
LAT	1.35847	DEG	LONG	322.039	DEG		

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 0 HRS 40 MIN SOS= 38063

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	52/0127	52/0312	175	.6845	.4009
62	CC3	52/0052	52/0113	18	.8803	-.4951
12	C3	52/0054	52/0113	20	.8708	-.2827
12	CC3	52/0124	52/0643	414	.9102	-.2353

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: MAP TIME REPORT FOR SITE 'F'

TIME OF REPORT: DAY 300 , 07 HR , 54 MIN PREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3D91M

TAPE NO.
ITEM NO. 3D91M5.2 EPOCH DAY 48 , 19 ' 42 ' 0.000 GMT
HR MIN SECSEQ. NO. 190
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-191.36381	KM	DX	-.90749793	KM/SEC
Y	3092.0204	KM	DY	-.31795261	KM/SEC
Z	1671.2514	KM	DZ	.19397786	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	23.06	M	DX	.03835	M/S	X	.0000	M	DX	.0000	M/S
Y	119.3	M	DY	.06046	M/S	Y	.0000	M	DY	.0000	M/S
Z	229.5	M	DZ	.07696	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA	2688.86	KM	ECC	.336760	APF	180.854	DEG	
LAN	190.178	DEG	INC	20.9257	DEG	TFP	-5177.04	SEC
RCA	1783.36	KM	PALT	45.2685	KM	PER	208.530	MIN
APO	3594.35	KM	AALT	1856.26	KM	TA	196.587	DEG
LAT	6.14503	DEG	LONG	206.532	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 2 HRS 40 MIN

SOS= 749.37

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	C3	48/2013	48/2203	152	.2029	.0301
62	CC3	48/1942	48/2003	20	.0775	-.0757
12	CC3	48/2013	48/2157	166	.1894	-.0189

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

TIME OF REPORT:
DAY 301 , 06 HR , 53 MINPREPARED BY: GAYLE D. BARROW
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3F91M

TAPE NO.
ITEM NO. 3F91M
SEQ. NO. 191
COMPUTER B5.2 EPOCH DAY 51 , 14 ' 25 ' 0.000 GMT
HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X	-2076.0513	KM	DX	-.39379966	KM/SEC
Y	1204.9002	KM	DY	-1.1490843	KM/SEC
Z	1450.6108	KM	DZ	-.44382547	KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X	55.75	M	DX	.01165	M/S	X	.0000	M	DX	.0000	M/S
Y	61.61	M	DY	.01804	M/S	Y	.0000	M	DY	.0000	M/S
Z	132.0	M	DZ	.03682	M/S	Z	.0000	M	DZ	.0000	M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA	2688.43	KM	ECC	.336302	APF	182.968	DEG	
LAN	152.894	DEG	INC	20.9871	DEG	TFP	-2719.85	SEC
RCA	1784.30	KM	PALT	46.2135	KM	PER	208.480	MIN
APO	3592.55	KM	AALT	1854.46	KM	TA	243.539	DEG
LAT	19.1760	DEG	LONG	217.930	DEG			

5.6 LUNAR HARMONICS USED: LRC 10/25/68

5.7 DATA ARC LENGTH: 2 HRS 40 MIN SOS= 3252.0

5.8 DATA SUMMARY:

STA NO.	DATA TYPE	START TIME	STOP TIME	NUMBER POINTS	STANDARD DEVIATION	MEAN
62	CC3	51/1425	51/1642	229	.2971	-.0139
41	C3	51/1425	51/1557	152	.3807	-.0164

5.9 RESIDUAL PLOTS: NOT AVAILABLE

5.10 REMARKS: ***EPOCH REPORT

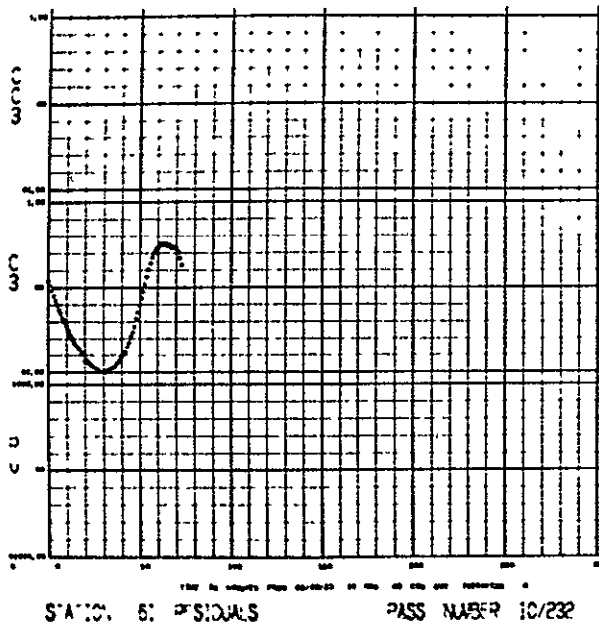
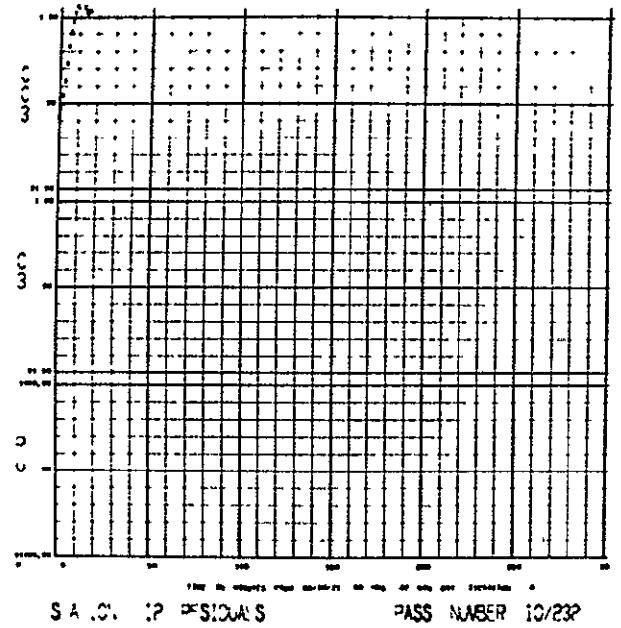
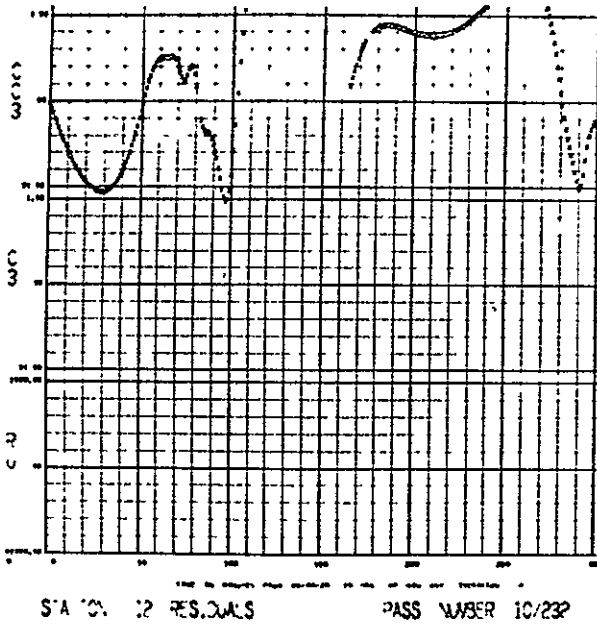
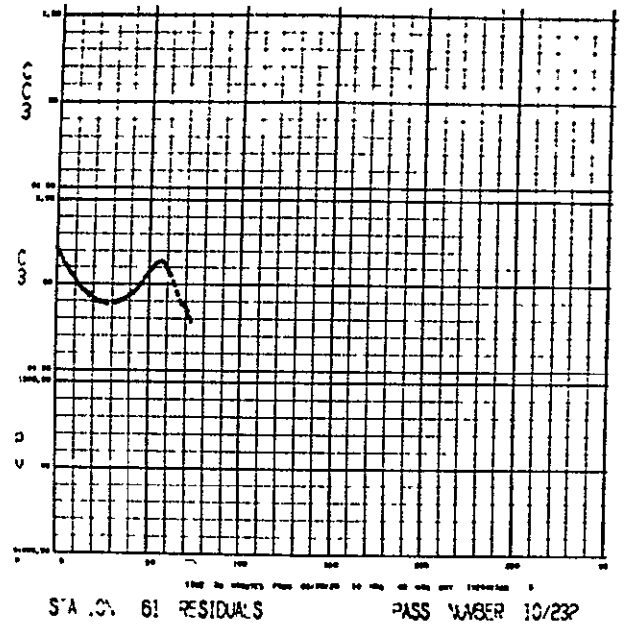
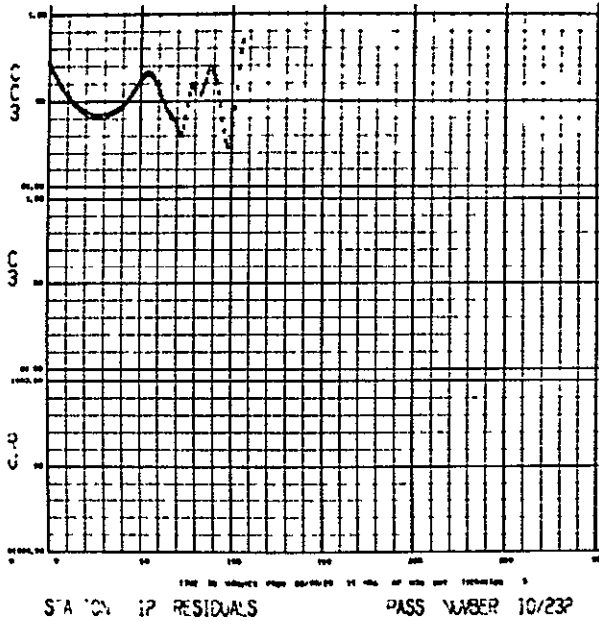
TIME OF REPORT:	PREPARED BY:	GAYLE D. BARROW
DAY 300 , 07 HR , 10 MIN	GMT	O.D. ANALYST

APPENDIX B

This section contains the plots of doppler residuals resulting from the various cases. The key described in Appendix A also applies to this data.

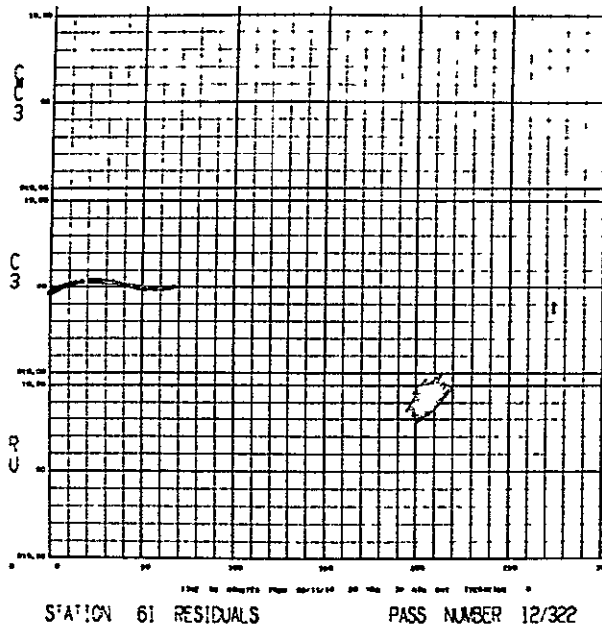
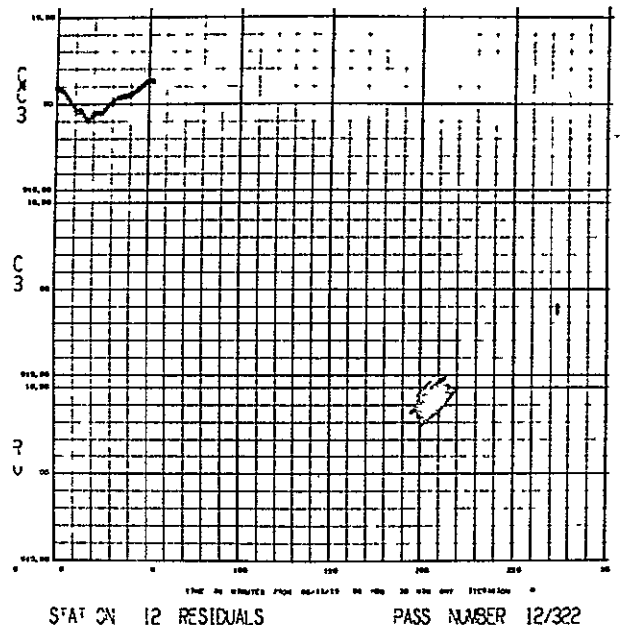
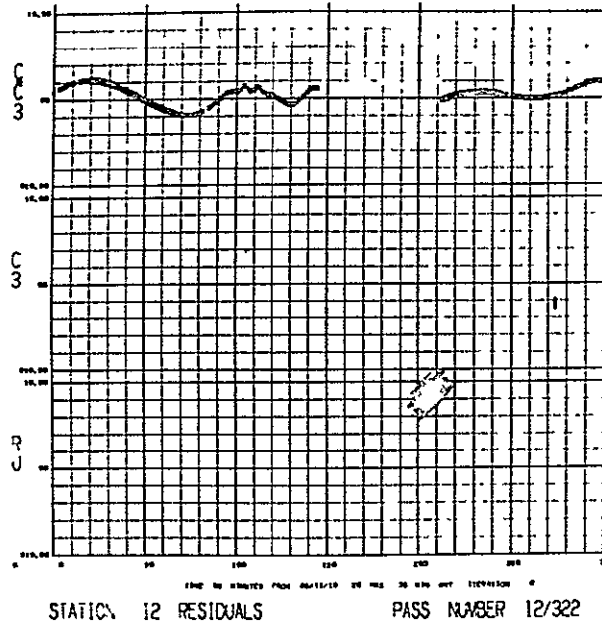
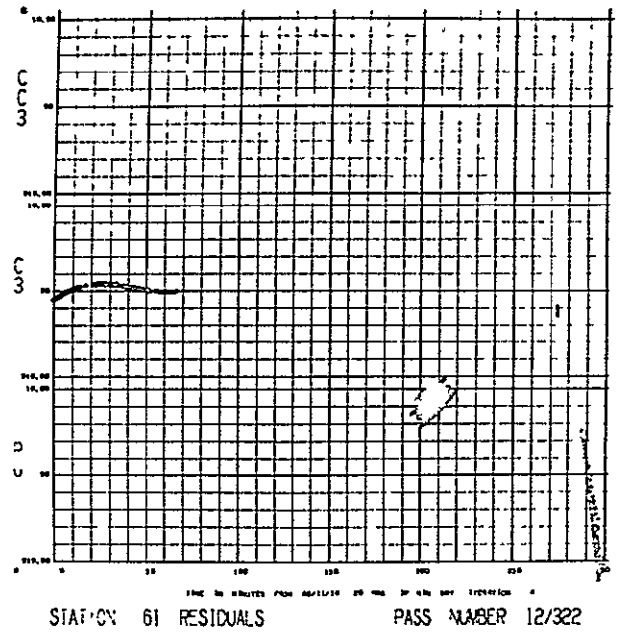
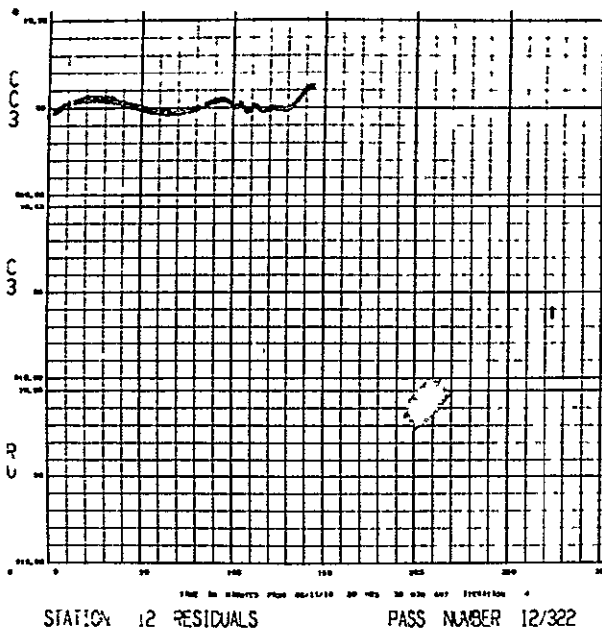
USE FOR TYPEWRITTEN MATERIAL ONLY

1B11P-72-12



DOPPLER RESIDUALS FOR CASES
1B11P AND 1B12P

D2-100820-1



2B1P AND 2B12P

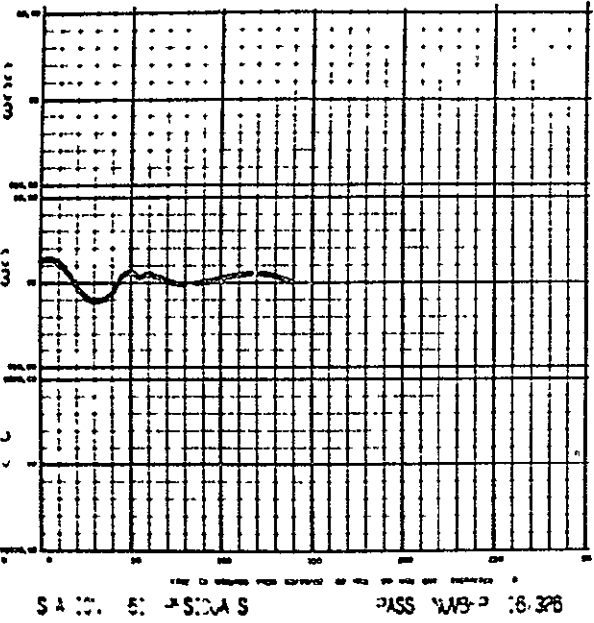
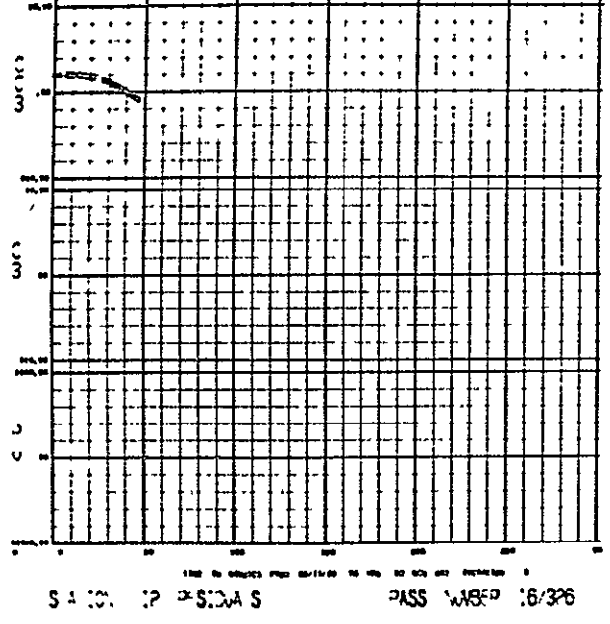
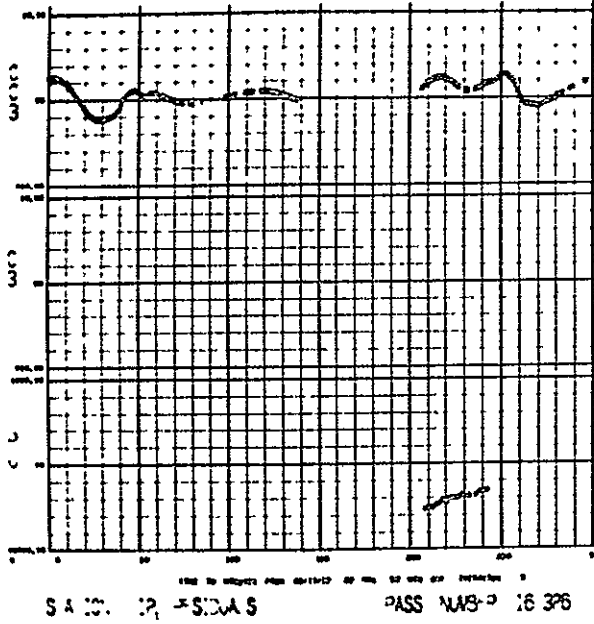
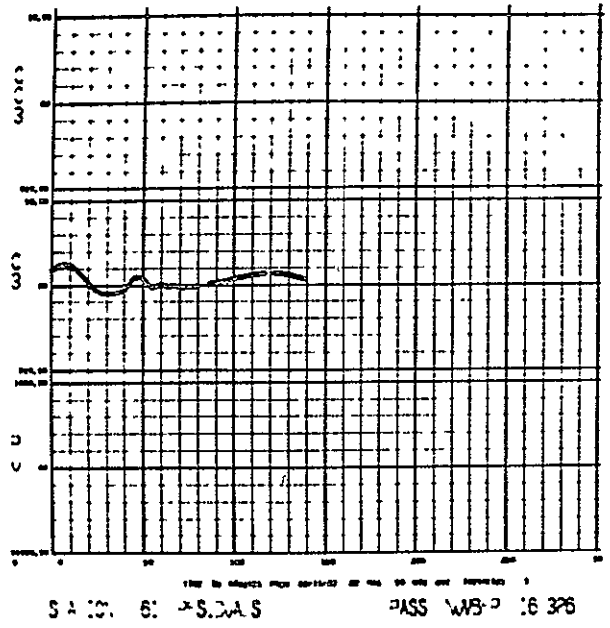
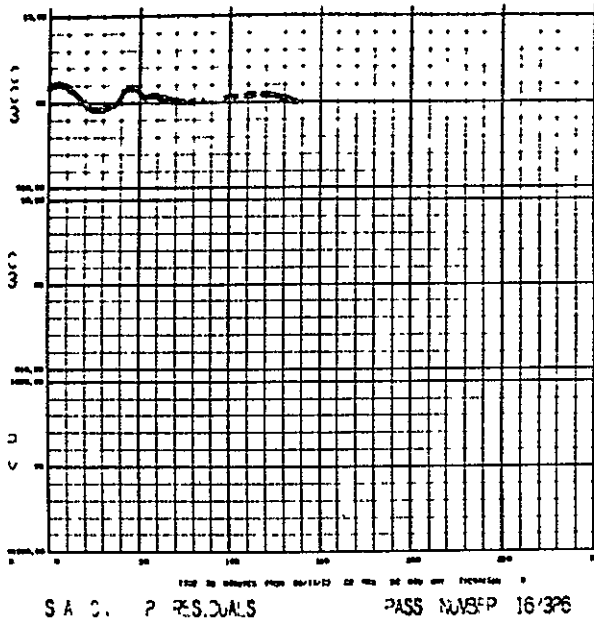
DOPPLER RESIDUALS FOR CASES
2B11P AND 2B12P

D2-100320-1

318

2B1P - 12/322

2D11P-12P

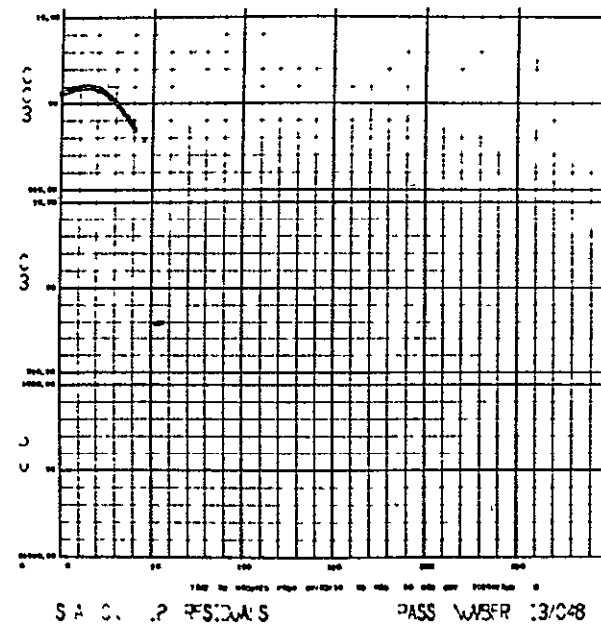
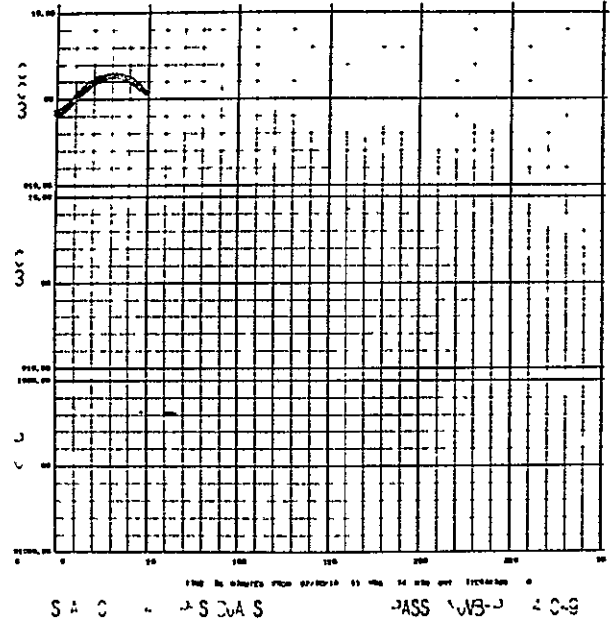
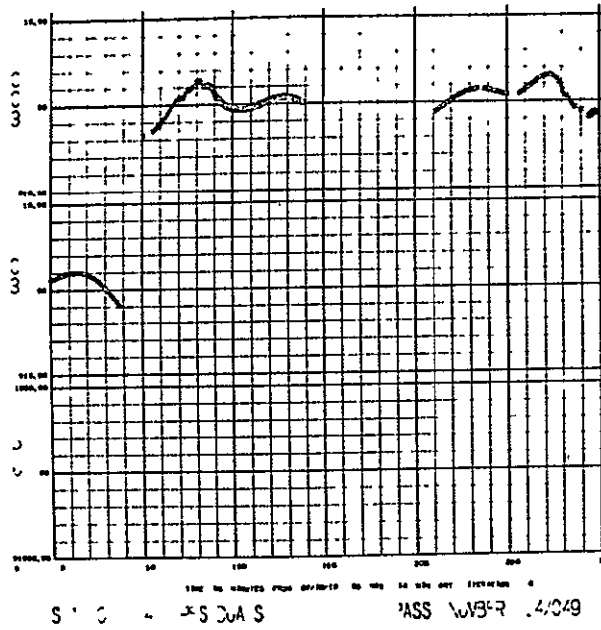
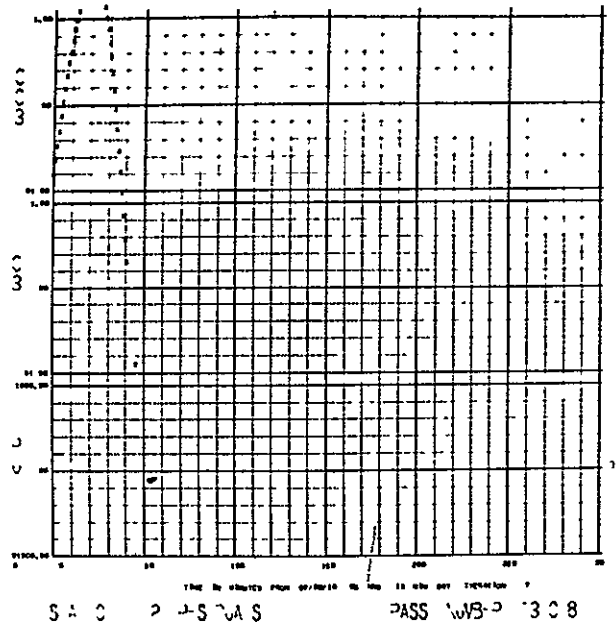
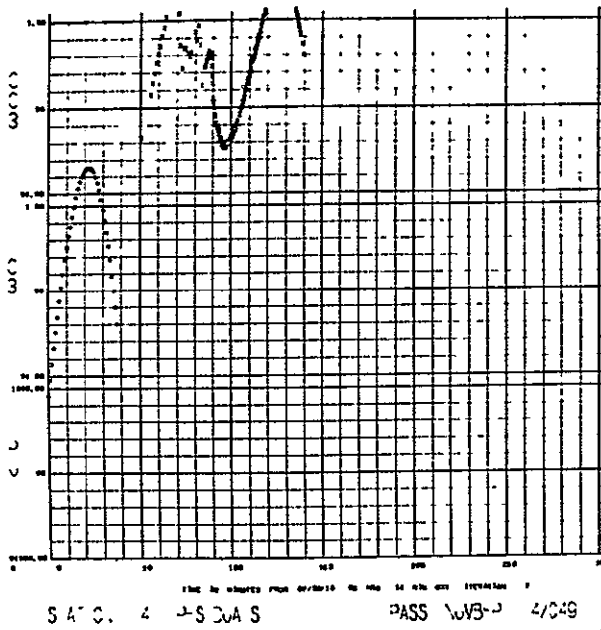


DOPPLER RESIDUALS FOR CASES
2D11P AND 2D12P

D2-109820 1

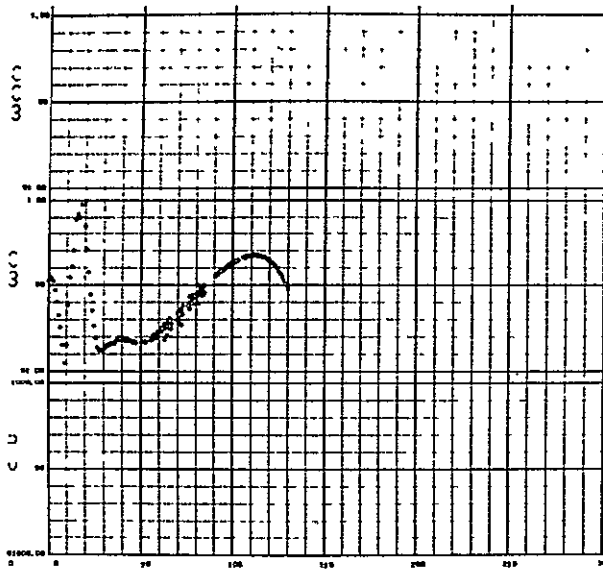
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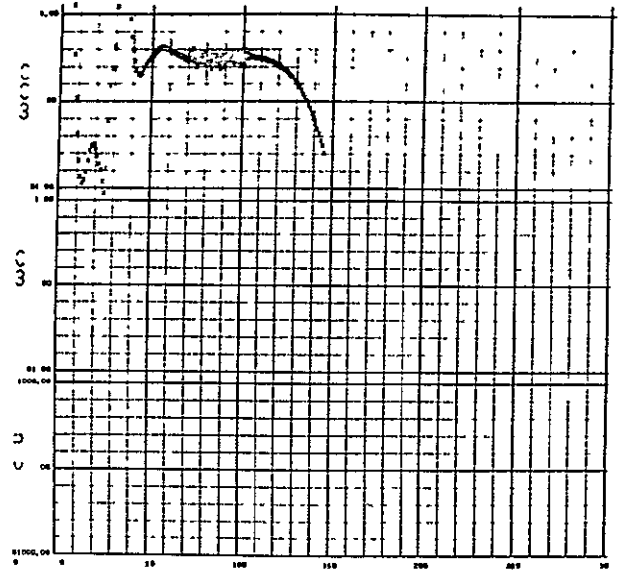


DOPPLER RESIDUALS FOR CASES
3D11P AND 3D12P

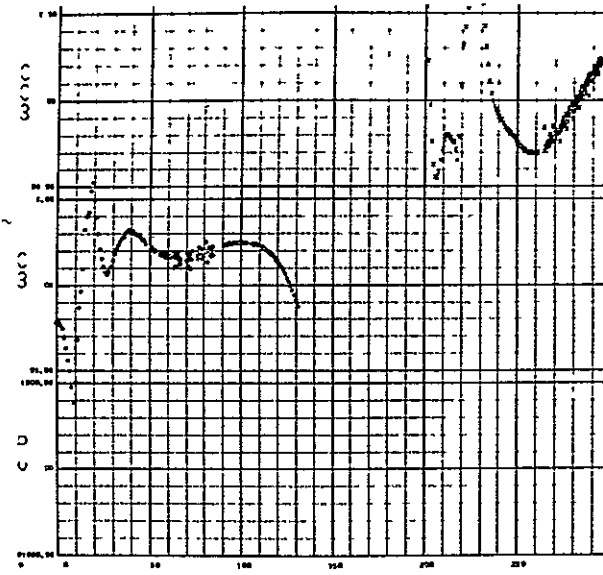
D2-10JC20-1



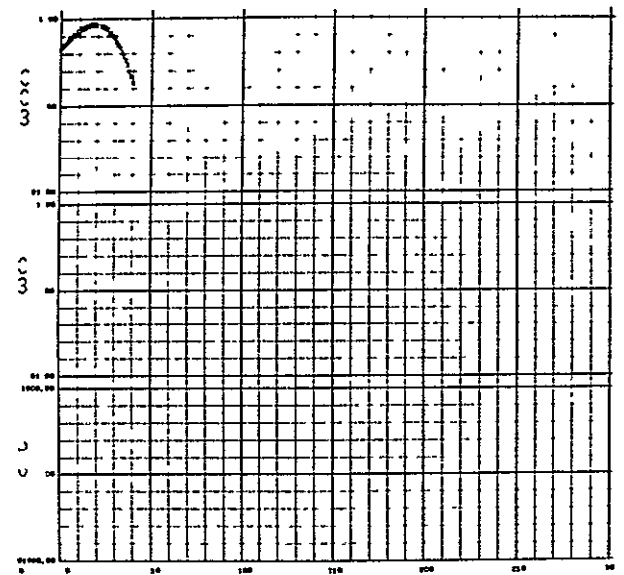
S A C - P S'DUALS PASS WVBEP 9/329



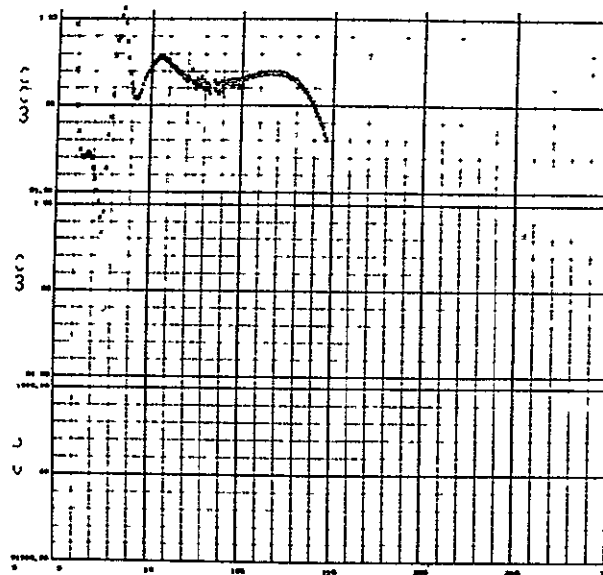
S A C - P S'DUALS PASS WVBEP 8/328



S A C - P S'DUALS PASS WVBEP 9/329



S A C - P S'DUALS PASS WVBEP 19 329



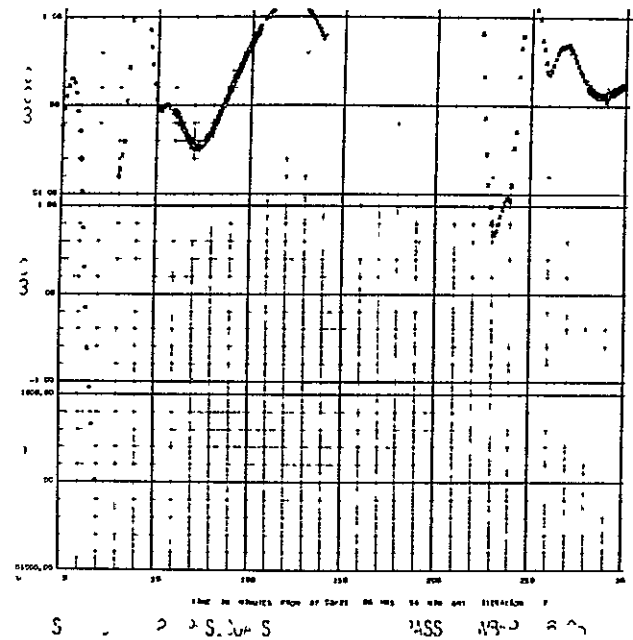
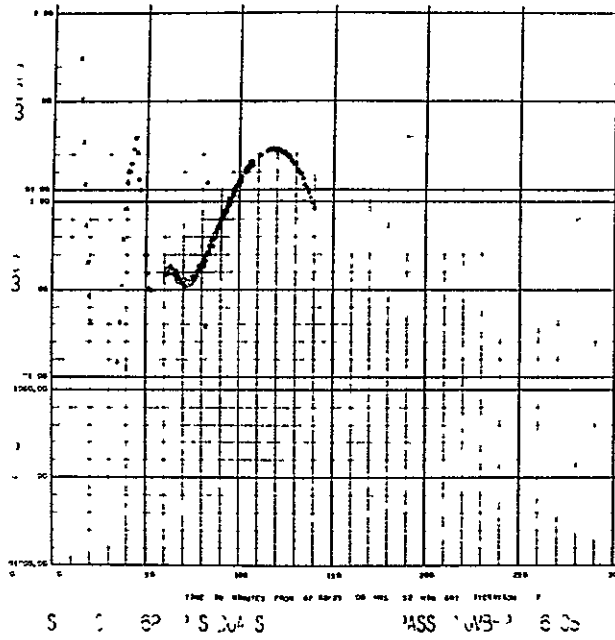
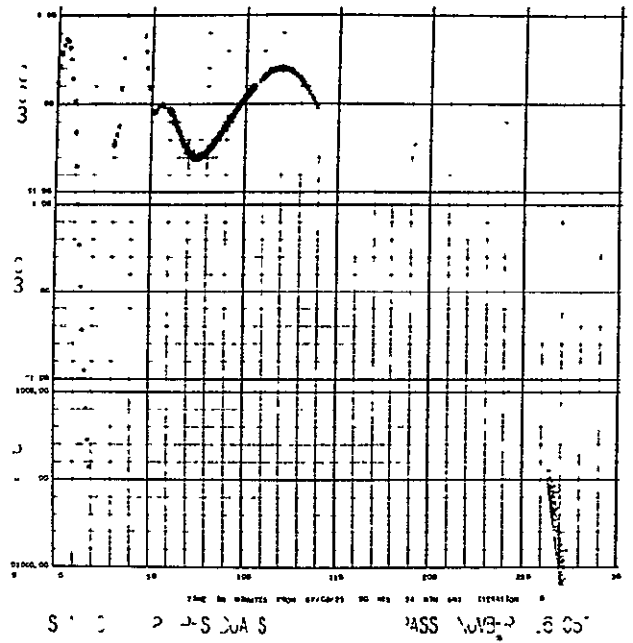
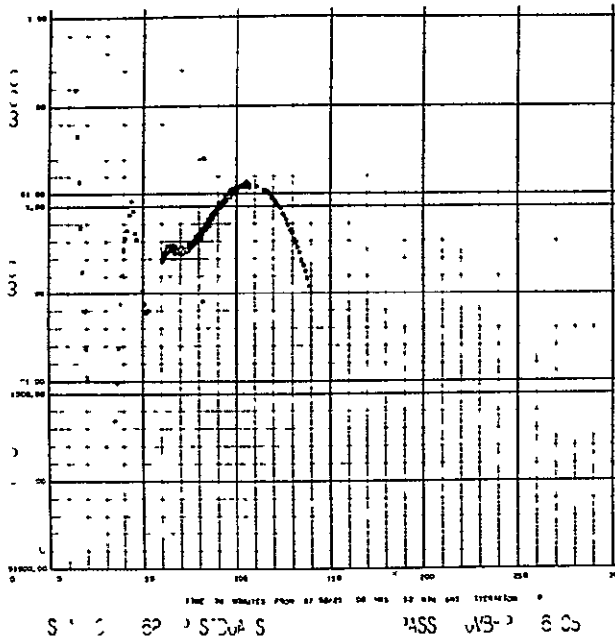
S A C - P S'DUALS PASS WVBEP 18/328

2F11P

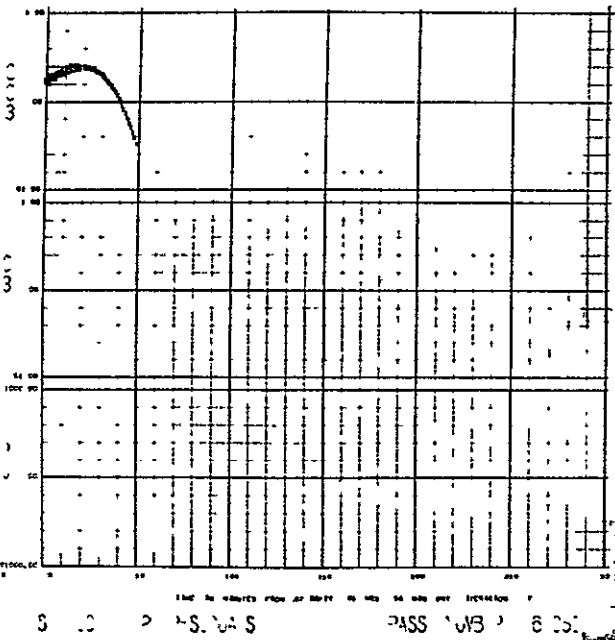
DOPPLER RESIDUALS FOR CASES
2F11P AND 2F12P

D2-100820-1



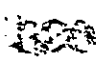


100
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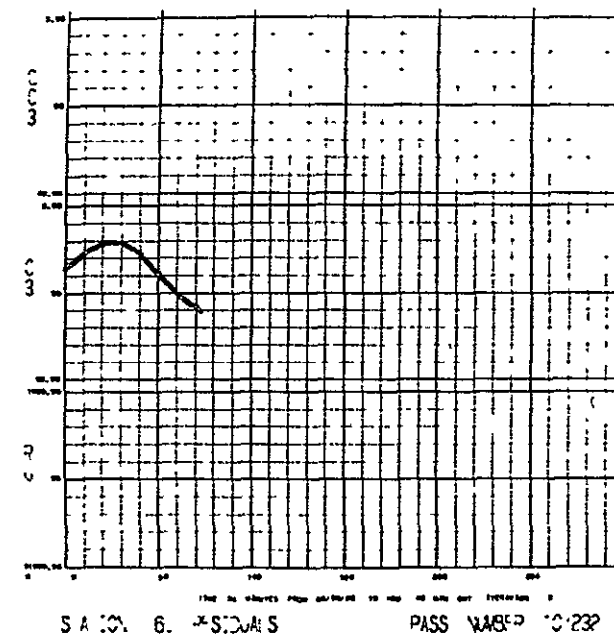
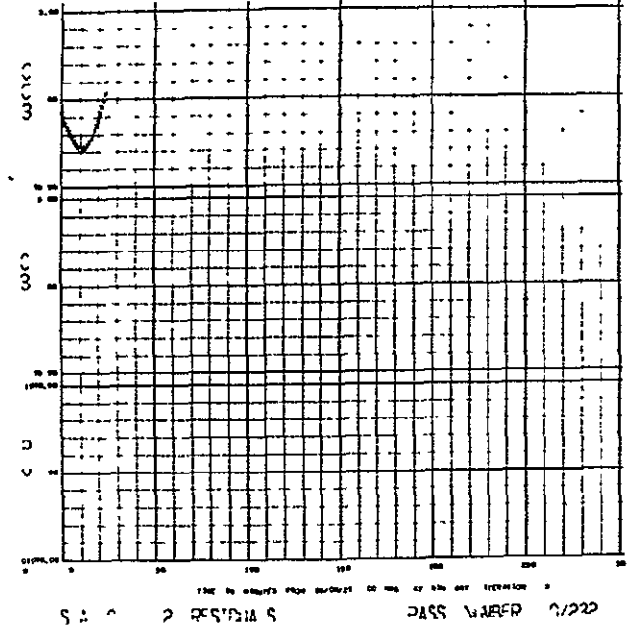
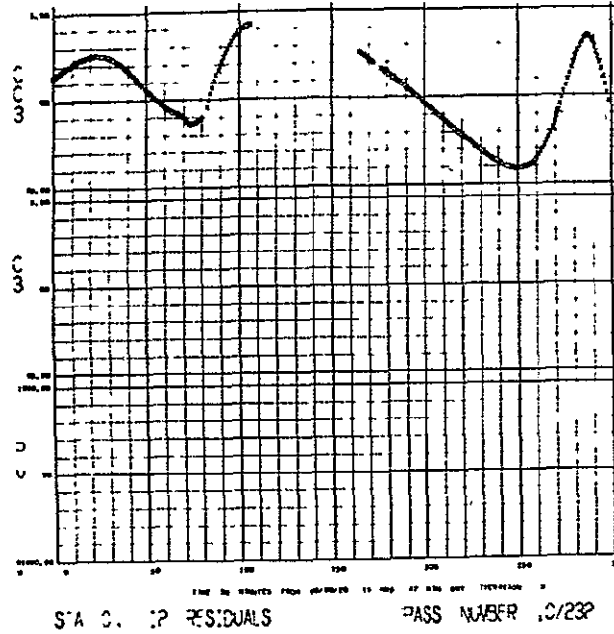
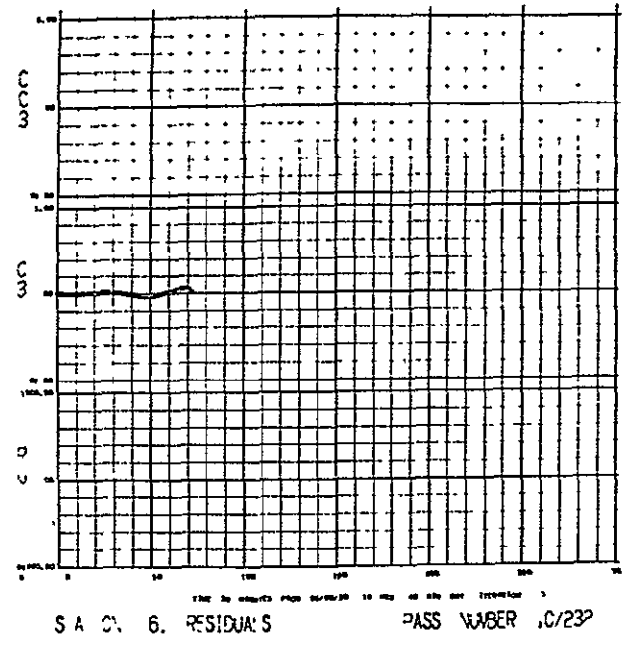
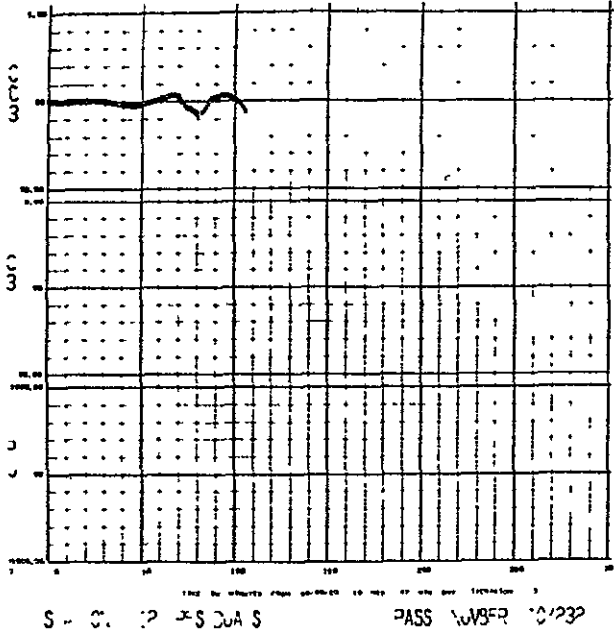


DOPPLER RESIDUALS FOR CASES
 3F11P AND 3F12P

D2-100820-1

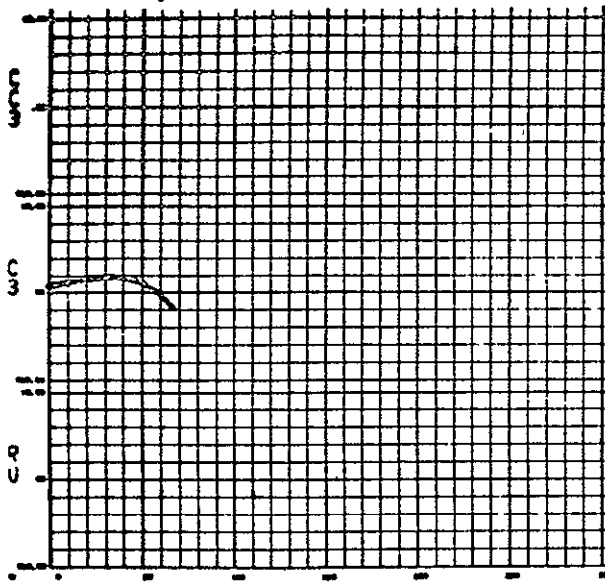


1B21P - D2P

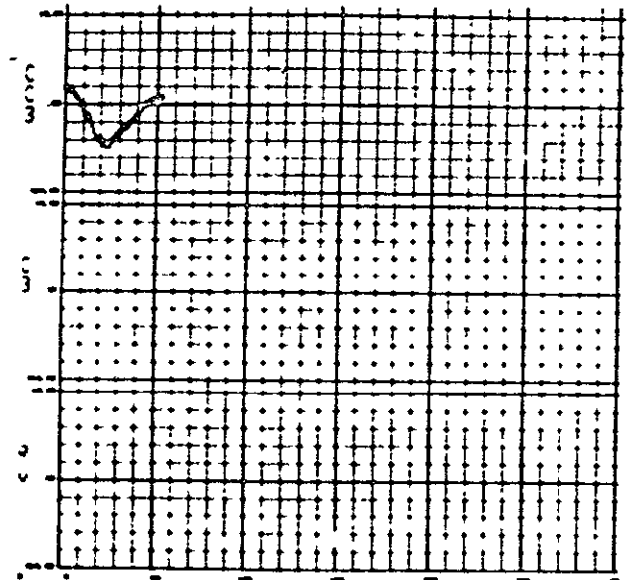


DOPLER RESIDUALS FOR CASES
1B21P AND 1B22P

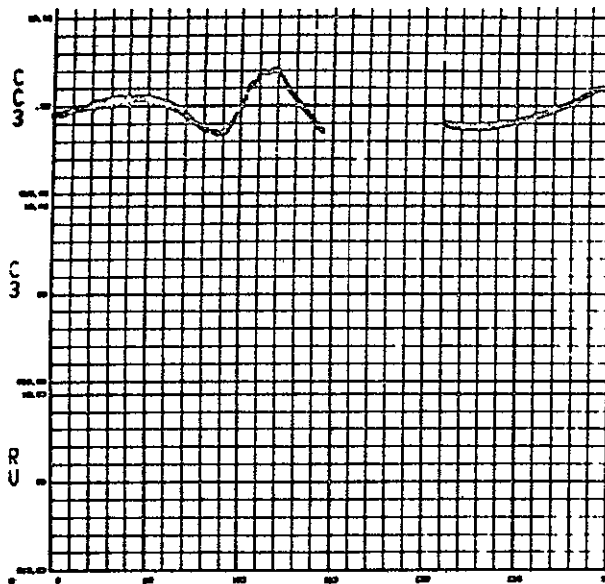
D2-101820-1



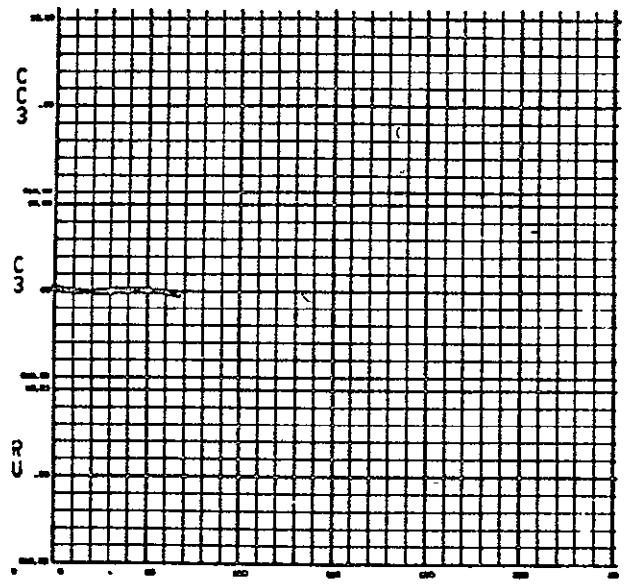
STATION 81 RESIDUALS PASS NUMBER 12/322



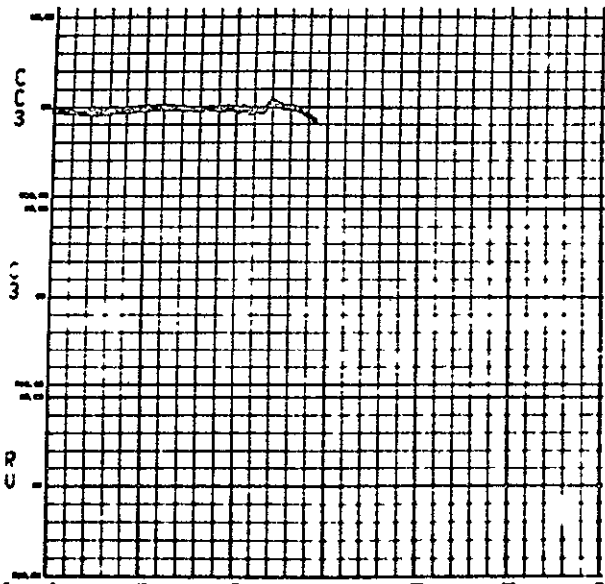
STATION 61 RESIDUALS PASS NUMBER 12/322



STATION 12 RESIDUALS PASS NUMBER 12/322



STATION 61 RESIDUALS PASS NUMBER 12/322

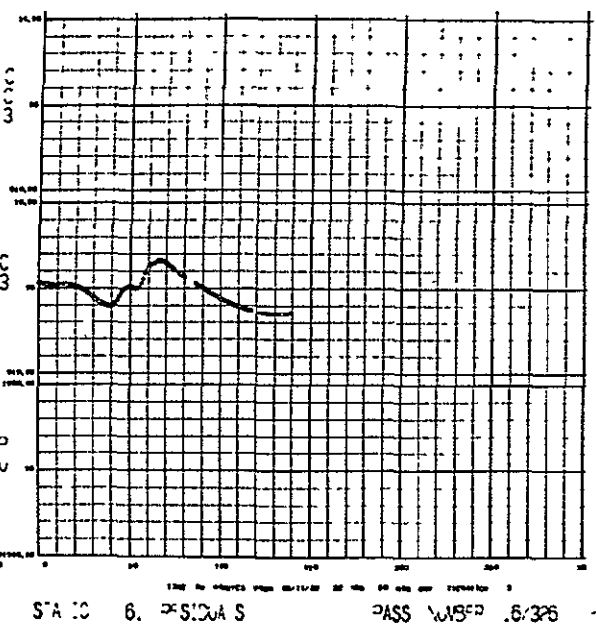
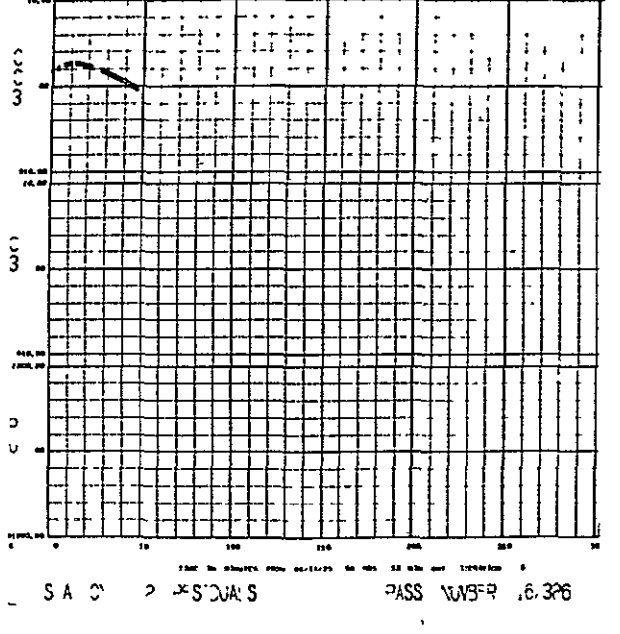
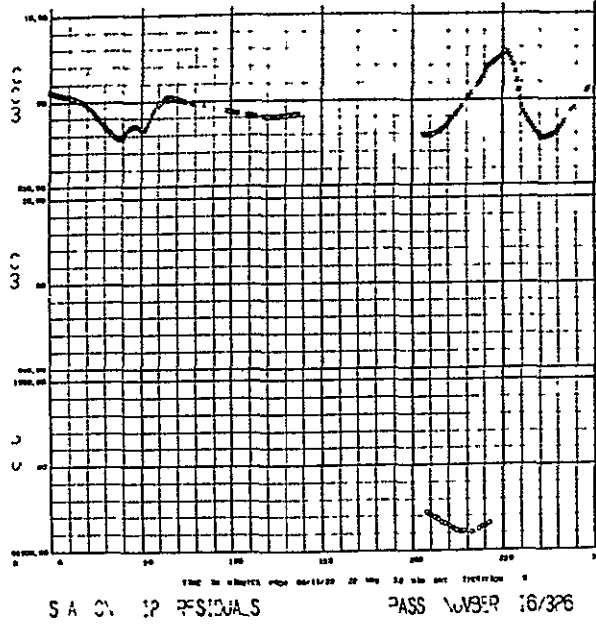
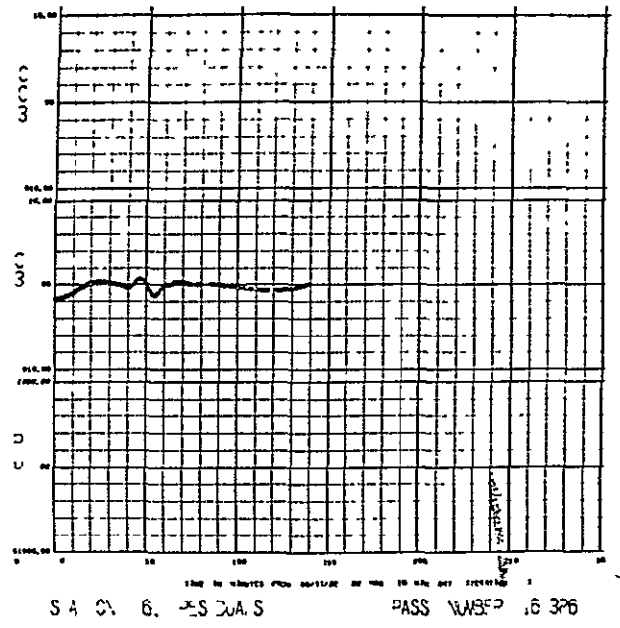
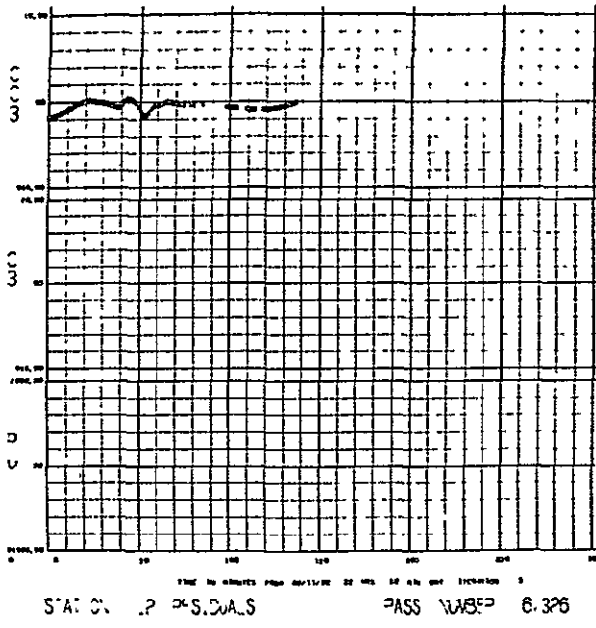


STATION 12 RESIDUALS PASS NUMBER 12/322

DOPPLER RESIDUALS FOR CASES
2B21P AND 2B22P

D2-100820-1

322



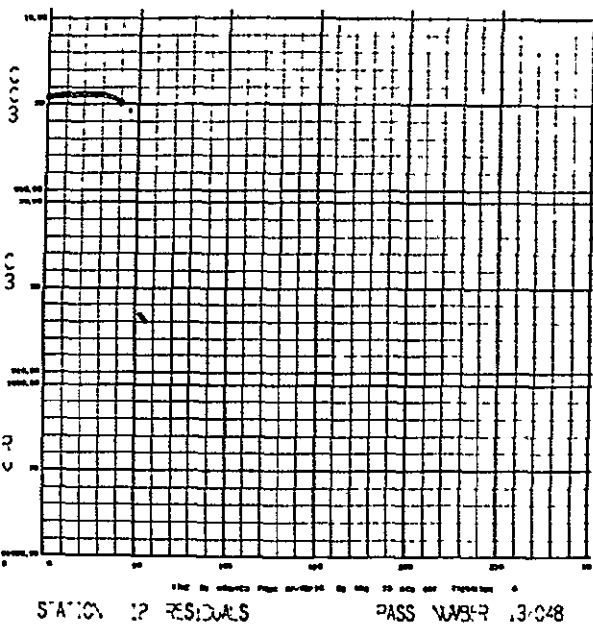
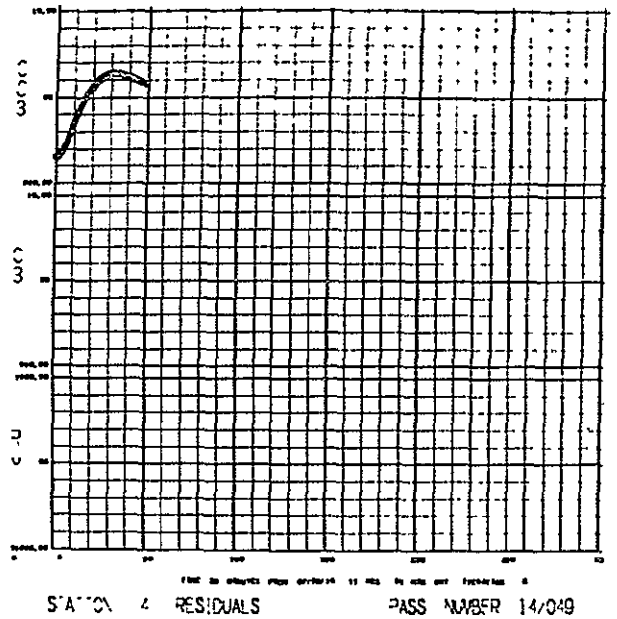
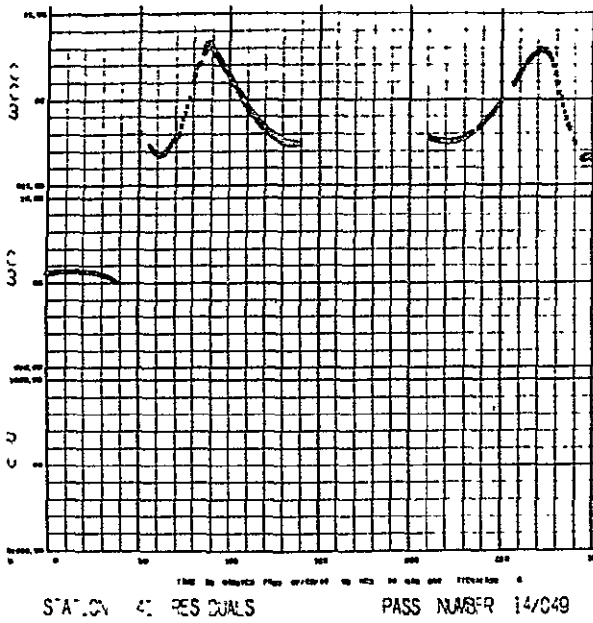
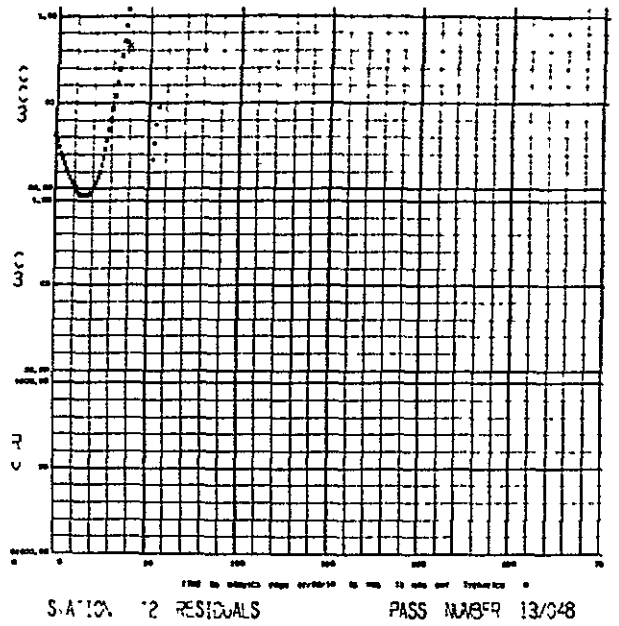
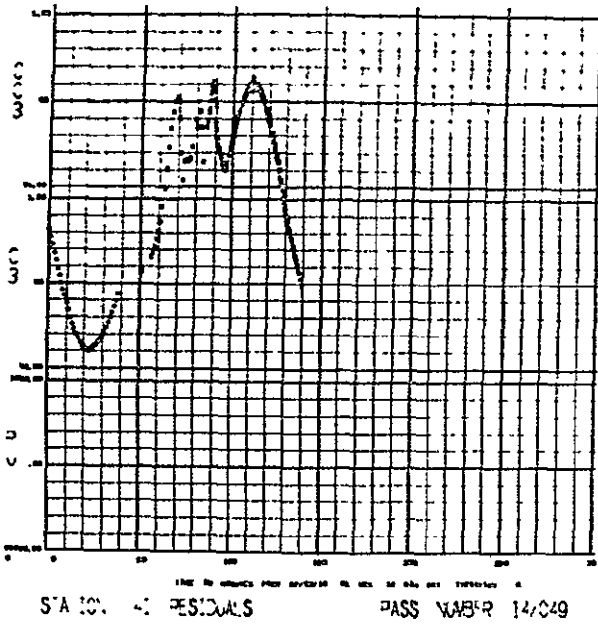
DOPLER RESIDUALS FOR CASES
2D21P AND 2D22P

D2-100821

222

2D21P

3D21P-420-P

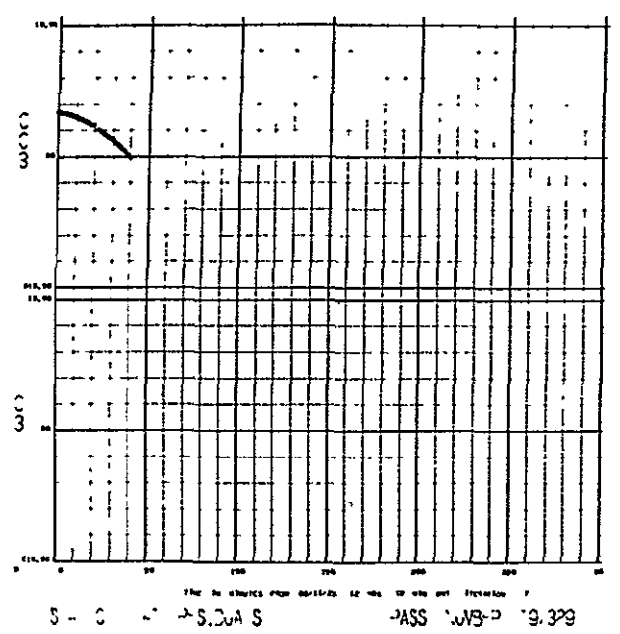
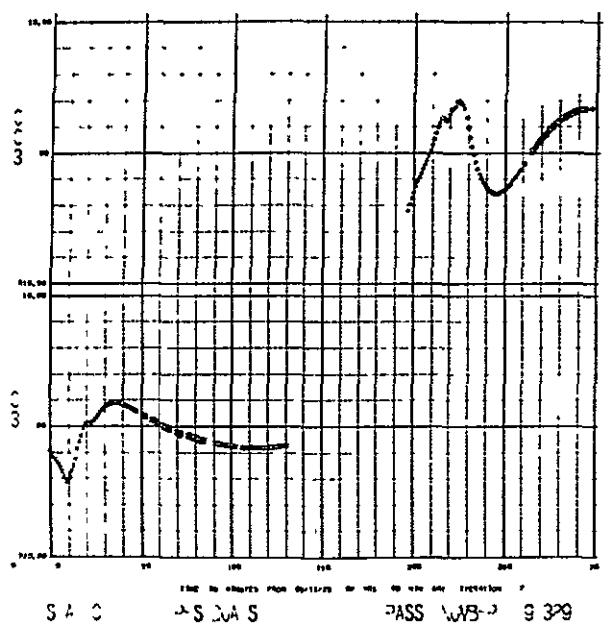
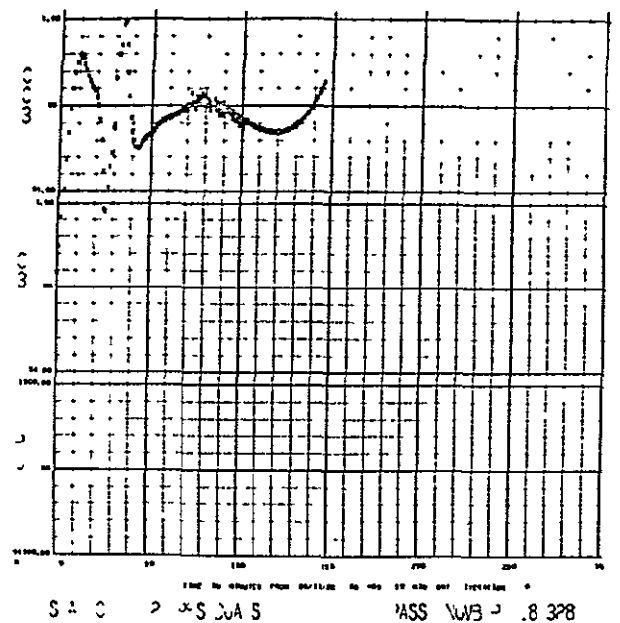
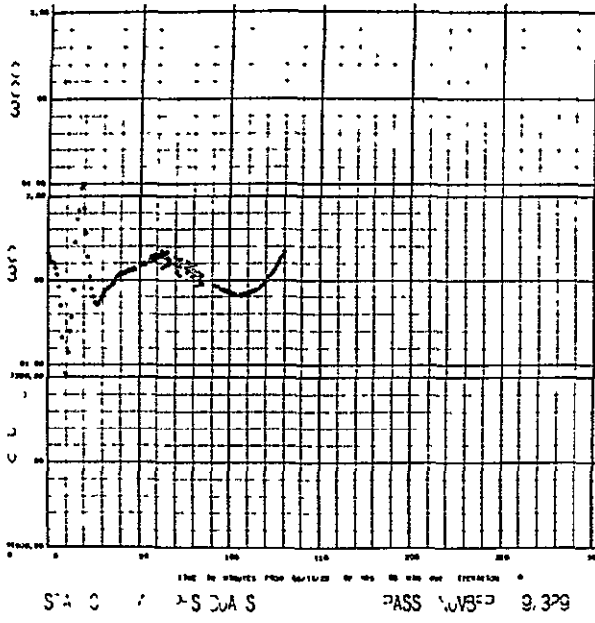


DOPLER RESIDUALS FOR CASES

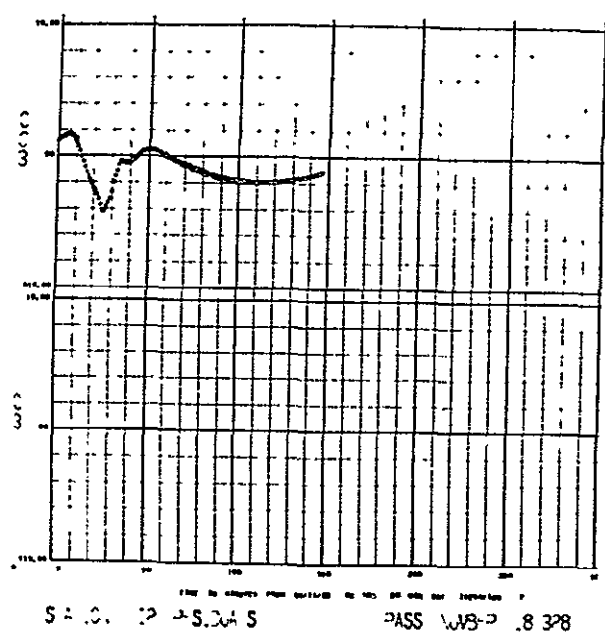
3D21P AND 3D22P

D2-104820-1

321



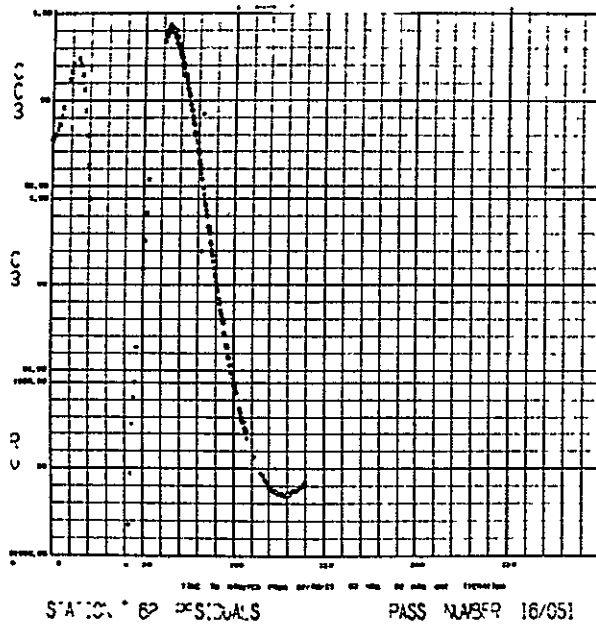
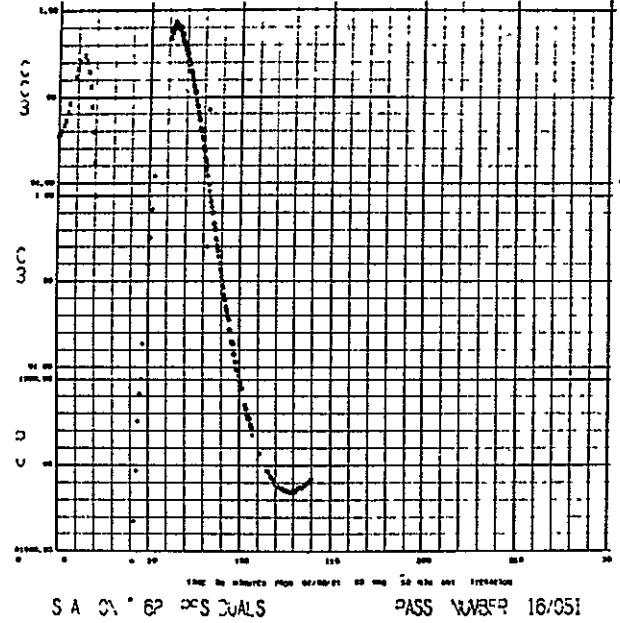
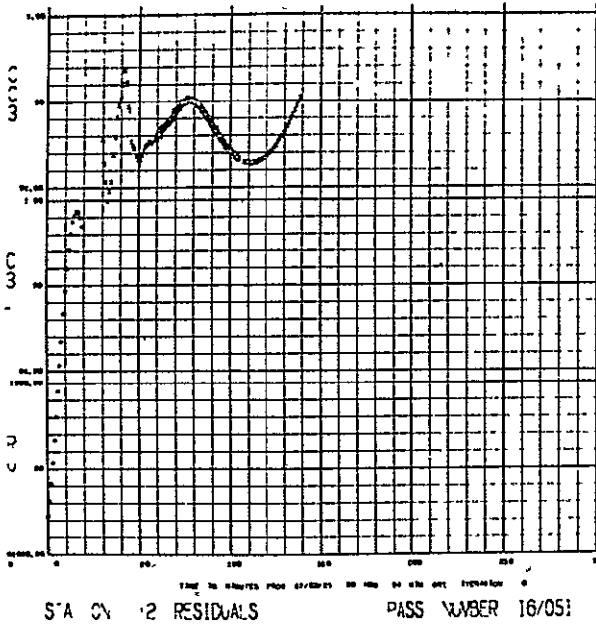
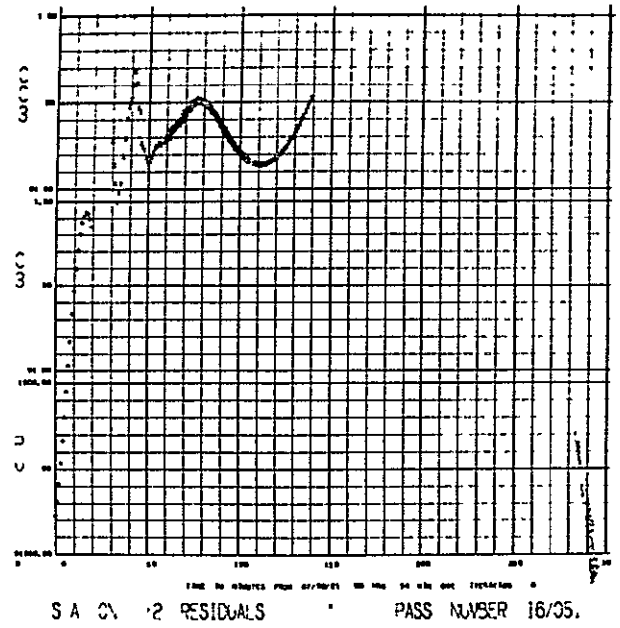
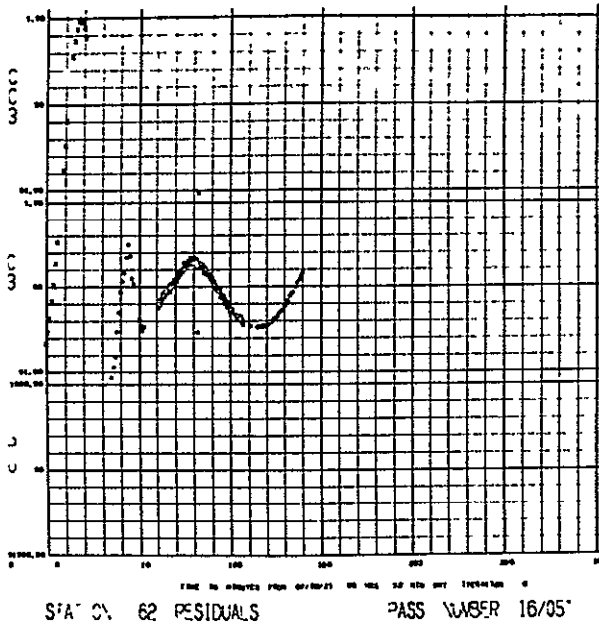
2F21P/2F22P



DOPPLER RESIDUALS FOR CASES
2F21P AND 2F22P

D2-101S20-1

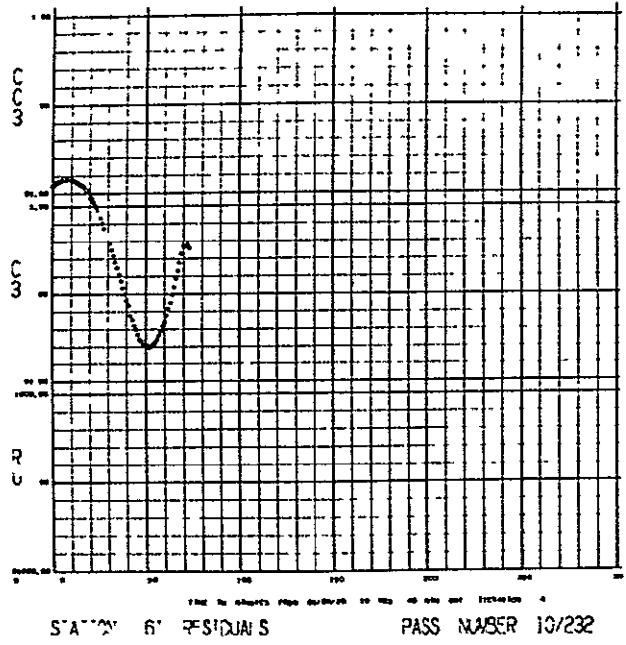
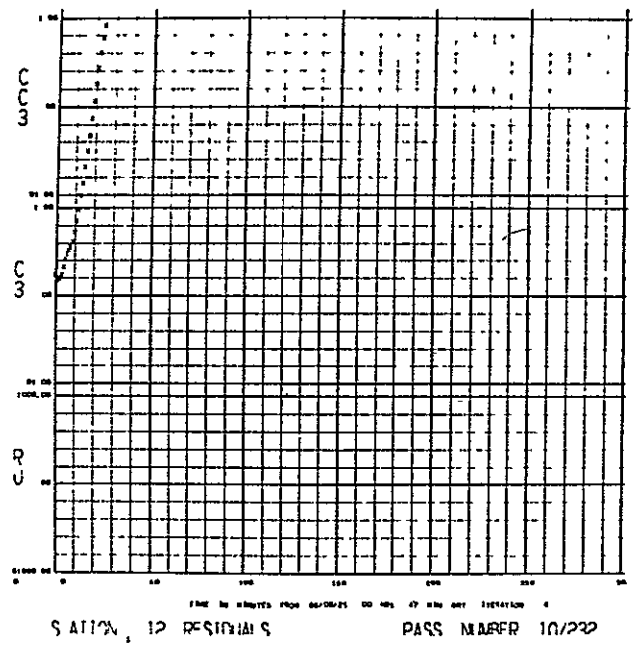
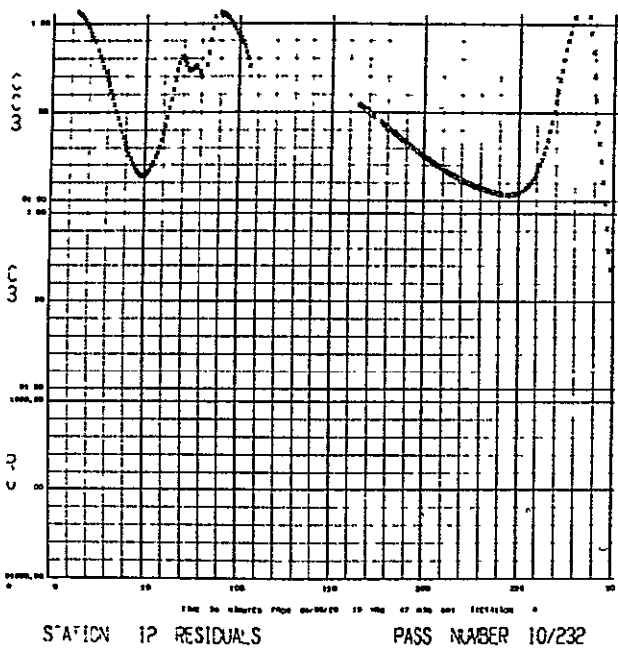
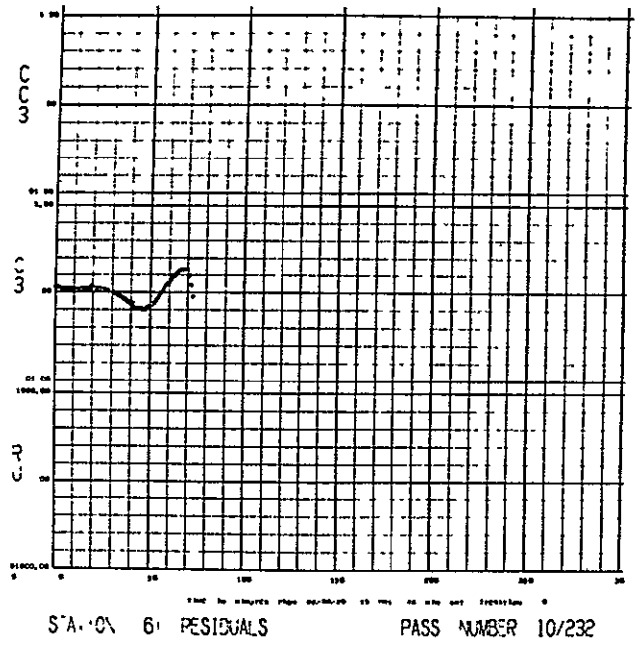
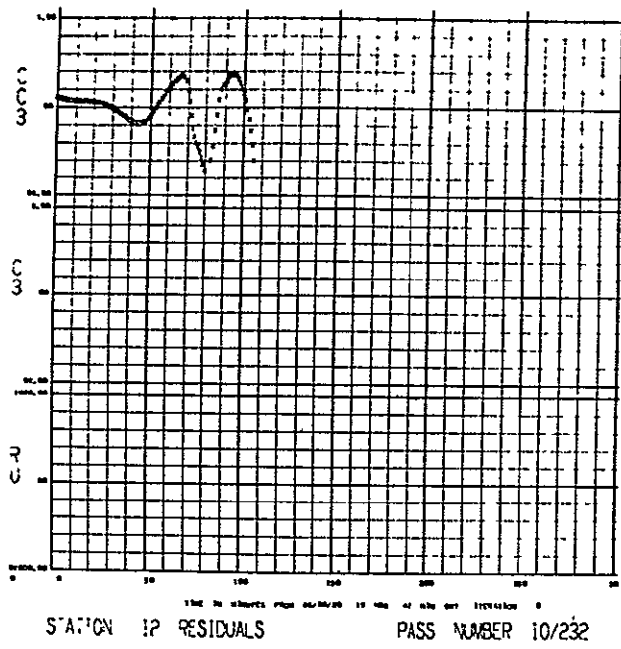
3F21P - 3F22P



DOPLER RESIDUALS FOR CASES
3F21P AND 3F22P

D2=100820-1

333

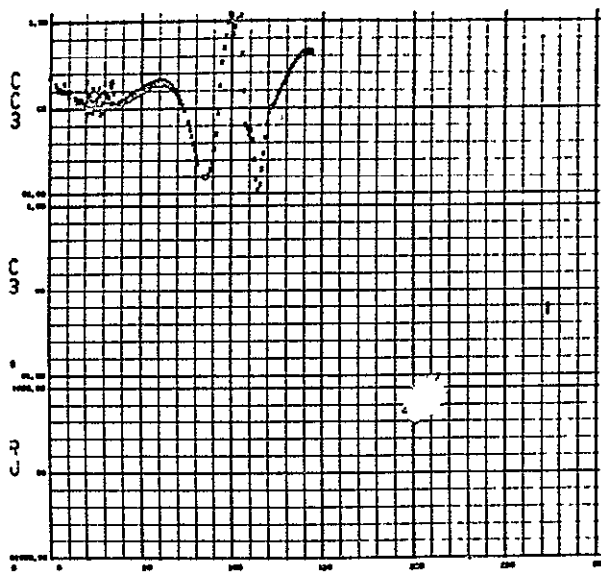


DOPPLER RESIDUALS FOR CASES
1B31P AND 1B32P

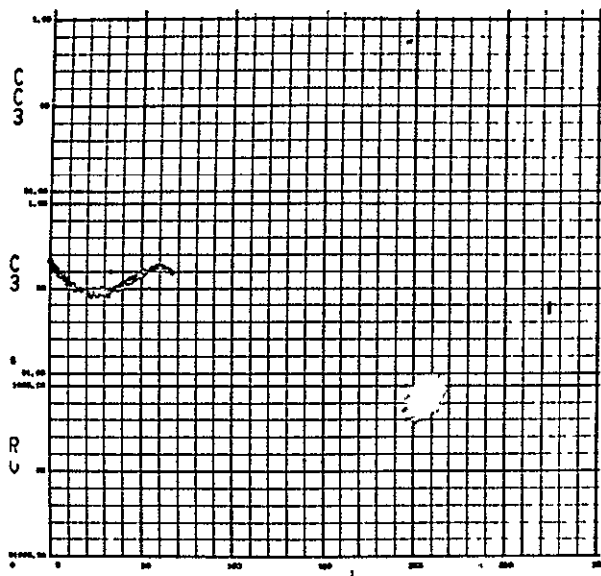
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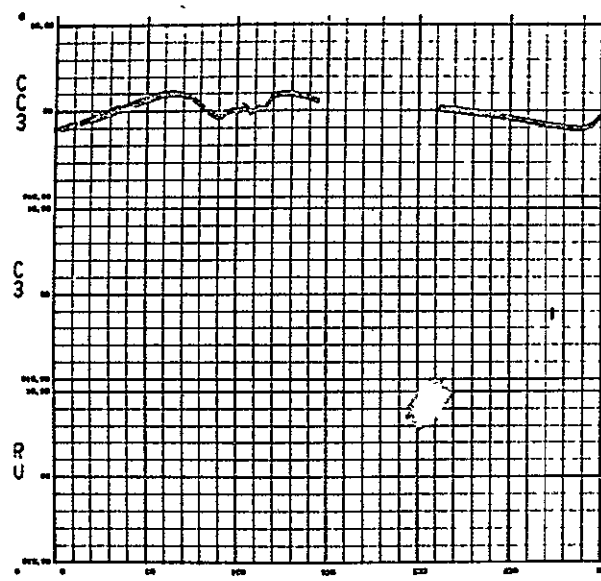
2301A - 01



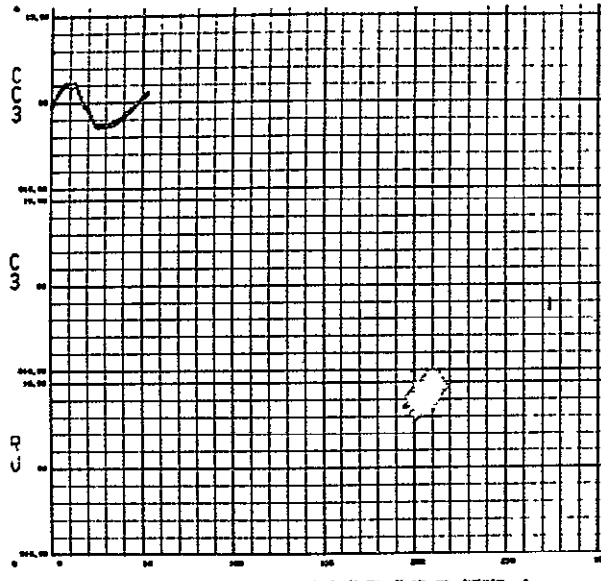
STATION 12 RESIDUALS PASS NUMBER 12/322



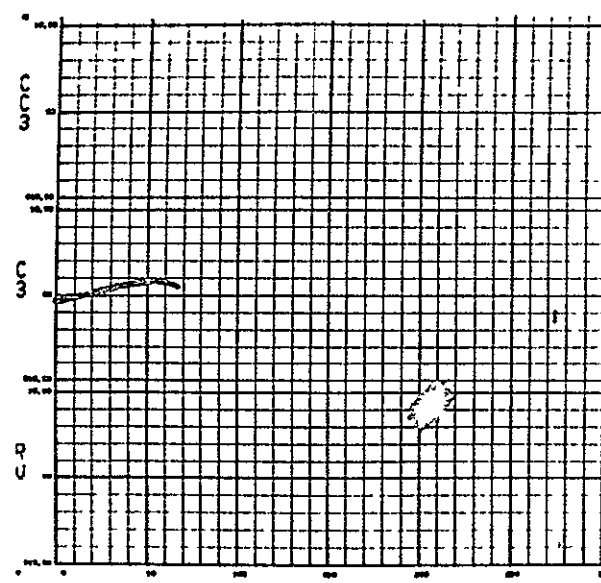
STATION 6: RESIDUALS PASS NUMBER 12/322



STATION 12 RESIDUALS PASS NUMBER 12/322



STATION 12 RESIDUALS PASS NUMBER 12/322



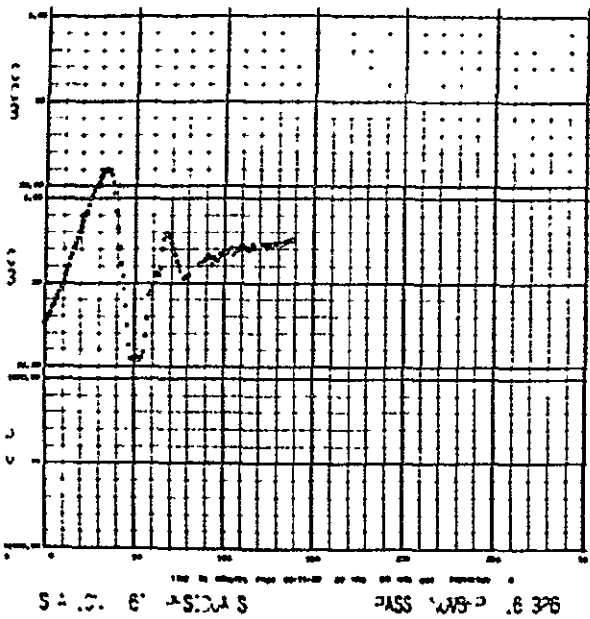
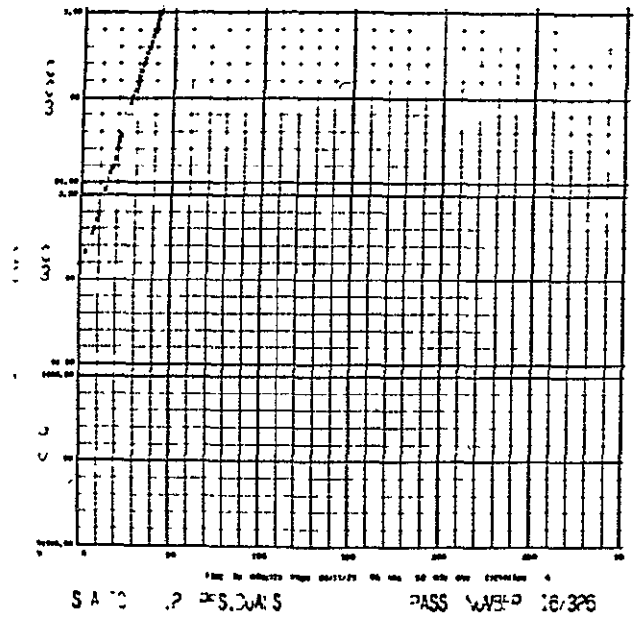
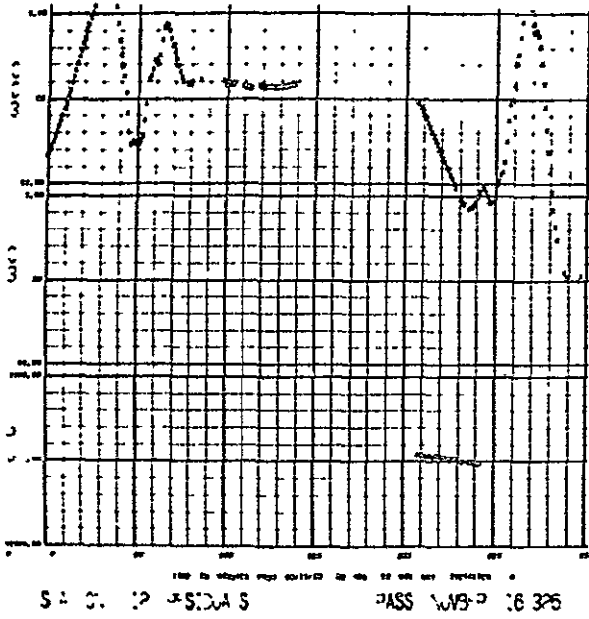
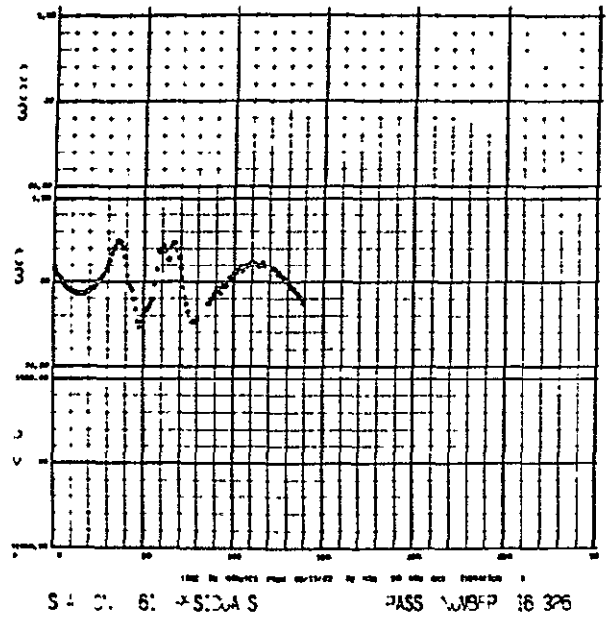
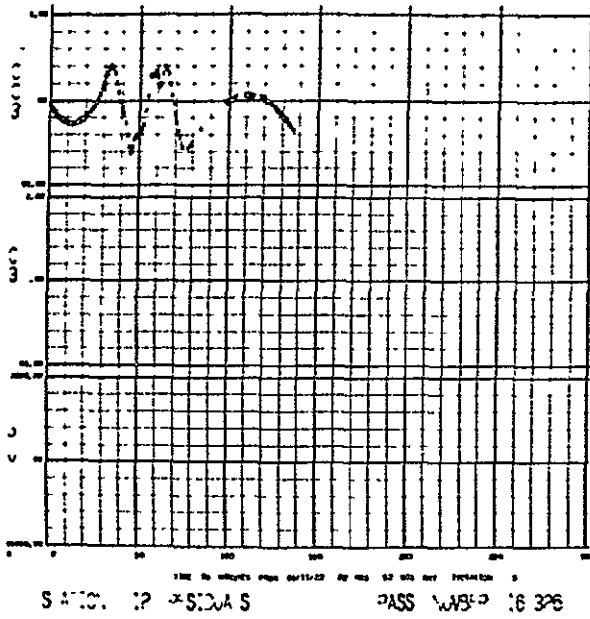
STATION 6: RESIDUALS PASS NUMBER 12/322

DOPPLER RESIDUALS FOR CASES
2B31P AND 2B32P

D2-100920-1

D2-100820-1

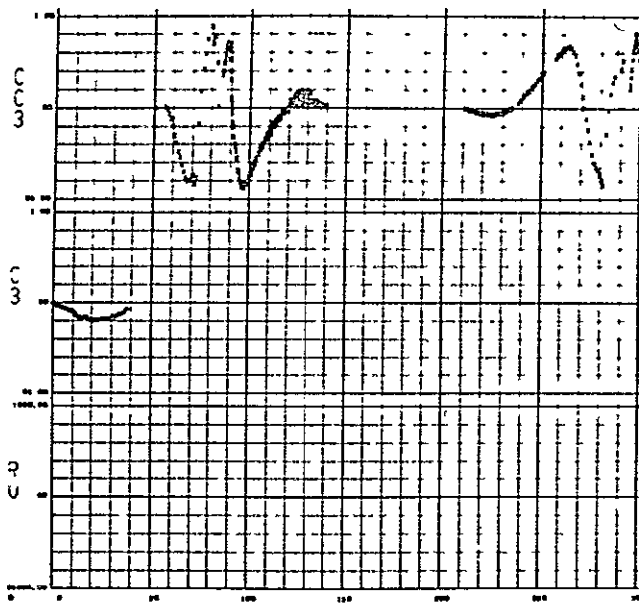
2301A



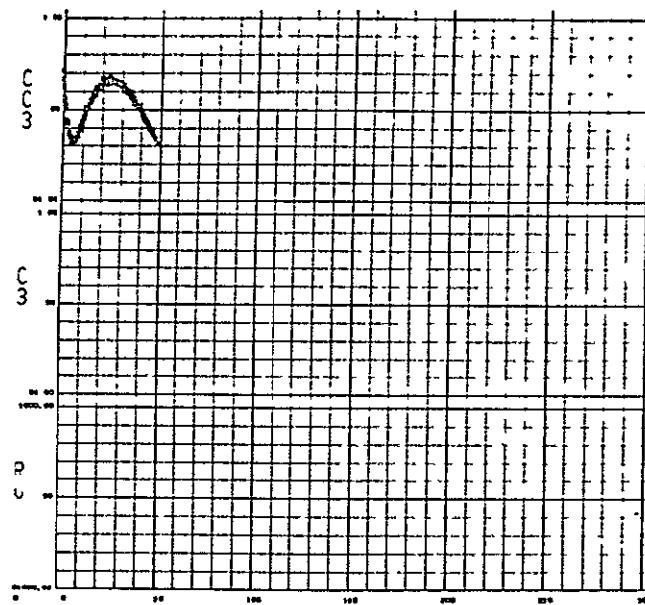
DOPPLER RESIDUALS FOR CASES
2D31P AND 2D32P

D2-1008000

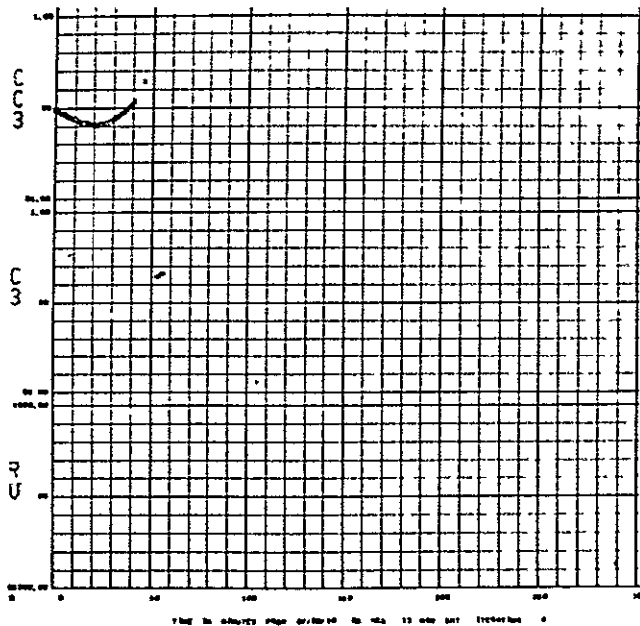
229



STATION 41 RESIDUALS PASS NUMBER 4 049



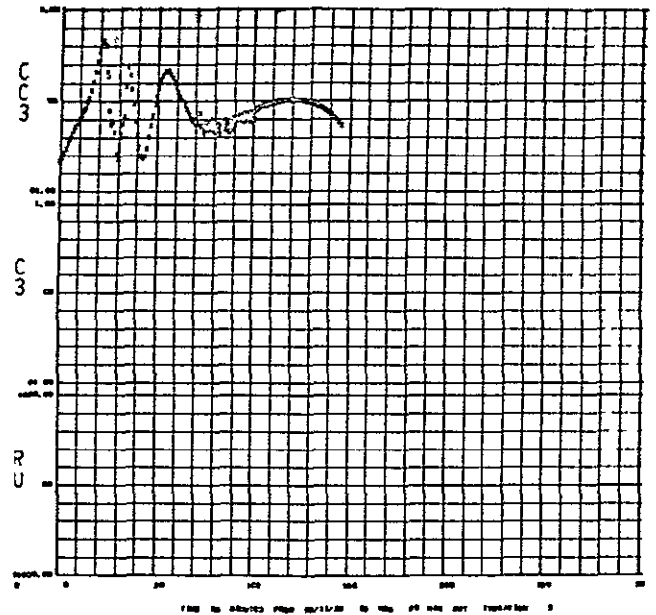
STATION 41 RESIDUALS PASS NUMBER 14/049



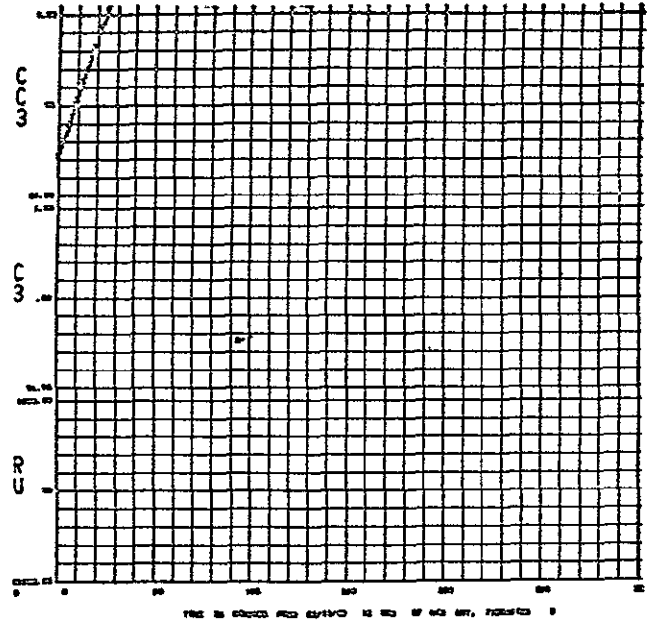
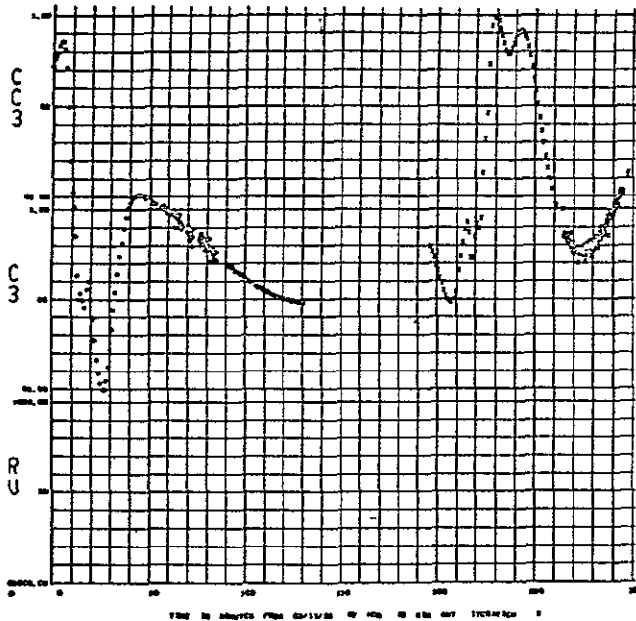
DOPPLER RESIDUAL FOR CASE
3D32P

D2-100897-1



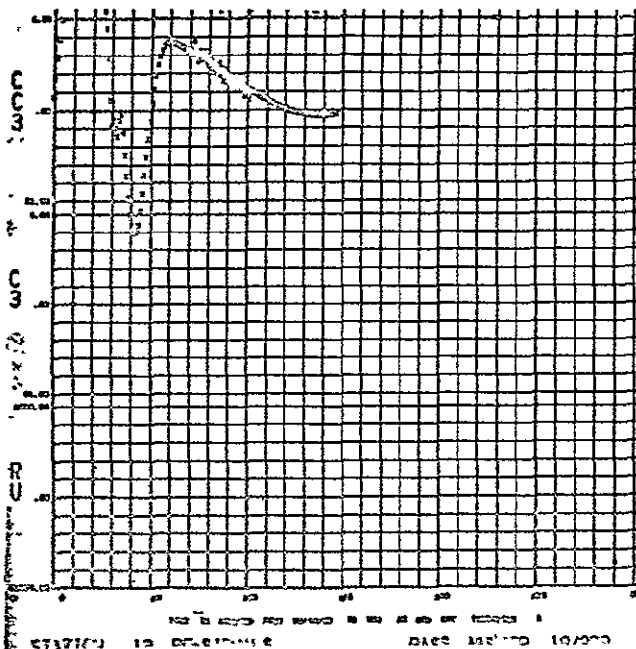


STATION 12 RESIDUALS PASS NUMBER 18/328



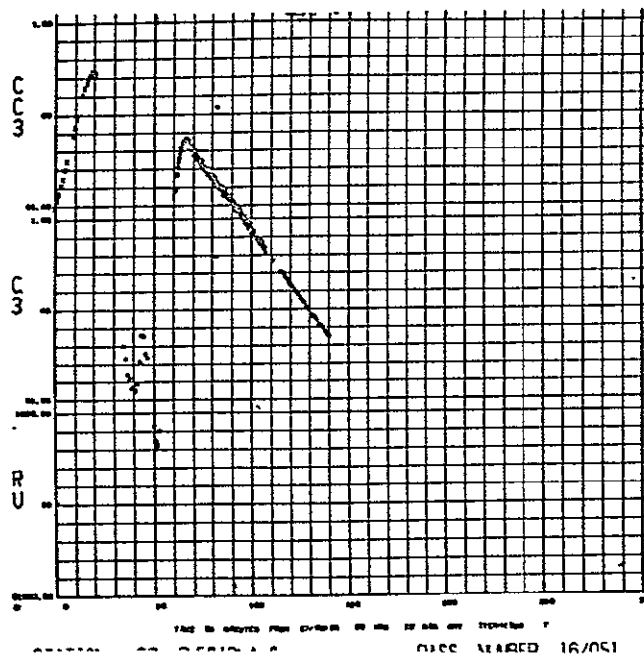
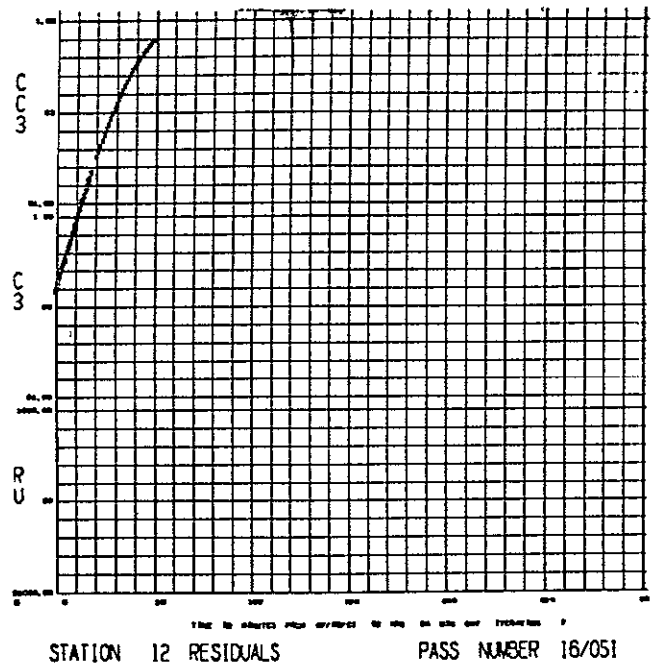
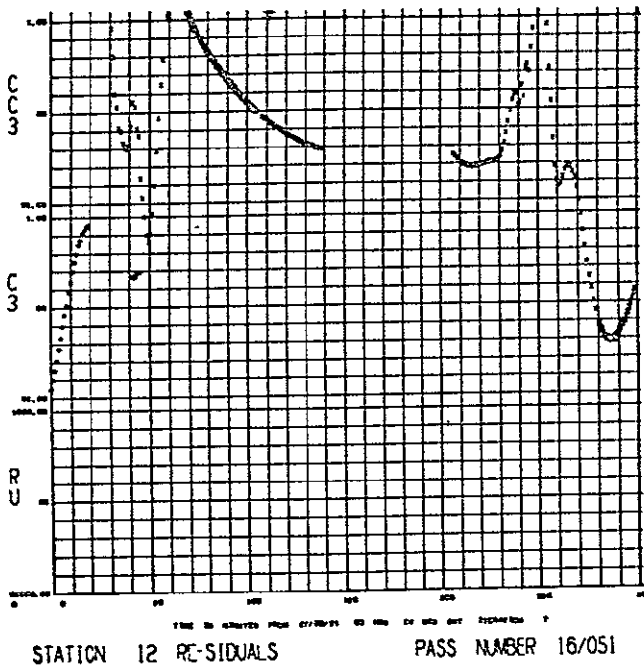
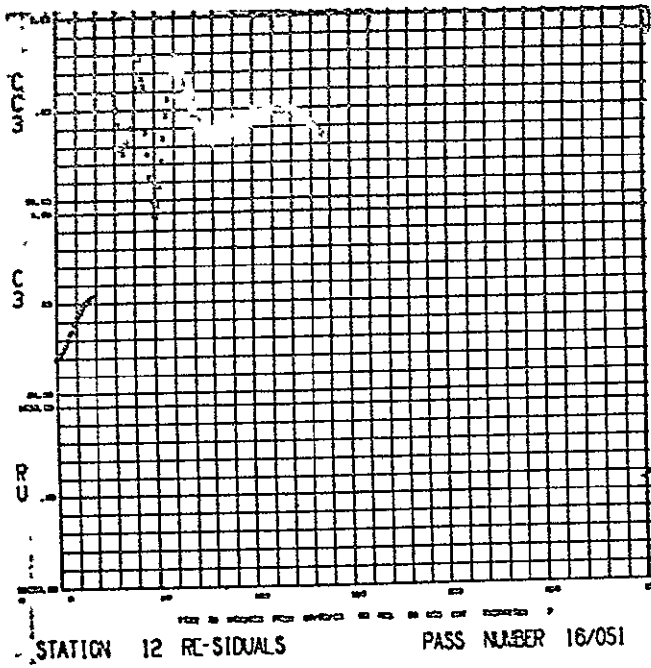
STATION 41 RESIDUALS PASS NUMBER 19/329

STATION 41 RESIDUALS PASS NUMBER 19/329



DOPLER RESIDUALS FOR CASES
2F31P & 2F32P

D2-100820-1

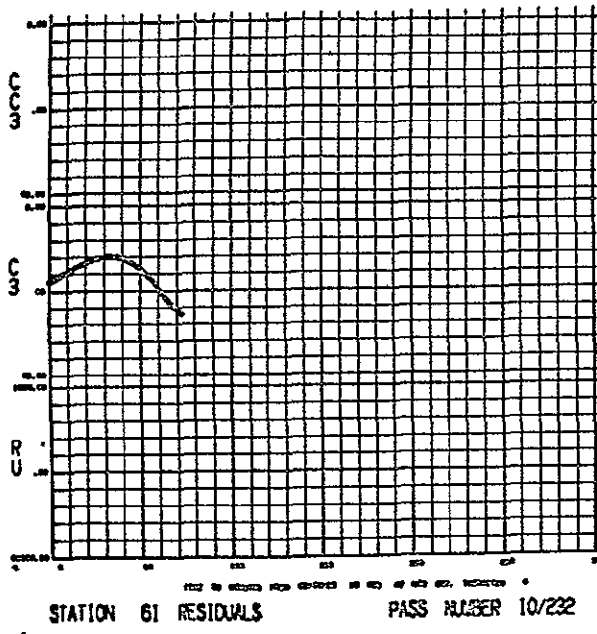
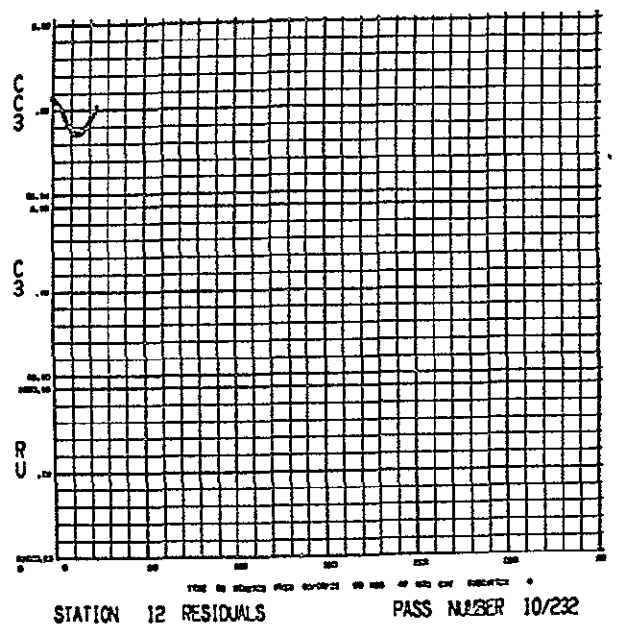
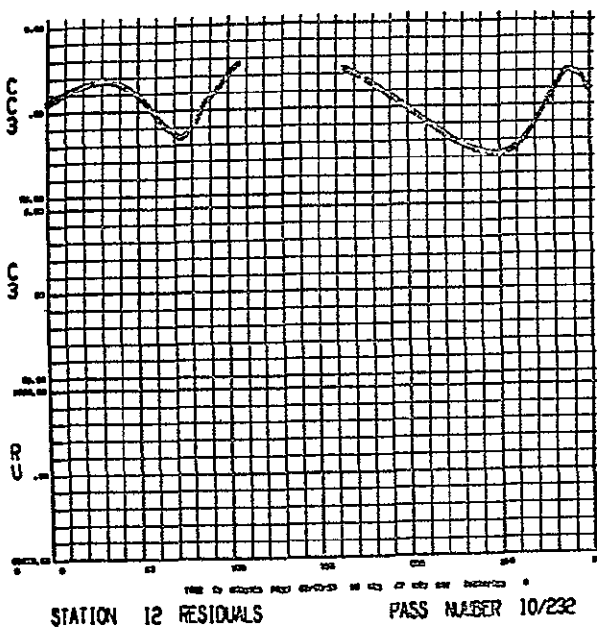
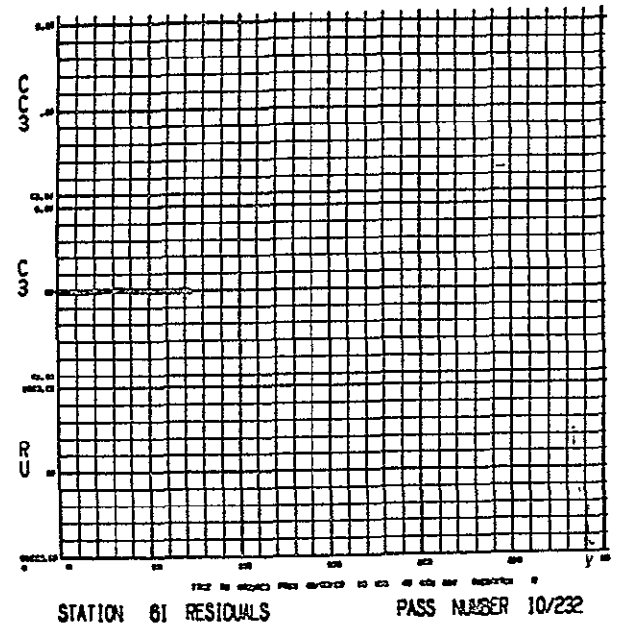
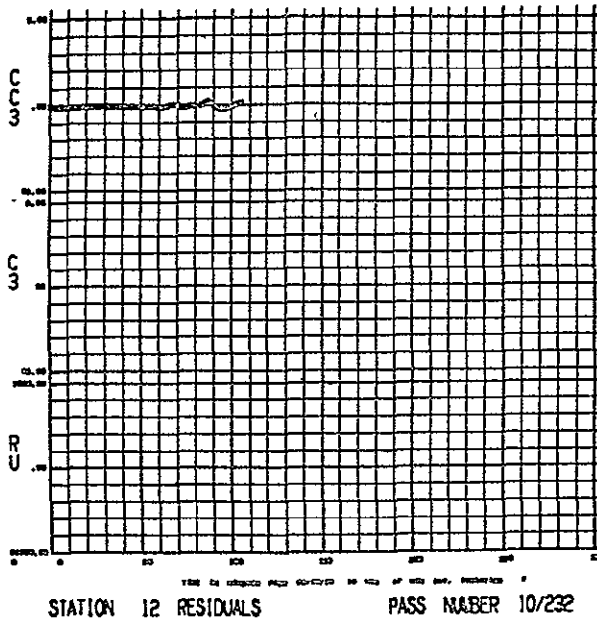


DOPPLER RESIDUALS FOR CASES
3F31P & 3F32P

D2-100°20-1

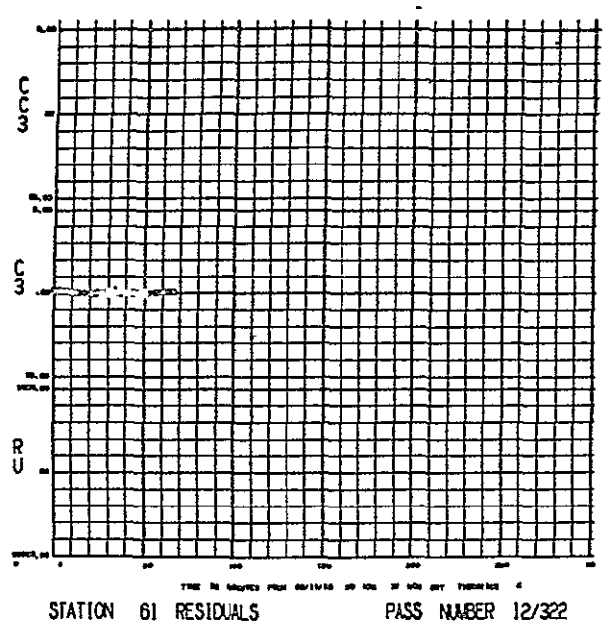
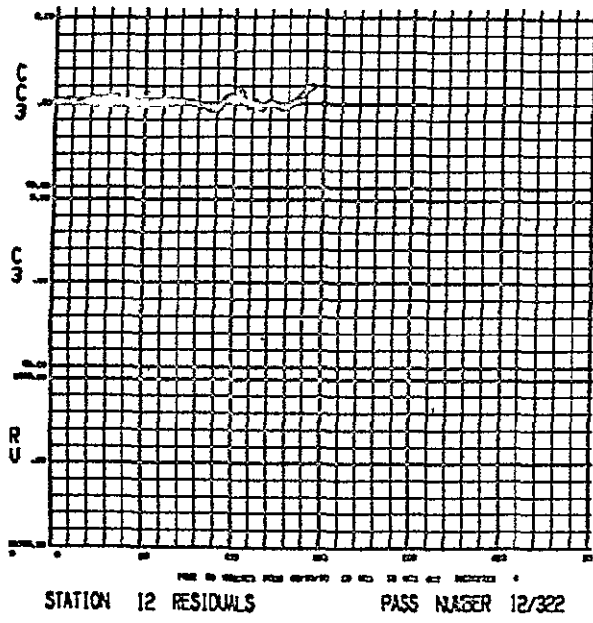


1A 41P - 42P



DOPPLER RESIDUALS FOR CASES
1B41P and 1B 42P

D2-100820-1



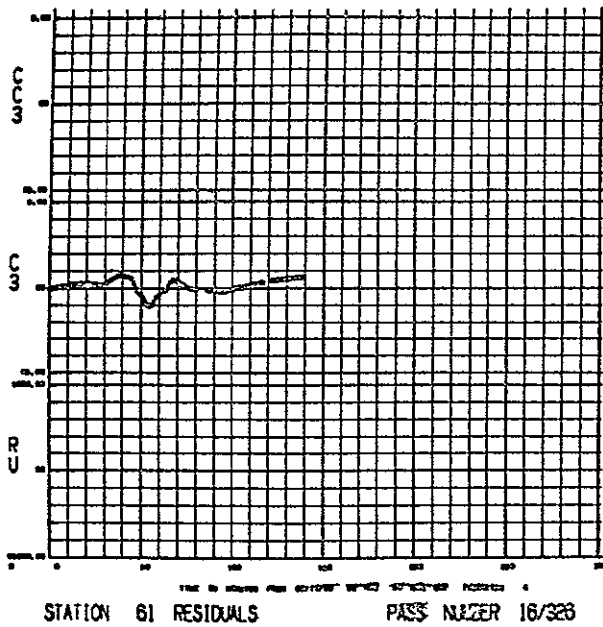
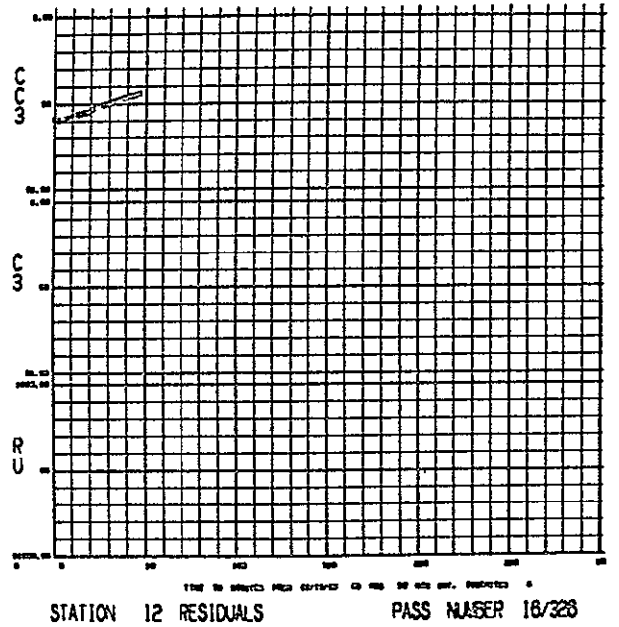
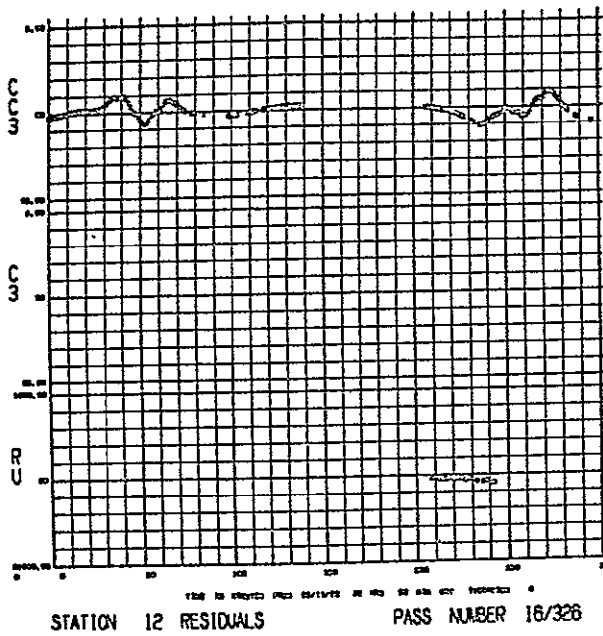
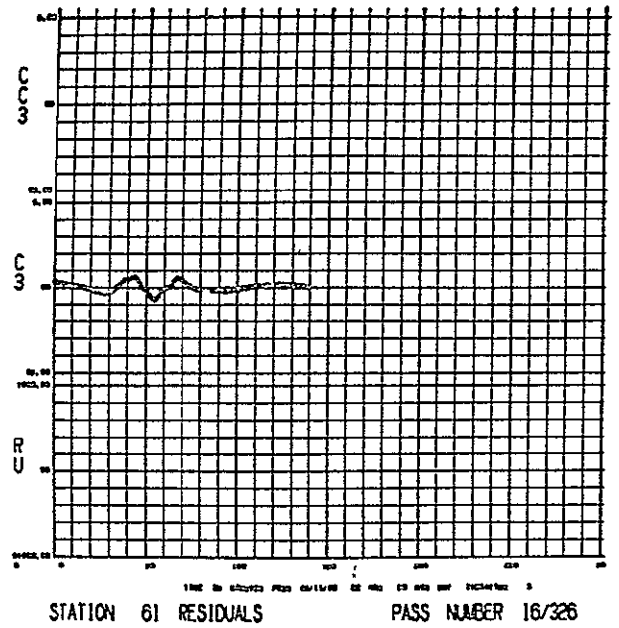
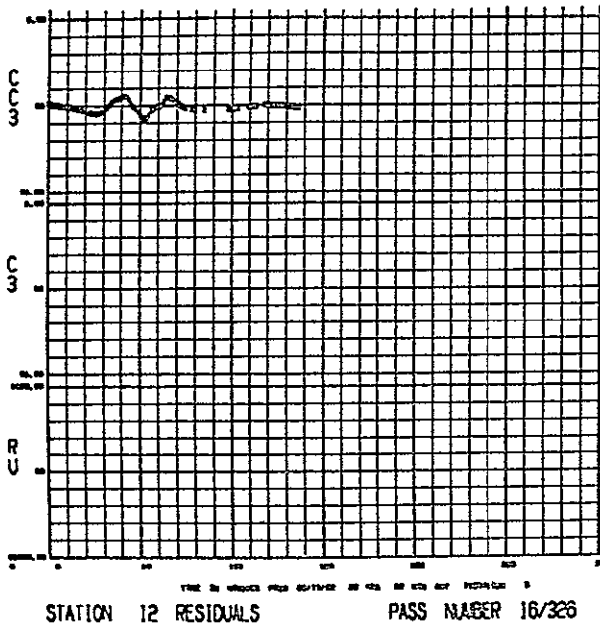
2/1/80

DOPLER RESIDUALS FOR CASES

2B41P

D2-100820-1

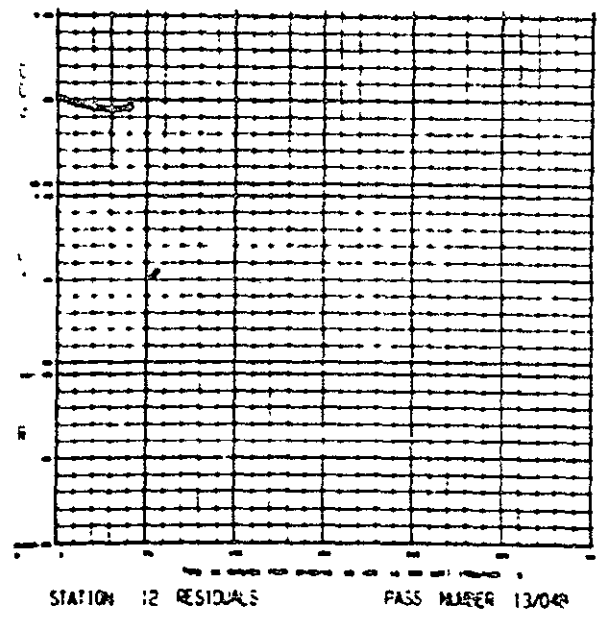
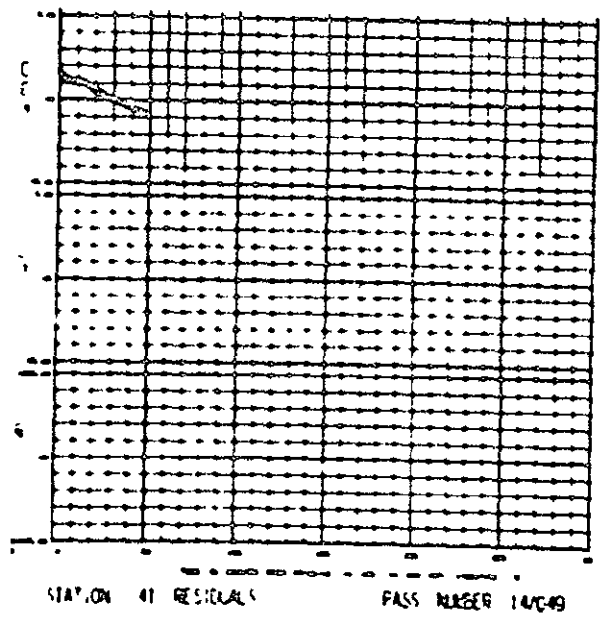
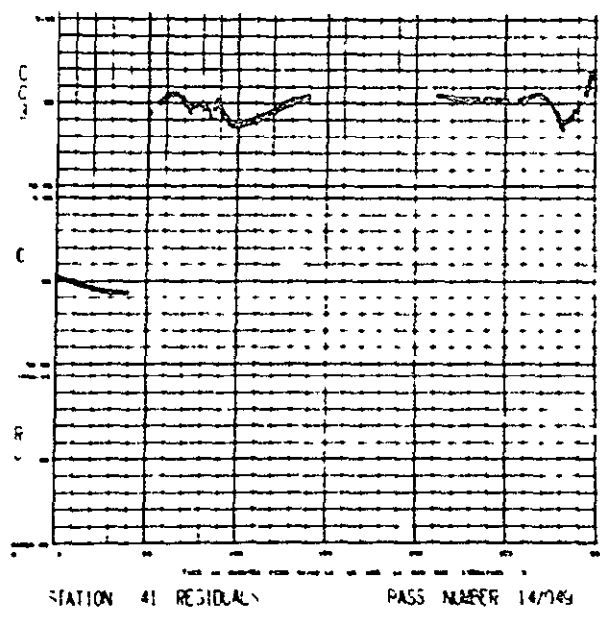
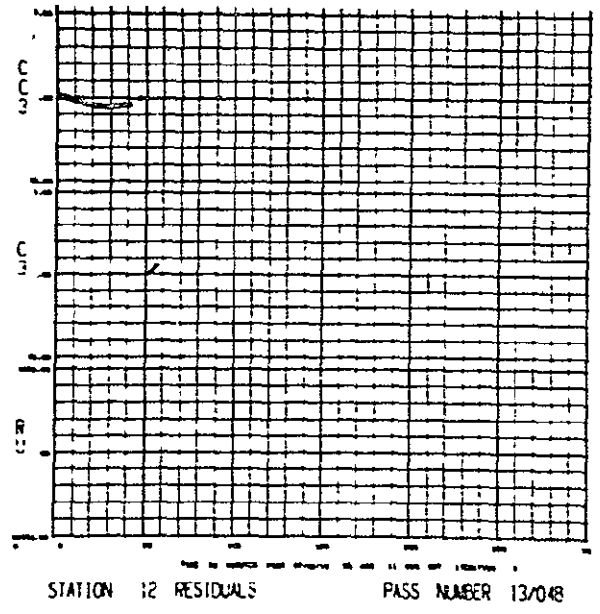
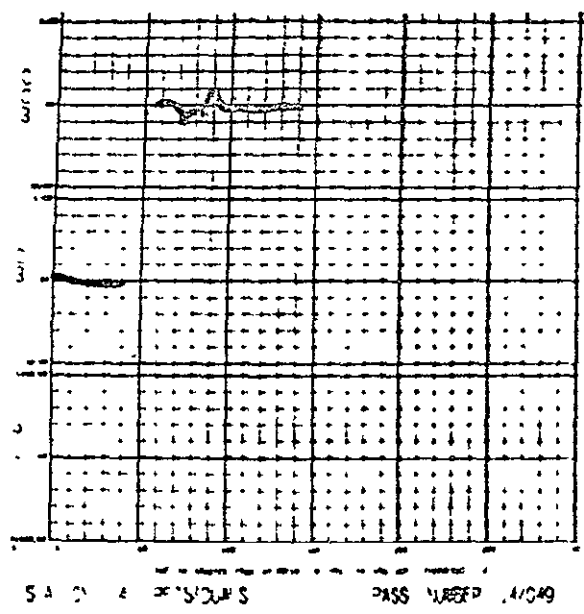
D2-100820-1



DOPPLER RESIDUALS FOR CASES
2D4.1P AND 2D4.2P

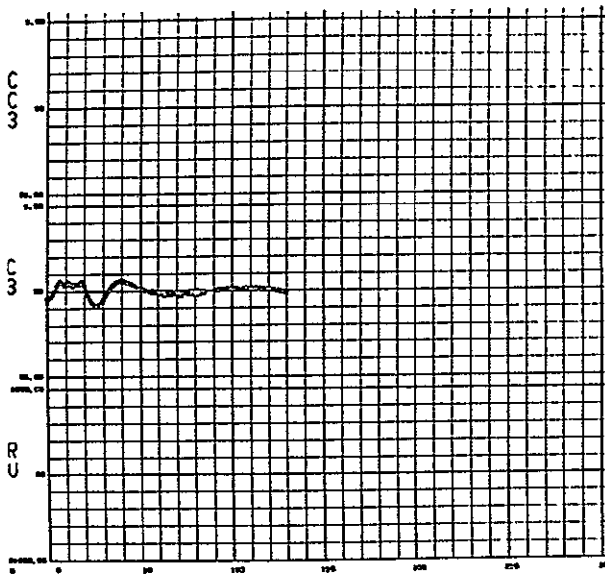
D2-100-20-1

3D41P 3D42P

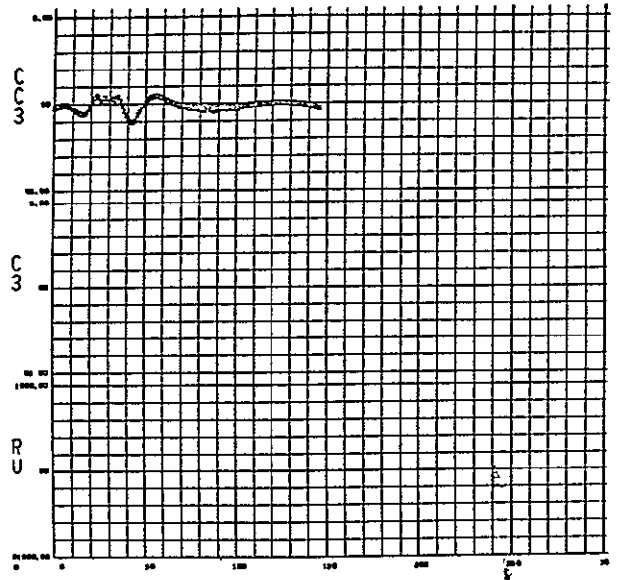


DOPPLER RESIDUALS FOR CASES
3D41P AND 3D42P

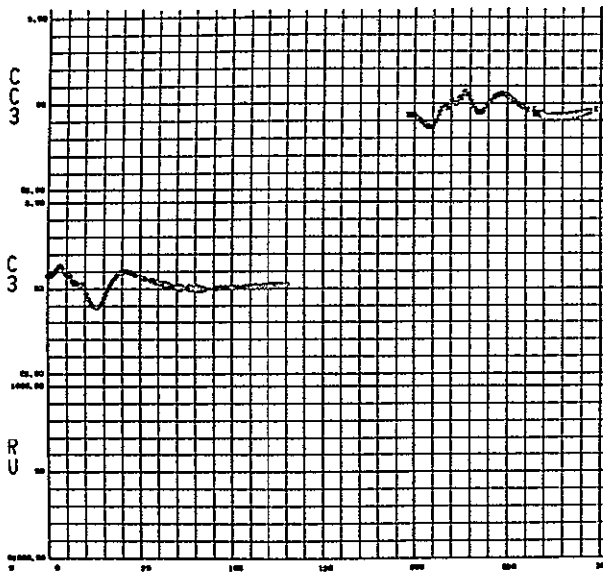
D2-100820-1



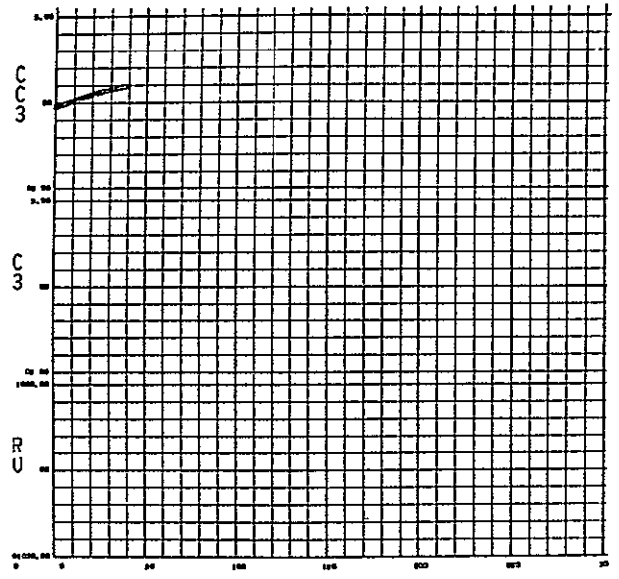
STATION 41 RESIDUALS PASS NUMBER 19/329



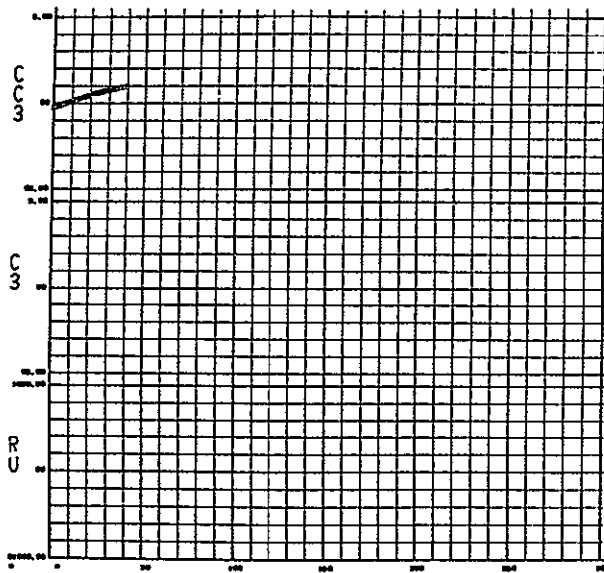
STATION 12 RESIDUALS PASS NUMBER 18/328



STATION 41 RESIDUALS PASS NUMBER 19/329



STATION 41 RESIDUALS PASS NUMBER 19/329



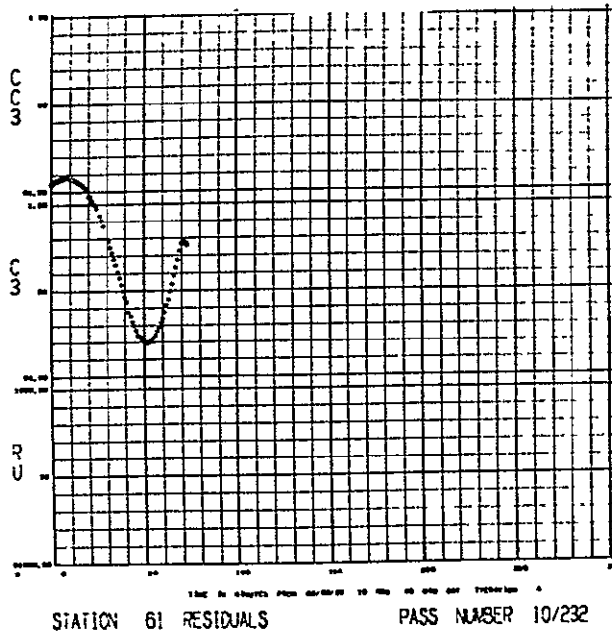
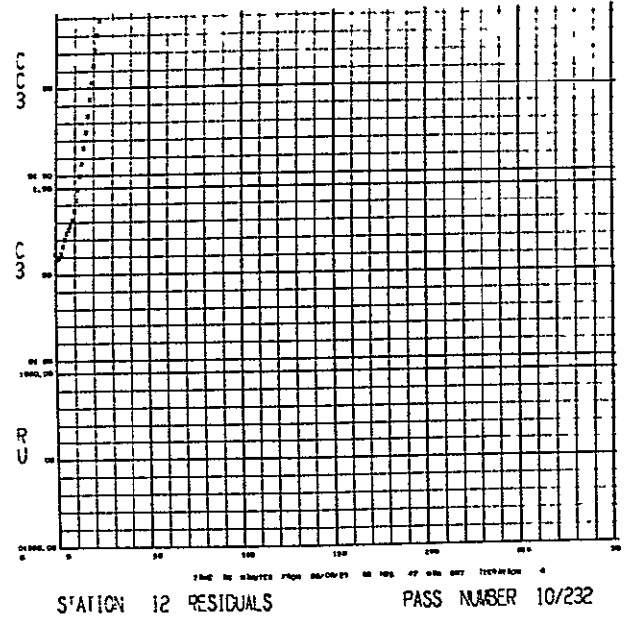
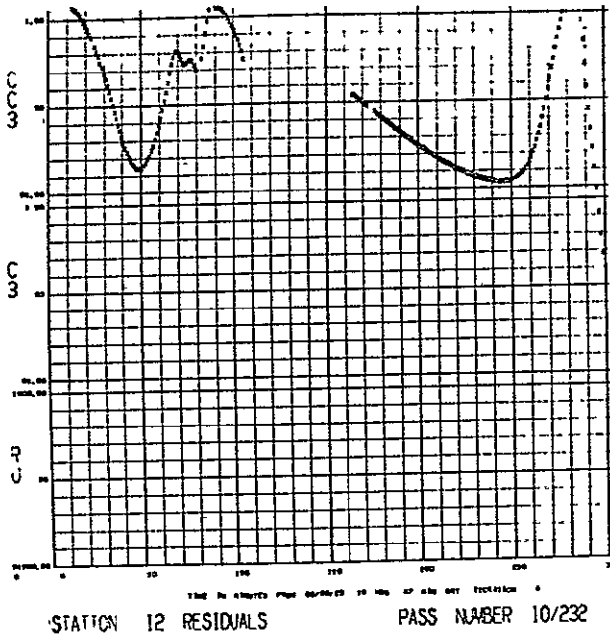
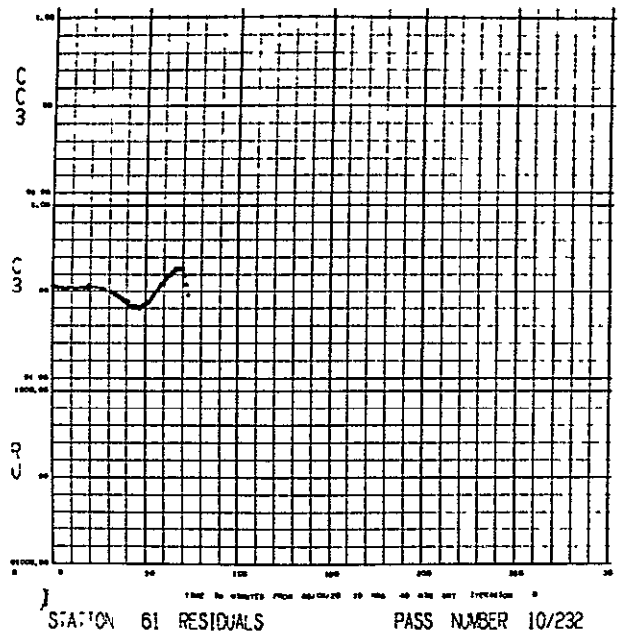
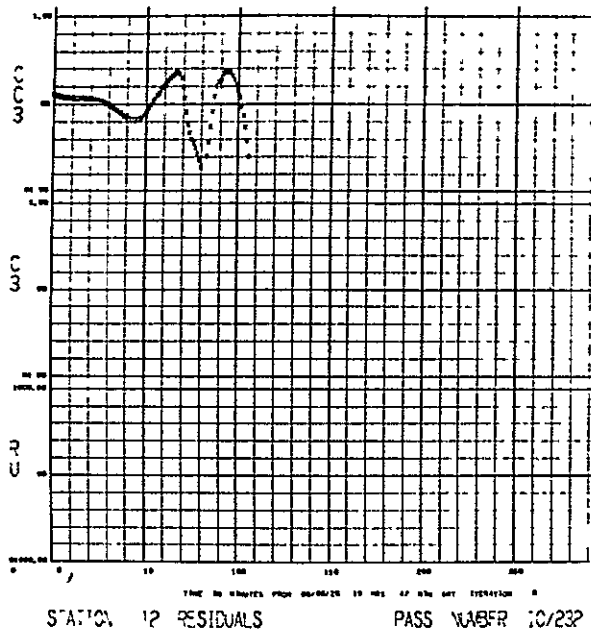
STATION 41 RESIDUALS PASS NUMBER 19/329

D-42-P

DOPPLER RESIDUALS FOR CASES
2F⁴1P AND 2F⁴2P

D2-100820-1

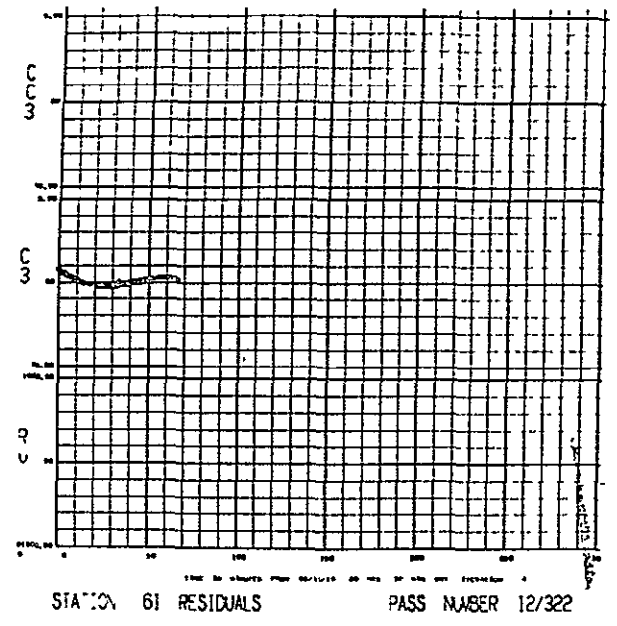
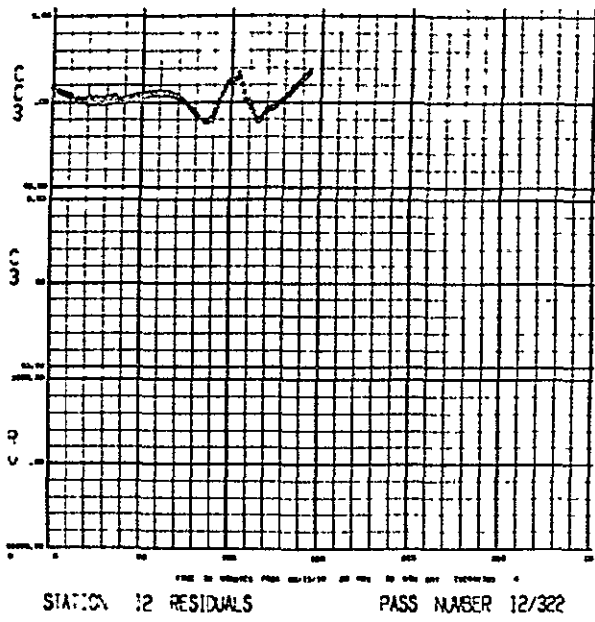
1B51P 52P



DOPPLER RESIDUALS FOR CASES
1B51P AND 1B52P

D2-100820-1

23



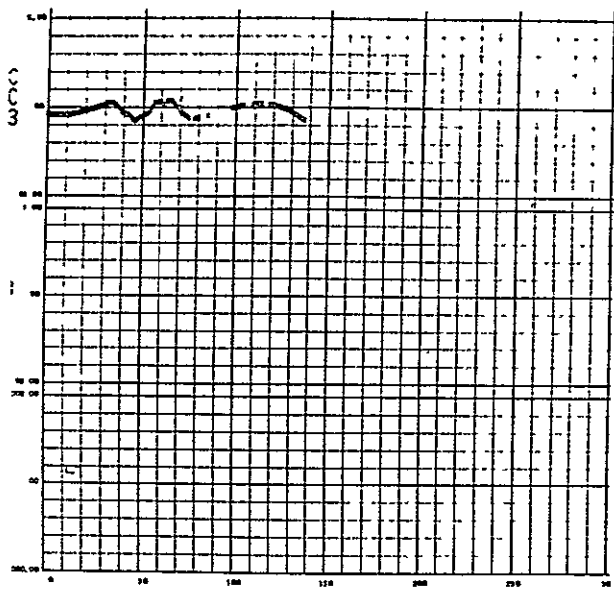
2B51P

DOPPLER RESIDUALS FOR CASES

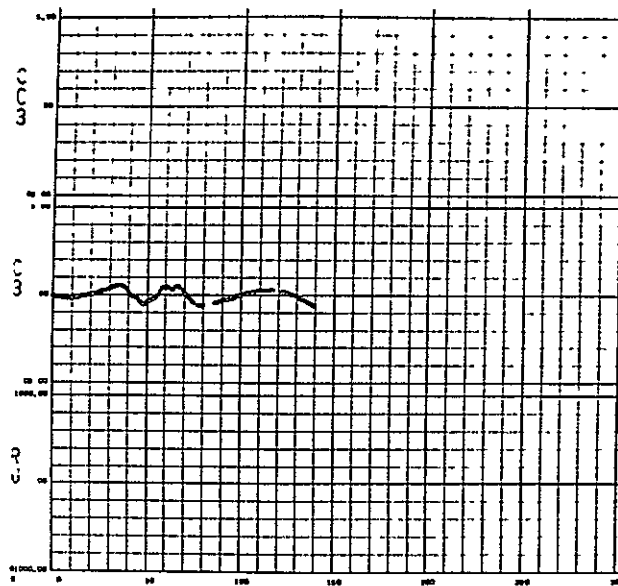
2B51P

D2-100920-1

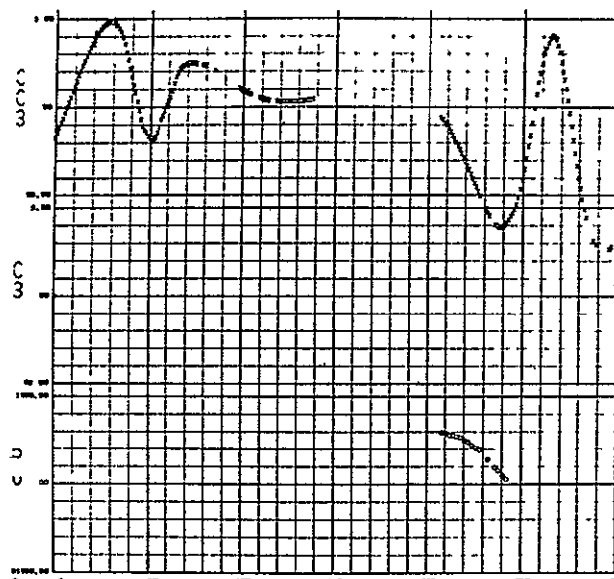
310



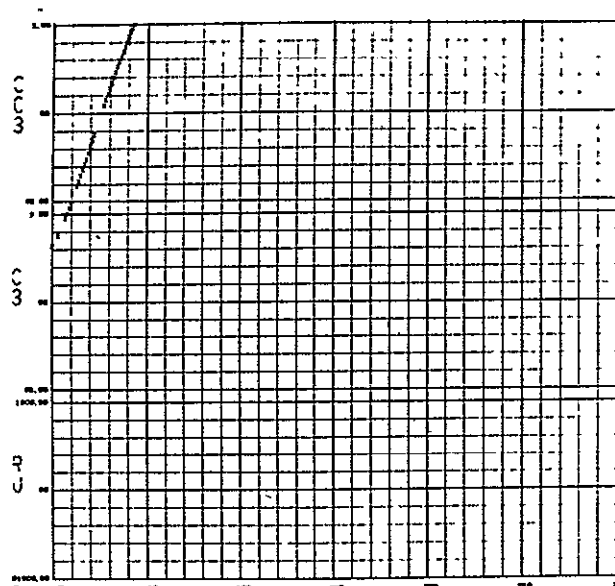
STATION 12 RESIDUALS PASS NUMBER 16/326



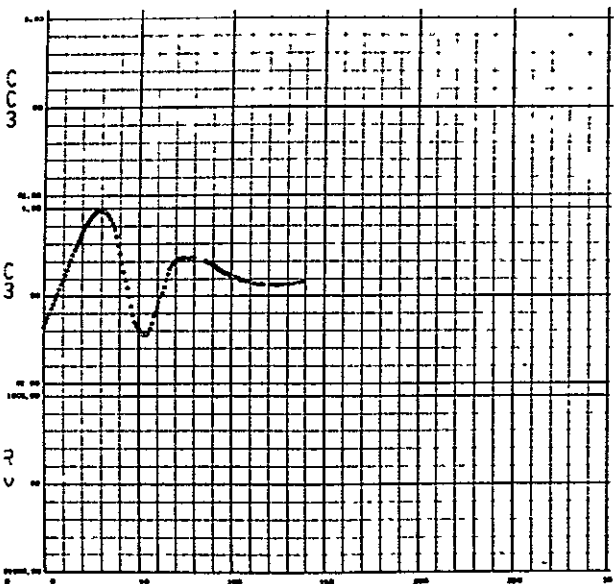
STATION 61 RESIDUALS PASS NUMBER 16/326



STATION 12 RESIDUALS PASS NUMBER 16/326



STATION 12 RESIDUALS PASS NUMBER 16/326

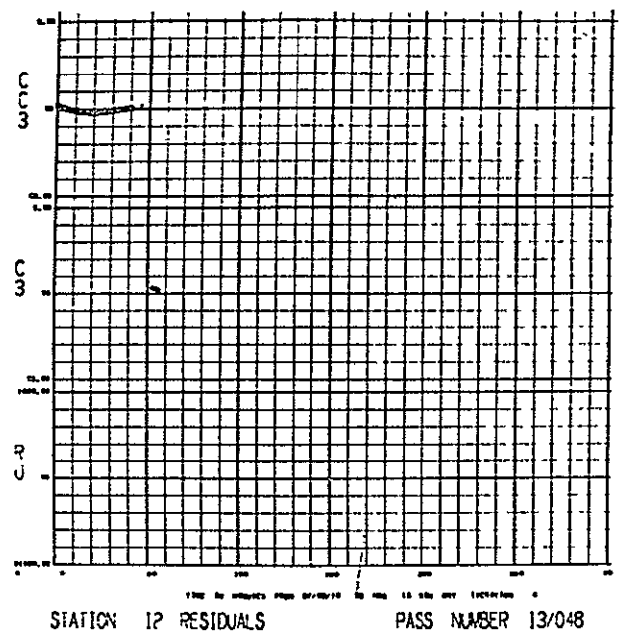
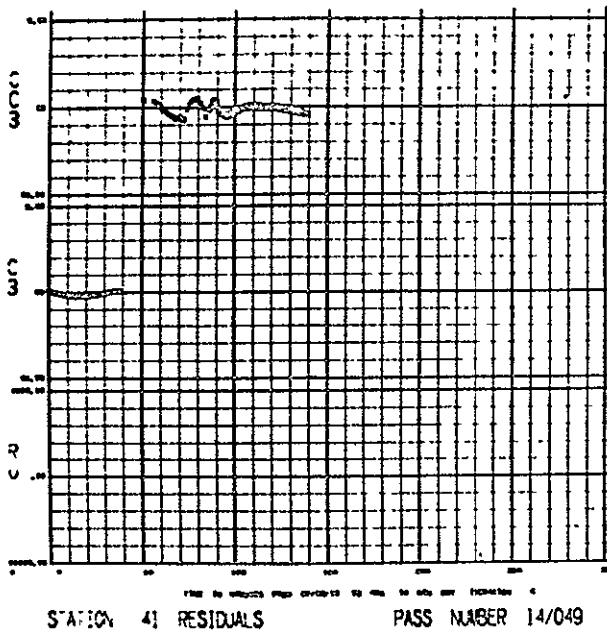


STATION 12 RESIDUALS PASS NUMBER 16/326

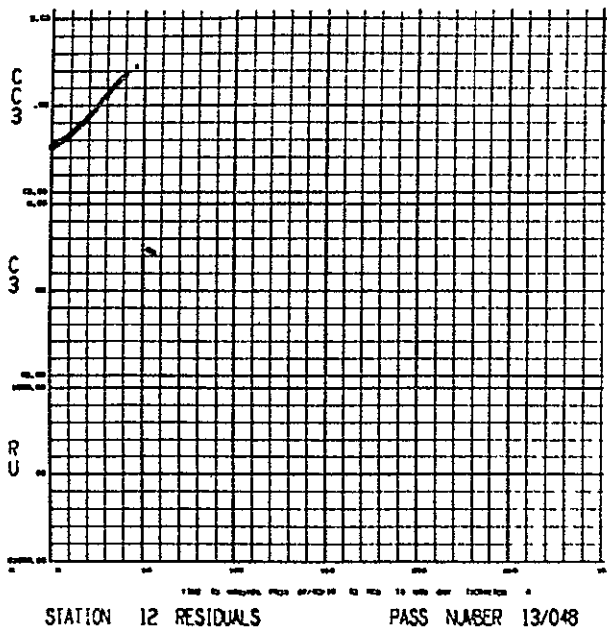
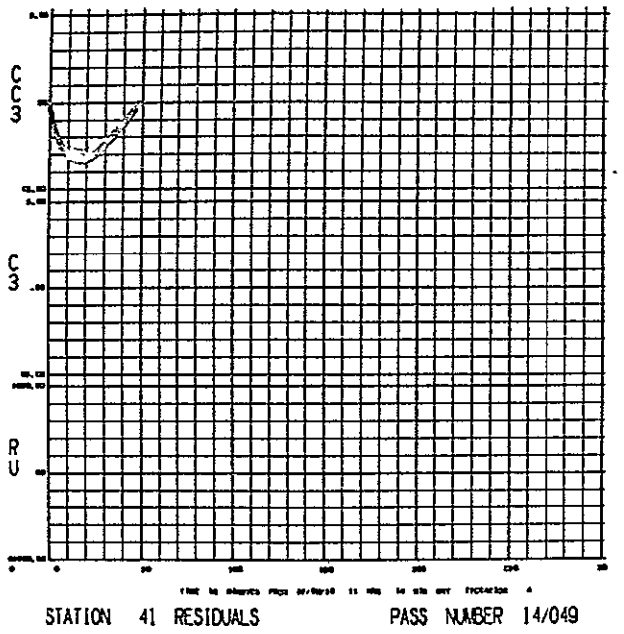
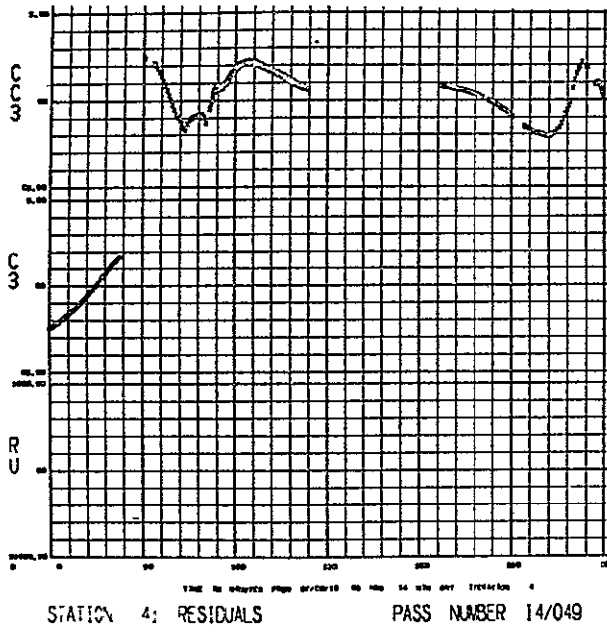
DOPPLER RESIDUALS FOR CASES
2D51P AND 2D52P

D2-100820-1

22
 21
 20



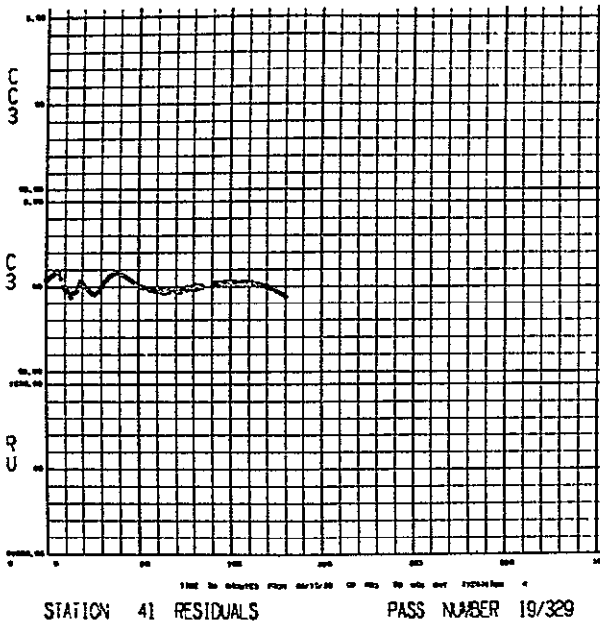
312
352P



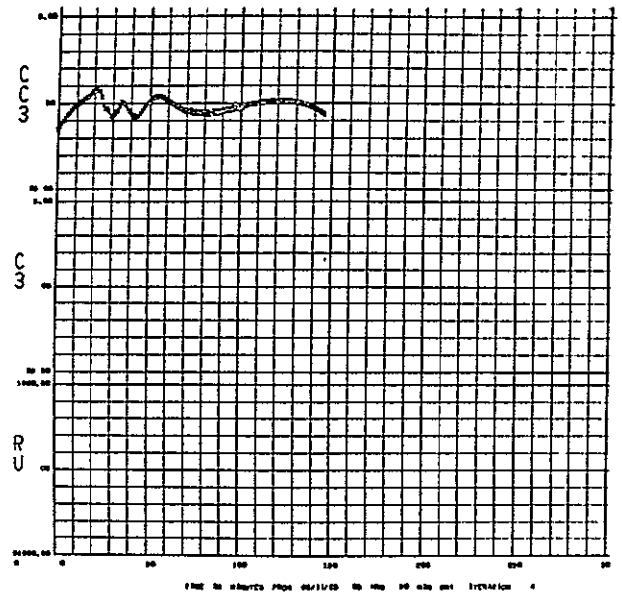
DOPPLER RESIDUALS FOR CASES
3D51P AND 3D52P

D2-100820-1

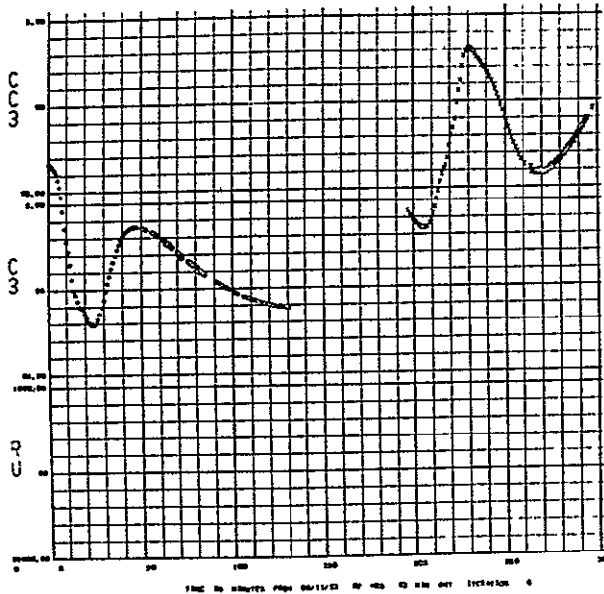
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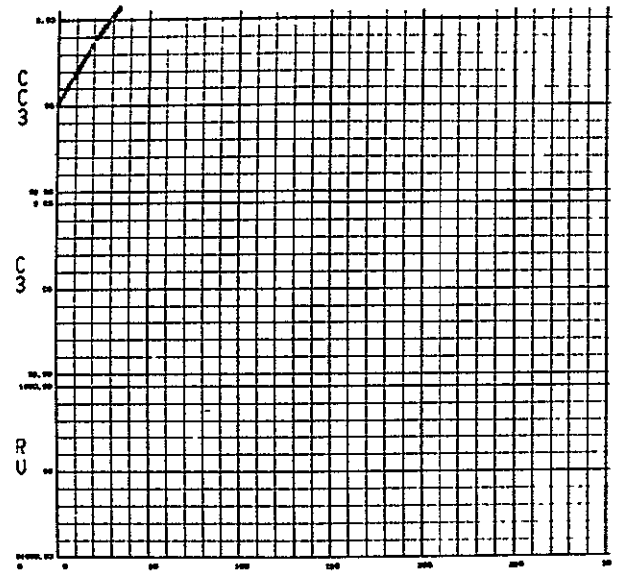
STATION 41 RESIDUALS PASS NUMBER 19/329



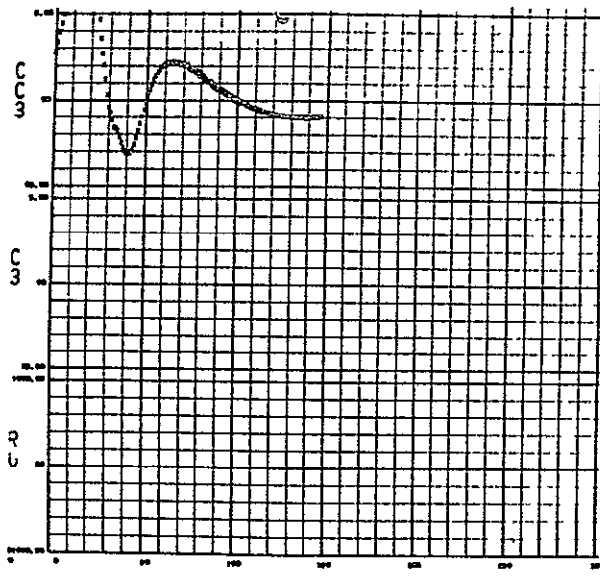
STATION 12 RESIDUALS PASS NUMBER 18/328



STATION 41 RESIDUALS PASS NUMBER 19/329



STATION 41 RESIDUALS PASS NUMBER 19/329



STATION 12 RESIDUALS PASS NUMBER 18/328

1.0 0.2

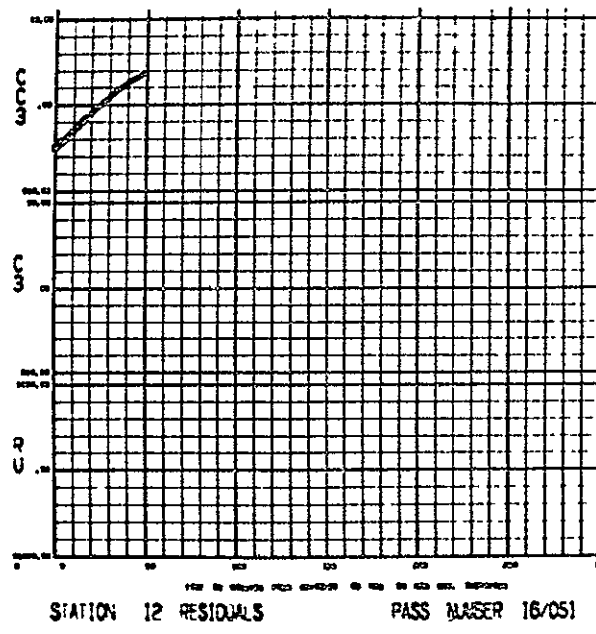
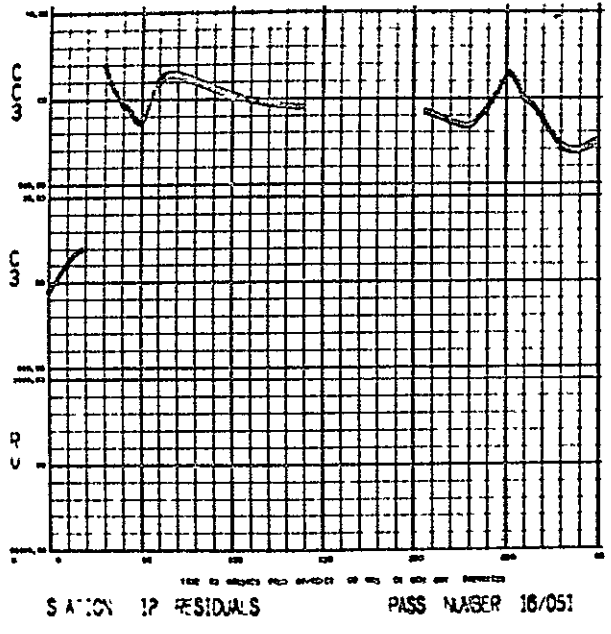
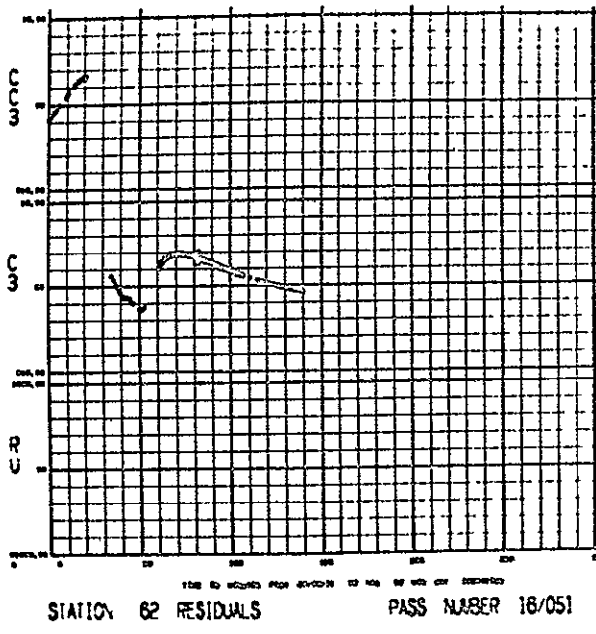
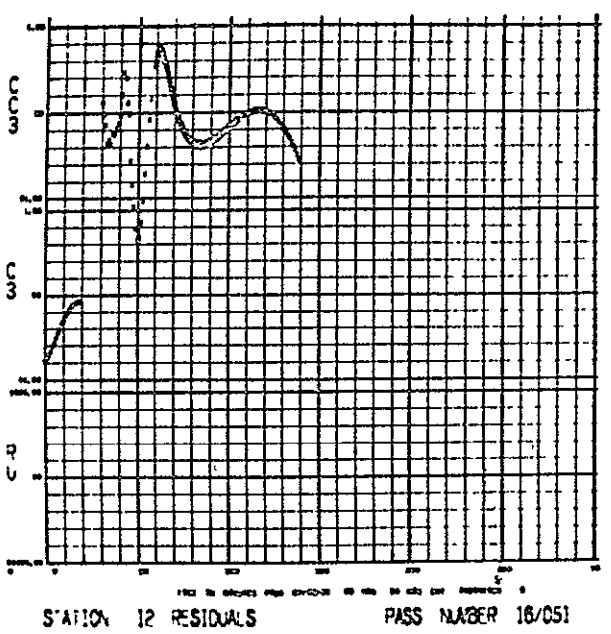
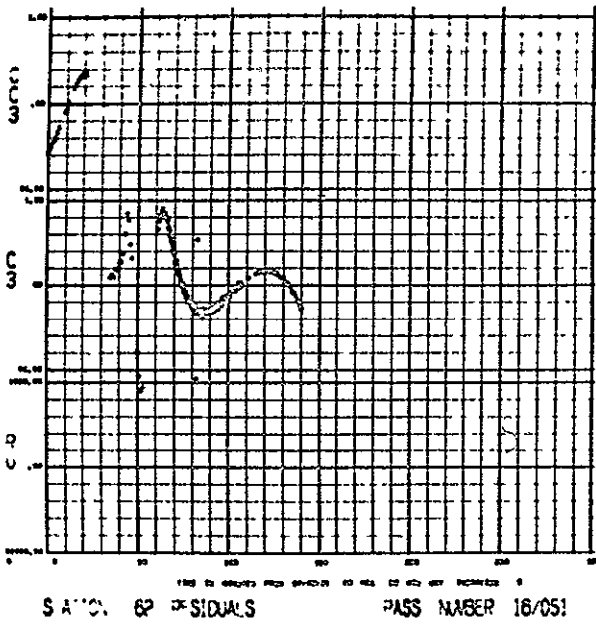
DOPPLER RESIDUALS FOR CASES

2F51P AND 2F52P

D2-100820-1

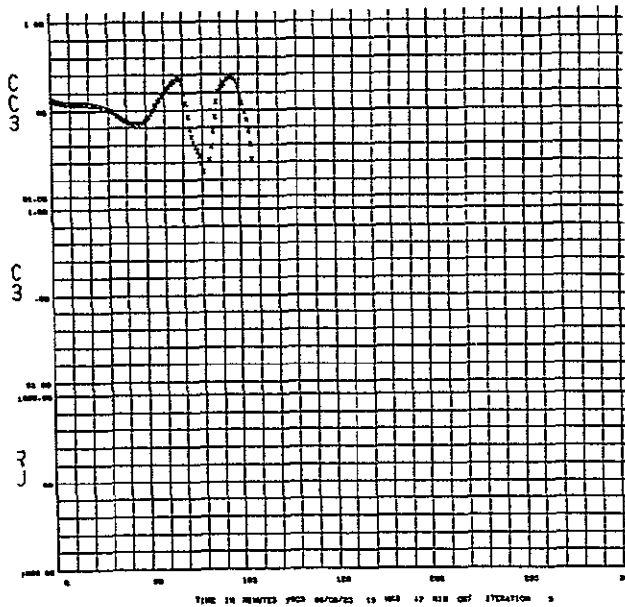
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3F51P-52P

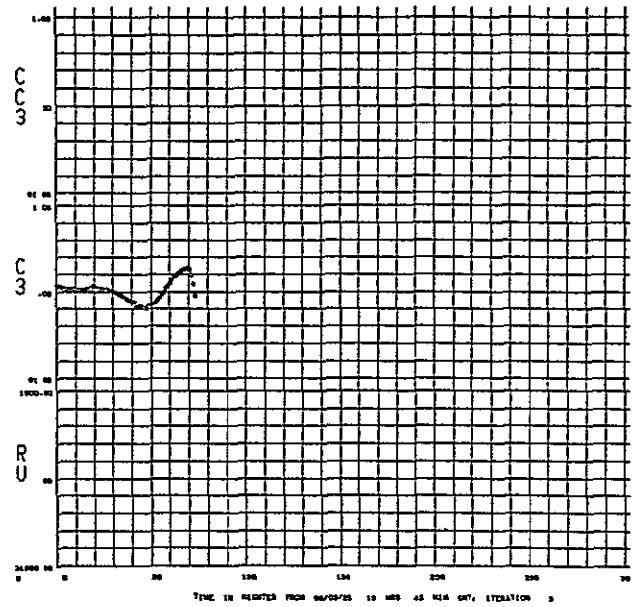


DOPPLER RESIDUALS FOR CASES
3F51P AND 3F52P

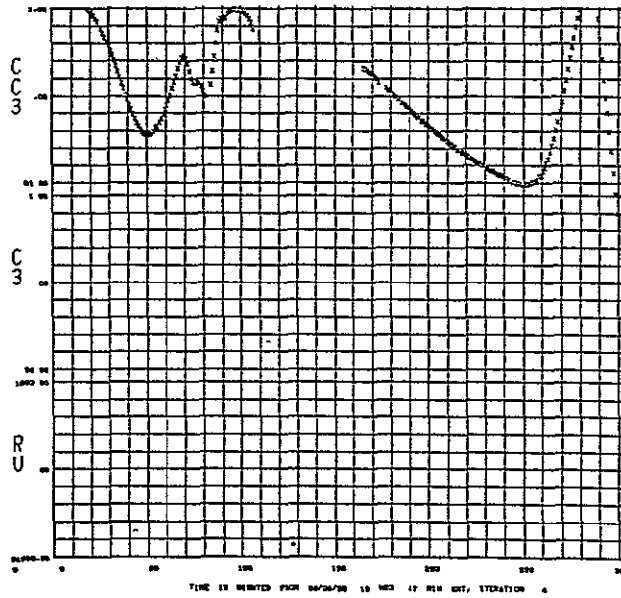
D2-100820-1



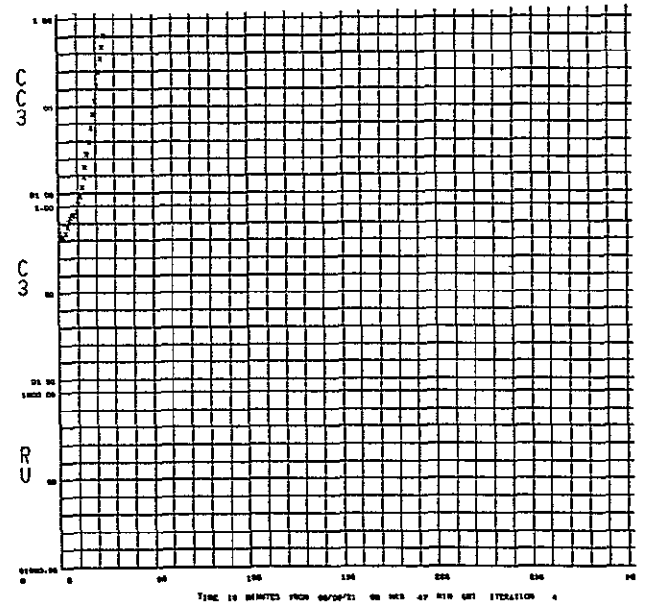
STATION 12 RESIDUALS PASS NUMBER 10/232



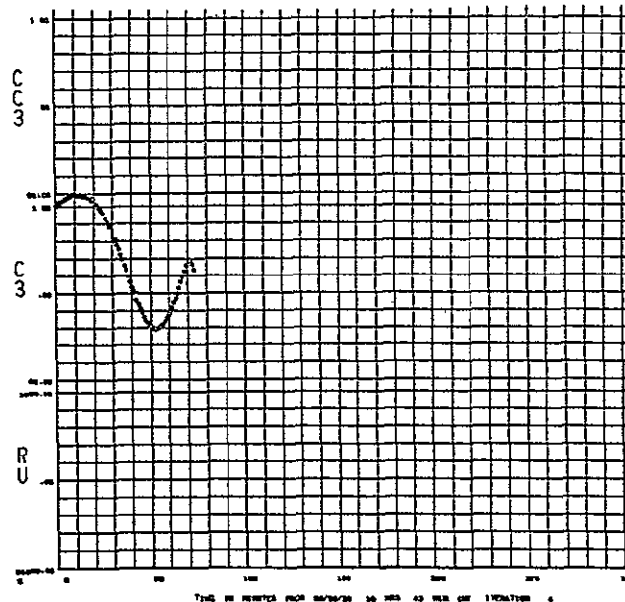
STATION 61 RESIDUALS PASS NUMBER 10/232



STATION 12 RESIDUALS PASS NUMBER 10/232



STATION 12 RESIDUALS PASS NUMBER 10/232



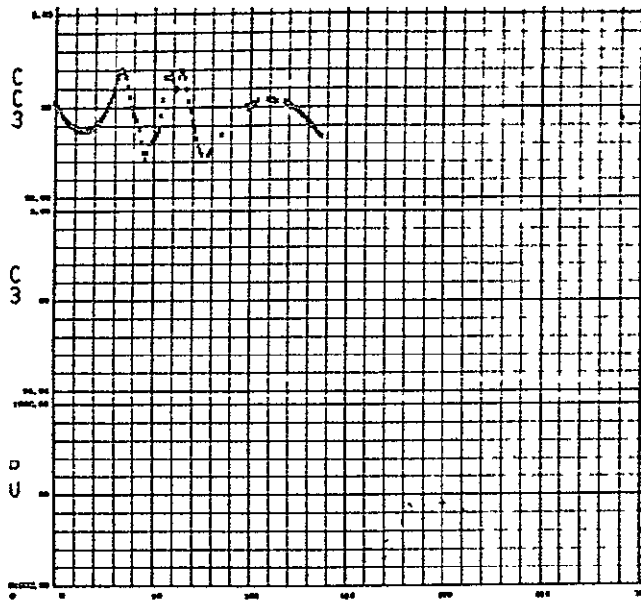
STATION 61 RESIDUALS PASS NUMBER 10/232

DOPPLER RESIDUALS FOR CASES
1B61D AND 1B62D

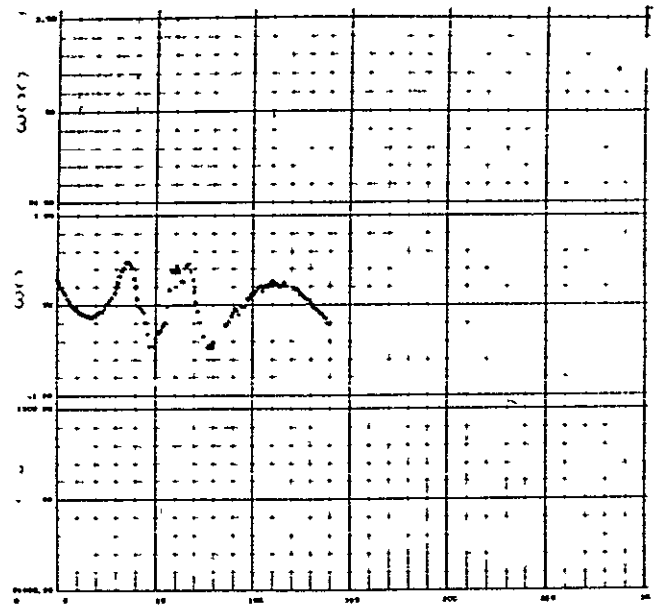
D2-100820-1

1A 1D-62D

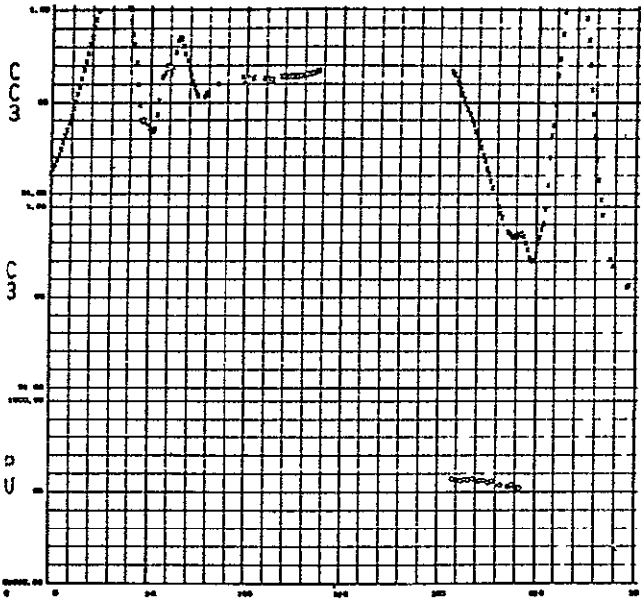
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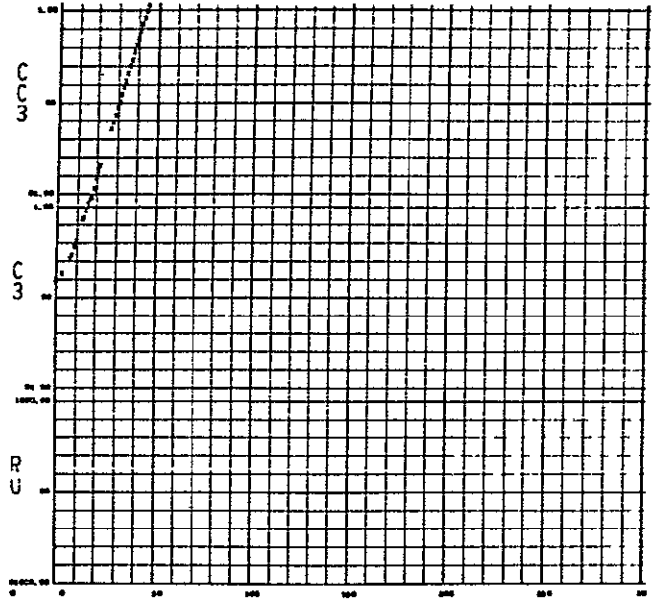
STATION 12 RE-SIDUALS PASS NUMBER 16/326



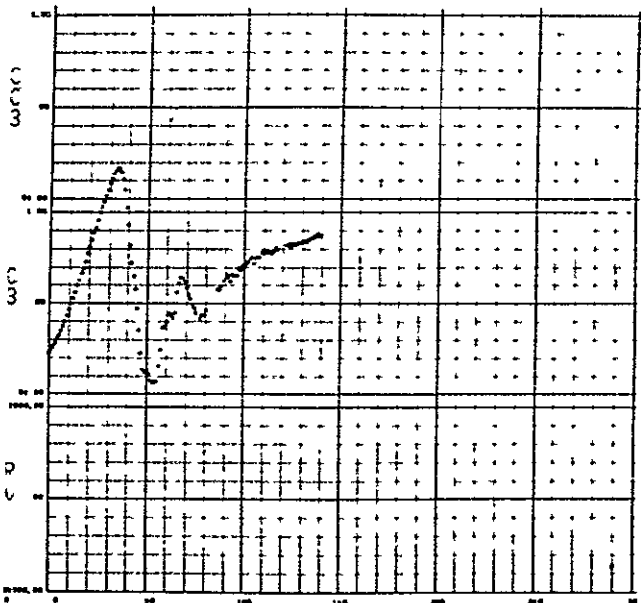
STATION 12 RE-SIDUALS PASS NUMBER 16/326



STATION 12 RE-SIDUALS PASS NUMBER 16/326



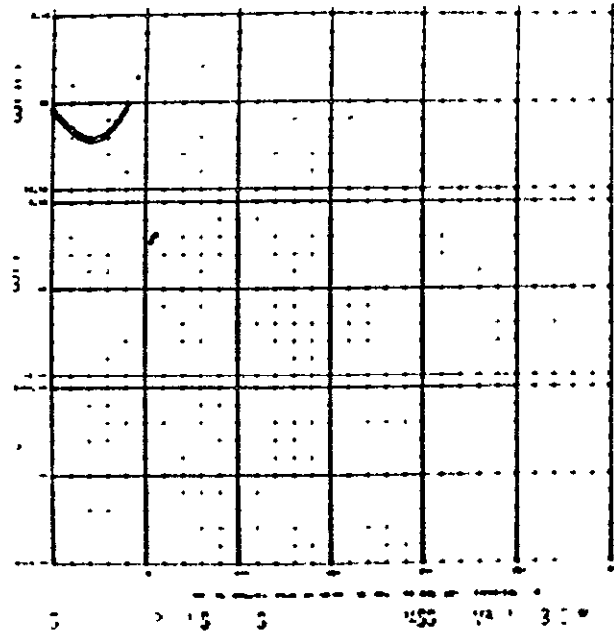
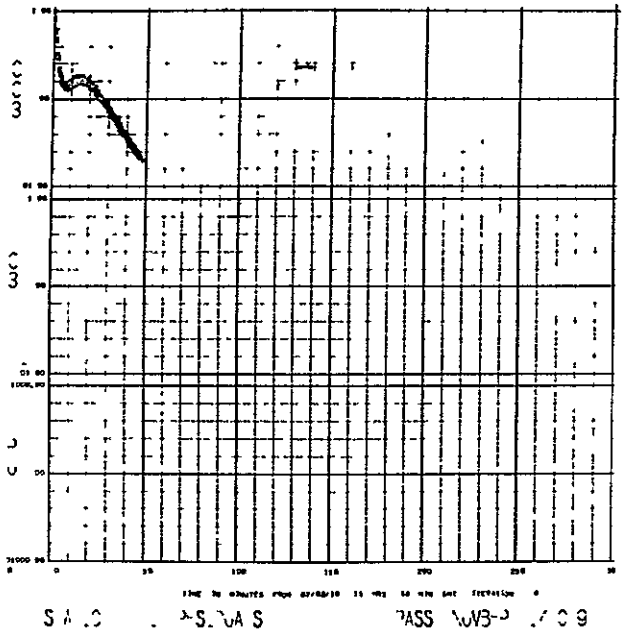
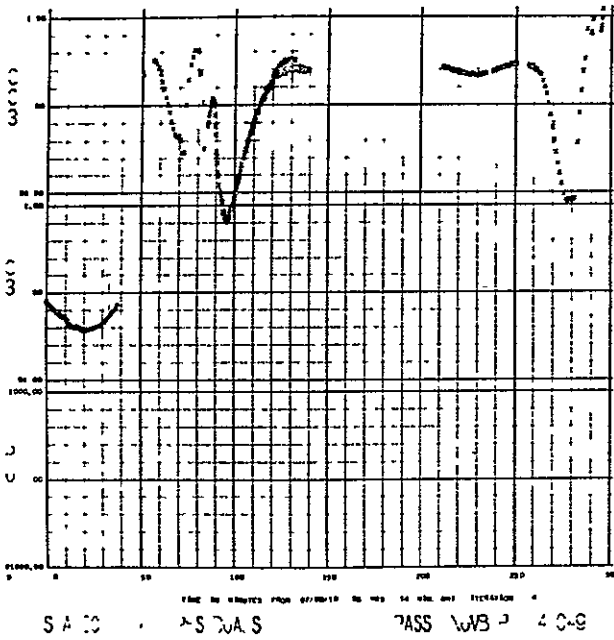
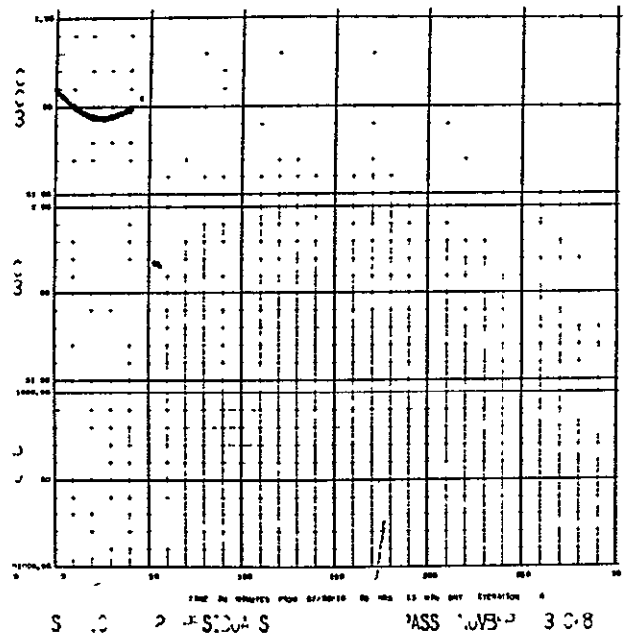
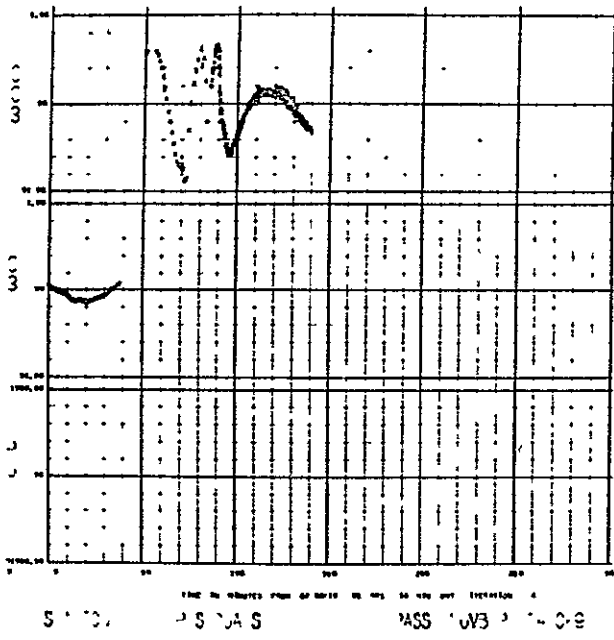
STATION 12 RESIDUALS PASS NUMBER 16/326



STATION 12 RE-SIDUALS PASS NUMBER 16/326

DOPLER RESIDUALS FOR CASES
2D61P & 2D62P

D2-100820-1

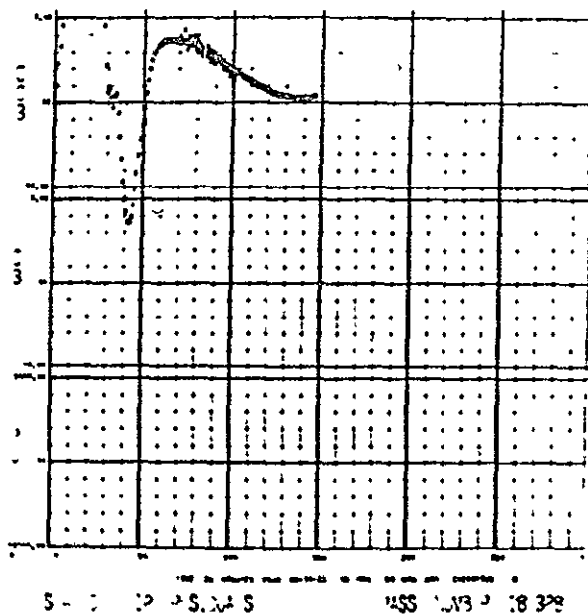
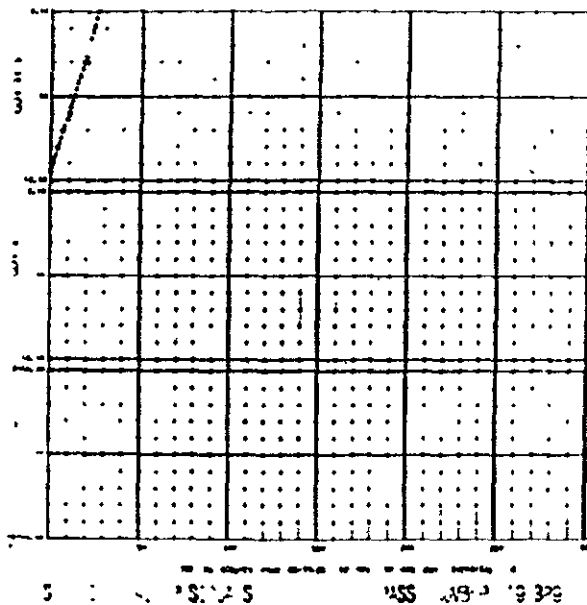
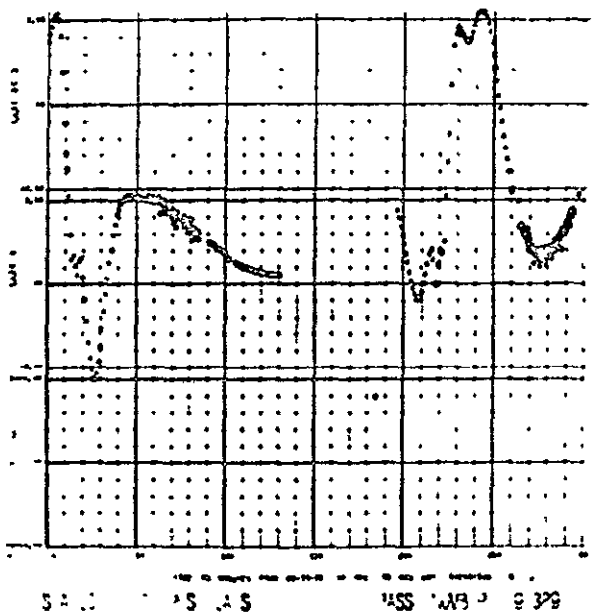
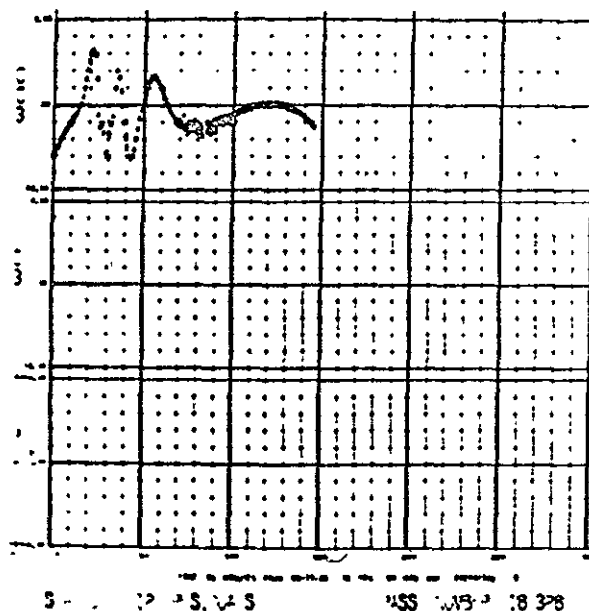
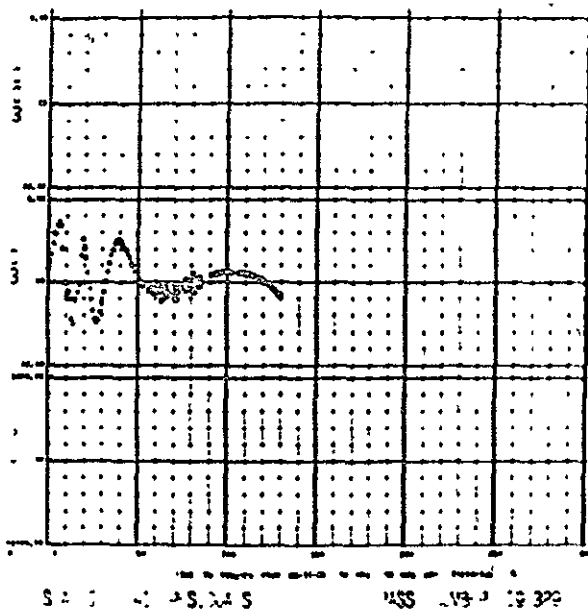


DOPPLER RESIDUALS FOR CASES
 3D61D AND 3D62D

D2-100820-1

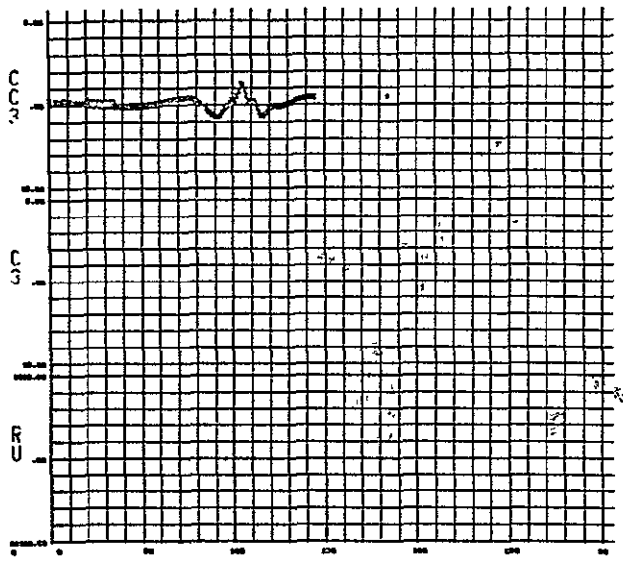
3D 62

2F61P - 22P

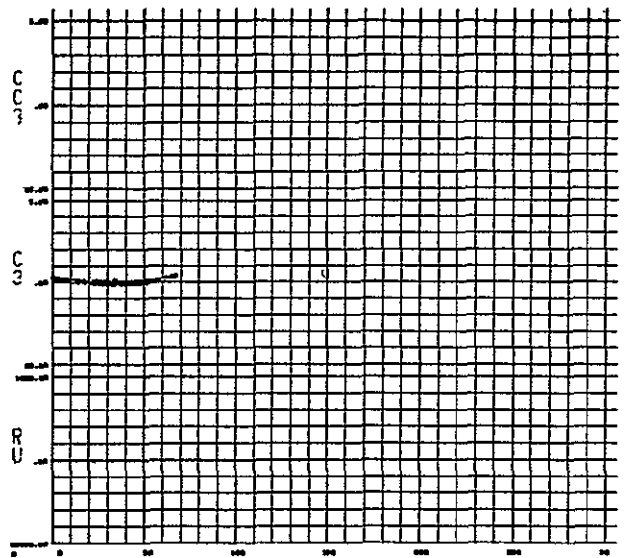


DOPPLER RESIDUALS FOR CASES
2F61P AND 2F62P

D2-100820-1

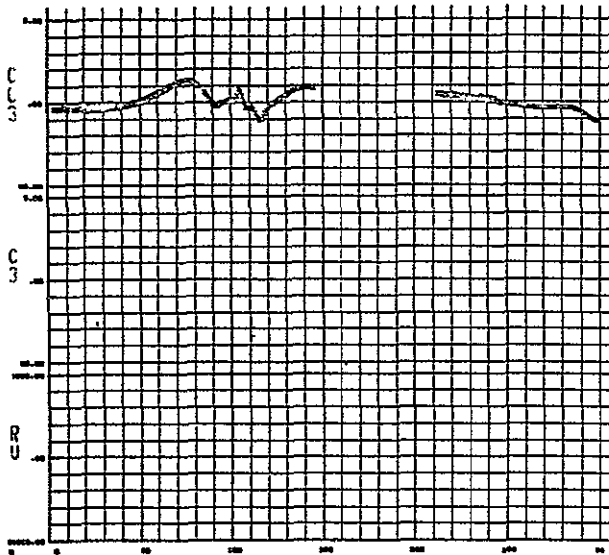


STATION 12 RESIDUALS PASS NUMBER 12/322

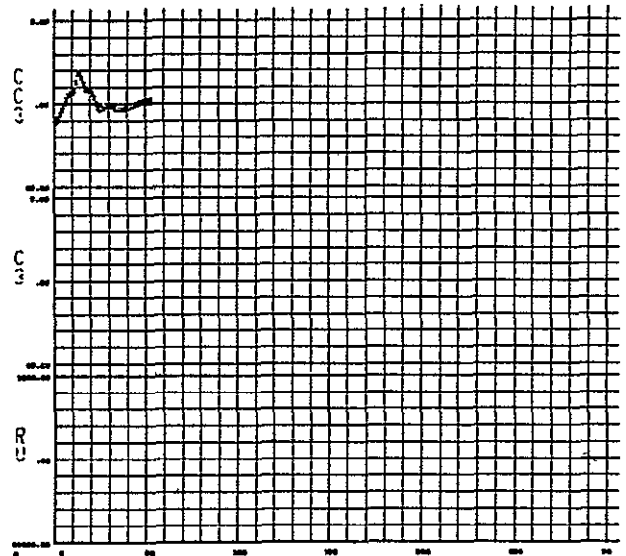


STATION 61 RESIDUALS PASS NUMBER 12/322

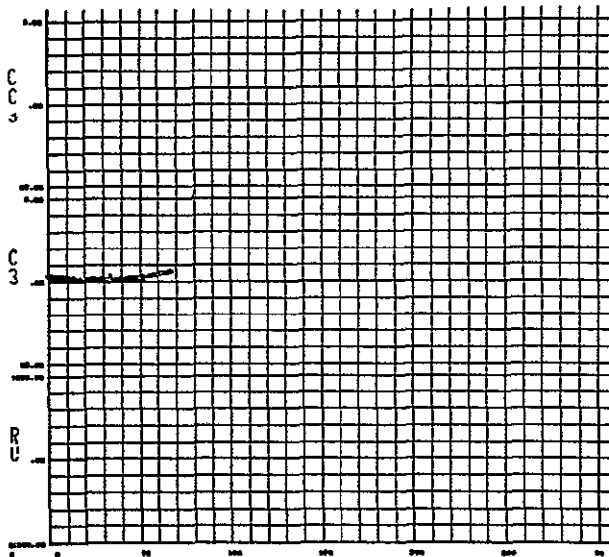
DARK P



STATION 12 RESIDUALS PASS NUMBER 12/322



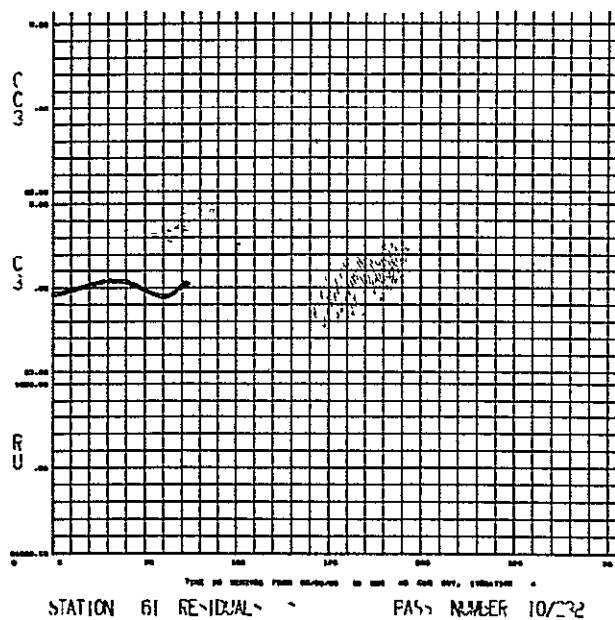
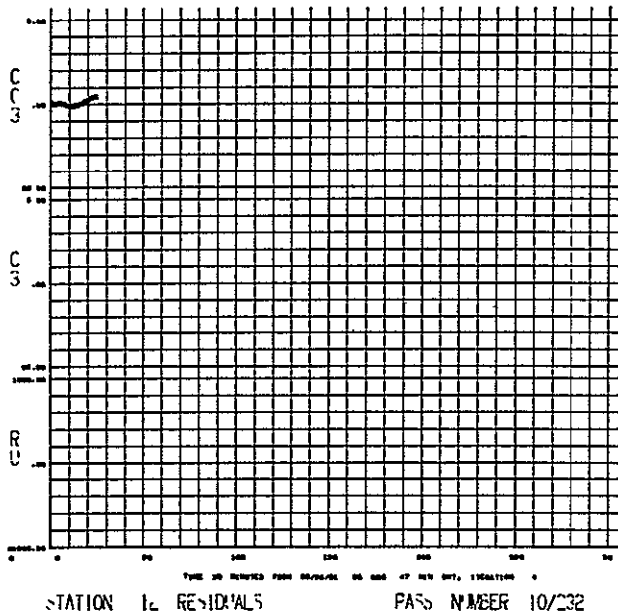
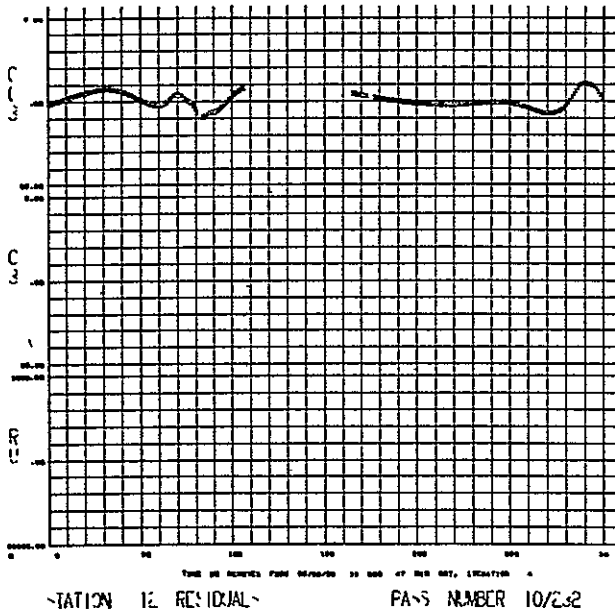
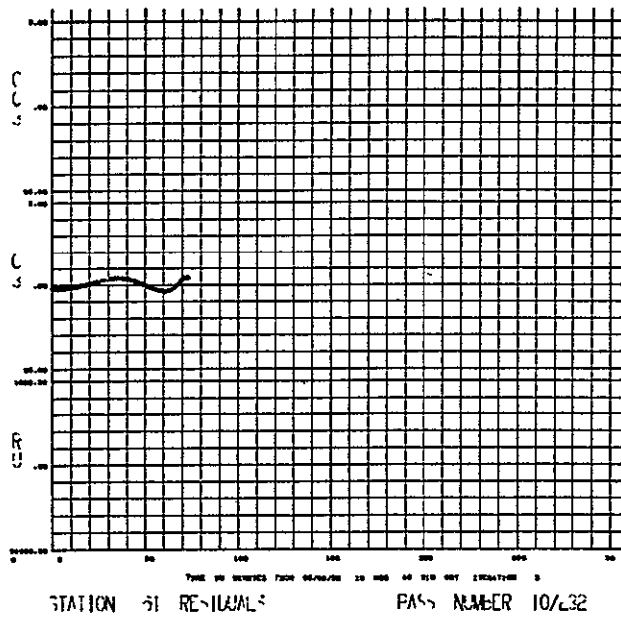
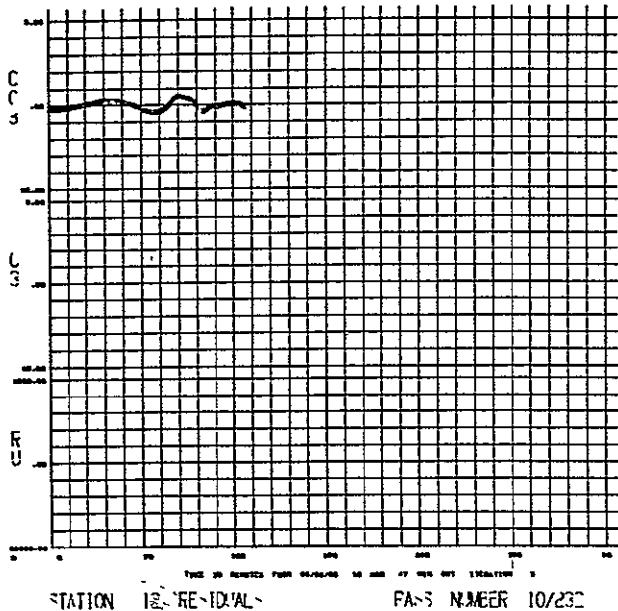
STATION 12 RESIDUALS PASS NUMBER 12/322



STATION 61 RESIDUALS PASS NUMBER 12/322

DOPPLER RESIDUALS FOR CASES
2B71P AND 2B72P

D2-100820-



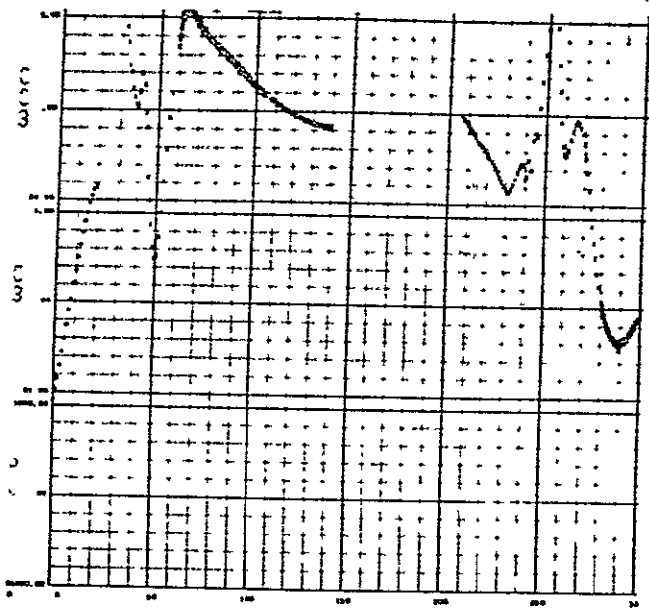
DOPPLER RESIDUALS FOR CASES
1B71P AND 1B72P

D2-100b20-1

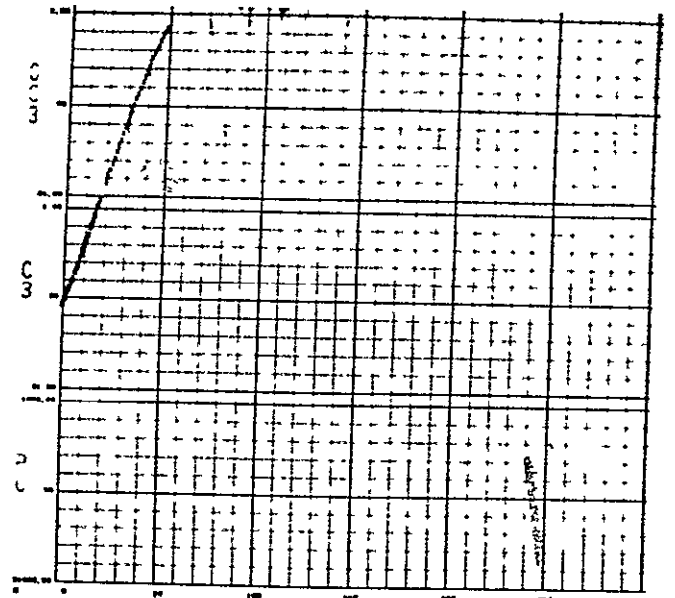
1B71P-2

10/232

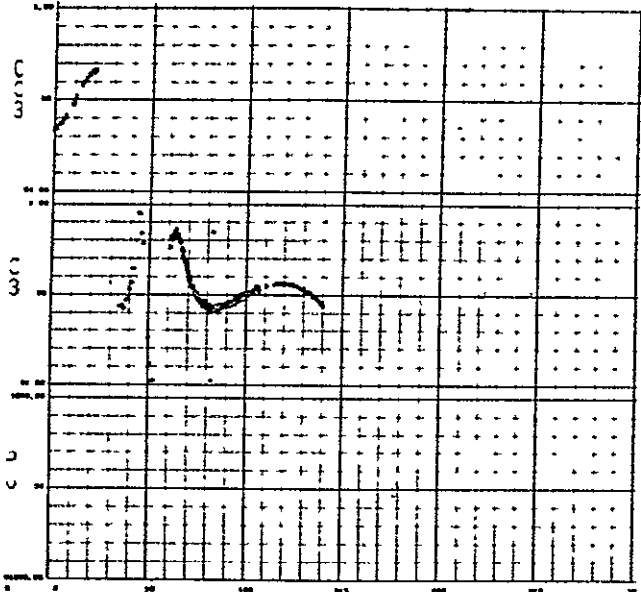
10/232



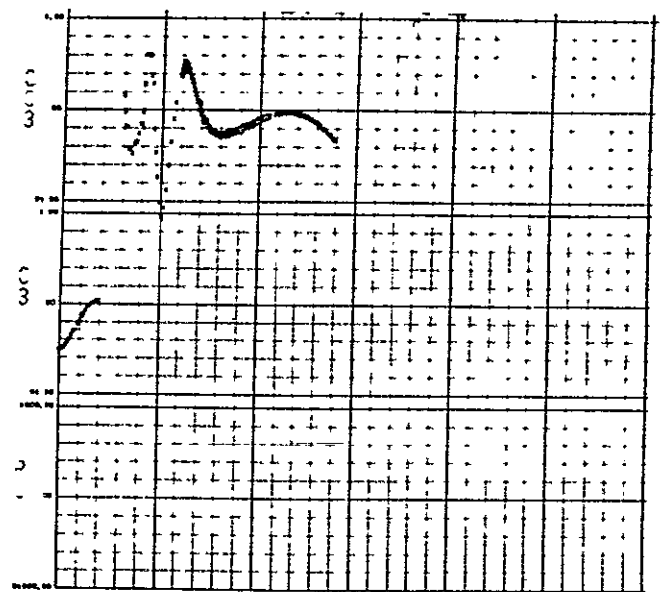
STATION 12 P SQUAS PASS 149-D 8:05



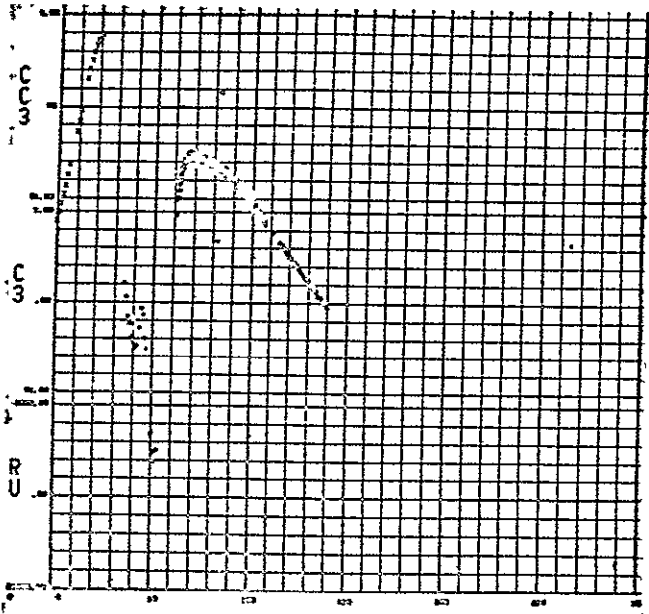
STATION 12 P SQUAS PASS 149-D 8:05



STATION 8P SQUAS PASS 149-D 8:05



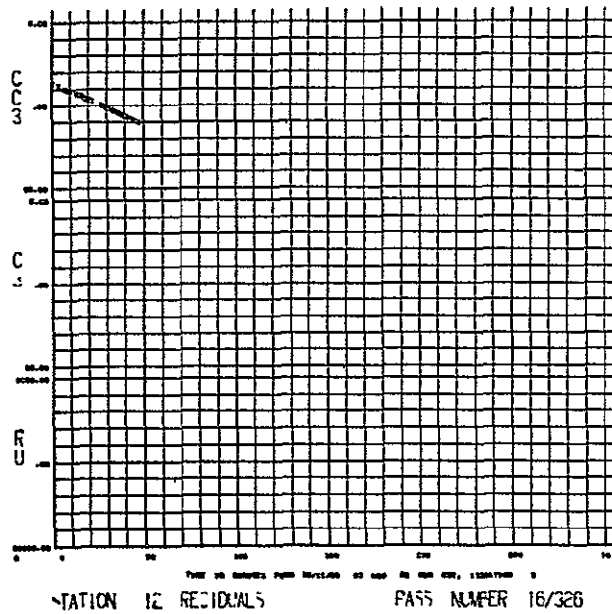
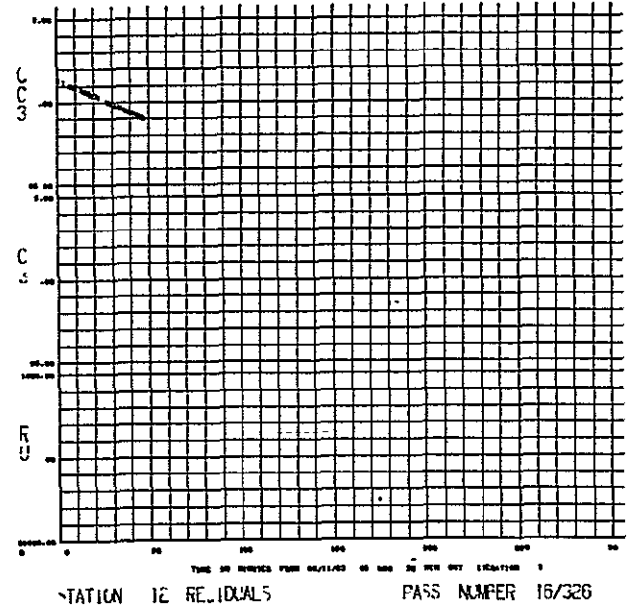
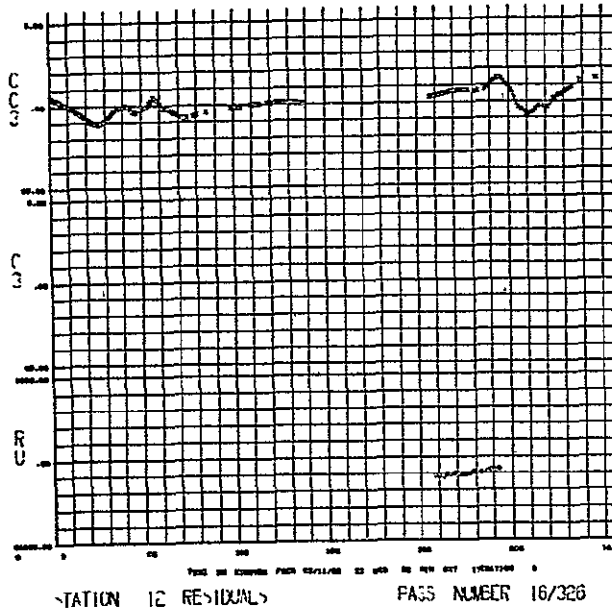
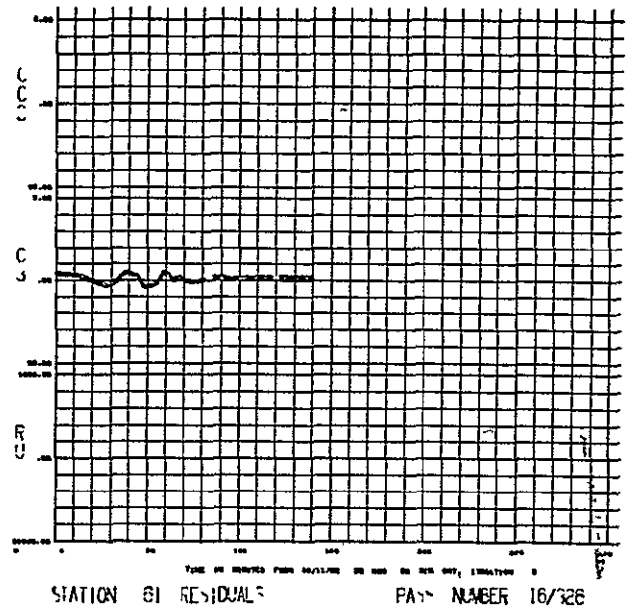
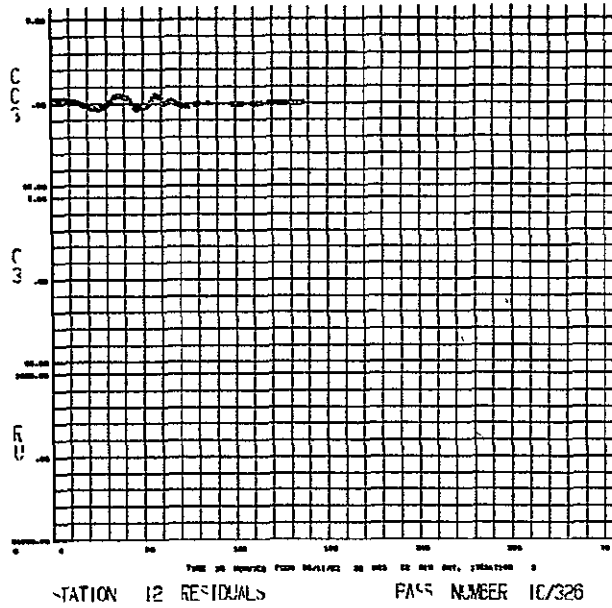
STATION 12 P SQUAS PASS 149-D 8:05



STATION 02 RESIDUALS PASS 149-D 8:05

DOPPLER RESIDUALS FOR CASES
3F61P & 3F62P

D2-100820-1

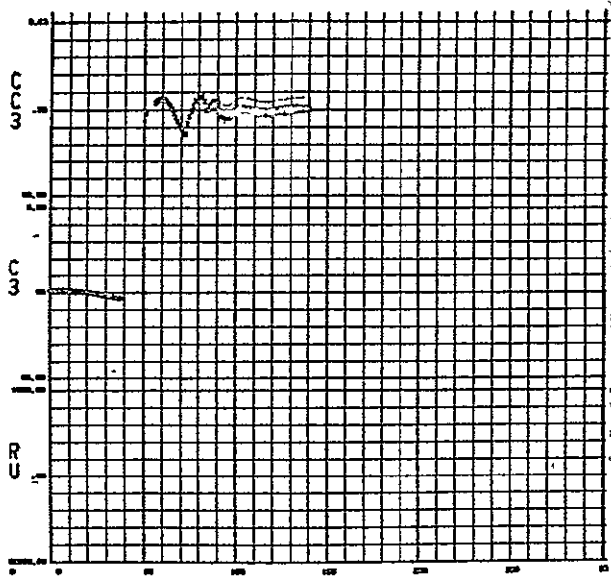


2D71P, 2D72P - 31, 100

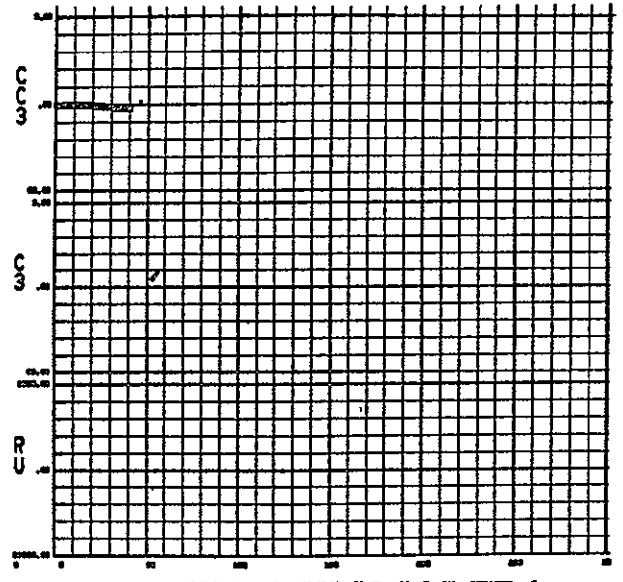
DOPPLER RESIDUALS FOR CASES
2D71P AND 2D72P

D2-100820-1

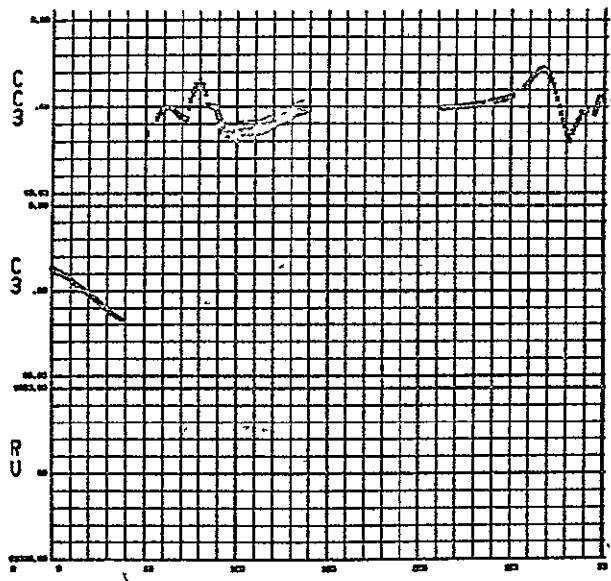
3D71P-72P



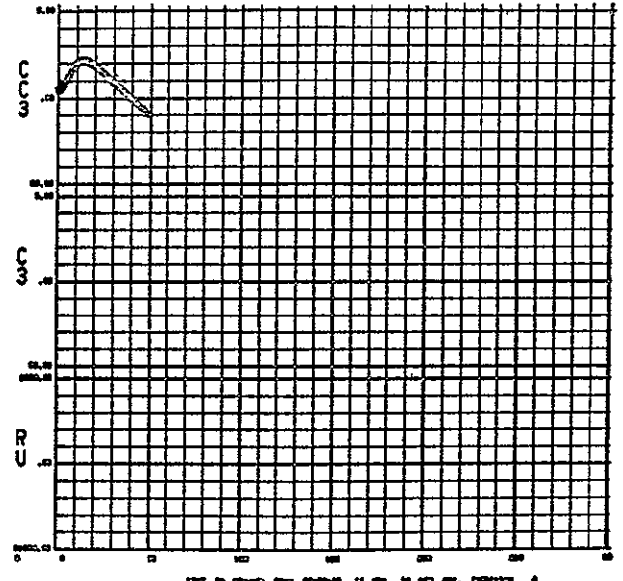
STATION 41 RESIDUALS PASS NUMBER 14/049



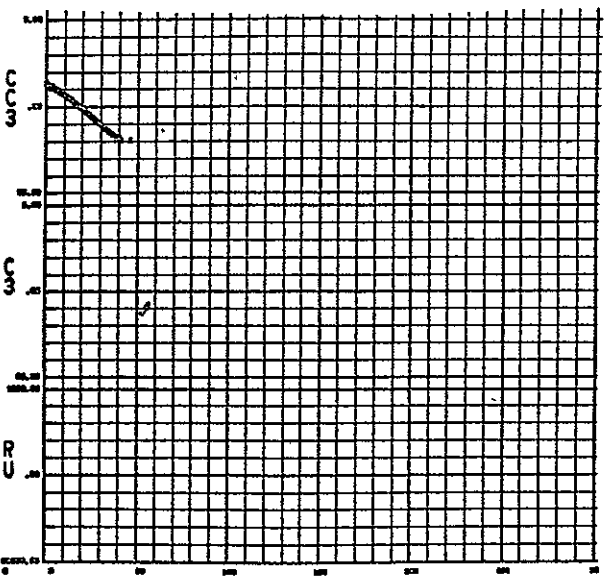
STATION 12 RESIDUALS PASS NUMBER 13/048



STATION 41 RESIDUALS PASS NUMBER 14/049



STATION 41 RESIDUALS PASS NUMBER 14/049

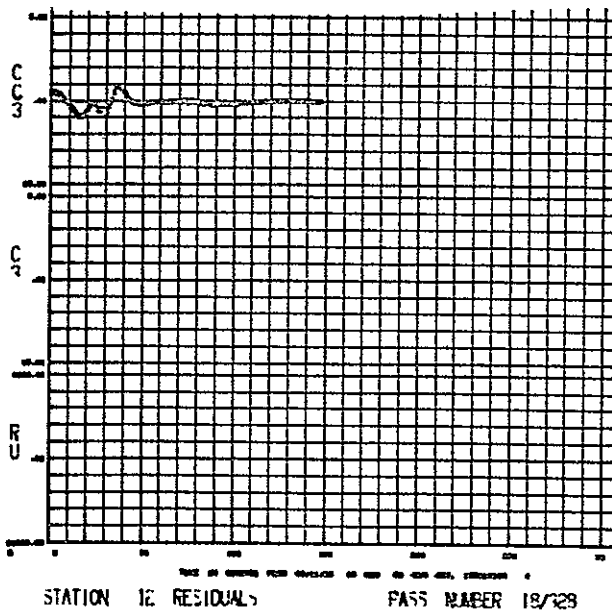
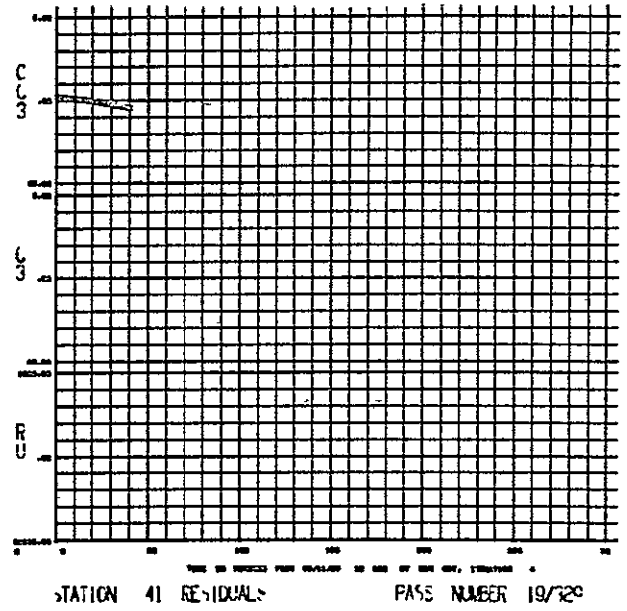
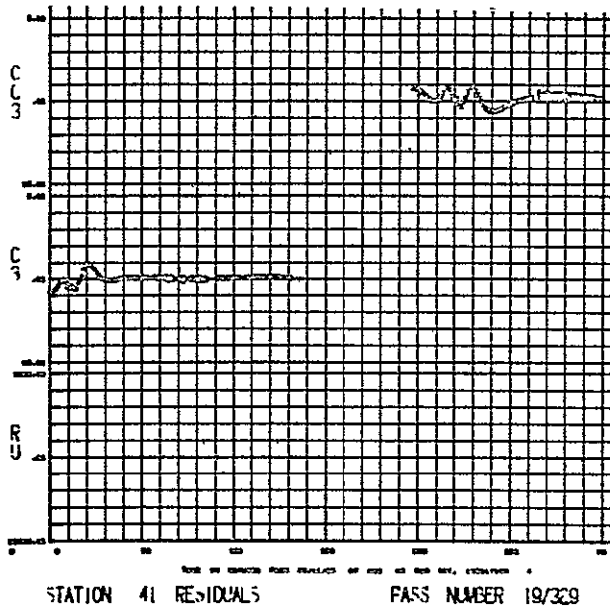
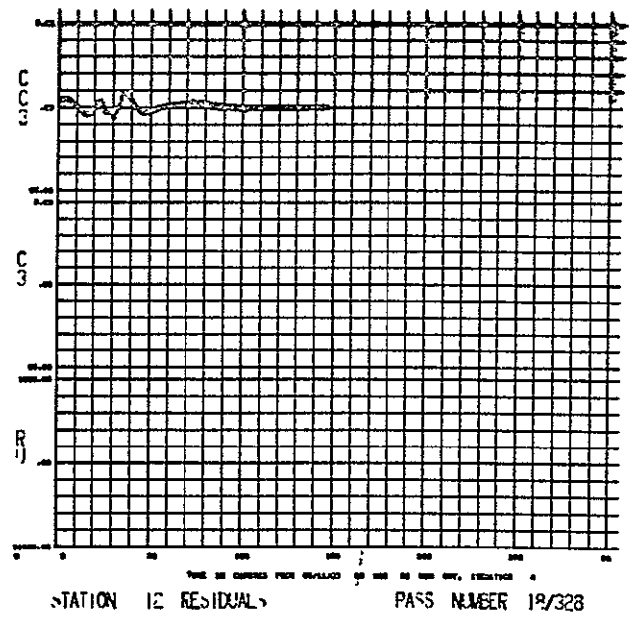
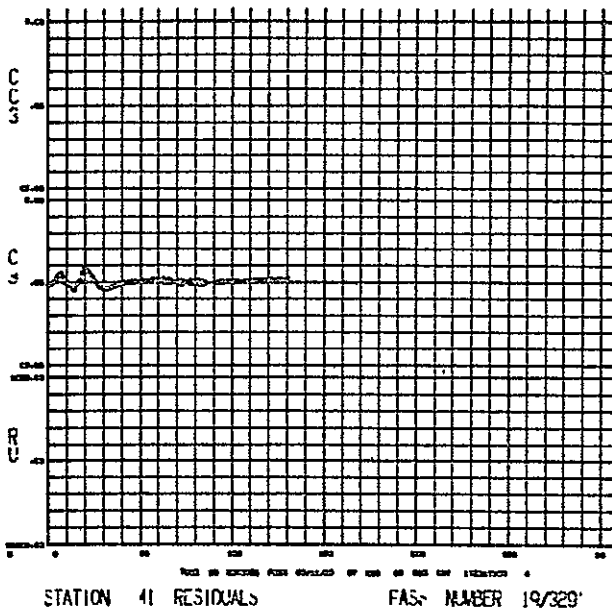


STATION 12 RESIDUALS PASS NUMBER 13/048

DOPPLER RESIDUALS FOR CASES
3D71P AND 3D72P

D2-100520-

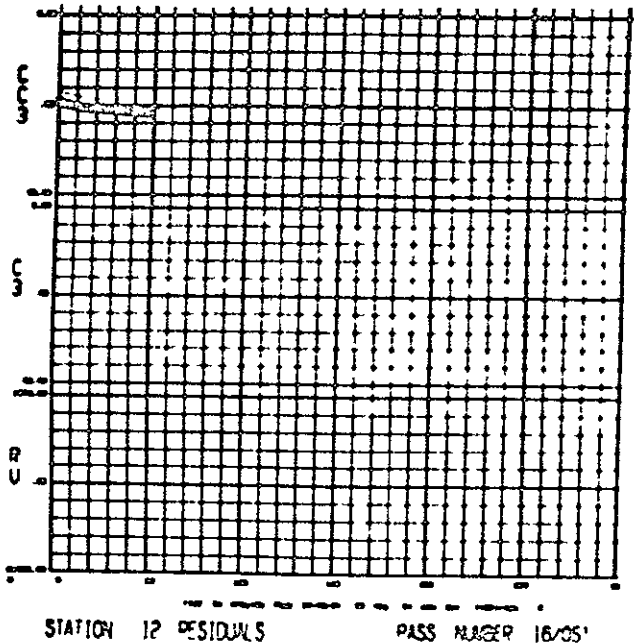
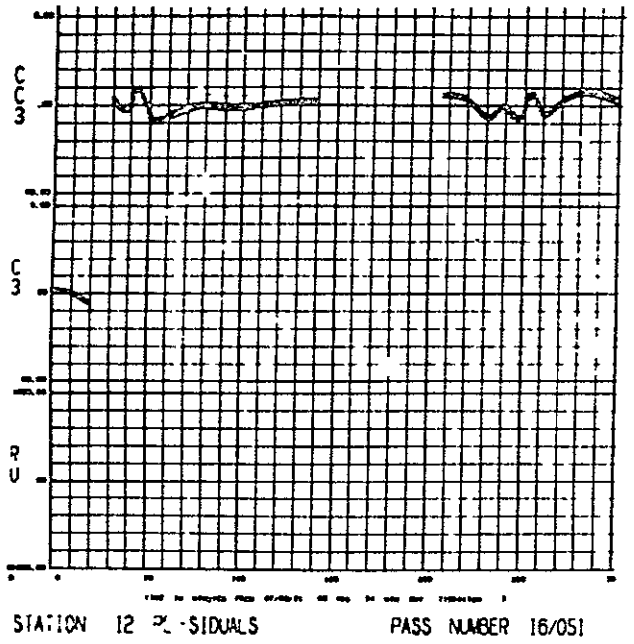
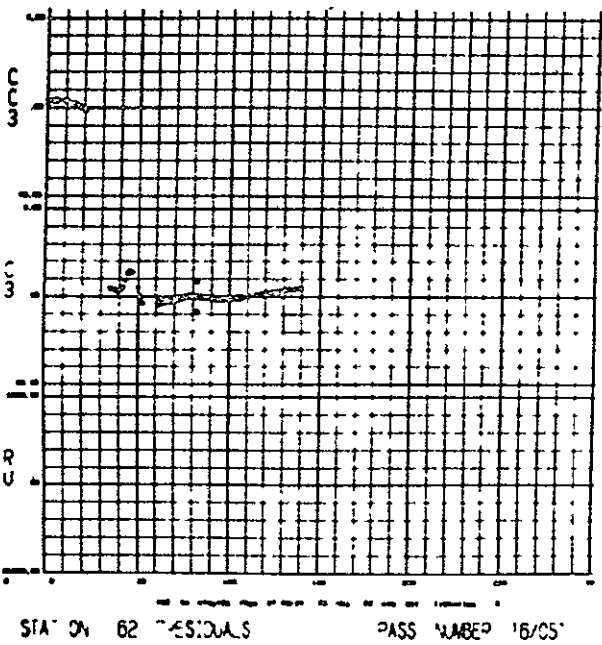
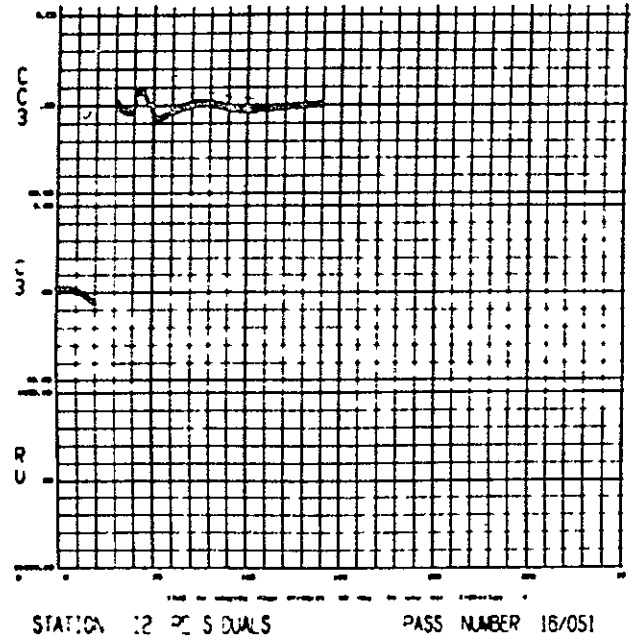
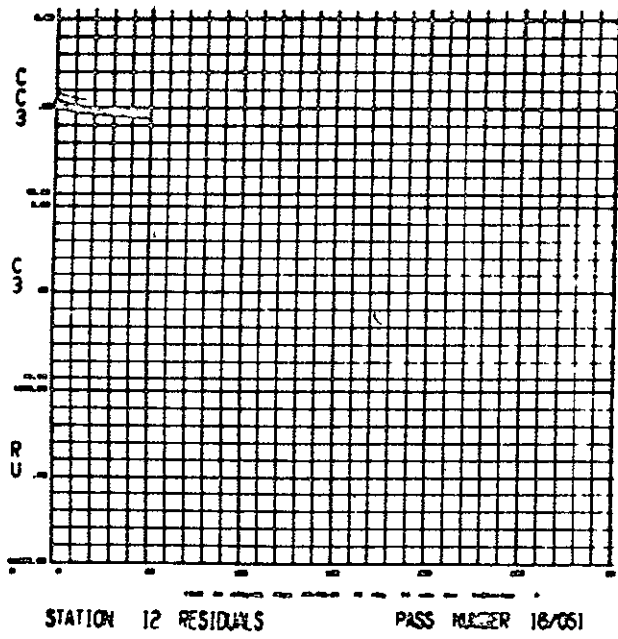
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DOPPLER RESIDUALS FOR CASES
2F71P AND 2F72P

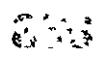
02-100920-1

2F71P - 72P

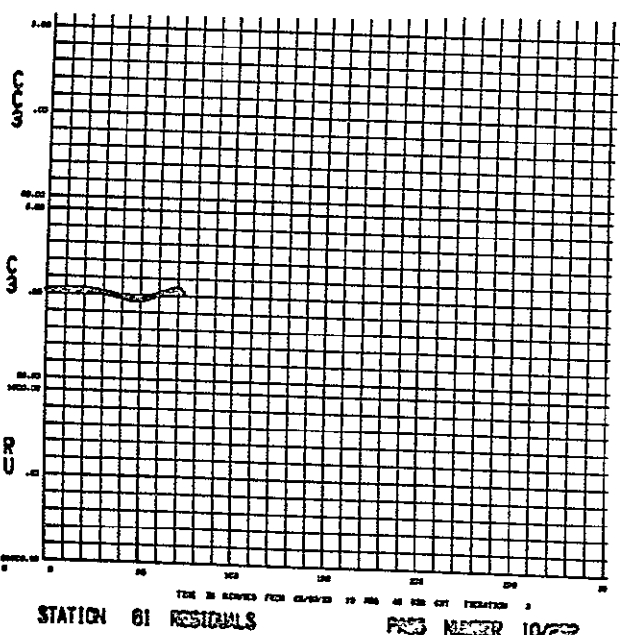
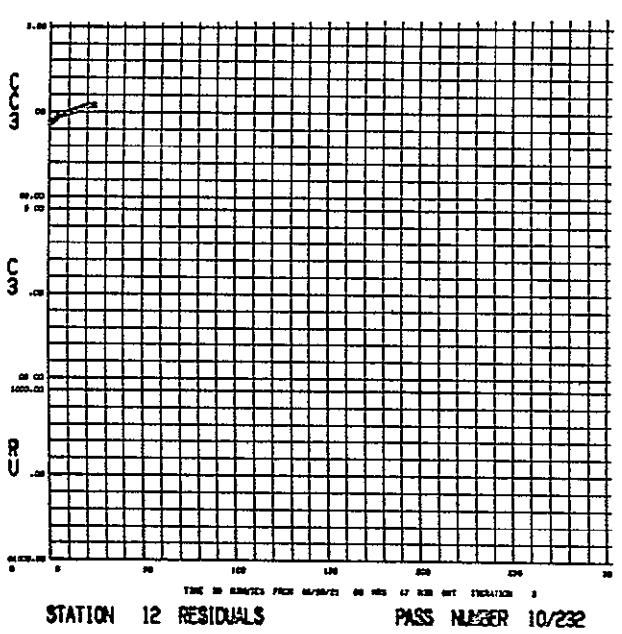
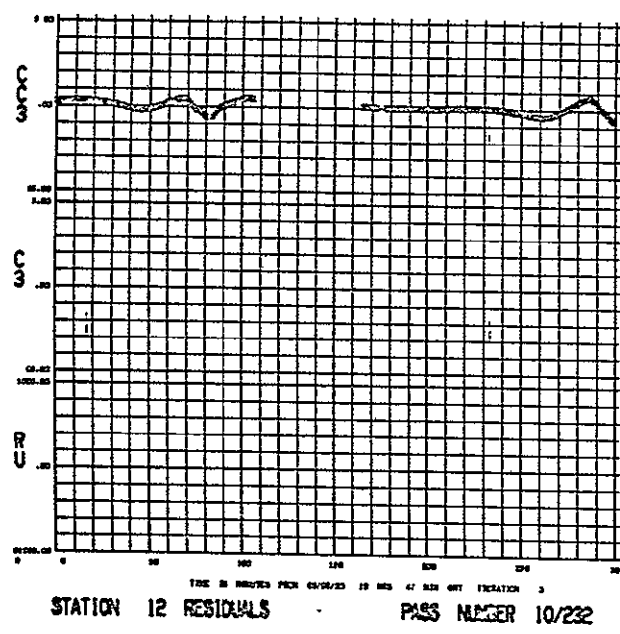
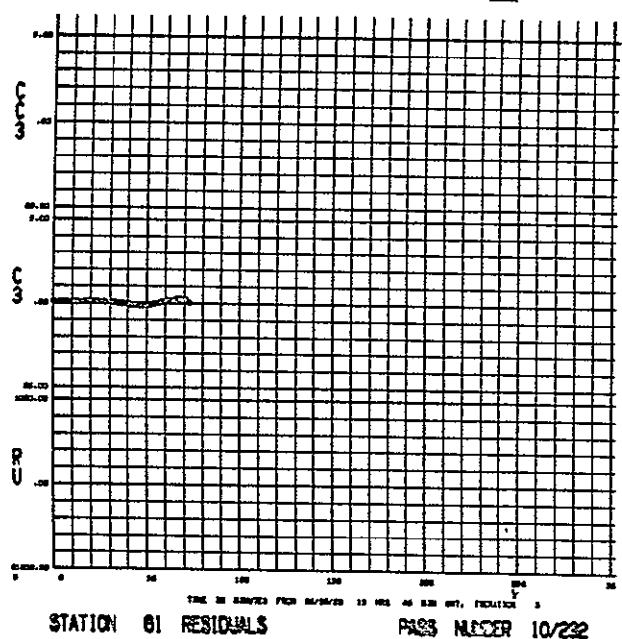
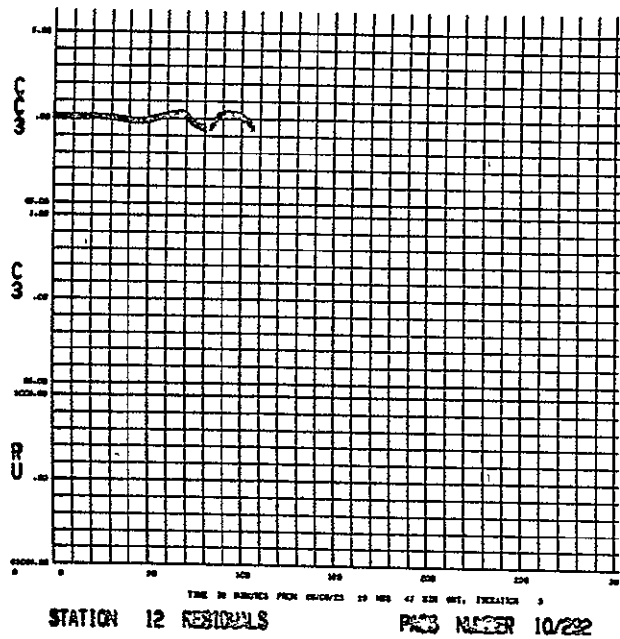


DOPPLER RESIDUALS FOR CASES
3F71P AND 3F72P

D2-100820-1



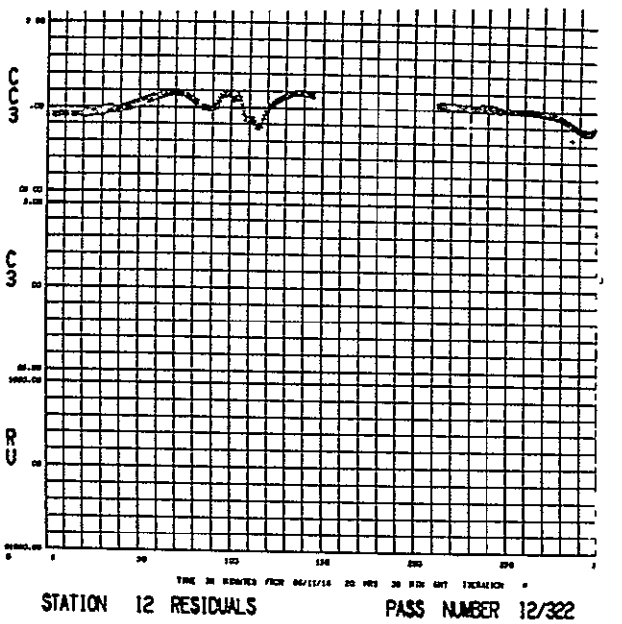
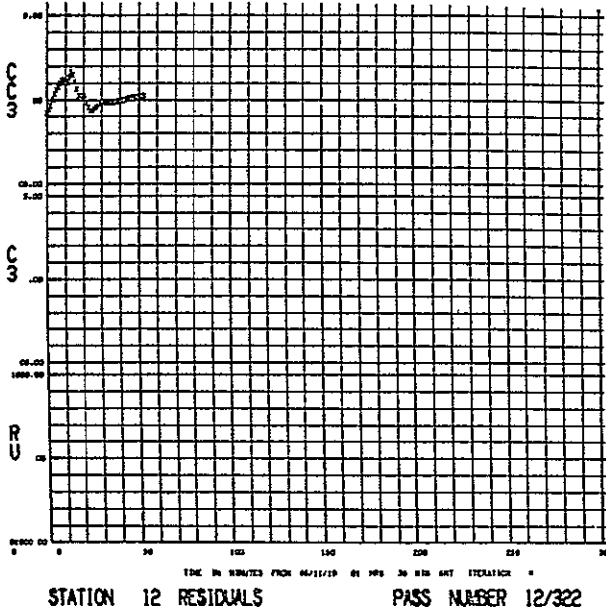
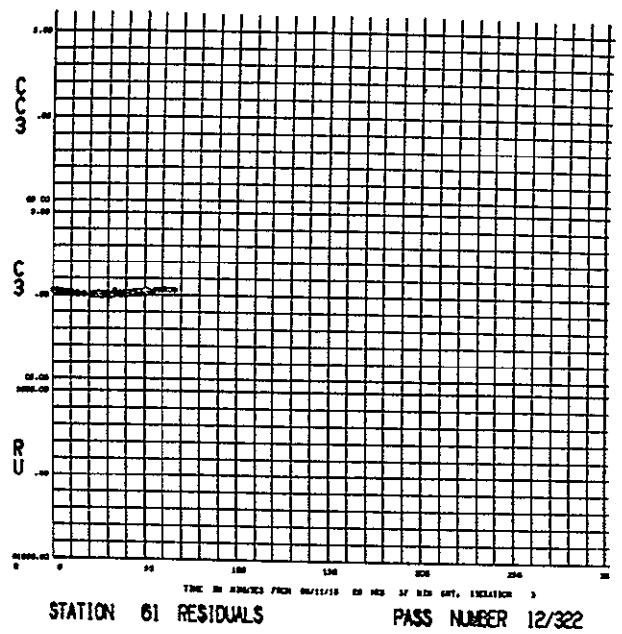
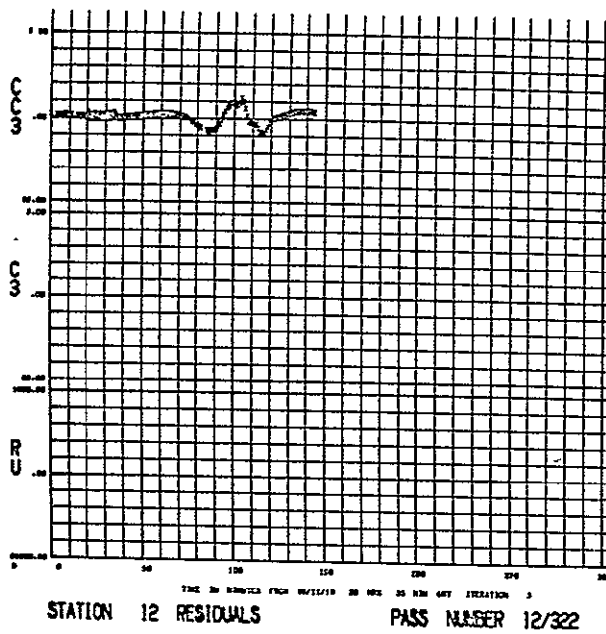
1B81P-82P



DOPPLER RESIDUALS FOR CASES
1B81P AND 1B82P

D2-100820-1

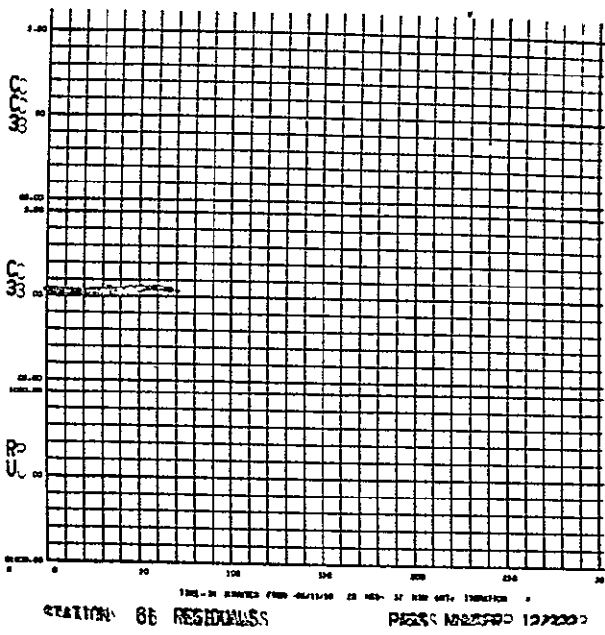




288P-1

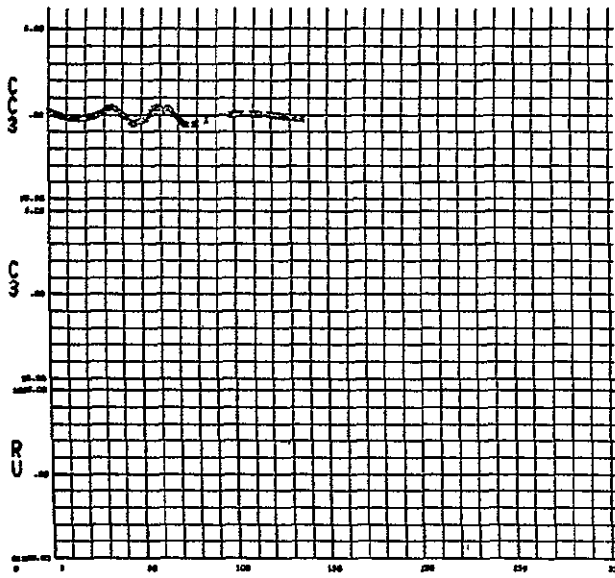
DOPPLER RESIDUALS FOR CASES
2881P AND 2882P

D2-100 20-1

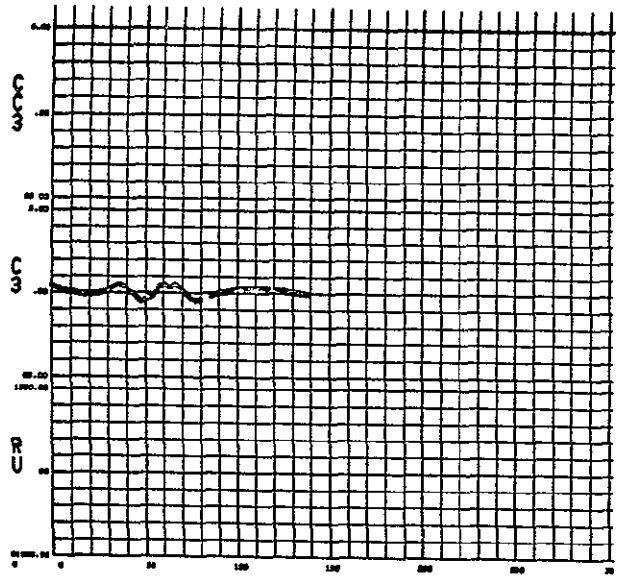


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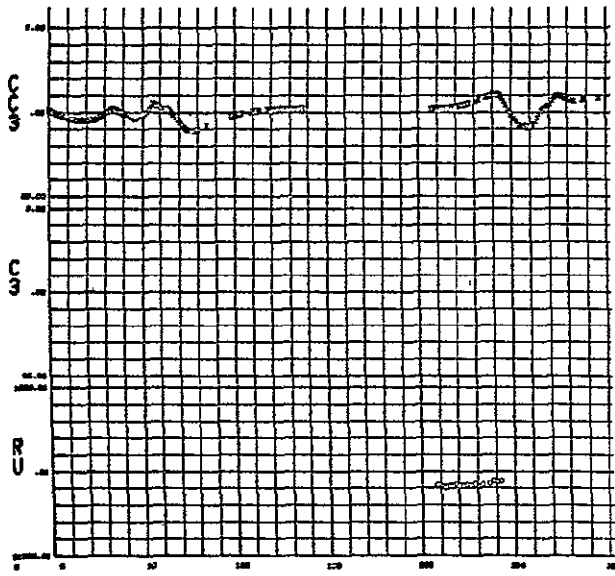
2: 81P-82P



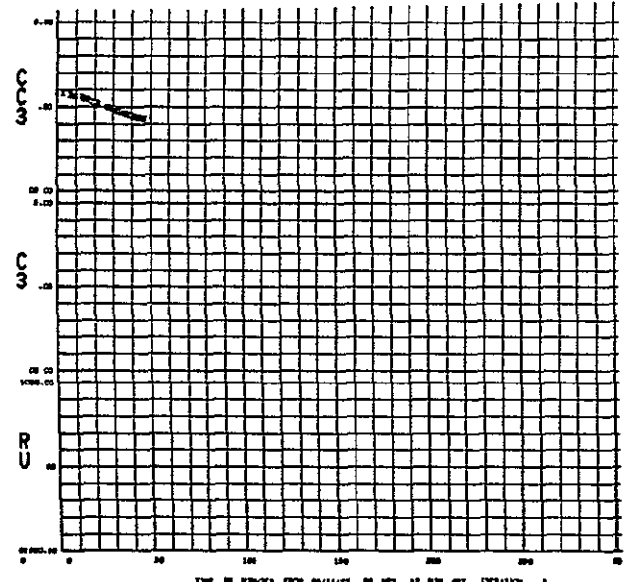
STATION 12 RESIDUALS PASS NUMBER 16/326



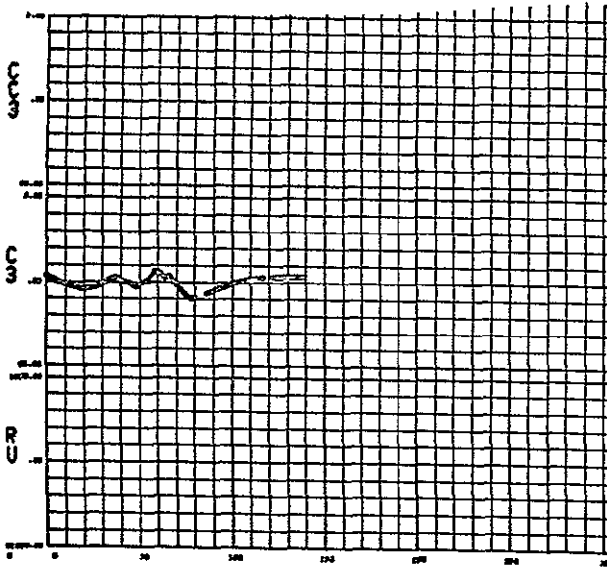
STATION 61 RESIDUALS PASS NUMBER 16/326



STATION 12 RESIDUALS PASS NUMBER 16/326



STATION 12 RESIDUALS PASS NUMBER 16/326

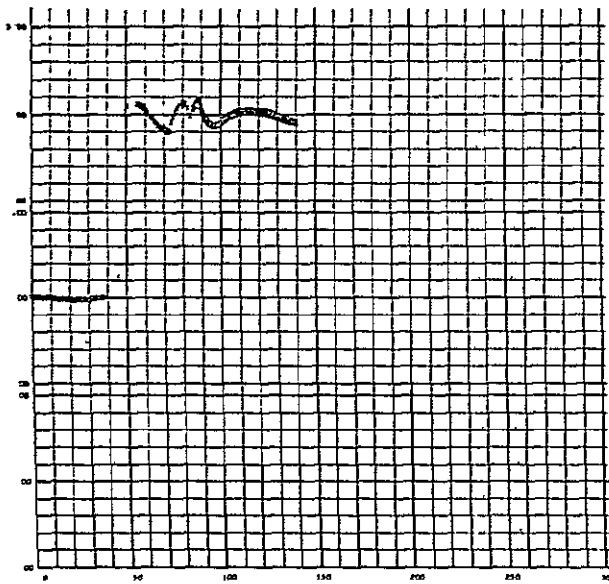


STATION 61 RESIDUALS PASS NUMBER 16/326

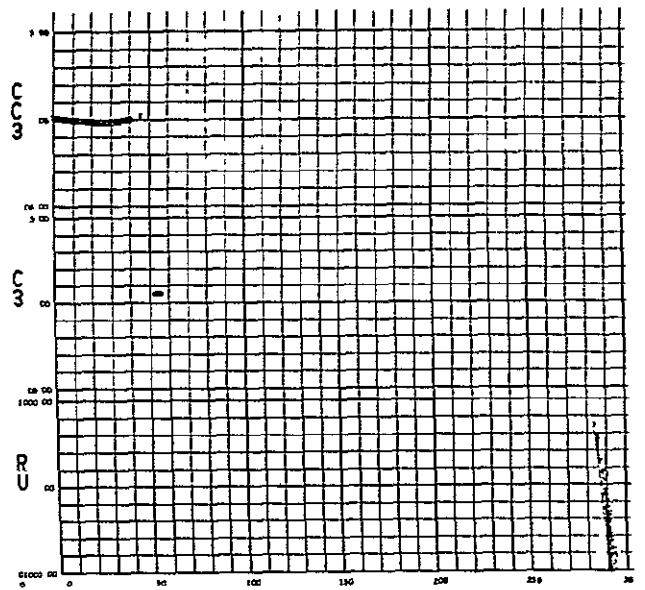
DOPLER RESIDUALS FOR CASES 2D81P AND 2D82P

D2-10020-1

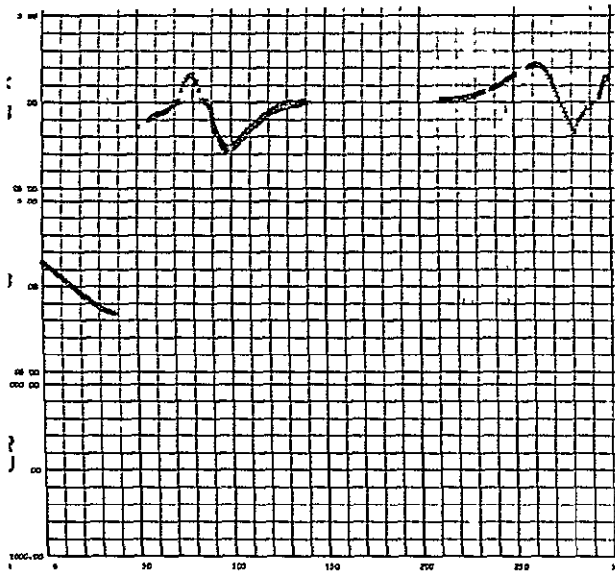
Handwritten signature or initials.



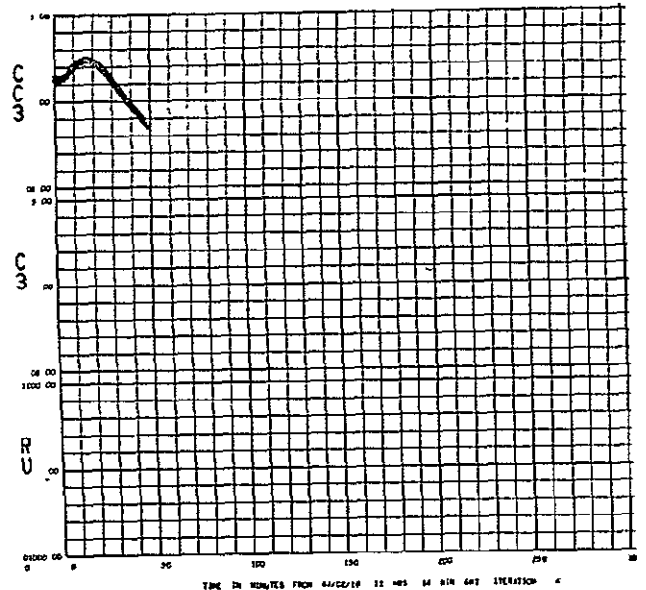
STATION 41 RESIDUALS PASS NUMBER 14/049



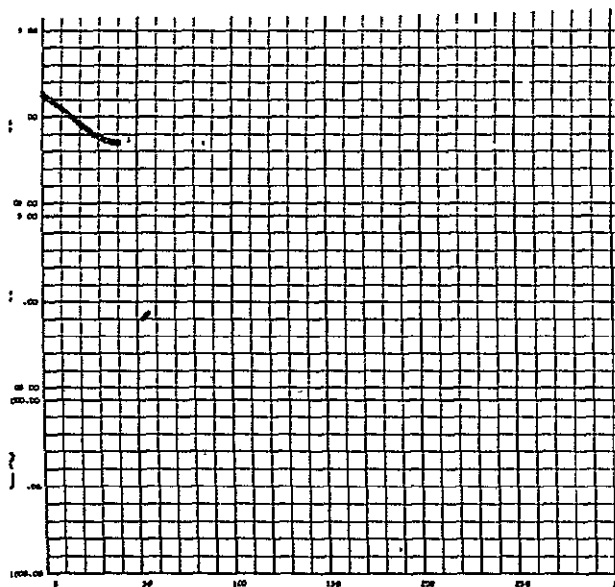
STATION 12 RESIDUALS PASS NUMBER 13/048



STATION 41 RESIDUALS PASS NUMBER 14/049



STATION 41 RESIDUALS PASS NUMBER 14/049



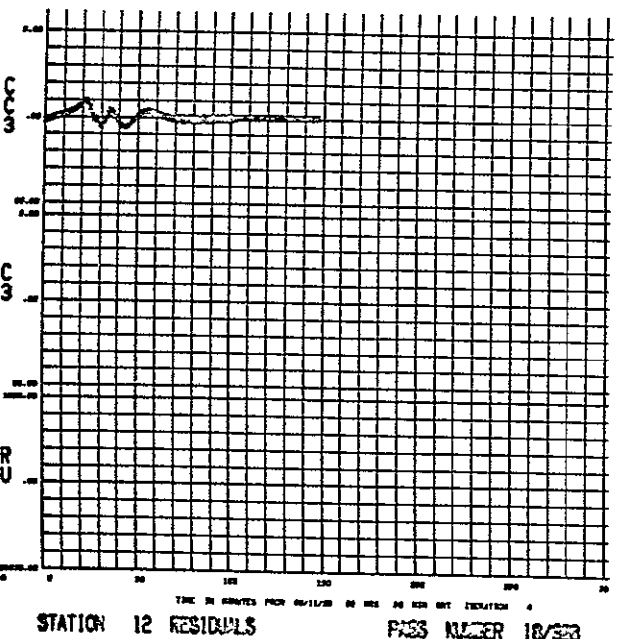
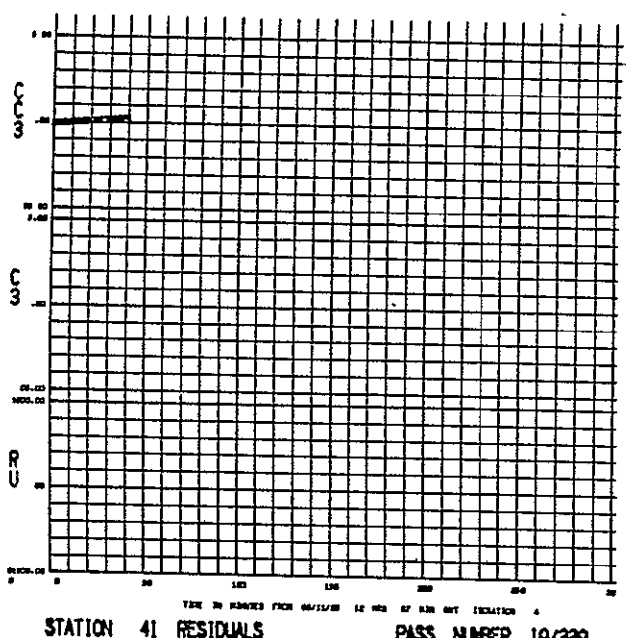
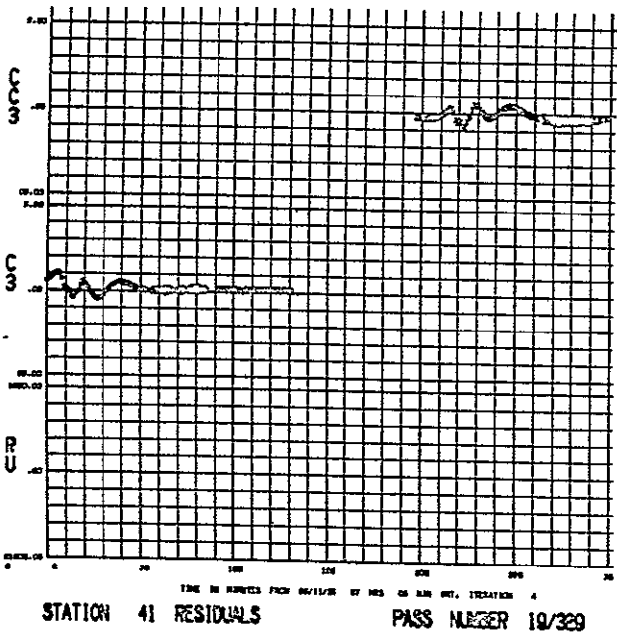
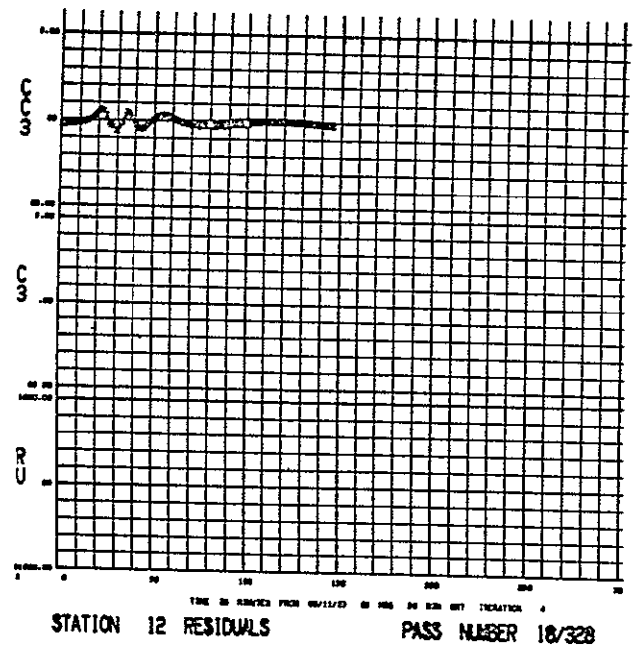
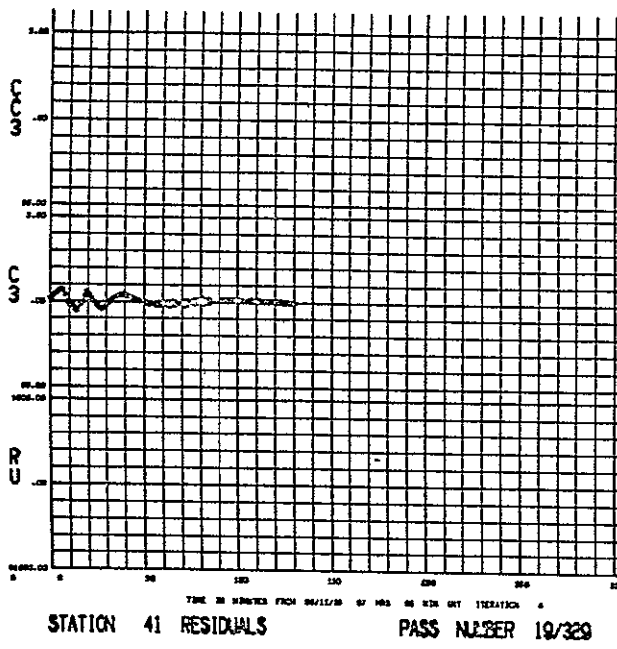
STATION 12 RESIDUALS PASS NUMBER 13/048

3-10 01/10

DOPPLER RESIDUALS FOR CASES
3D81P AND 3D82P

D2=100820-1

83

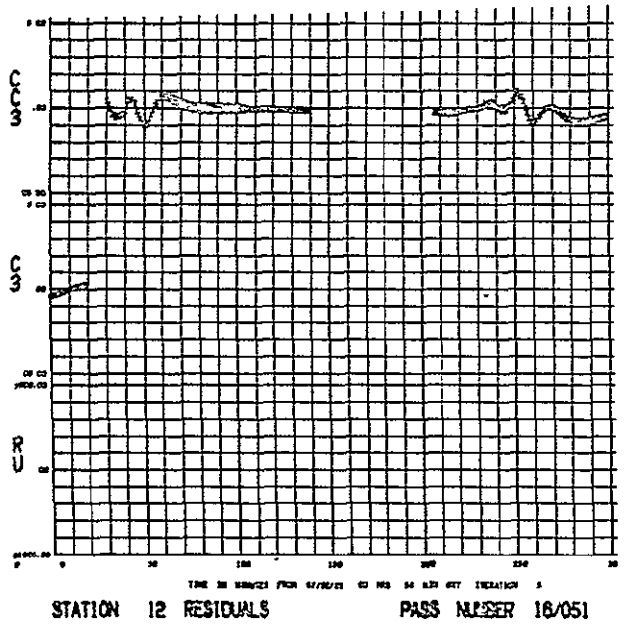
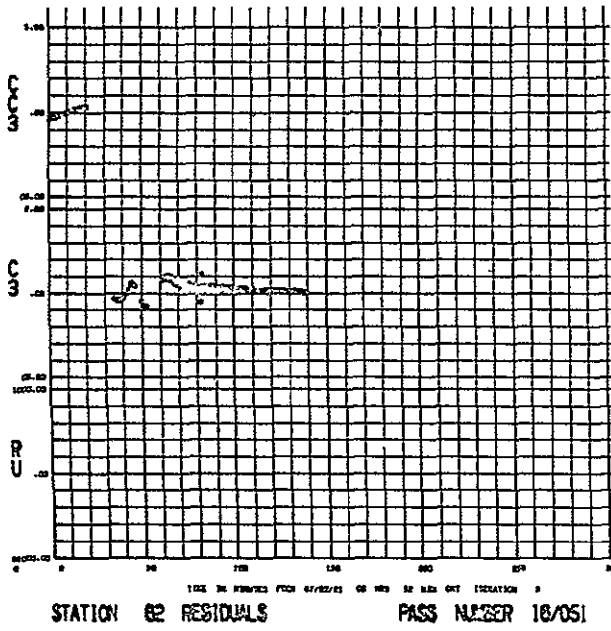
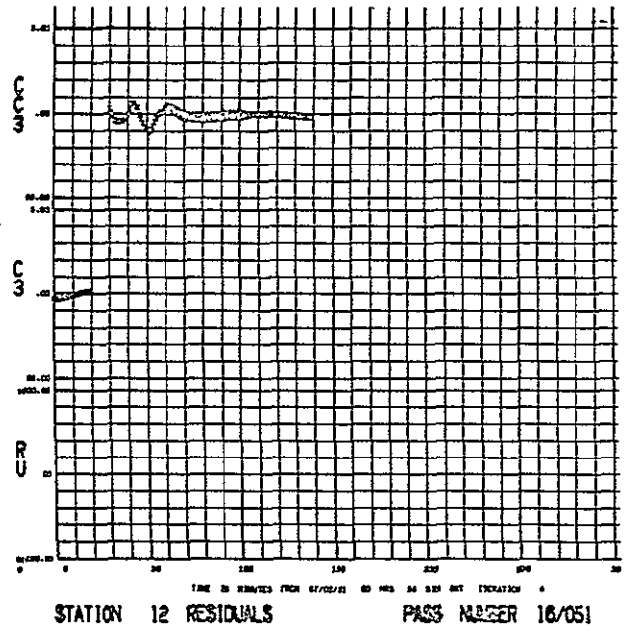
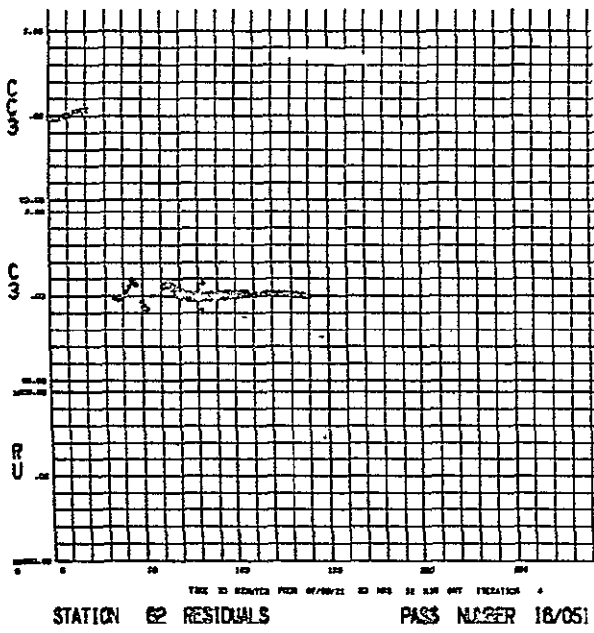


28, 2 - 82P

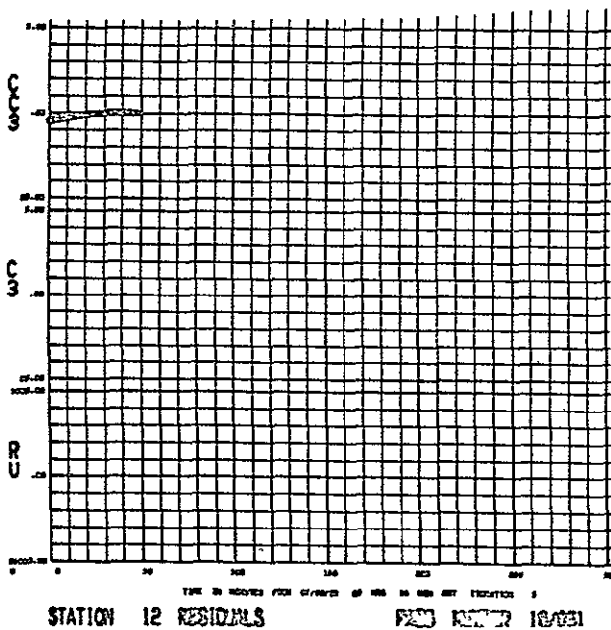
DOPPLER RESIDUALS FOR CASES
2F81P AND 2F82P

D2-100820-1

810



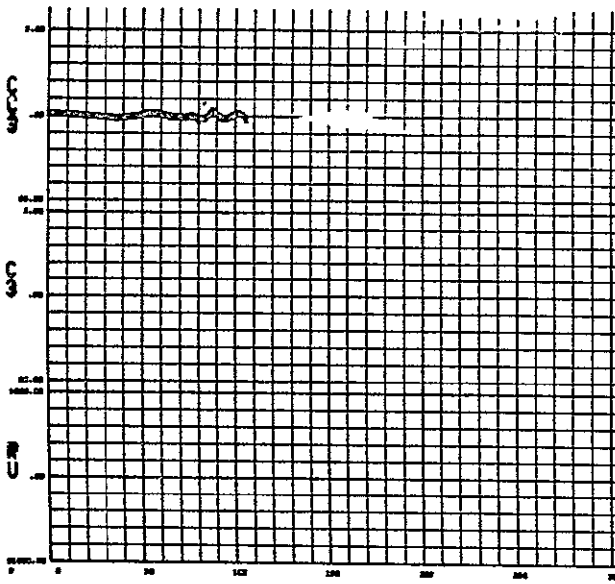
3F81P 3F82P



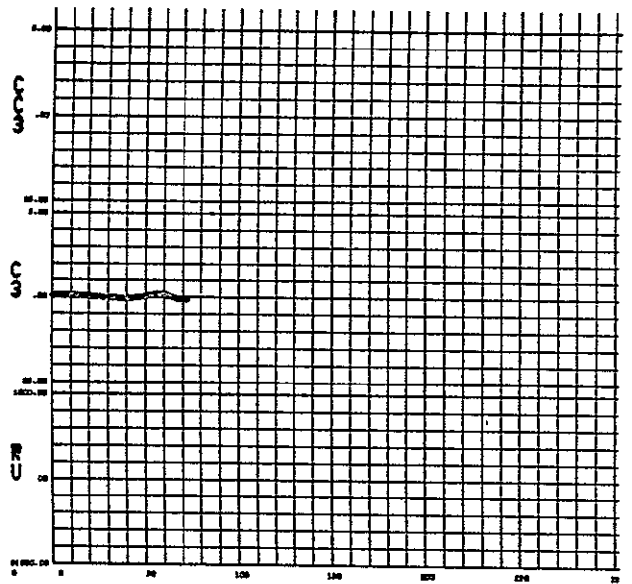
DOPPLER RESIDUALS FOR CASES
3F81P AND 3F82P

02-10000-1

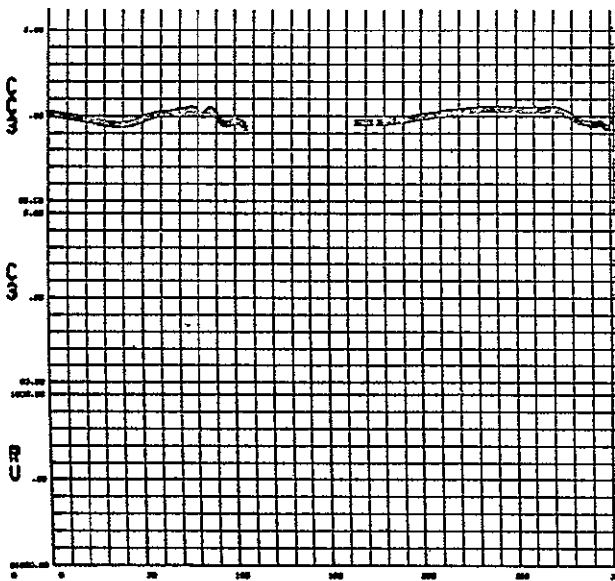
07-002



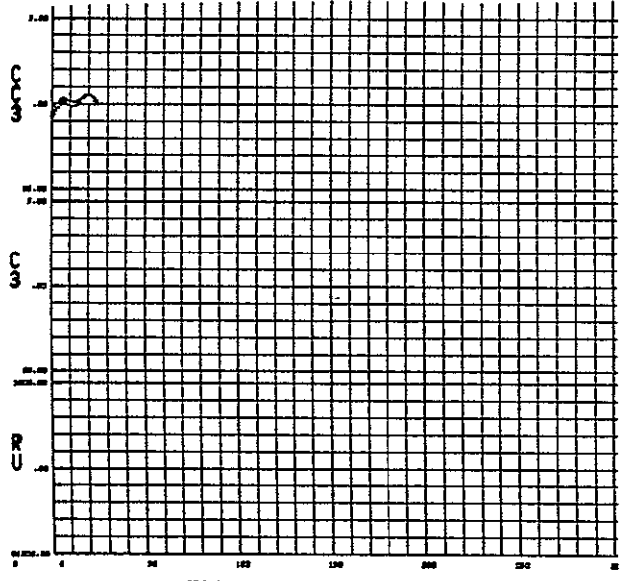
STATION 12 RESIDUALS PWS NUMBER 10/222



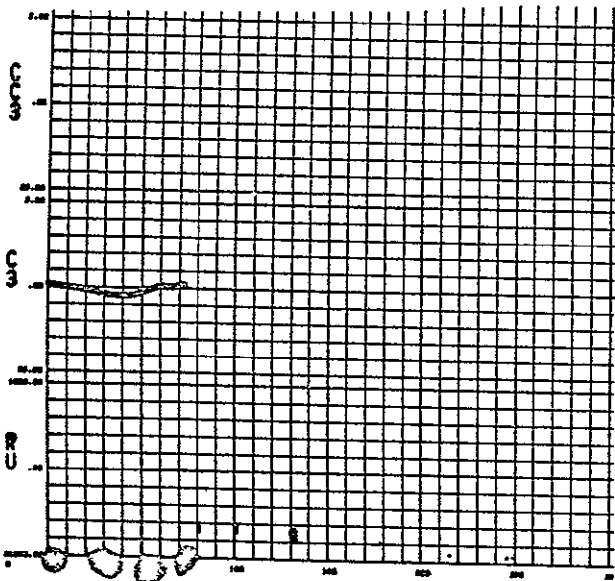
STATION 61 RESIDUALS PWS NUMBER 10/222



STATION 12 RESIDUALS PWS NUMBER 10/222



STATION 12 RESIDUALS PWS NUMBER 10/222



STATION 12 RESIDUALS PWS NUMBER 10/222

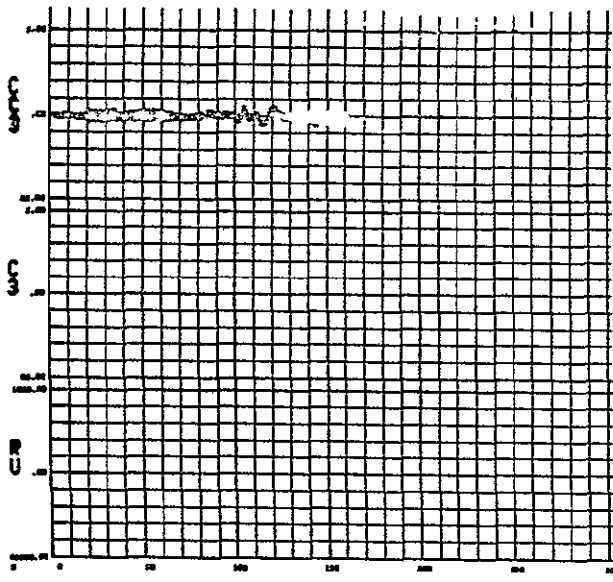
141P 99P

DOPPLER RESIDUALS FOR CASES
LB91P AND LB92P

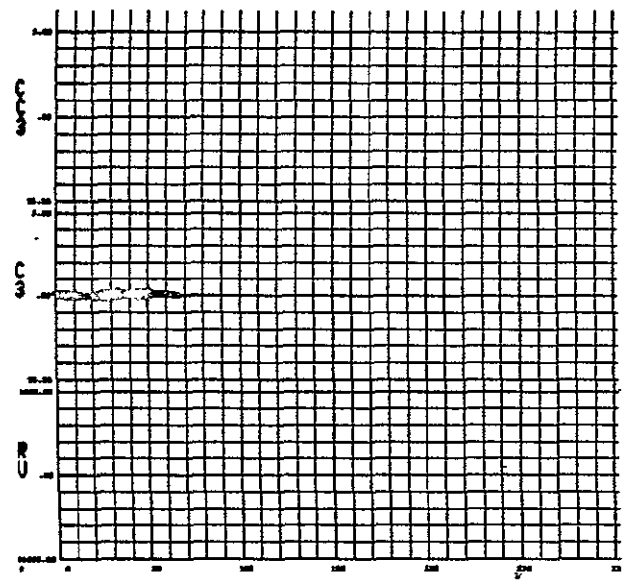
02-1007 20-1

23

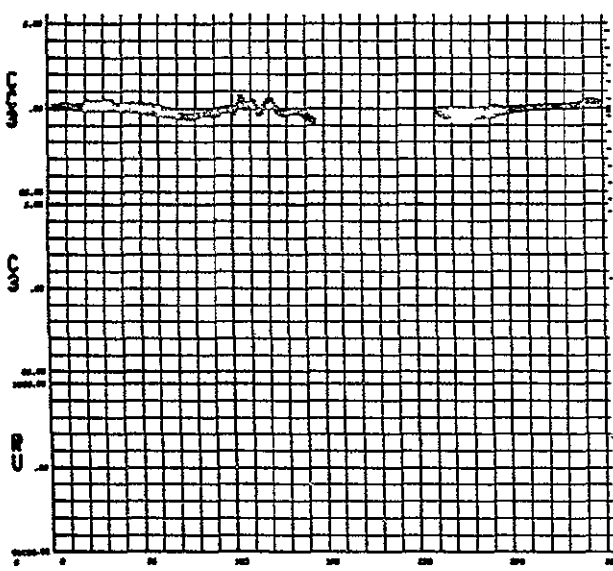
2891P-92P



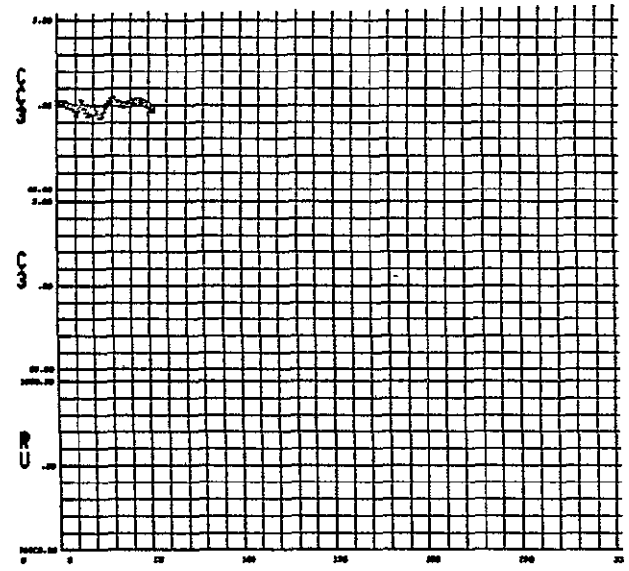
STATION 12 RESIDUALS PWS NUMBER 12/62



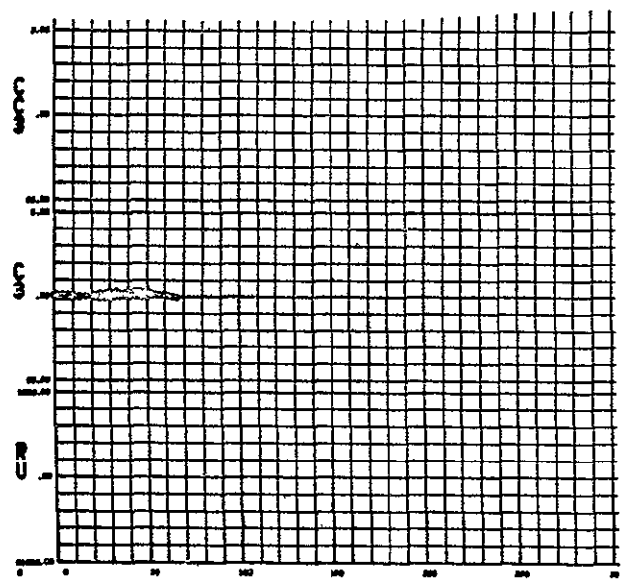
STATION 61 RESIDUALS PWS NUMBER 12/62



STATION 12 RESIDUALS PWS NUMBER 12/62



STATION 12 RESIDUALS PWS NUMBER 12/62

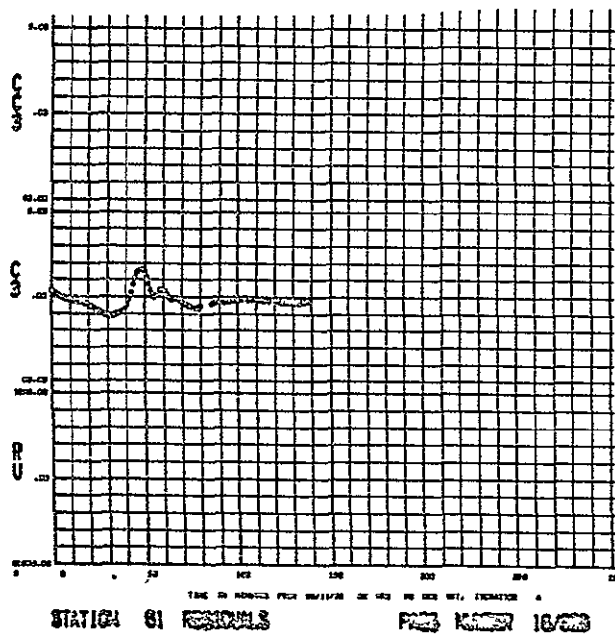
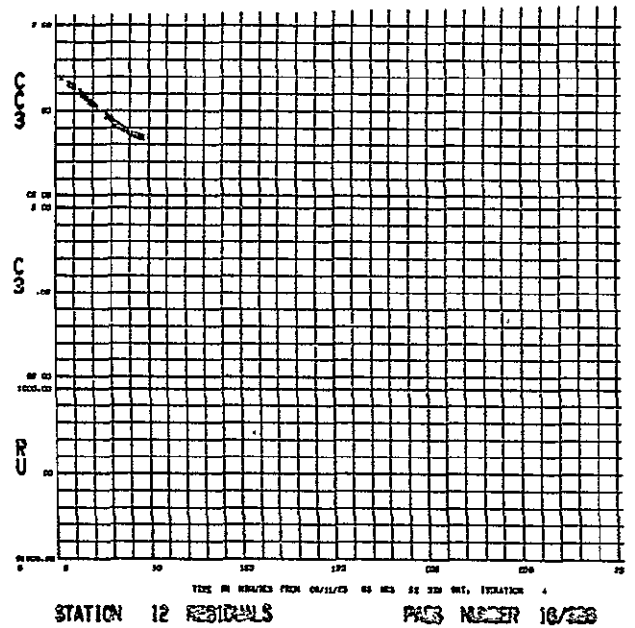
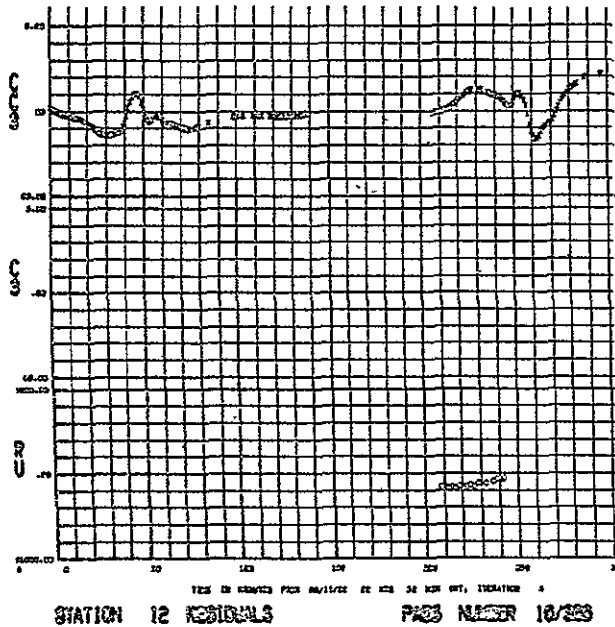
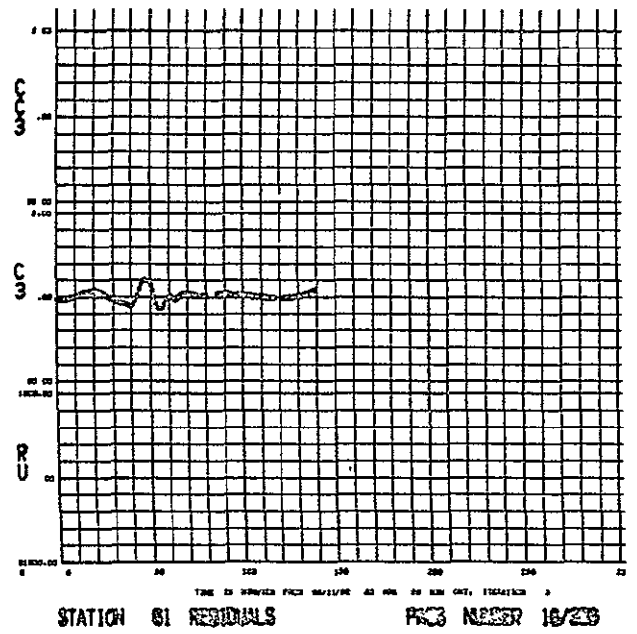
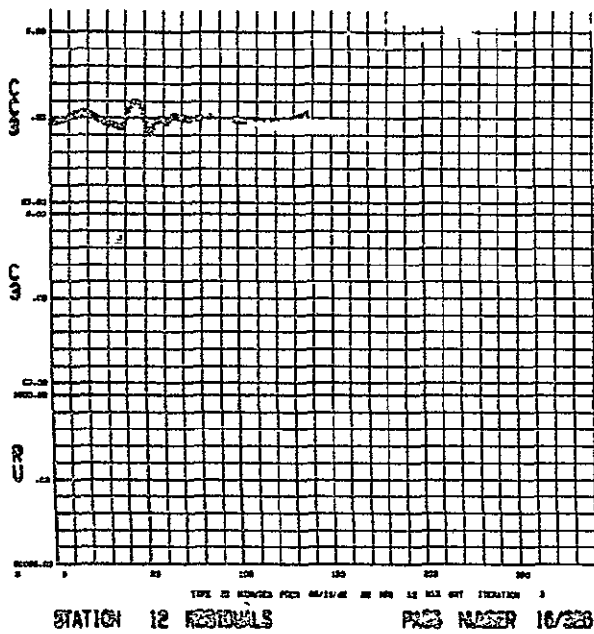


STATION 61 RESIDUALS PWS NUMBER 12/62

DOPPLER RESIDUALS FOR CASES
2891P AND 2892P

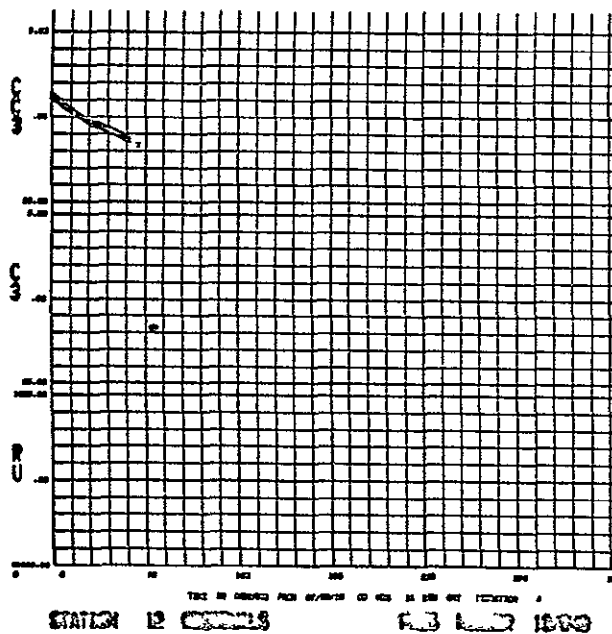
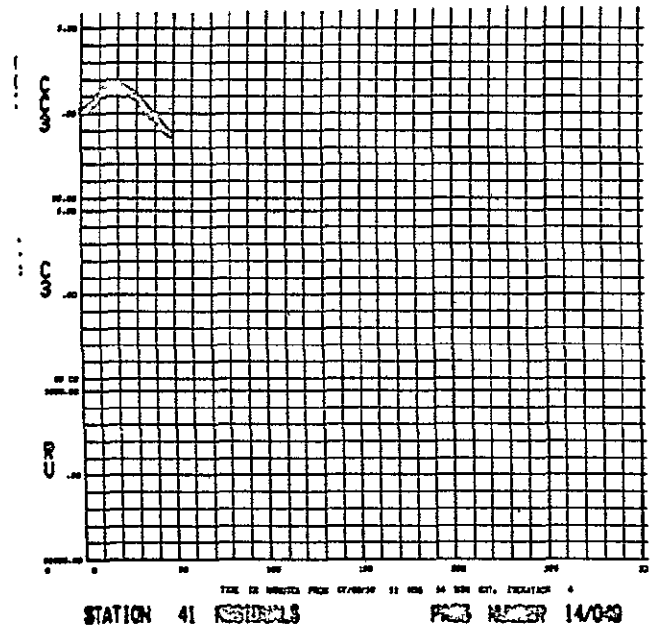
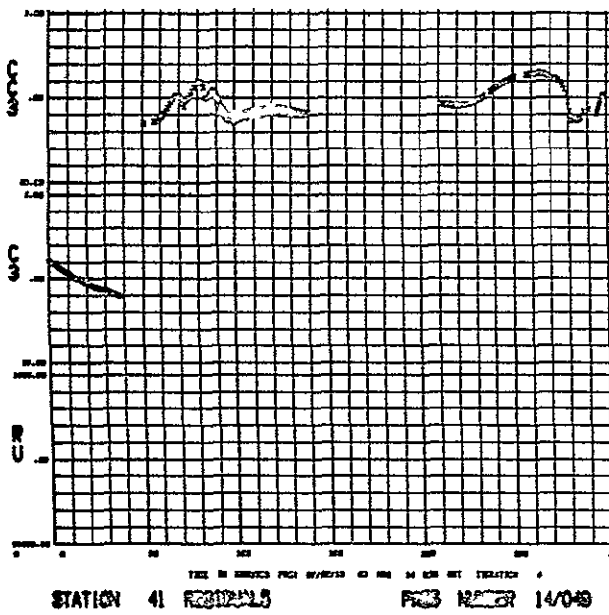
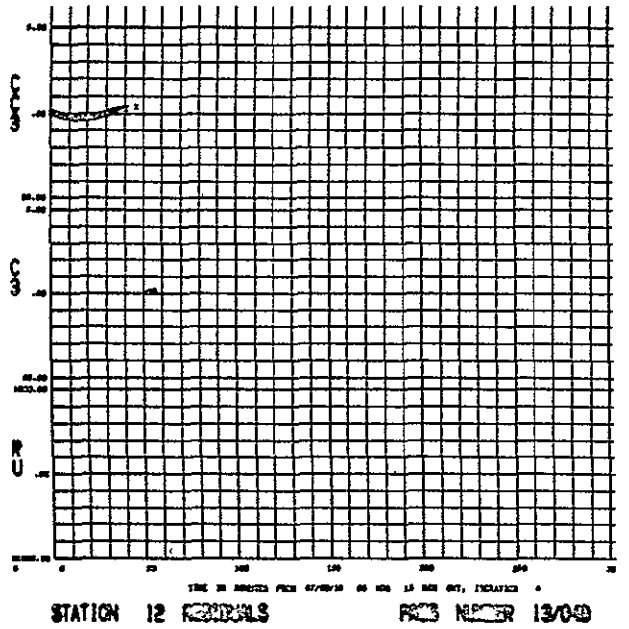
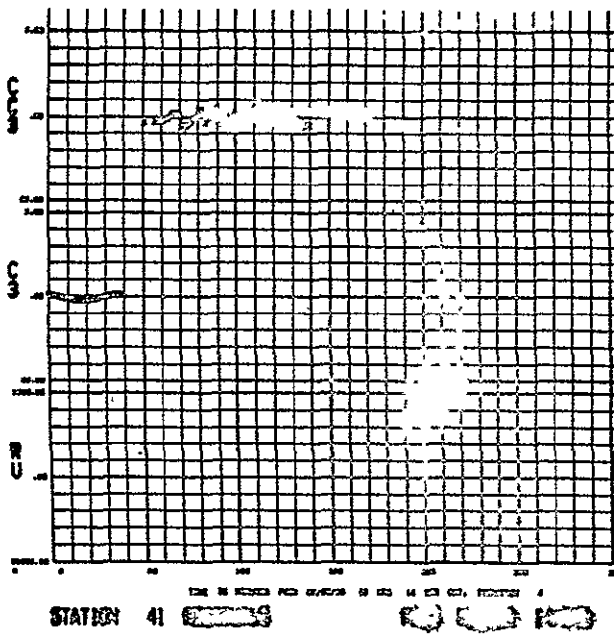
2891-100 1-1
2892-100 1-1
2893-100 1-1

D 291P - 21147



DOPLER RESIDUALS FOR CASES
2D91P AND 2D92P

D2-100820-1

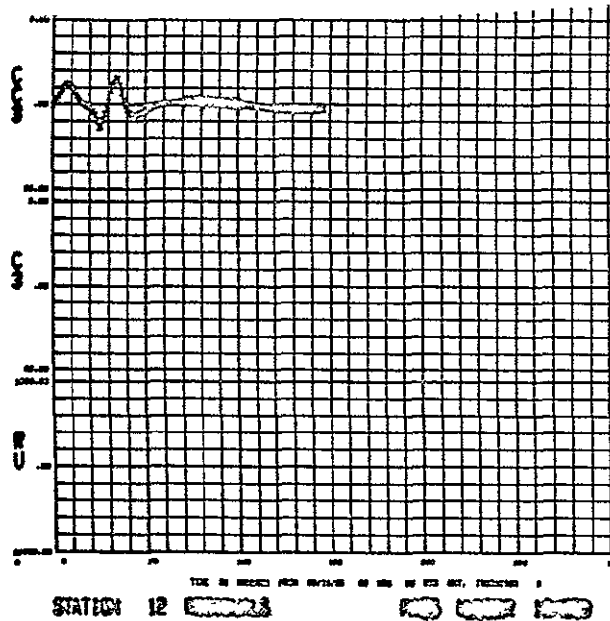
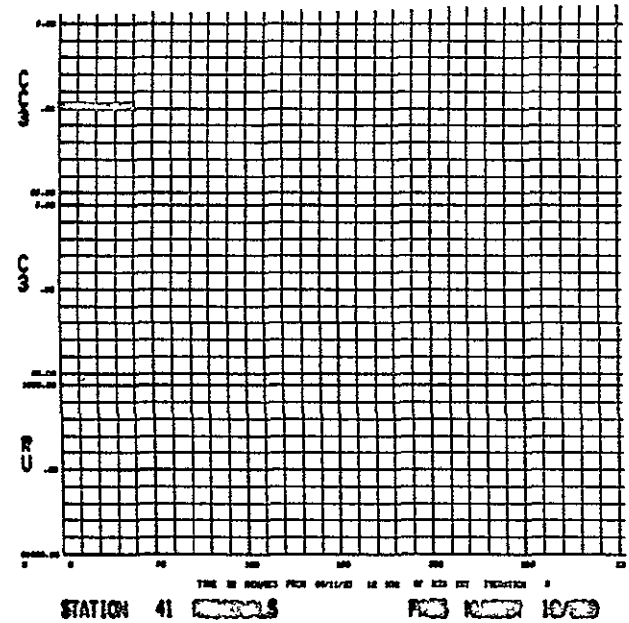
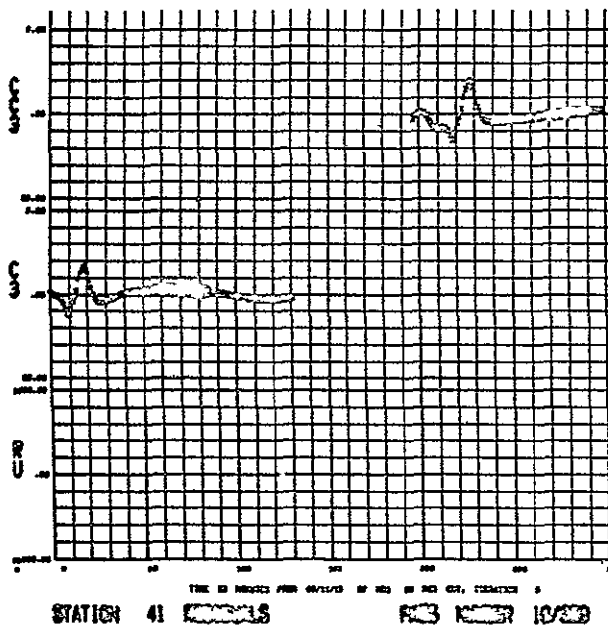
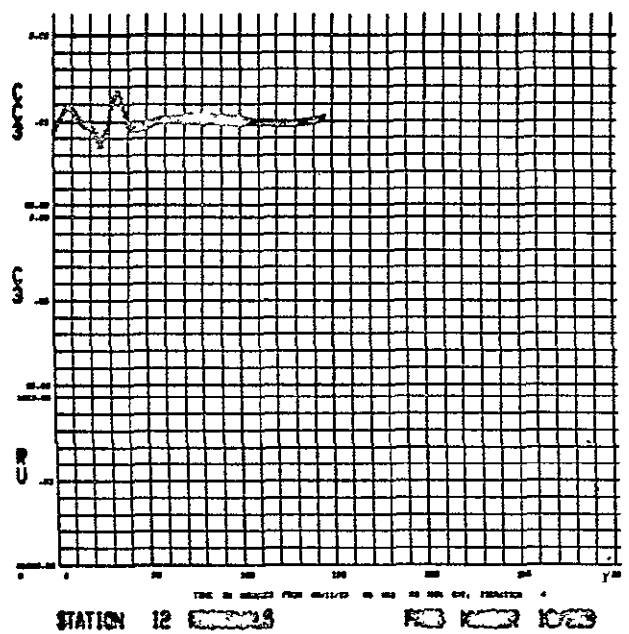
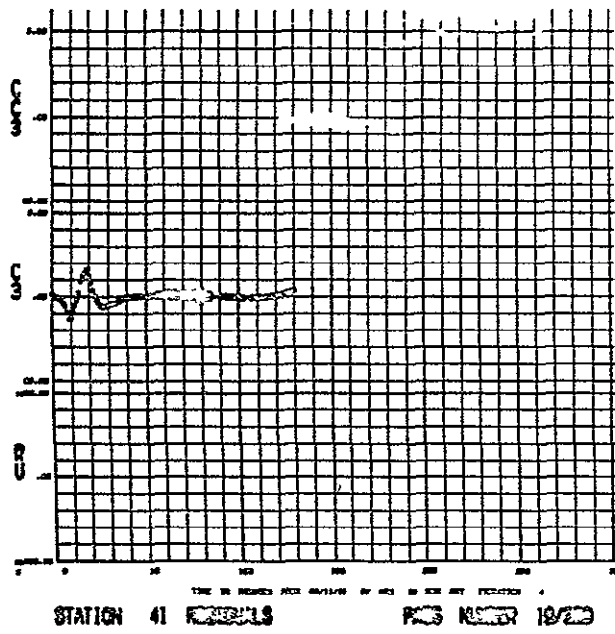


DOPPLER RESIDUALS FOR CASES
3D91P AND 3D92P

D2-111000-1
22-10-SIC-1

3

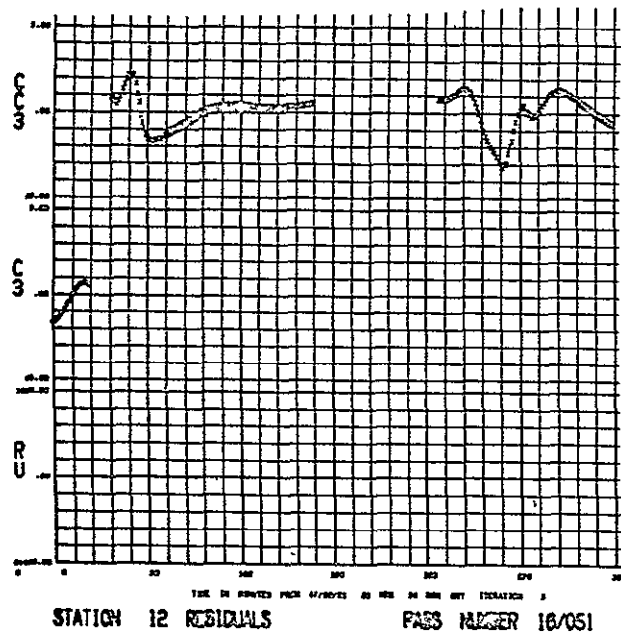
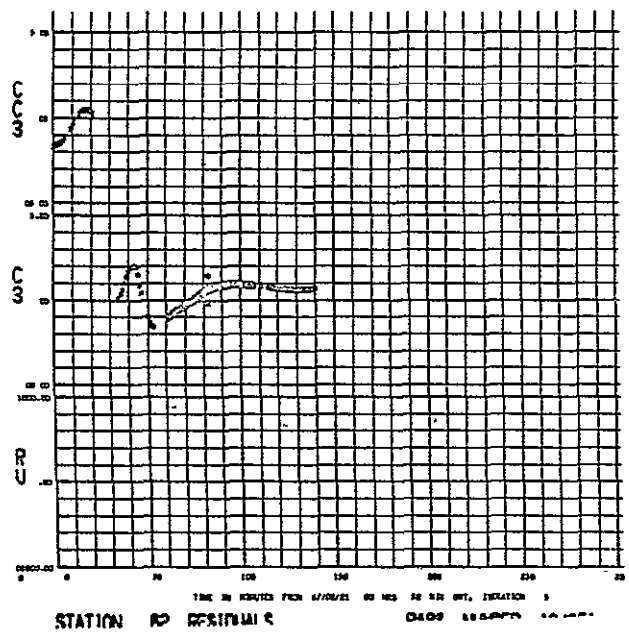
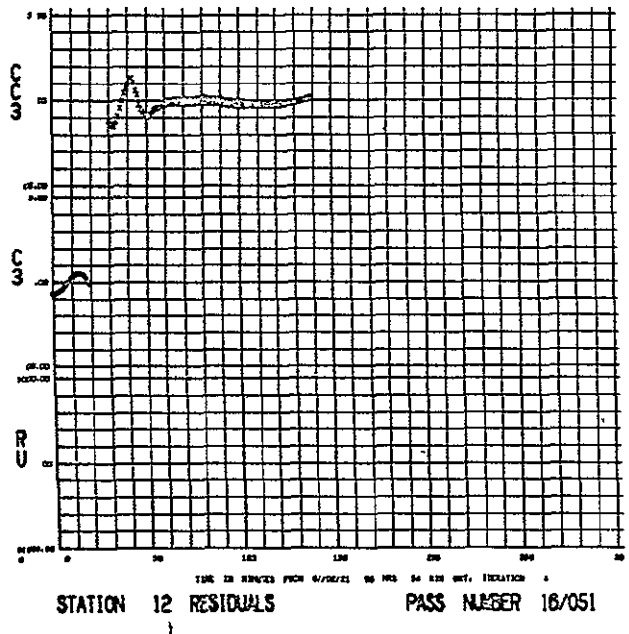
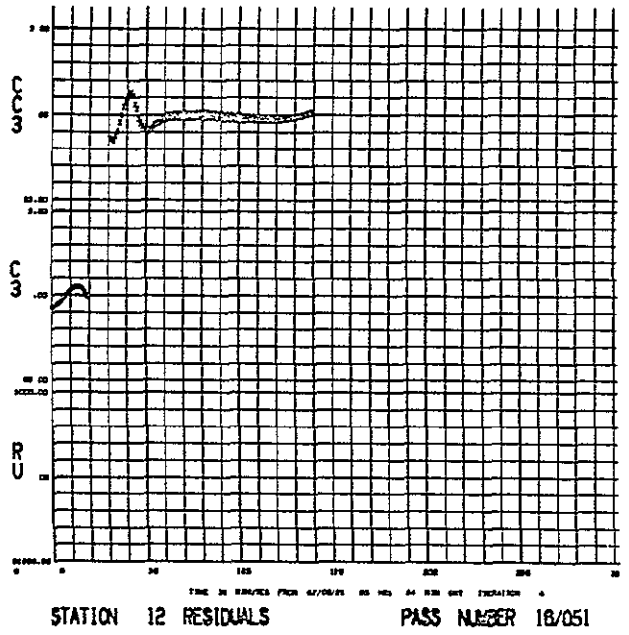
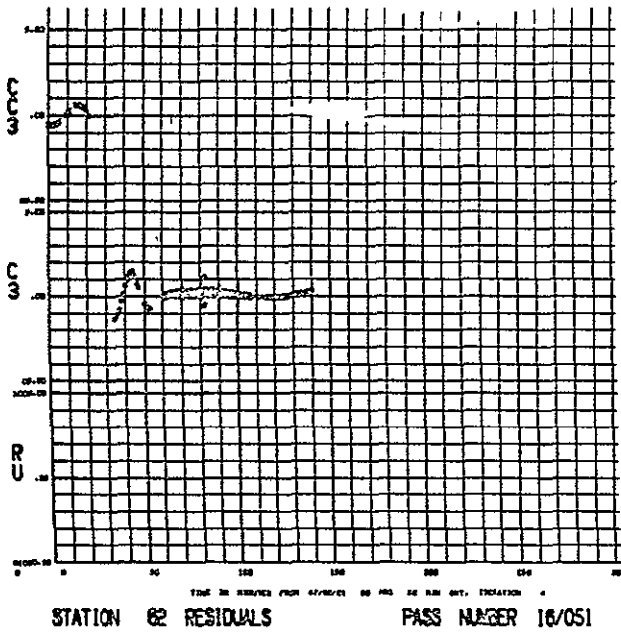
3D91P - 1, 2



DOPPLER RESIDUALS FOR CASES
2F91P AND 2F92P

D2-100207

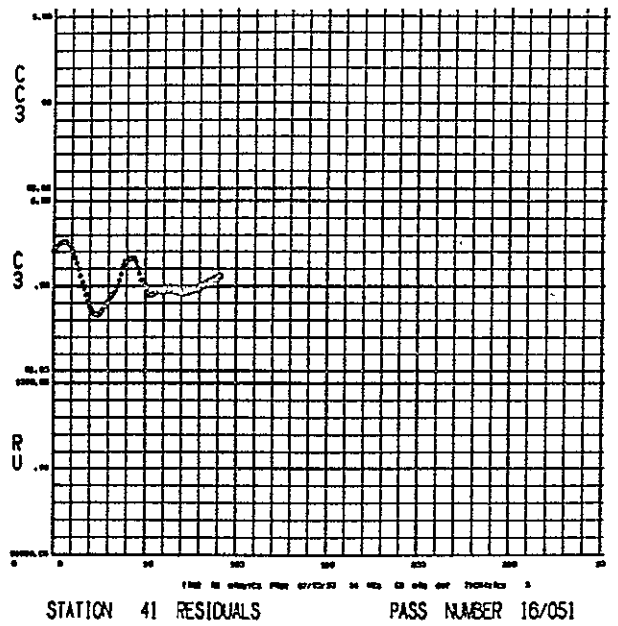
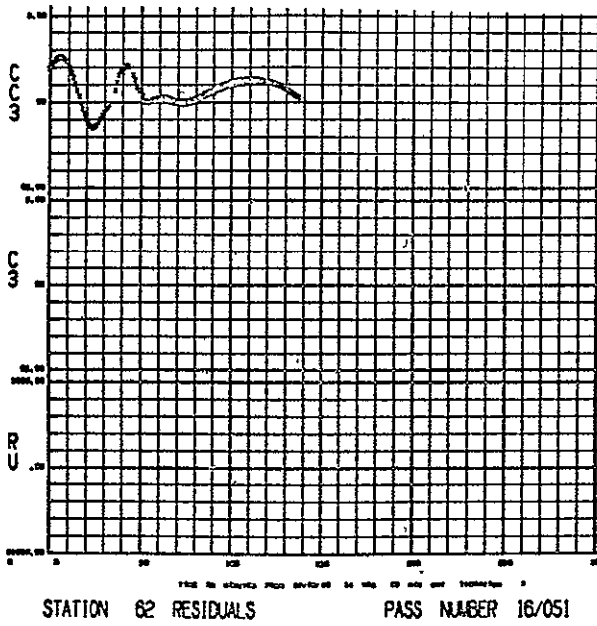
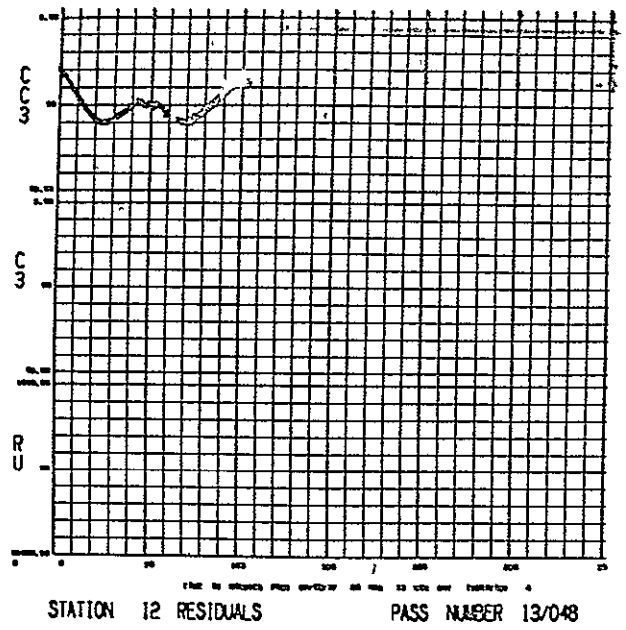
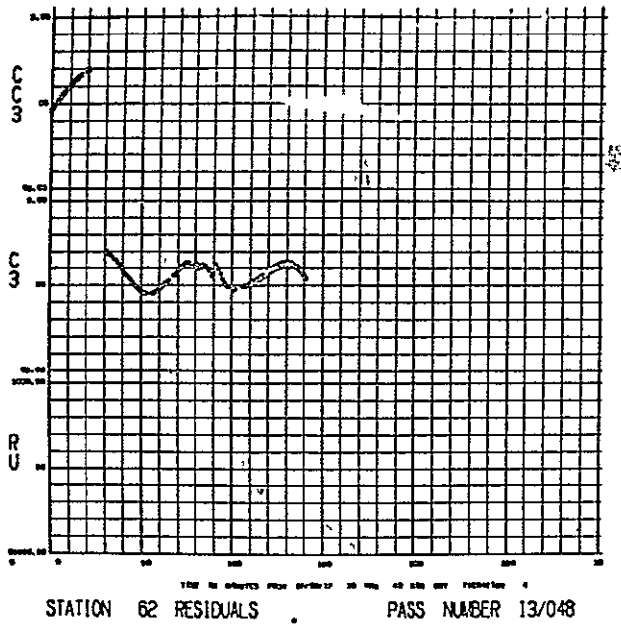
200



DOPPLER RESIDUALS FOR CASES
3F91P AND 3F92P

D2-100800-

3F91P-92P



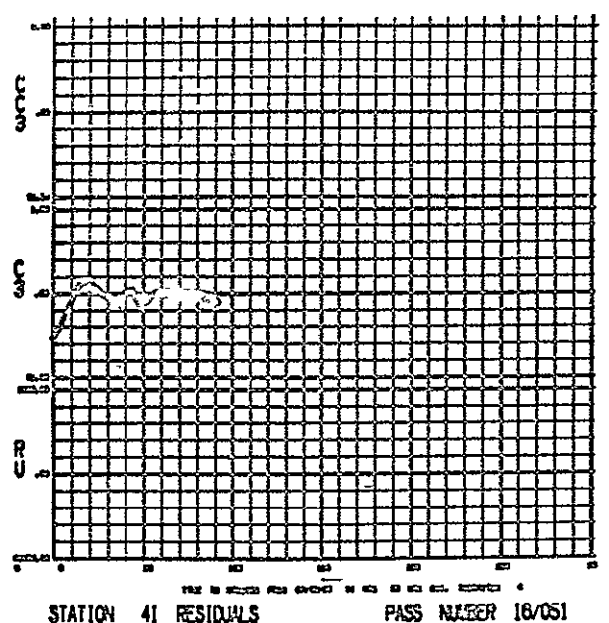
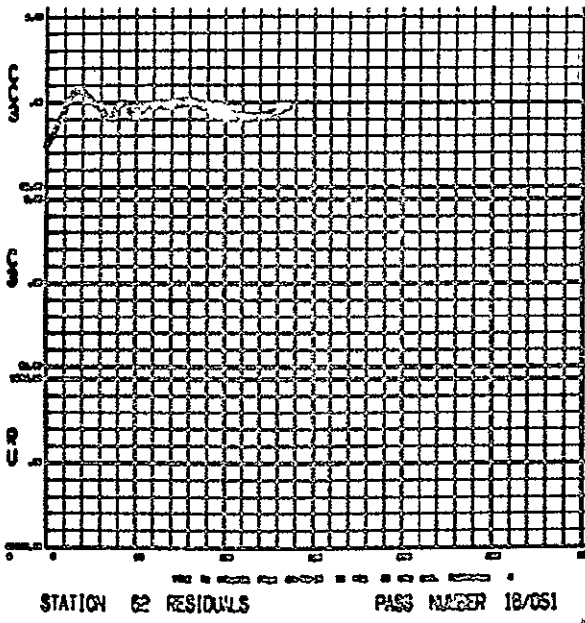
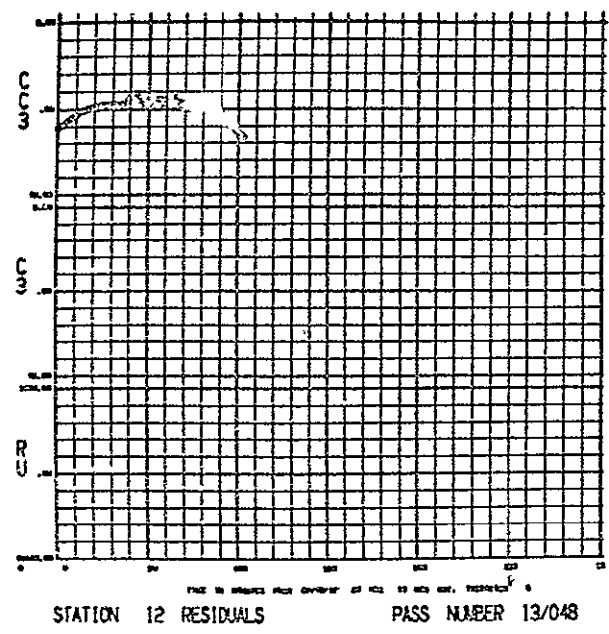
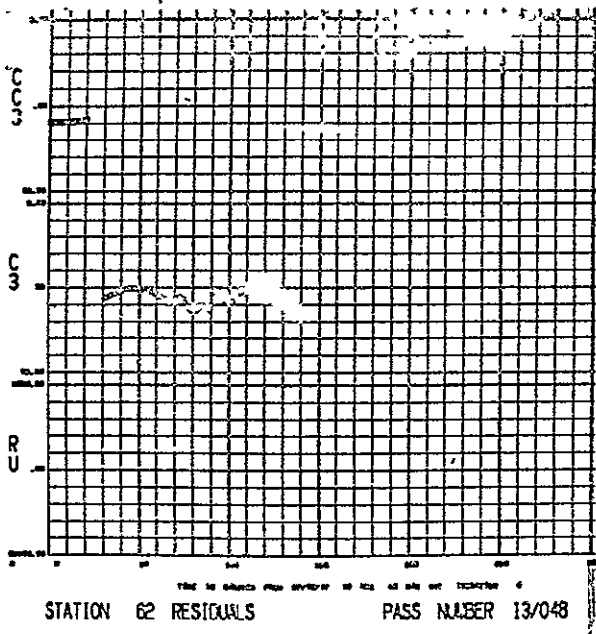
3D11M
3F11M

DOPPLER RESIDUALS FOR CASES
3D11M and 3F11M

D2-103890-1

23

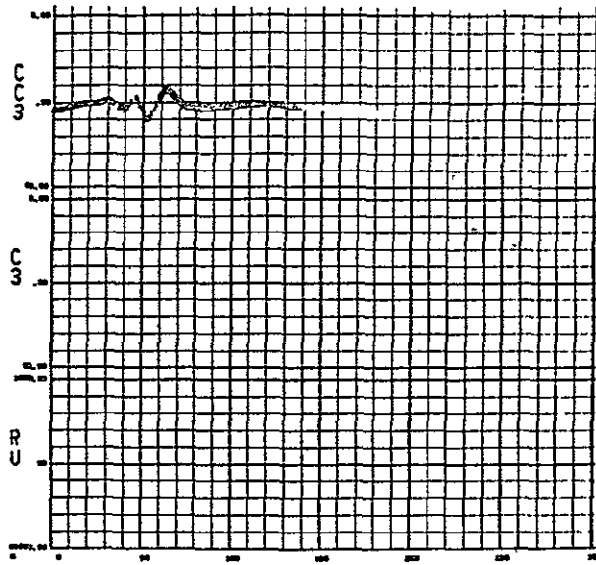
3D21M - 3F21M



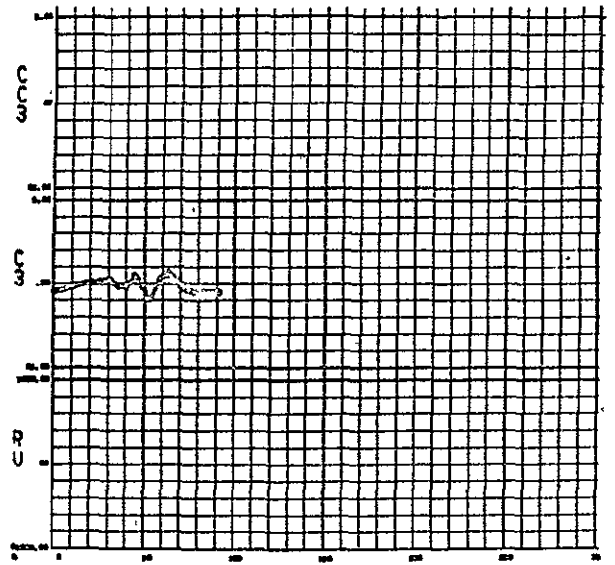
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DOPPLER RESIDUALS FOR CASES
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3D21M AND 3F21M

D2-100890-1

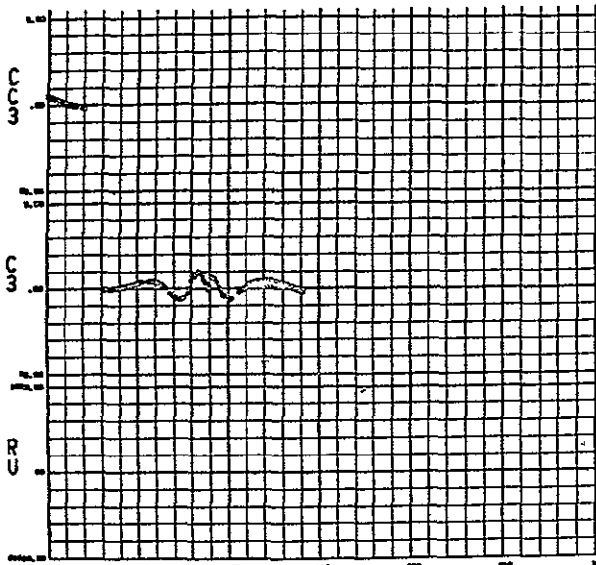
3D3M
3F3M



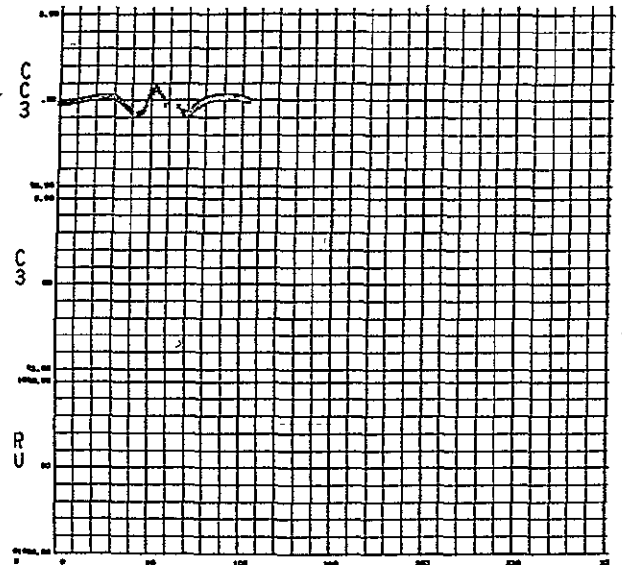
STATION 62 RESIDUALS PASS NUMBER 16/051



STATION 41 RESIDUALS PASS NUMBER 16/051



STATION 62 RESIDUALS PASS NUMBER 13/048



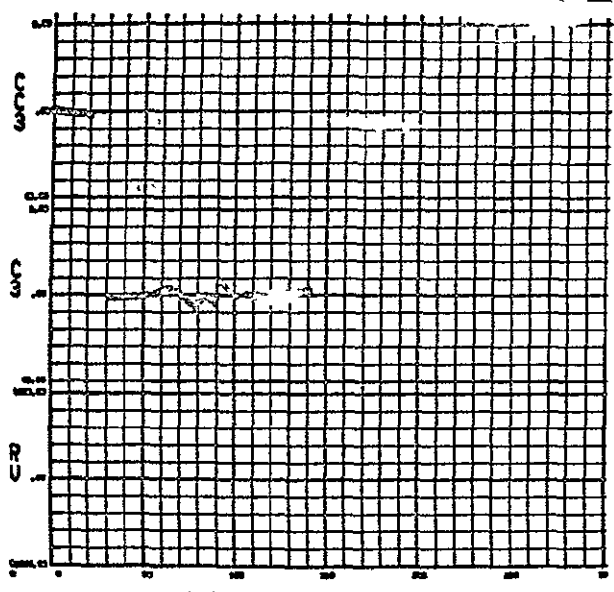
STATION 12 RESIDUALS PASS NUMBER 13/048

DOPLER RESIDUALS FOR CASES

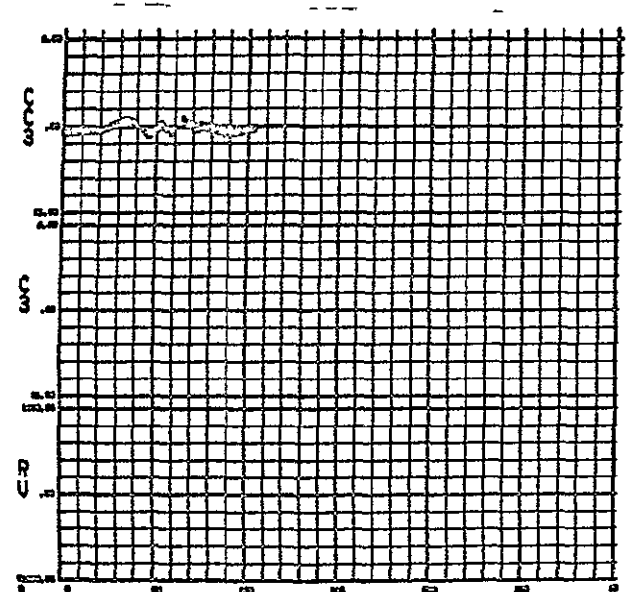
3D31M AND 3F31M

D2-100870-1

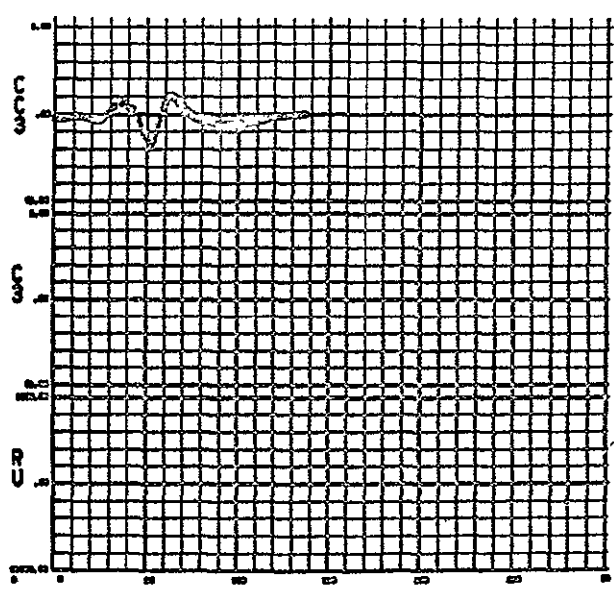
3F41M
3D41M



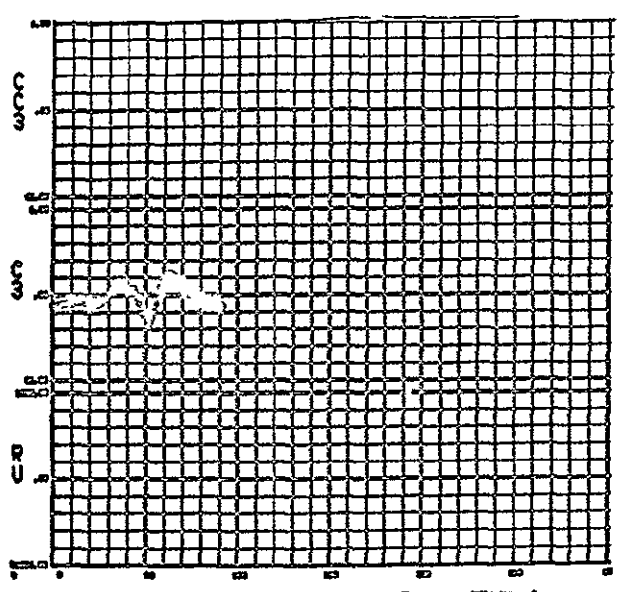
STATION 02 RESIDUALS PASS NUMBER 13/043



STATION 12 RESIDUALS PASS NUMBER 13/043



STATION 02 RESIDUALS PASS NUMBER 16/051



STATION 41 RESIDUALS PASS NUMBER 16/051

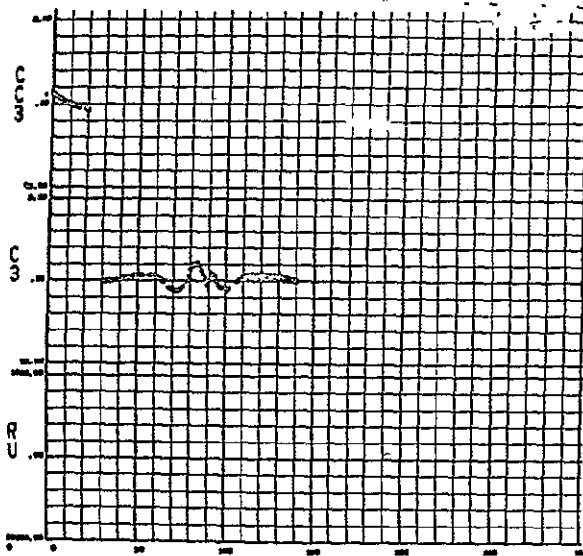
DOPPLER RESIDUALS FOR CASES

3D41M AND 3F41M

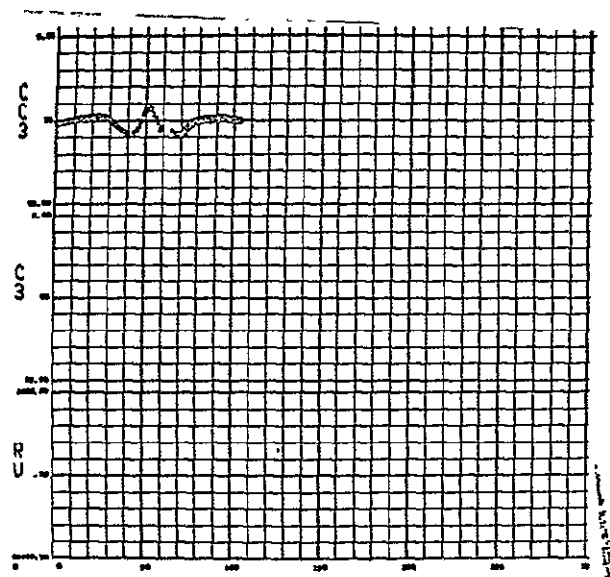
D2-100820-1

3F41M

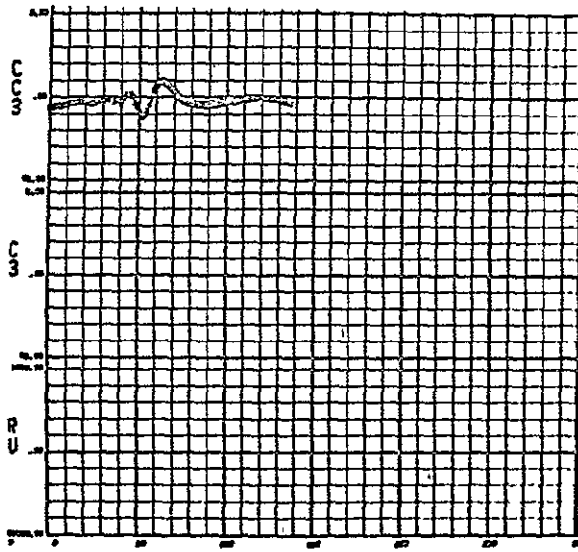
3D51M
3F51M



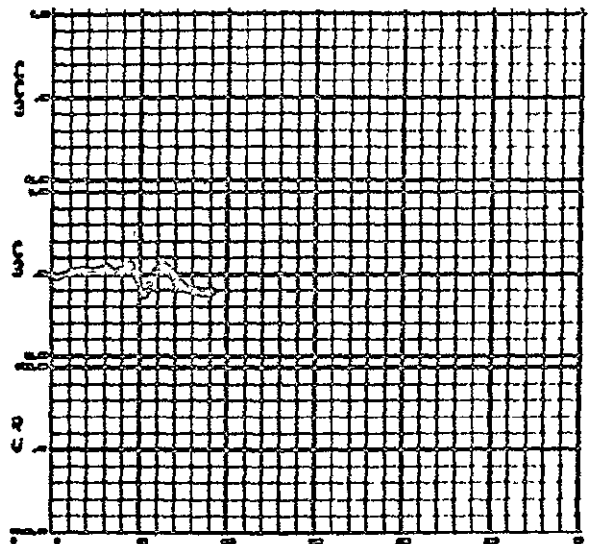
STATION 62 RESIDUALS PASS NUMBER 13/048



STATION 12 RESIDUALS PASS NUMBER 13/048



STATION 62 RESIDUALS PASS NUMBER 16/051



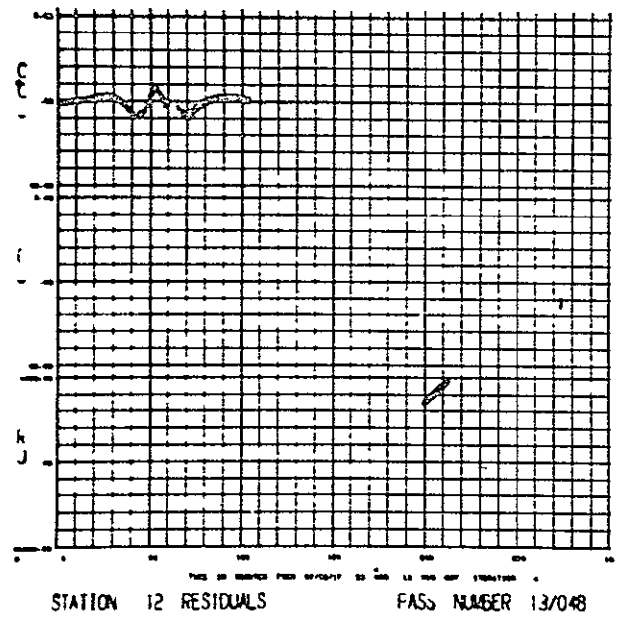
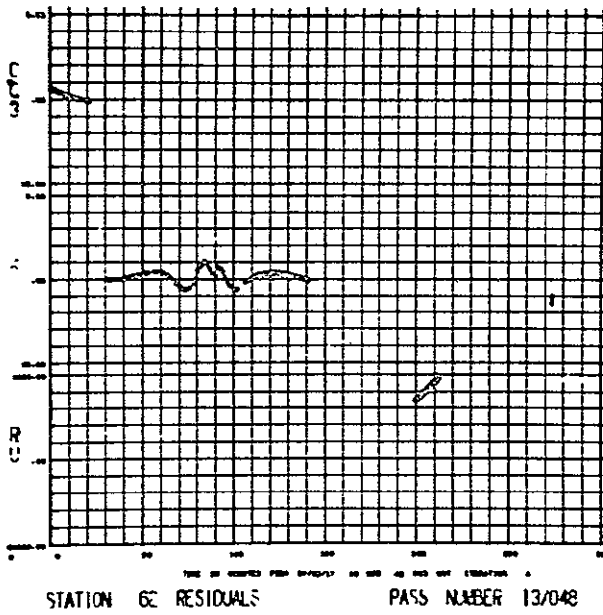
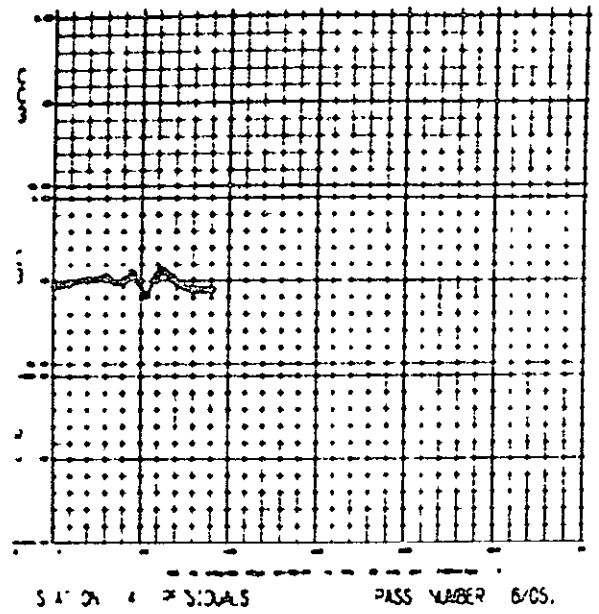
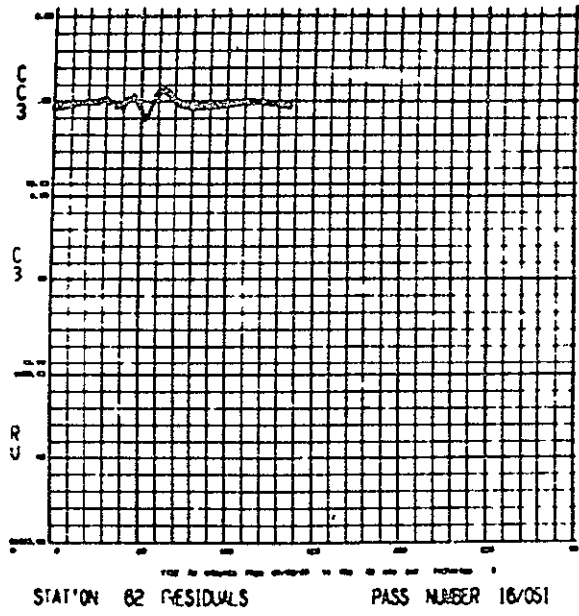
STATION 41 RESIDUALS PASS NUMBER 16/051

DOPPLER RESIDUALS FOR CASES

3D51M AND 3F51M

DG-100820-1

0203

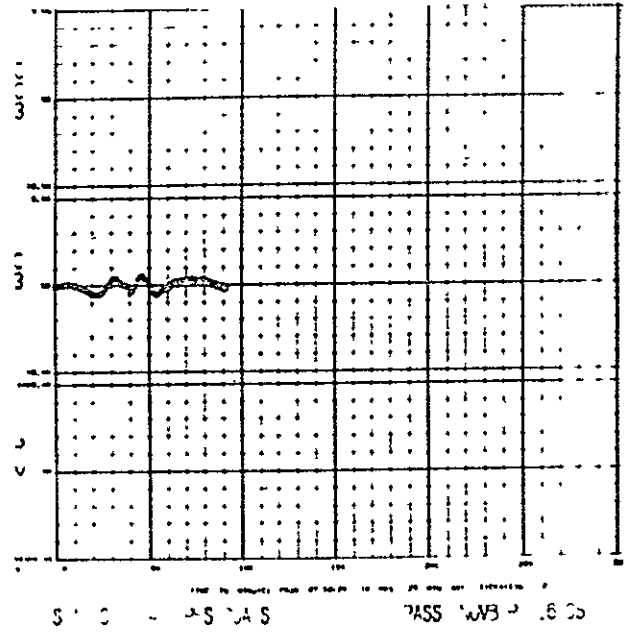
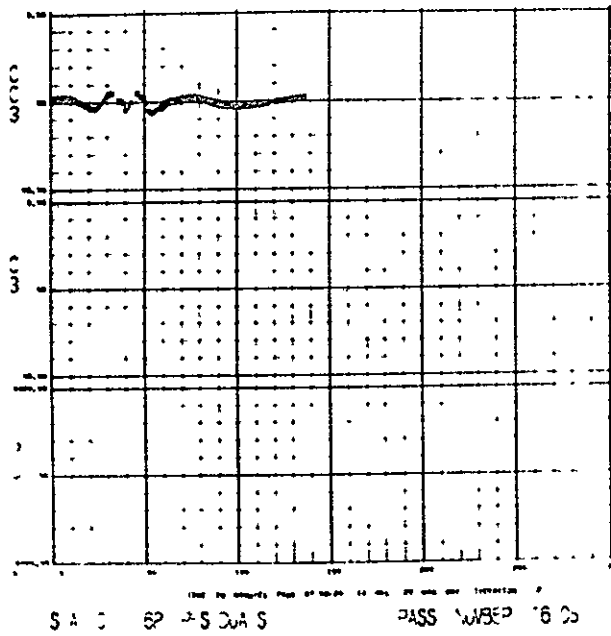
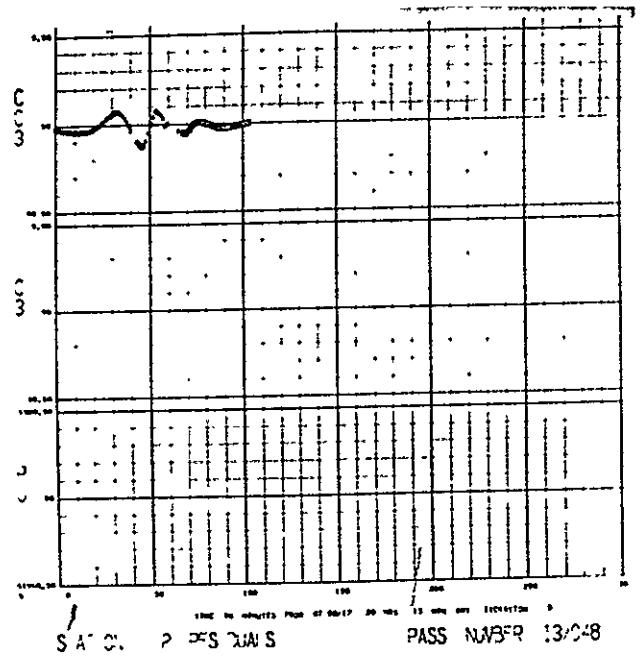
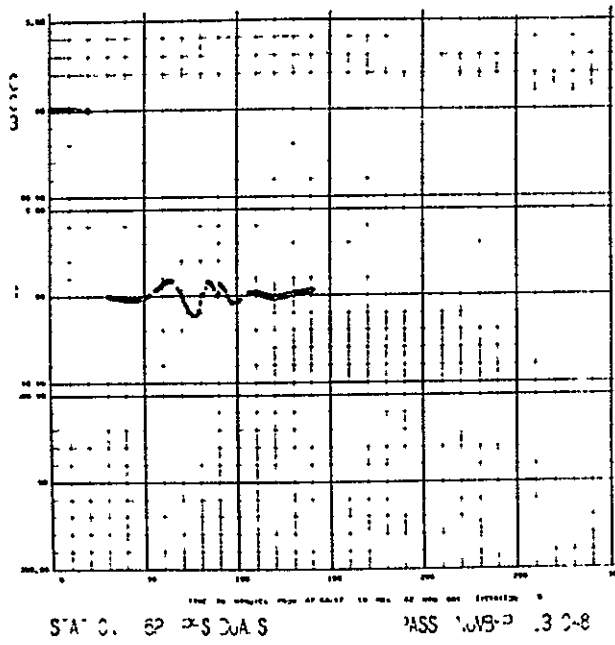


3F61M
3D61M

DOPPLER RESIDUALS FOR
3D61M AND 3F61M

D2-100820-1

300



3D71M 3F71M

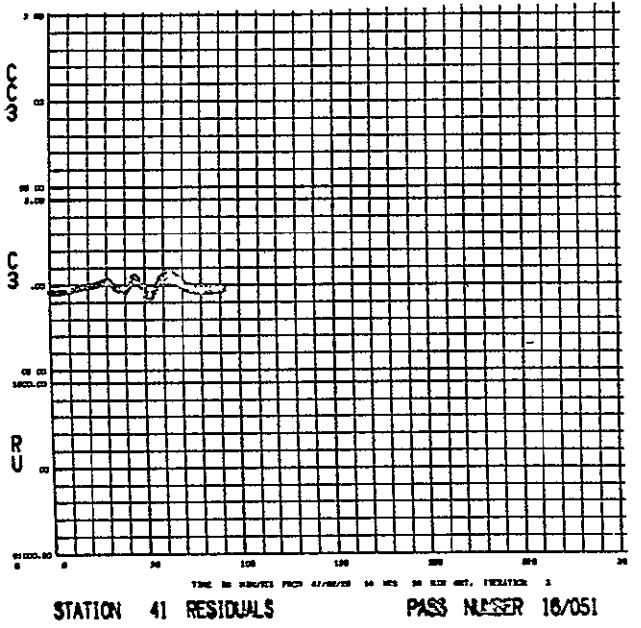
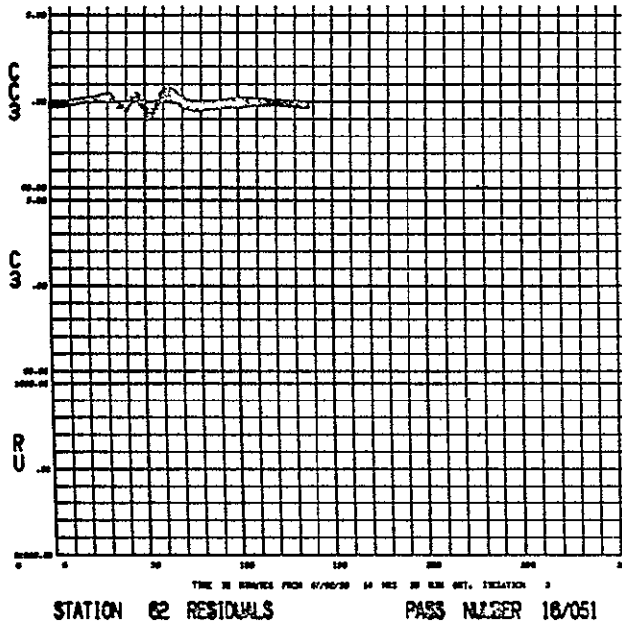
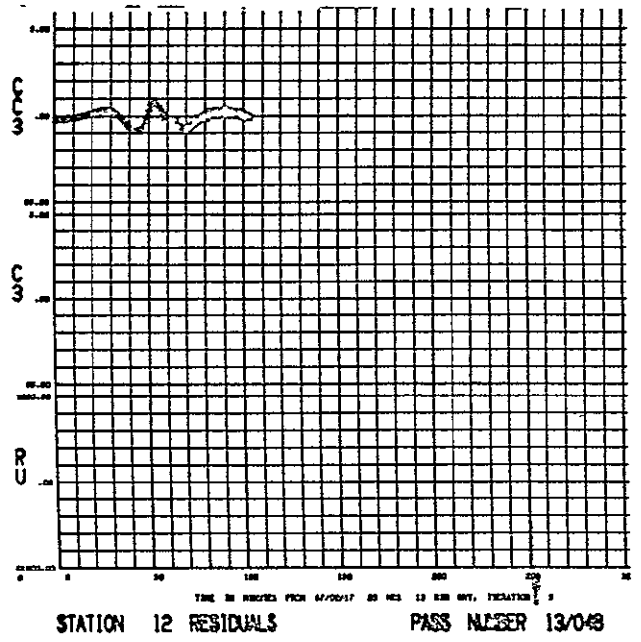
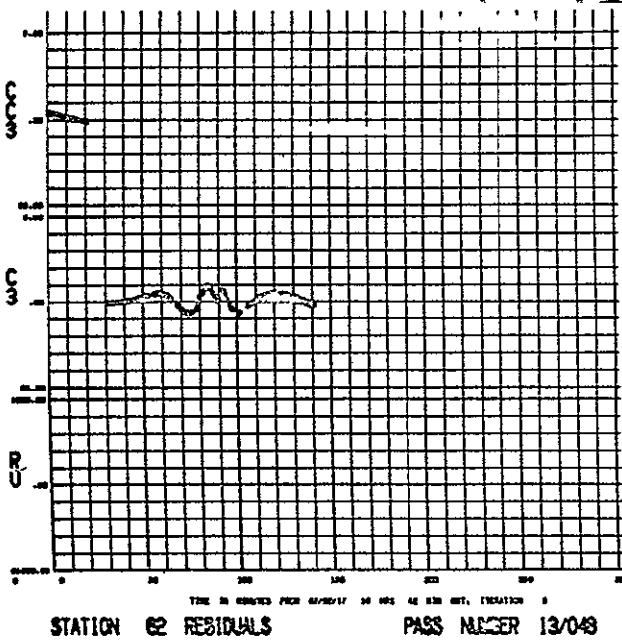
DOPPLER RESIDUALS FOR CASES

3D71M AND 3F71M

D2-100820-1

30

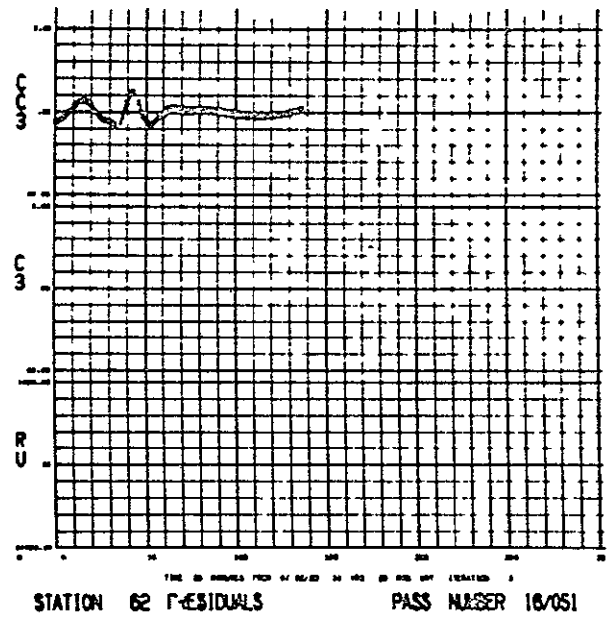
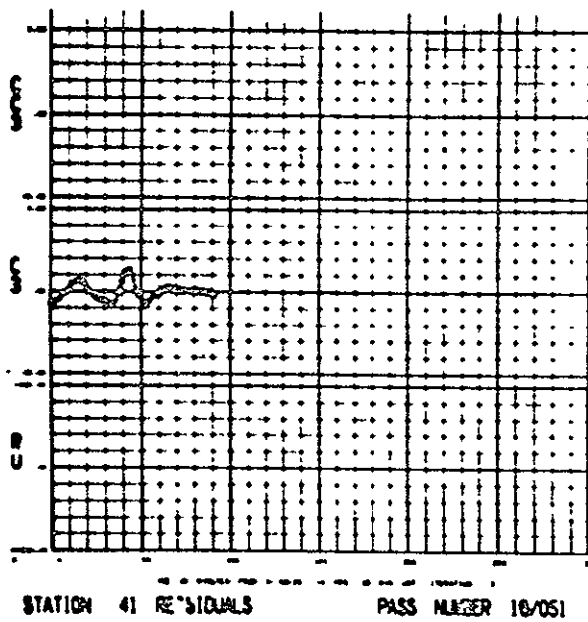
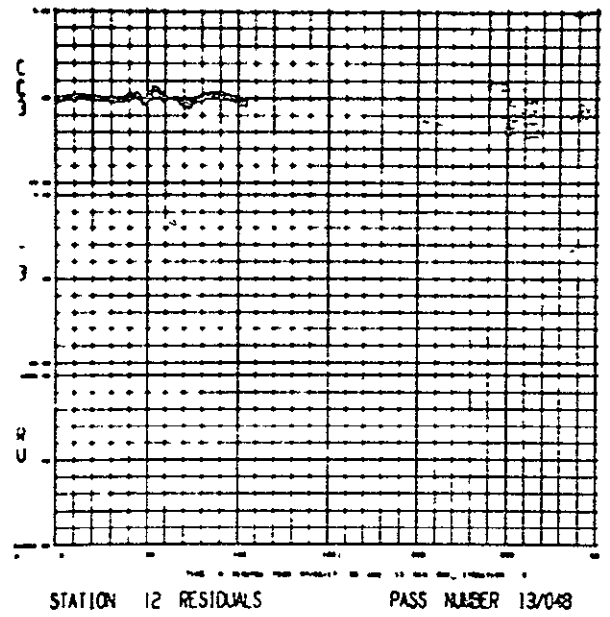
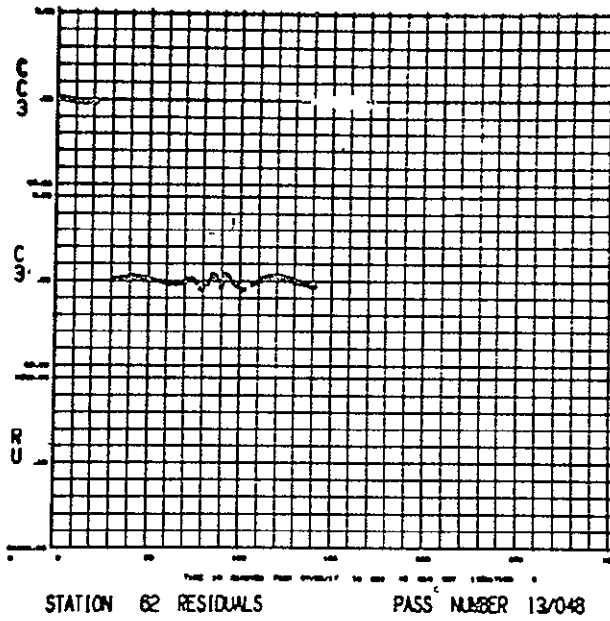
D-5: 171 - 13/04/81



DOPLER RESIDUALS FOR CASES

3D81M AND 3F81M

D2-100020-1



DOPPLER RESIDUALS FOR CASES
3D91M AND 3F91M

D2-100820

D2-100820-1

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