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TECHNICAL REPORT NO. 9387 (LL 109)

ATLAS OF OFF-ROAD GROUND ROUGHNESS P.S.D.'s AND REPORT ON DATA ACQUISITION TECHNIQUE

by John L. Bogdanoff
Frank Kozin
Louis J. Cote

ATAC
COMPONENTS RESEARCH & DEVELOPMENT LABORATORIES
U.S. ARMY TANK AUTOMOTIVE CENTER WARREN, MICHIGAN

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LAND LOCOMOTION LABORATORY

ABSTRACT

Power spectral densities, in one(line)and two(area) dimensions, are presented for off-road ground in eleven sites in the United States. Methods of acquiring, recording, and processing the data are described in detail.

FOREWORD

Ground roughness measurements on lines at three sites were given in a previous report and their power spectral densities (p.s.d.'s) displayed. These p.s.d.'s possessed many common characteristics and the question was raised by many as to whether these characteristics would persist for other sites. Moreover, no computer program was available for processing area data or even parallel line data.

These basic data and their p.s.d.'s are required in any vibrational analysis of the motion of a vehicle on open ground.

The opportunity arose in the summer of 1964 to acquire additional roughness data in the mid-continent of the United States.

GLOSSARY

Ground Profile is a plot of the survey height vs. distance along a line.

Power Spectral Density (p.s.d.) measures the amount of vibration, by frequency bands, of the ground heights.

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INTRODUCTION

The theory of land locomotion we are developing requires ground roughness spectra as input data. Line spectra have been obtained from a limited number of sites. However, vehicles make use of parallel tracks and the dynamical input from parallel tracks requires the spectra on each track and also the cospectra. A complete description of a site would require the spectra of a track and the cospectra of parallel tracks with different separations. Also, the spectra and co-spectra for tracks in different directions would be required. Fortunately, this total information is contained in the two-dimensional spectrum [See Report [1] (references) for a complete description].

The preparation of inputs to the differential equations of motion making use of the two-dimensional spectrum is described in References [2]. We are now in the process of comparing this first order theory with experiment.

Part of the basic information needed in this theory is a description of ground roughness in terms of p.s.d.'s (power spectral densities). In one of our reports [1], we presented p.s.d.'s obtained from data taken at three sites. Two of the sites had been modified by vehicle traffic. The three spectra had many points of similarity and some points of difference. We interpreted the spectra and compared them with the profile data. Certain questions remained outstanding which required, for their resolution, the acquisition of additional data:

a) Are these p.s.d.'s typical?

b) Can the major and relevant features of ground p.s.d.'s be summarized in a simple manner?

c) Is it possible to estimate the relevant characteristics of ground roughness p.s.d.'s from information found in aerial photography, topographical and geographical maps, etc.?

It was therefore decided to compile a small atlas of ground roughness p.s.d.'s made at a variety of sites.

During a visit (May 1964) to Vicksburg the objectives were discussed. It was suggested there that we choose our sites at military installations that were being used by the MERS Project. This had the advantage that the sites were available for future vehicle testing. The MERS Project had compiled photographs and topographical maps of these installations, and the commanding officers had indicated their willingness to cooperate with MERS. The location and terrain characteristics of the installations were reviewed and preliminary selection was made at that time.

These selected installations were in the mid-continent so that a surveying crew could travel from one to another in a short summer period and make a maximum number of surveys at a variety of locations.

The Commanding Officer at ATAC sent a letter to each installation explaining our purpose and requesting permission to make an initial visit and then to make the required measurements at a subsequent time. It was also explained that we might need the services of a guide, etc.

Preliminary trips were made by MASC personnel to select sites at:

1. Fort Riley, Kansas
2. Camp Gruber, Oklahoma (abandoned)
3. Fort Carson, Colorado
4. Fort Sill, Oklahoma
5. Fort Hood, Texas
6. Fort Polk, Louisiana
7. Fort Benning, Georgia
8. Fort McClellan, Alabama

Two sites were selected at each installation after a reconnaissance of the general areas available to us. The sites were selected so there would be a maximum chance of availability within the next few years if vehicle tests were desired. In addition, the following considerations were used in site selection:

a) relatively free of heavy ground cover so that the surveying operation would not be unduly hampered,

b) relatively near access roads,

c) relatively flat and of fairly uniform roughness characteristics over fairly large areas,

d) relatively undeformed by vehicles.

Under no circumstances was it very difficult to meet the above conditions.

In all cases, the commanding officers and personnel of the installations gave outstanding cooperation.

In addition to the data collected above, other survey data are available at MASC. These data will also be included in the atlas. The locations of these additional sites are as follows:

9. Fort Knox, Kentucky
10. Aberdeen Proving Grounds, Maryland
11. Yuma Test Station, Arizona
12. Las Vegas, Nevada (Mercury Test Site of AEC)

Vehicle tests were conducted at Fort Sill, Las Vegas, and Thailand along with elevation surveys. Only the survey data associated with the first two vehicle test sites will be reported upon here; the vibration data will be discussed in a subsequent report. The Thailand data are on a road rather than open ground, and thus will not appear in this atlas.

With respect to the surveying program, a number of decisions were made by MASC.

It was decided to survey two sites at each installation, preferably of different character. Each site would provide area and line data. Preliminary reconnaissance indicated (see [1] for a discussion of details in planning experiments of this type) that a two-foot spacing would be sufficiently close to include all significantly high frequencies without aliasing. (Observation of the vehicle trials at Fort Sill suggests, however, that closer spacing may be necessary on rocky ground.)

The number of data points in a square was decided to be 10,000 (100 x 100) and for the line 500. The dimensions of the squares, therefore, were 200 ft. x 200 ft. and the lines were 1000' long. For convenience, we required the line to go through the center of the square. However, the angle of the line to the side of the square was left to the surveyors and a variety of angles was expected and obtained from the different sites.

Preliminary discussion with John Chen, a professional land surveyor, indicated that normal horizontal and vertical control within 1/100 of a foot and horizontal control 2/100 of a foot could easily be obtained. This is well within limits required by the dynamic problem. In view of the fact that loose material on the surface of the ground will give comparable deviation, the control was deemed adequate.

A survey crew was organized under the leadership of Dr. Jay Barton, a biophysicist at St. Joseph College, Rensselaer, Indiana. The crew consisted of Arthur Hawkins, Donald Paarlberg, Jr., John Foster, Paul F. Chenea, Jr., and William Whistler. Of these Dr. Barton and Arthur Hawkins had surveying experience. The others were college students on summer vacation.

Under the direction of Dr. Barton, and with advice of Mr. John Chen, equipment and other necessary items were selected and acquired. The equipment and crew were fitted into a standard Chevrolet Station Wagon rented for the purpose. There was a short training period during which the crew practiced stowing the equipment and carrying out the surveys. The tour was completed ahead of schedule without mishaps to personnel or equipment.

On the average, it took four days to complete the surveys at an installation and approximately one and a half days to travel between installations. Approximately 180,000 data points were acquired by this crew.

The surveying equipment included the following major items:

2 Repeating Theodolites, K&E 730050

2 Self-Leveling Zeiss Levels, K&E 750020

2 Lenker Elevation Leveling Rods

In addition, the equipment included both steel and cloth tapes, marking pins, range poles, etc. A complete list of surveying equipment is given in Appendix A.

In addition to the survey data, the following data were acquired at each site. The reconnaissance party located the survey sites on topographical maps, and marked them on the ground with paint, plastic tape, etc. The orientation of the survey lines and squares was noted by the survey party. Verbal descriptions were made and in some cases photographs were taken to further identify sites.

The survey data plus the other material discussed above taken at a site were returned each week to MASC by registered mail. On his return from the surveying operations, Dr. Barton put the survey data in order for data processing. Dr. Barton also remained on the staff of MASC to assist in the data processing.

The data were put on IBM cards, the cards were preprocessed to remove the instrument height and compare each data point with its nearest neighbors. The output was listed and large deviations were marked by an asterisk. These marked points were compared by Dr. Barton with the data in the survey books and any errors were corrected. The corrections were not made on the IBM cards but rather on the input tapes. Both cards and tape are stored at MASC and copies are available at cost upon request.

This report is the first of two reports. In this report, we shall be concerned with presenting the computational results, the site description, and the computing programs. Conclusions and recommendations will be concerned with data acquisition methods and processing. The second report will deal with the interpretation and implication of these results.

OBJECT

The object of this report is to present the results of mid-continent surveys and the computations performed. Interpretations will, to a large part, be presented in the next report. Recommendations will be limited to the recording, acquisition, and processing of the data.

SUMMARY

A short description is given of the survey methods and the equipment used. This is followed by a table listing all site locations and orientations of the squares and line surveyed. The results (p.s.d.'s in numerical form and graphs of the p.s.d.'s) of one-dimensional (line) surveys are presented next; results for parallel lines are also included. The section which follows presents similar results for two-dimensional (area) data.

Complete descriptions of the two computer programs are given.

CONCLUSIONS

The p.s.d.'s obtained from the data taken at the additional sites show the same general features noted in the previous report.

Rod and level survey methods of data acquisition are cheap and efficient.

RECOMMENDATIONS

Further data acquisition by the methods used for the purpose of enlarging this atlas are not recommended.

When roughness data are required for special purposes, however, the rod and level method used is recommended. Self-leveling levels and self-zeroing rods are recommended as basic equipment.

SITE DESCRIPTION

Survey sites are located with reasonable accuracy on topographical maps along with verbal descriptions and in some cases photographs. No attempt was made to preserve the exact locations of data points; first, this is not relevant from the point of view of p.s.d. analysis; second, to do this, permanent markers would have had to be erected and permission to do this was thought to be hard to obtain. At this point, it should be emphasized that the data were acquired to make a statistical estimate of a roughness characteristic and not to provide an exact description of ground elevation. Our results should be regarded as reproducible within the statistical accuracy to be described later. For this reason, the exact relocation of data points is considered to be unnecessary.

If vehicle tests are to be conducted at a site at which a survey has been made, our results will be useful in general selection considerations. When vehicle tests are made, our exact site might not be the most convenient; even if it is, ground deformation may occur due to a variety of factors associated with vehicle weight, ground moisture, etc. Hence, surveys along actual tracks may prove necessary.

The site description information is summarized in Table I. Additional information is available at MASC.

The sites coded by letters A-U are those surveyed in the summer of 1964. Some additional lines were surveyed at Ft. Sill in connection with vehicle trials conducted there. Lines L and M are on half of the previously surveyed lines of G and H. In particular, care was taken in conducting the trial at Site 2 so that the wheel track was exactly on the 1000 foot line and so the first half of line H represents the ground heights before and M the ground heights after modification by the vehicle.

The remaining sites, given by names, were surveyed earlier.

TABLE I

Revised 8/8/66

SITE	INSTALLATION	MAP LOCATION	AZIMUTH OF X-AXIS DEGREES E of No.	ANGLE OF LINE WITH X-AXIS, DEGREES COUNTER-CLOCKWISE
A	Fort Riley, Kan. W. of Manhattan	USGS Ft. Riley, Kan Twp. 11S, R. 5E, Sec. 6	15	47
B	Fort Riley, Kan.	USGS Ft. Riley, Kan. Twp. 10S, R. 5E, Sec. 12	335	30
C	Camp Gruber, Okla. E. of Muskogee	USGS Webber's Falls Twp. 14N, R. 20E, Sec. 11	280	160
D	Camp Gruber, Okla.	USGS Webber's Falls Twp. 14N, R. 20E, Sec. 23	45	135
E	Ft. Carson, Colo. S. of Colo. Sprgs.	USGS Timber Mountain Twp. 17S, R. 67W, Sec. 1	340	171
F	Ft. Carson, Colo.	USGS Timber Mountain Twp. 17S, R. 67W, Sec. 1	170	43
G	Ft. Sill, Okla. N. of Lawton (Site 1)	USGS Cache Twp. 3N, R. 13W, Sec. 20 & 21	320	2

Table I (Cont'd.)

Revised 8/8/66

SITE	INSTALLATION	MAP LOCATION	AZIMUTH OF X-AXIS DEGREES E. of N.	ANGLE OF LINE WITH X-AXIS DEGREES COUNTER-CLOCKWISE
H	Ft. Sill, Okla. (Site 2)	USGS Cache Twp. 3N, R. 13W, Sec. 20 & 21	260	128
J	Ft. Sill, Okla. (Site 3)	Same as above	No Square Two Track Line	Azimuth 129
K	Ft. Sill, Okla. (Site 4)	Same as above	No Square Two Track Line	Azimuth 173
L	Ft. Sill, Okla. (Site 1)	Same as above	No Square Two Track Line	Azimuth 318
M	Ft. Sill, Okla. (Site 2)	Same as above	No Square One Track Line	Azimuth 313
N	Ft. Hood, Tex. N. of Killeen	USGS Fort Hood 97° 50'W, 31° 12'N	136	16
O	Ft. Hood, Tex.	USGS Fort Hood 97° 53'W, 31° 11'N	41	35
P	Ft. Polk, La. E. of Leesville	USGS Slagle Twp. 2N, R. 7W, Sec. 23	180	50 (900' Line)

Table I (Cont'd.)

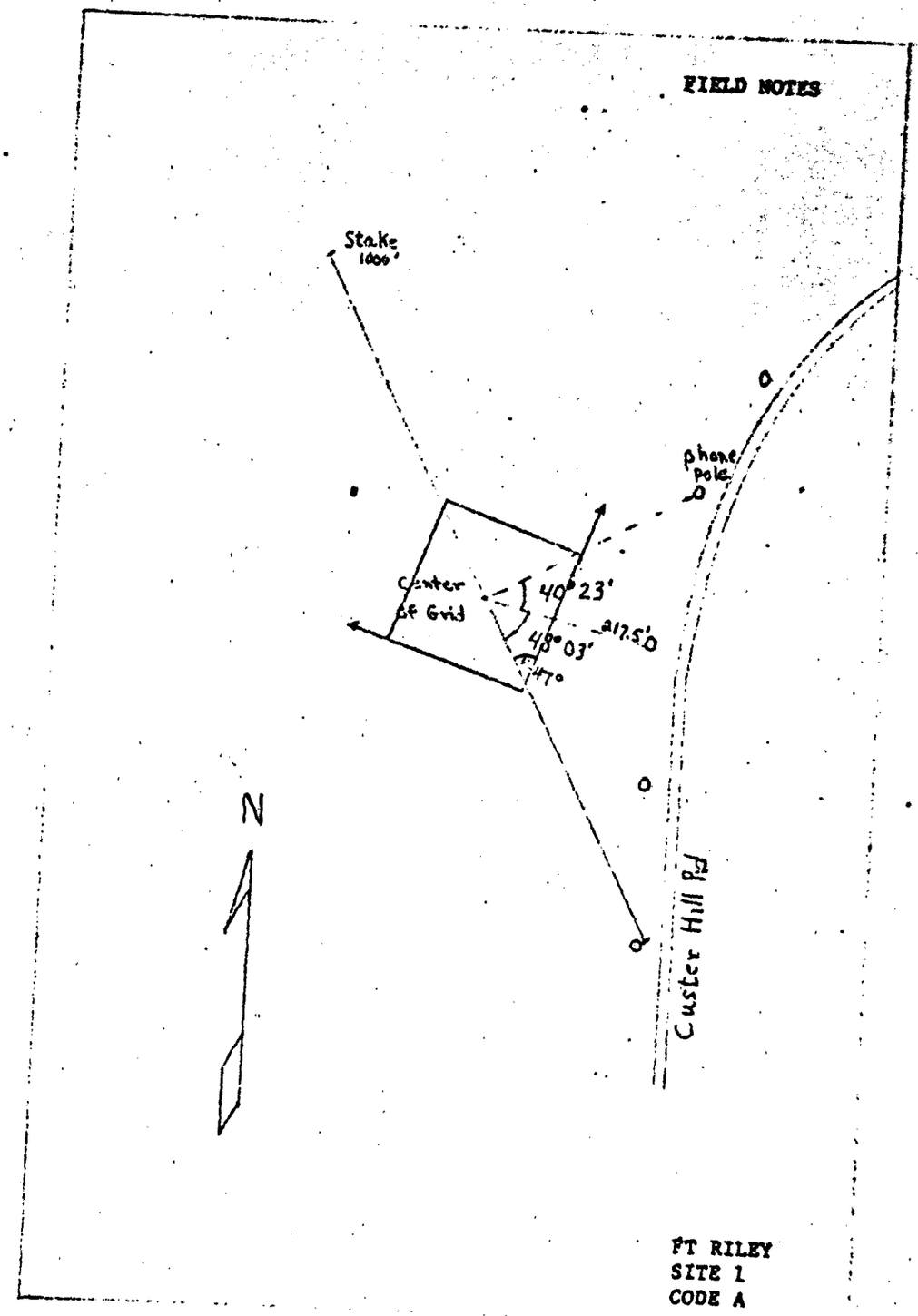
Revised 8/8/66

SITE	INSTALLATION	MAP LOCATION	AZIMUTH OF X-AXIS DEGREES E of N.	ANGLE OF LINE WITH X-AXIS DEGREES COUNTER-CLOCKWISE
Q	Ft. Polk, La.	USGS Slagle Twp. 2N, R. 7W, Sec. 23	140	90 (900' Line)
R	Ft. Benning, Ga. S. of Columbus	USGS Columbus Mil Grid 932697	335	176
S	Ft. Benning, Ga.	USGS Columbus Mil Grid 934698	176	45
T	Ft. McClellan, Ala. N. of Anniston	USGS Anniston Twp. 15S, R. 7E, Sec. 16	130	0
U	Ft. McClellan, Ala.	USGS Anniston Twp. 15S, R. 8E, Sec. 2	186	45
Aberdeen 1	Aberdeen Proving Grounds, Md.	No Data		
Aberdeen 2	As Above	No Data		
Knox 1	Ft. Knox, Ky.	Army Map Serv. 10-55 600060 Sheet 3759I NE Ser. V835 Mil Grid 863049	355	No Line

Table I (Cont'd) Revised 8/8/66

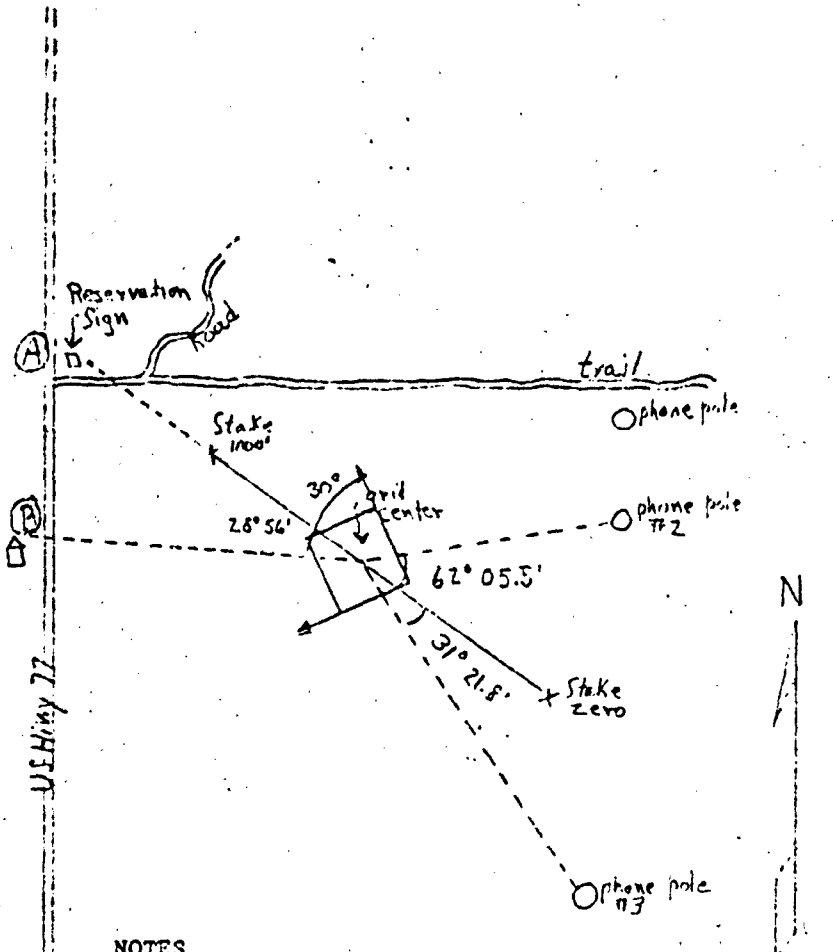
SITE	INSTALLATION	MAP LOCATION	AZIMUTH OF X-AXIS DEGREES E of N.	ANGLE OF LINE WITH X-AXIS DEGREES COUNTER-CLOCKWISE
Yuma 1	Yuma Test Station N. of Laguna, Ariz.	USGS Laguna 114° 24.2'W 32° 55'N	290	No Line
Yuma 2	Yuma Test Station	USGS Laguna 32° 51.7'N 114° 22.5'W	227	155
Las Vegas	AEC Nevada Test Site Mercury, Nevada	On Buckboard Mesa	No Square	Azimuth 118

FIELD NOTES



FT RILEY
SITE 1
CODE A

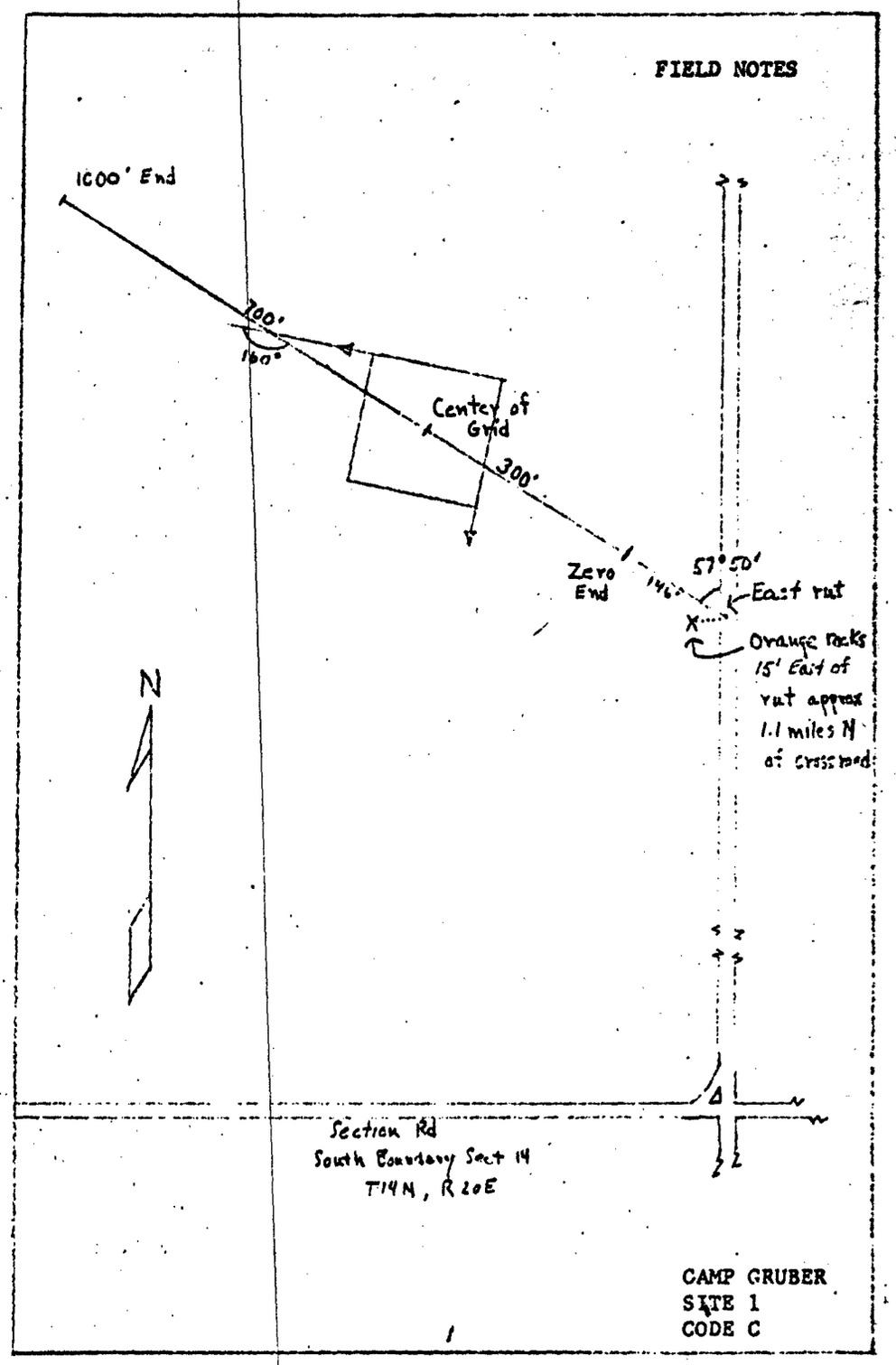
FIELD NOTES



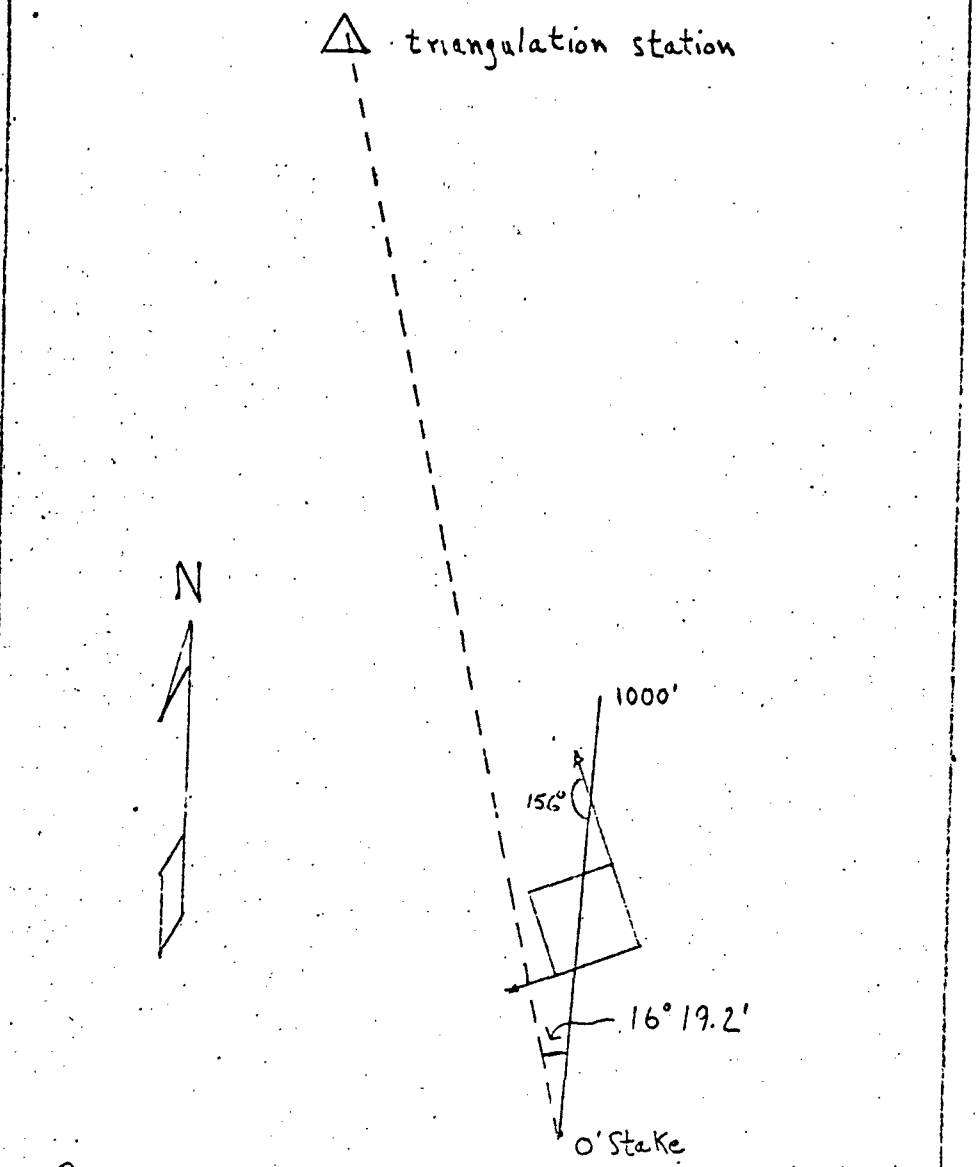
NOTES

A - Rt. side reservation sign
B - Peak of roof, Sweitzer farmhouse
grid center approx. 600' south of trail

FT RILEY
SITE 2
CODE B


FIELD NOTES
1000' End
200'
160°
Center of Grid
300'
Zero End
146°
57° 50'
East rut
Orange rocks
15' East of rut approx
1.1 miles N of crossroad
N
Section Rd
South Boundary Sect 14
T14N, R20E
CAMP GRUBER
SITE 1
CODE C

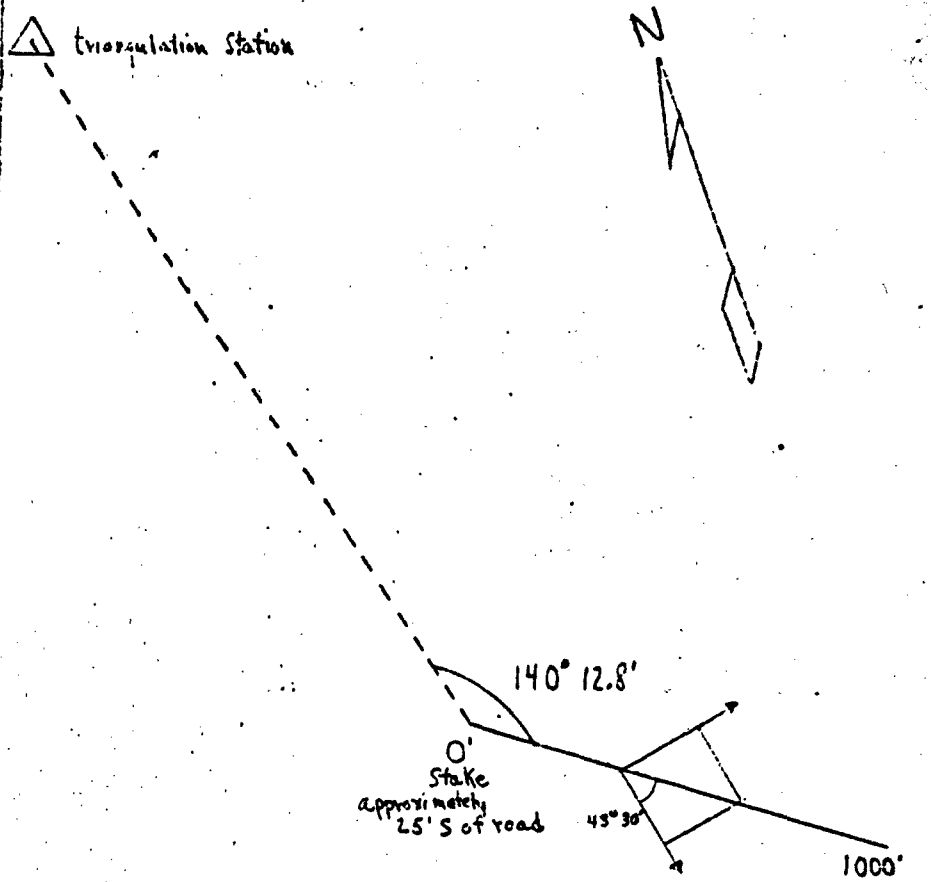
FIELD NOTES



Bearing of line N 3° 30' E
- grid azimuth

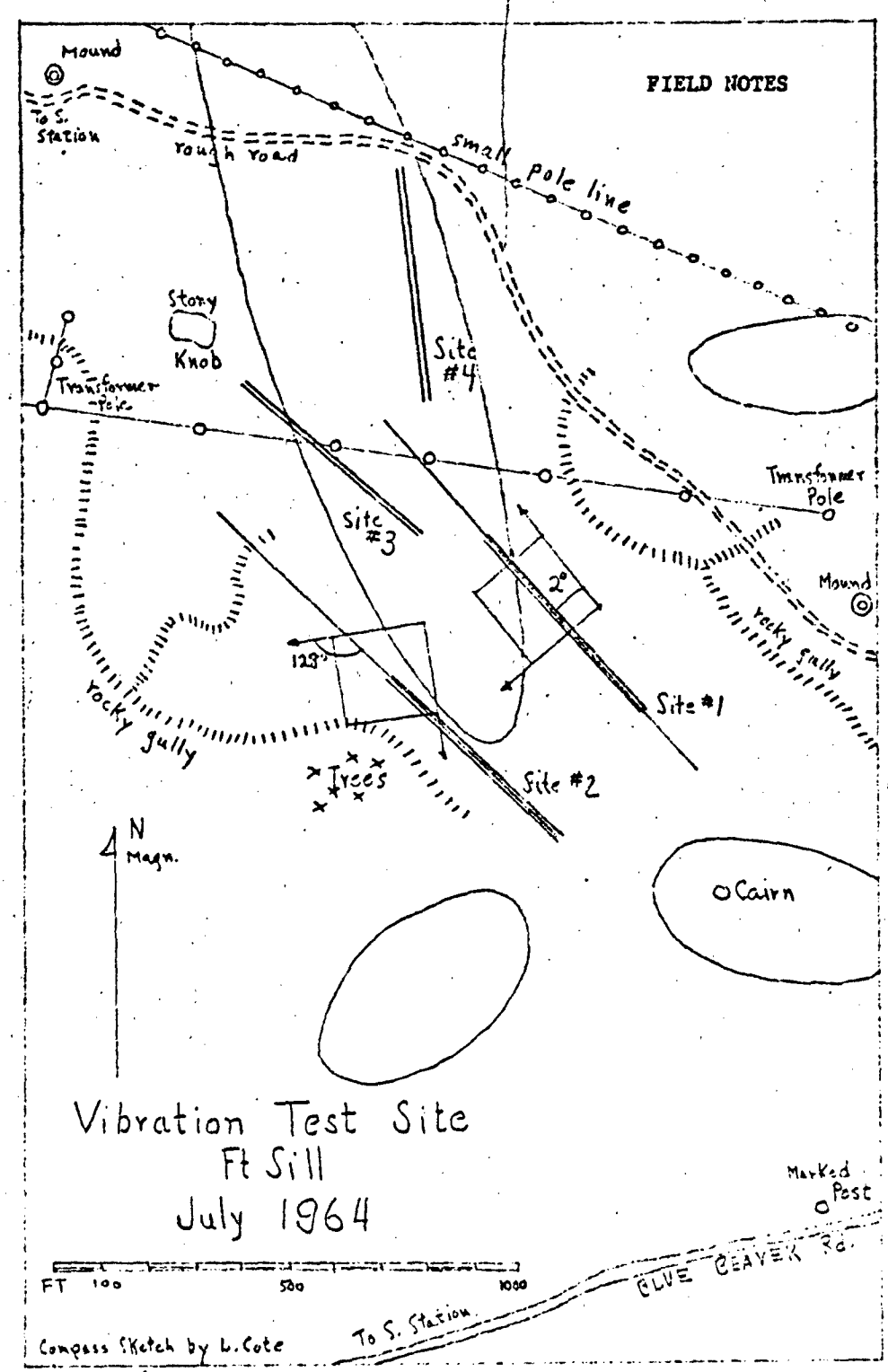
FT CARSON
SITE 1
CODE E

FIELD NOTES

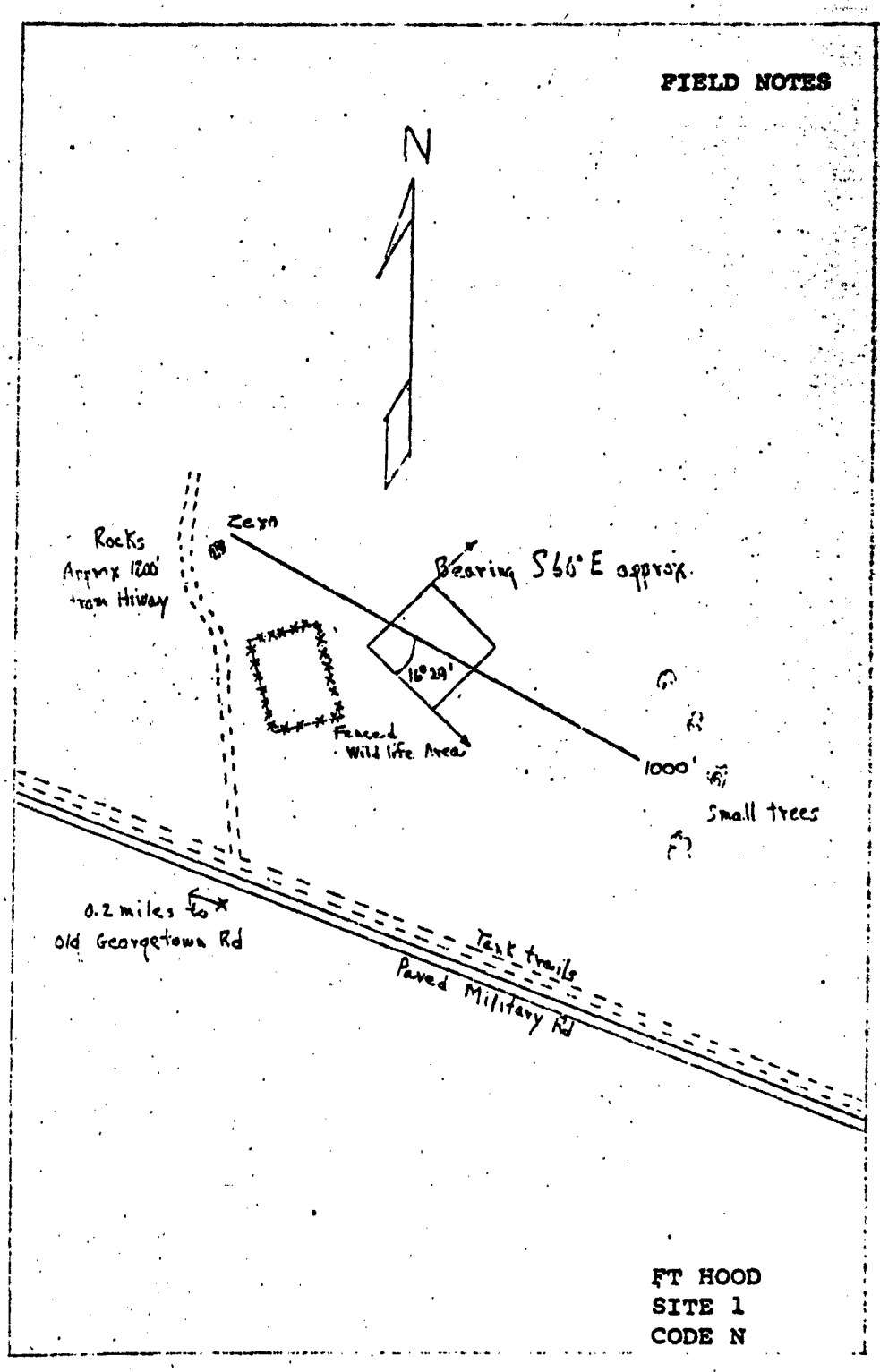


Bearing of line S 52° 30' E
grid azimuth

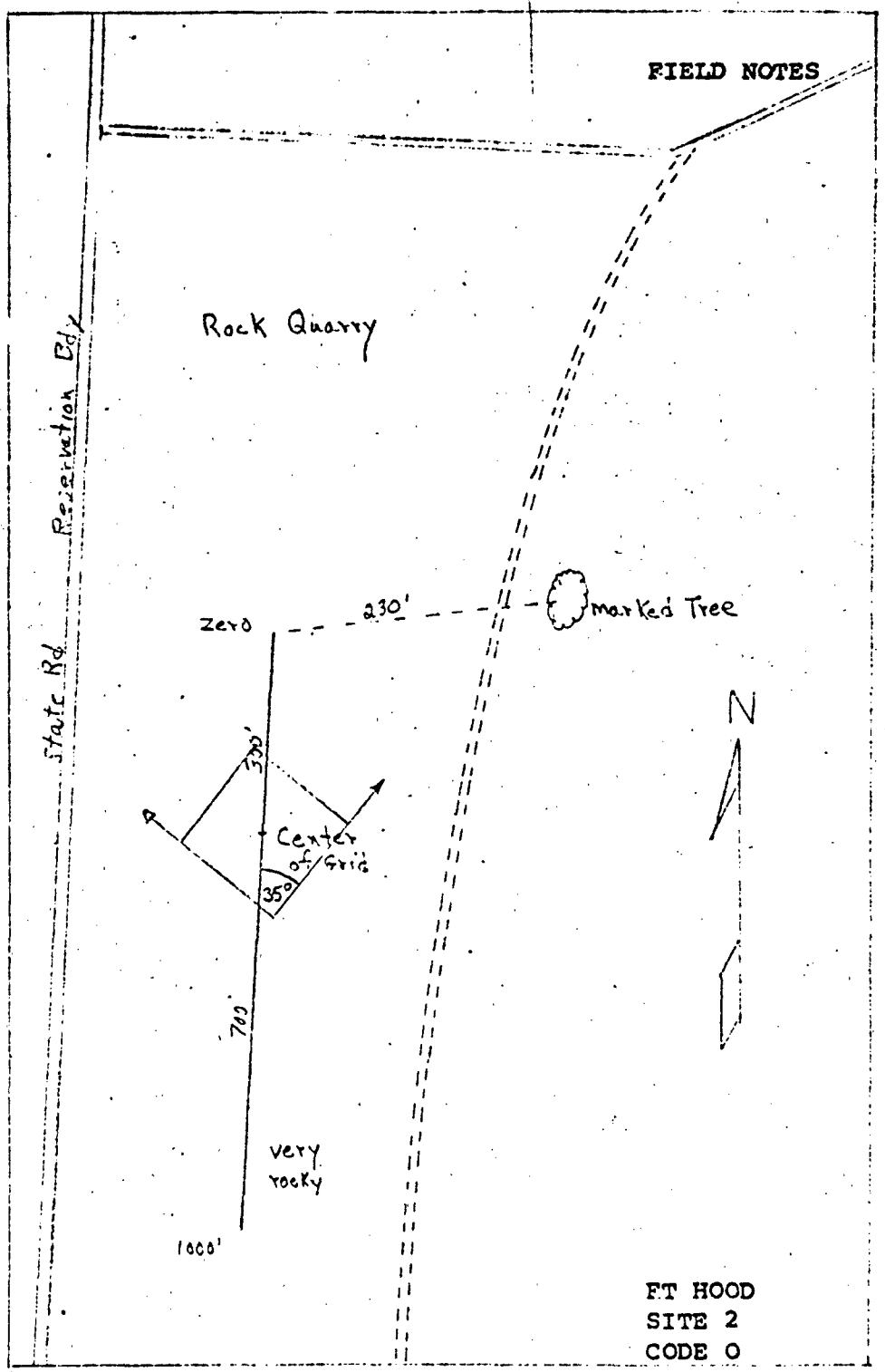
FT CARSON
SITE 2
CODE F

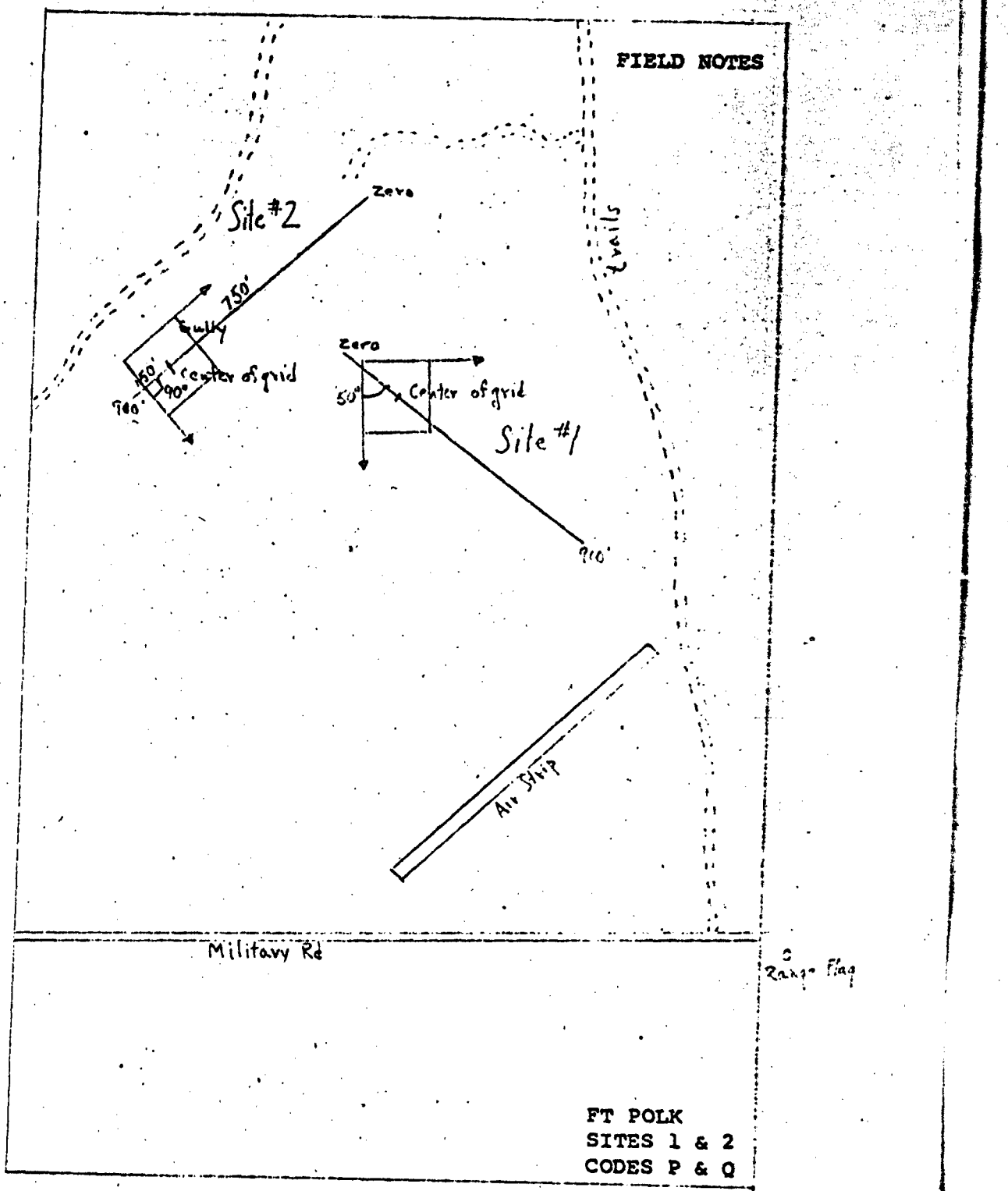

FIELD NOTES
Mound
To S. Station
rough road
small pole line
Story Knob
Transformer Pole
Site #4
Site #3
Site #1
Site #2
Transformer Pole
Mound
rocky gully
rocky gully
123°
2°
Trees
N Magn.
Cairn
Marked Post
Vibration Test Site
Ft Sill
July 1964
FT 100 500 1000
Compass Sketch by L. Cote
To S. Station
GLOVE BEAVER Rd.

FIELD NOTES

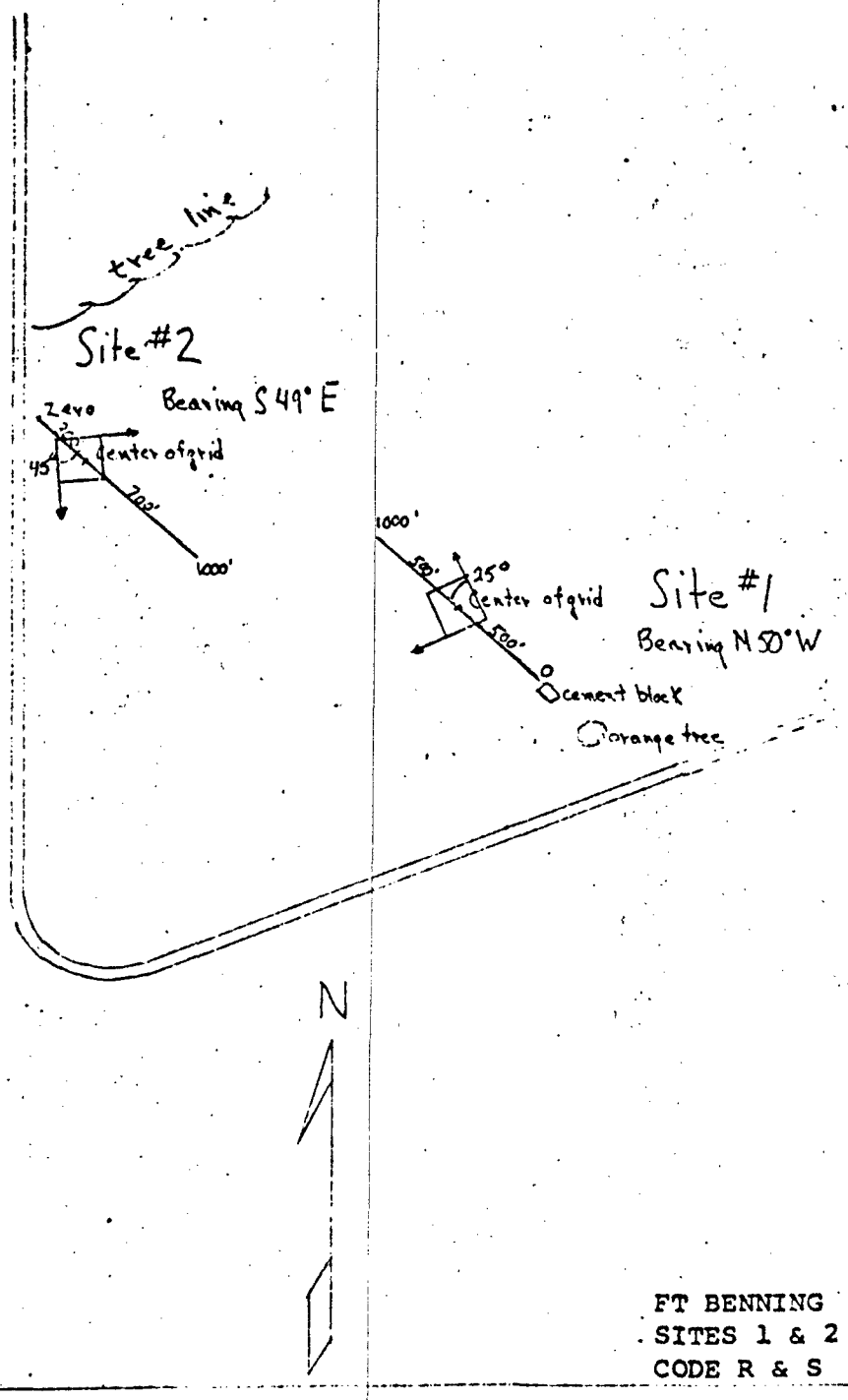


FT HOOD
SITE 1
CODE N

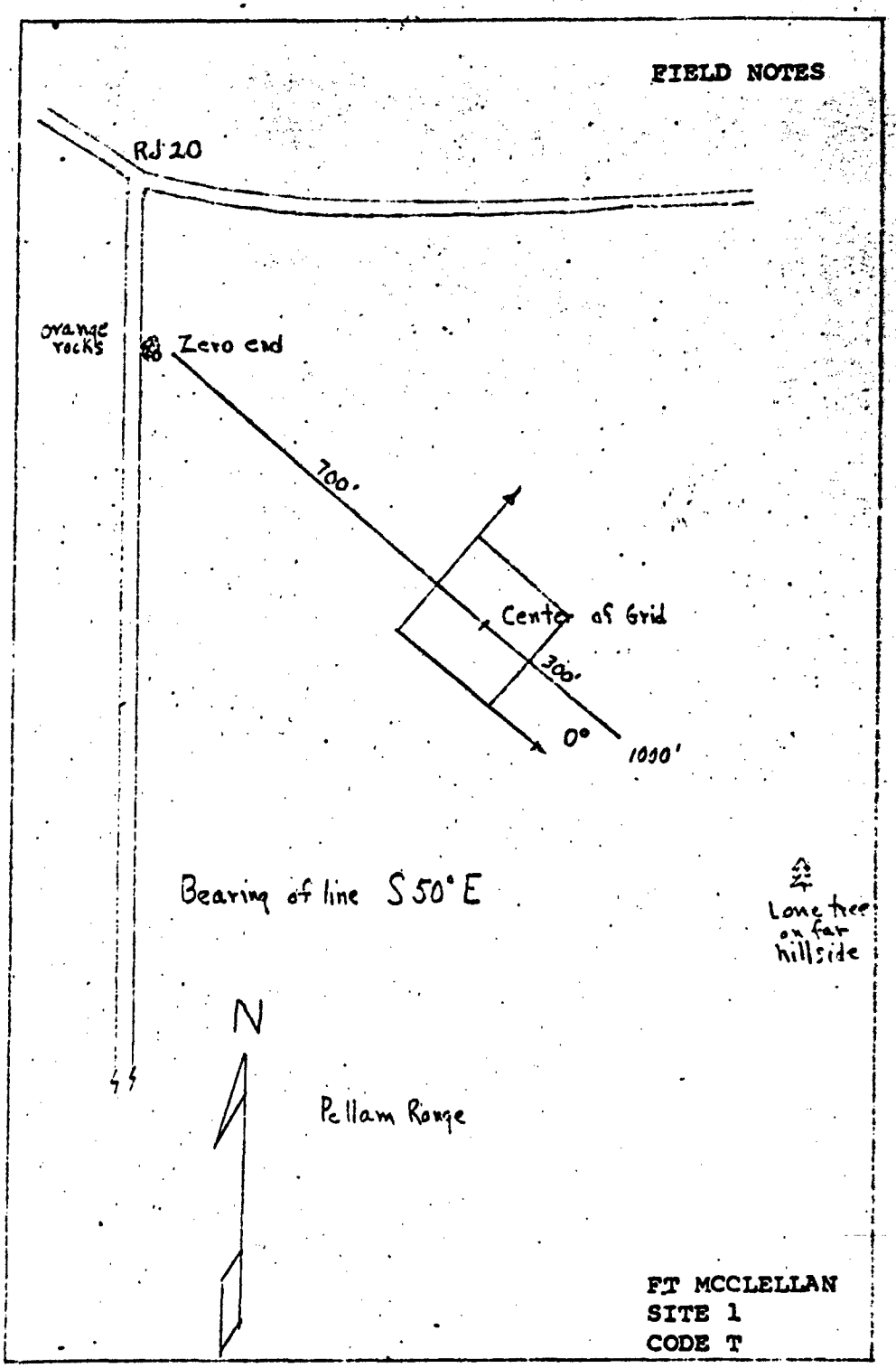

FIELD NOTES
Rock Quarry
Reservation Rd
State Rd
Zero
230'
marked Tree
N
330'
Center of Grid
35°
700'
very rocky
1000'
FT HOOD
SITE 2
CODE O

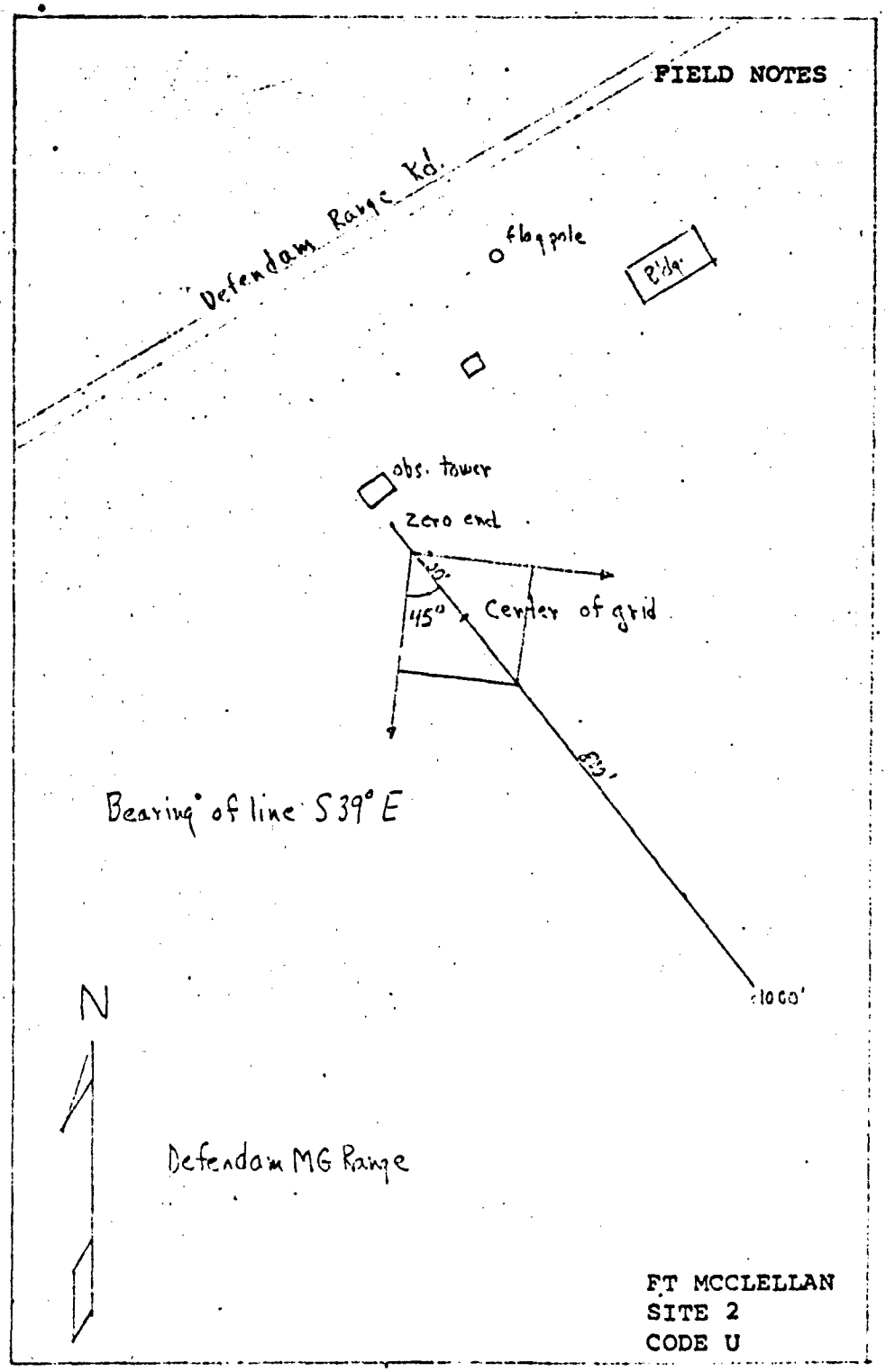

FIELD NOTES
Site #2
Zero
750'
Gully
150'
Center of grid
90°
900'
Zero
50°
Center of grid
Site #1
910'
Trails
Air Strip
Military Rd
Range Flag
FT POLK
SITES 1 & 2
CODES P & Q

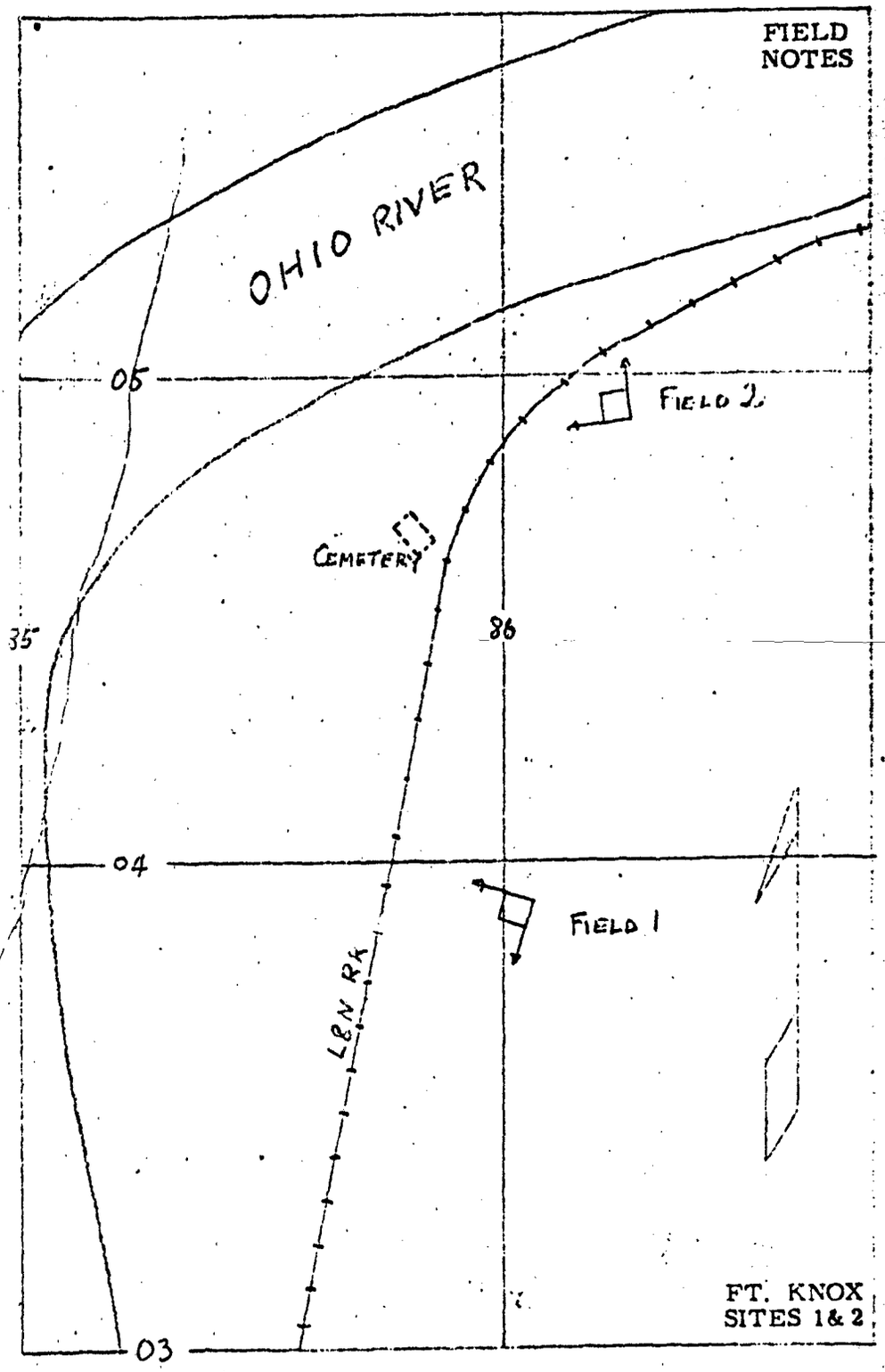
FIELD NOTES

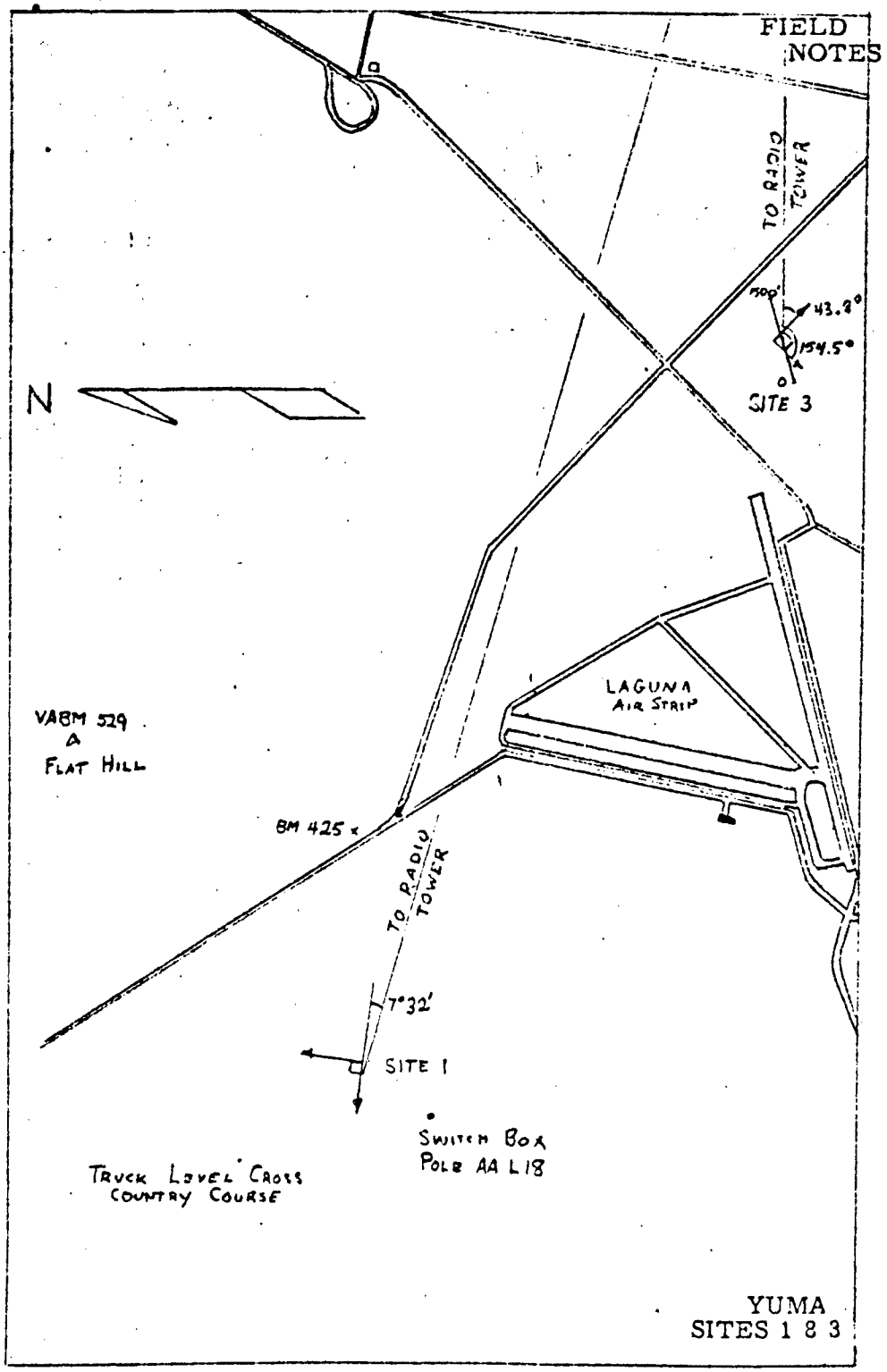


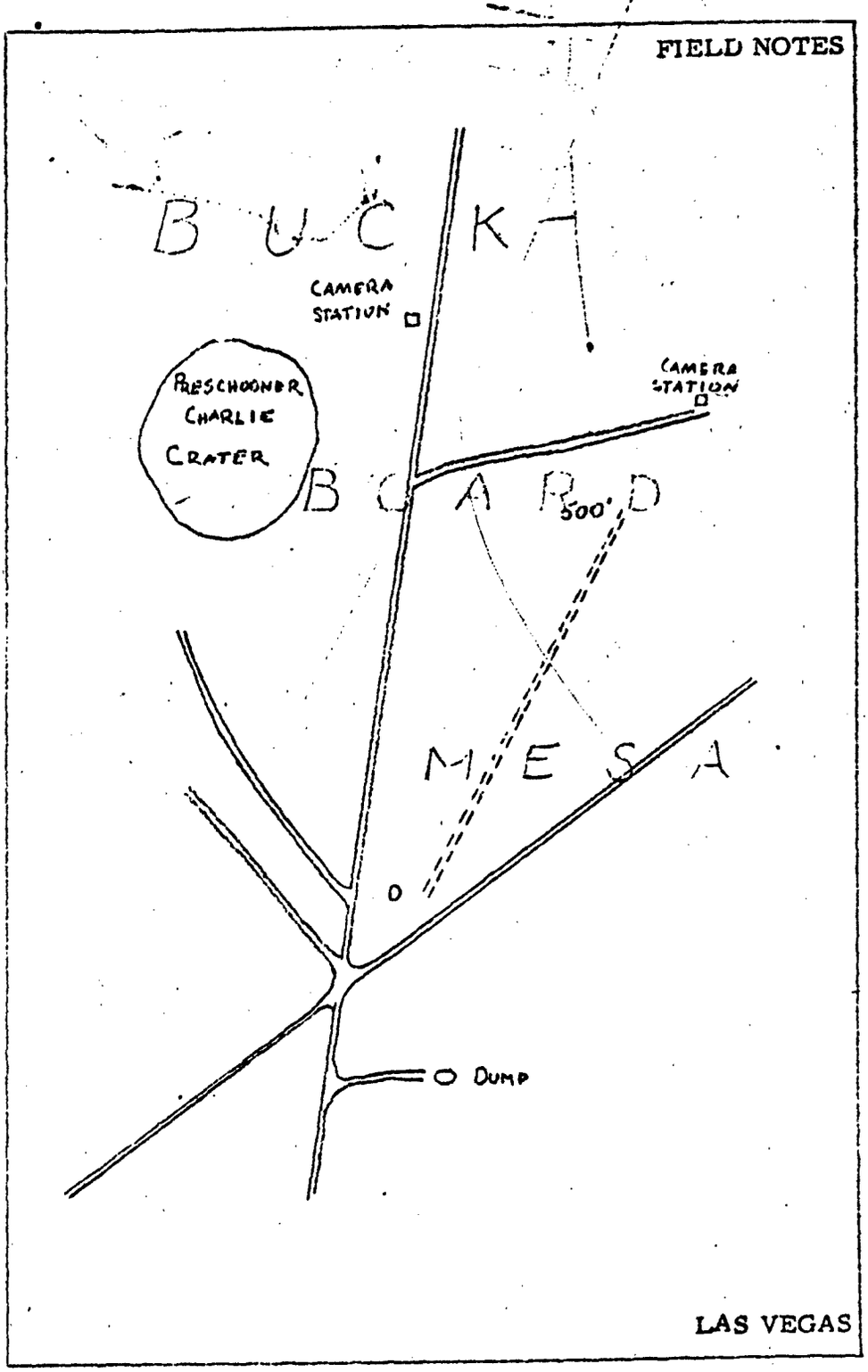
FT BENNING
SITES 1 & 2
CODE R & S


FIELD NOTES
RJ 20
orange rocks
Zero end
700'
Center of Grid
300'
0°
1000'
Bearing of line S 50° E
Lone tree on far hillside
N
Pellam Range
FT MCCLELLAN
SITE 1
CODE T


FIELD NOTES
Defendam Range Rd.
flagpole
B'ldg.
obs. tower
zero end
45°
Center of grid
Bearing of line S 39° E
1000'
N
Defendam MG Range
FT MCCLELLAN
SITE 2
CODE U


FIELD NOTES
OHIO RIVER
05
FIELD 2
CEMETERY
35
86
04
FIELD 1
L&N RR
03
FT. KNOX SITES 1&2


FIELD NOTES
TO RADIO TOWER
1100'
43.8°
134.5°
SITE 3
N
LAGUNA AIR STRIP
VABM 529
FLAT HILL
BM 425 ±
TO RADIO TOWER
7°32'
SITE 1
SWITCH BOX
POLE AA L18
TRUCK LEVEL CROSS COUNTRY COURSE
YUMA
SITES 1 & 3


FIELD NOTES
B U C K
CAMERA STATION
CAMERA STATION
PRESCHOONER CHARLIE CRATER
B O A R D
500'
M E S A
O
O DUMP
LAS VEGAS

LINE SPECTRA

Our methods of obtaining p.s.d. estimates for line data are described in [1]. They will not be repeated here. However, a description of computation is given in the section on computations.

We present in this section the spectral estimates in a numerical table, and graphs on semi-log paper of the spectral estimates. Each of the two-track spectra will be graphed on the same sheet for comparison purposes.

Co-spectra between parallel lines are needed in vehicle motion analysis. They have been computed where parallel line surveys were conducted. These co-spectra are presented in tabular form only, since plots are difficult to interpret.

The statistical accuracy of the spectra of the 1000 feet lines may be given in several ways. Each estimate has 18 degrees of freedom or, in other words, a confidence interval at 95% confidence may be found by using the factors .571 and 2.186. [We are 95% confident that the true spectral value lies between .571 times the estimate and 2.186 times the estimate.] The computations are made according to pp 28-30 of [1].

The raw elevation data on IBM cards may be obtained at cost from MASC.

SPECTRAL ESTIMATES FOR RILEY 1 LINE A -31-

ITEM A

P	WX(P)
0	----
1	2.544E 01
2	2.088E 00
3	2.998E-01
4	9.556E-02
5	9.669E-02
6	7.378E-02
7	3.810E-02
8	1.793E-02
9	1.836E-02
10	2.130E-02
11	2.396E-02
12	3.677E-02
13	3.706E-02
14	2.054E-02
15	1.147E-02
16	8.753E-03
17	6.620E-03
18	6.884E-03
19	7.776E-03
20	7.851E-03
21	7.742E-03
22	8.993E-03
23	9.915E-03
24	7.609E-03
25	5.666E-03
26	8.499E-03
27	1.122E-02
28	1.272E-02
29	1.267E-02
30	1.088E-02
31	9.100E-03
32	7.546E-03
33	6.229E-03
34	4.186E-03
35	4.337E-03
36	5.787E-03
37	4.834E-03
38	4.550E-03
39	5.406E-03
40	5.327E-03
41	5.308E-03
42	5.299E-03
43	4.685E-03
44	4.082E-03
45	4.433E-03
46	6.458E-03
47	8.227E-03
48	6.721E-03
49	5.557E-03
50	6.120E-03

ITEM A

P	WX(P)
0	----
1	1.203E 00
2	2.243E-01
3	1.087E-01
4	8.534E-02
5	4.978E-02
6	2.396E-02
7	3.125E-02
8	5.646E-02
9	7.093E-02
10	6.972E-02
11	6.049E-02
12	4.057E-02
13	3.073E-02
14	4.087E-02
15	5.175E-02
16	6.365E-02
17	6.771E-02
18	5.056E-02
19	2.838E-02
20	1.795E-02
21	2.265E-02
22	3.071E-02
23	2.921E-02
24	2.438E-02
25	2.787E-02
26	3.355E-02
27	3.011E-02
28	2.427E-02
29	2.103E-02
30	2.478E-02
31	3.032E-02
32	2.826E-02
33	2.805E-02
34	2.617E-02
35	2.042E-02
36	1.978E-02
37	2.169E-02
38	1.998E-02
39	1.759E-02
40	1.670E-02
41	1.269E-02
42	1.100E-02
43	1.791E-02
44	2.603E-02
45	2.125E-02
46	1.073E-02
47	9.850E-03
48	1.200E-02
49	1.544E-02
50	1.863E-02

SPECTRAL ESTIMATES FOR GRUBER 1 LINE C -33-

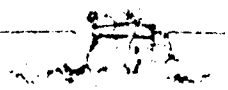
ITEM A

P	WX(P)
0	----
1	2.149E 00
2	2.880E-01
3	6.543E-02
4	1.565E-02
5	1.711E-02
6	2.033E-02
7	1.835E-02
8	1.607E-02
9	1.239E-02
10	8.907E-03
11	9.608E-03
12	1.143E-02
13	1.338E-02
14	1.534E-02
15	1.142E-02
16	6.170E-03
17	5.095E-03
18	5.554E-03
19	6.106E-03
20	7.327E-03
21	9.803E-03
22	9.189E-03
23	7.117E-03
24	7.438E-03
25	6.614E-03
26	6.596E-03
27	9.409E-03
28	9.730E-03
29	7.815E-03
30	8.589E-03
31	9.228E-03
32	6.939E-03
33	4.723E-03
34	5.850E-03
35	8.545E-03
36	9.183E-03
37	7.529E-03
38	6.140E-03
39	8.922E-03
40	1.007E-02
41	8.365E-03
42	1.115E-02
43	1.144E-02
44	7.109E-03
45	4.818E-03
46	5.149E-03
47	6.473E-03
48	6.293E-03
49	6.853E-03
50	8.048E-03

SPECTRAL ESTIMATES FOR GRUBER 2 LINE D -34-

ITEM A

P	WX(P)
0	-----
1	1.905E 01
2	3.259E 00
3	8.841E-01
4	3.690E-01
5	1.950E-01
6	1.425E-01
7	1.285E-01
8	1.190E-01
9	1.185E-01
10	9.107E-02
11	5.692E-02
12	4.256E-02
13	4.023E-02
14	4.446E-02
15	4.998E-02
16	4.710E-02
17	3.143E-02
18	2.917E-02
19	3.701E-02
20	2.718E-02
21	1.756E-02
22	1.775E-02
23	1.660E-02
24	1.721E-02
25	2.067E-02
26	1.911E-02
27	1.374E-02
28	1.255E-02
29	1.194E-02
30	1.040E-02
31	9.920E-03
32	9.679E-03
33	1.006E-02
34	1.124E-02
35	1.163E-02
36	1.027E-02
37	8.567E-03
38	7.415E-03
39	6.775E-03
40	6.220E-03
41	7.433E-03
42	1.026E-02
43	9.497E-03
44	6.022E-03
45	5.512E-03
46	5.822E-03
47	6.107E-03
48	6.282E-03
49	4.647E-03
50	3.736E-03



SPECTRAL ESTIMATES FOR CARSON 1 LINE E -35-

ITEM A

P	WX(P)
0	———
1	2.411E 00
2	2.971E-01
3	1.015E-01
4	6.537E-02
5	5.168E-02
6	3.770E-02
7	2.962E-02
8	2.752E-02
9	2.460E-02
10	1.871E-02
11	1.333E-02
12	9.154E-03
13	6.060E-03
14	7.755E-03
15	1.298E-02
16	1.399E-02
17	1.167E-02
18	1.011E-02
19	8.764E-03
20	1.105E-02
21	1.597E-02
22	1.445E-02
23	7.454E-03
24	5.701E-03
25	7.580E-03
26	7.095E-03
27	6.790E-03
28	5.732E-03
29	3.538E-03
30	3.776E-03
31	5.034E-03
32	5.237E-03
33	4.777E-03
34	4.040E-03
35	4.127E-03
36	4.356E-03
37	3.822E-03
38	4.140E-03
39	5.120E-03
40	5.476E-03
41	5.847E-03
42	4.943E-03
43	2.794E-03
44	2.468E-03
45	3.352E-03
46	3.665E-03
47	3.471E-03
48	3.494E-03
49	4.302E-03
50	4.853E-03

SPECTRAL ESTIMATES FOR CARSON 2 LINE F

ITEM A

P	WX(P)
0	----
1	9.254E 00
2	8.074E-01
3	2.365E-01
4	1.093E-01
5	5.708E-02
6	3.408E-02
7	1.997E-02
8	1.198E-02
9	1.065E-02
10	1.071E-02
11	1.153E-02
12	1.203E-02
13	1.184E-02
14	1.270E-02
15	9.685E-03
16	5.107E-03
17	5.396E-03
18	5.540E-03
19	4.689E-03
20	5.954E-03
21	6.193E-03
22	4.367E-03
23	3.330E-03
24	4.511E-03
25	5.787E-03
26	5.838E-03
27	5.847E-03
28	4.197E-03
29	3.455E-03
30	4.604E-03
31	3.809E-03
32	2.617E-03
33	3.245E-03
34	5.835E-03
35	7.199E-03
36	5.620E-03
37	3.893E-03
38	3.313E-03
39	2.983E-03
40	2.369E-03
41	1.949E-03
42	1.733E-03
43	2.866E-03
44	4.904E-03
45	4.194E-03
46	2.886E-03
47	4.084E-03
48	5.077E-03
49	4.192E-03
50	3.344E-03

SPECTRAL ESTIMATES FOR SILL 1 LINE G -37-

ITEM A

P	WX(P)
0	———
1	2.405E 01
2	2.761E 00
3	1.296E 00
4	6.264E-01
5	2.741E-01
6	1.579E-01
7	1.290E-01
8	7.999E-02
9	3.755E-02
10	2.126E-02
11	1.836E-02
12	2.173E-02
13	1.874E-02
14	1.608E-02
15	1.791E-02
16	1.915E-02
17	1.858E-02
18	1.466E-02
19	1.503E-02
20	1.496E-02
21	1.066E-02
22	1.032E-02
23	9.479E-03
24	8.905E-03
25	1.032E-02
26	1.046E-02
27	1.253E-02
28	1.309E-02
29	1.105E-02
30	1.301E-02
31	1.293E-02
32	1.013E-02
33	1.229E-02
34	1.227E-02
35	1.101E-02
36	1.210E-02
37	1.250E-02
38	1.455E-02
39	1.439E-02
40	1.191E-02
41	1.003E-02
42	8.425E-03
43	9.439E-03
44	1.121E-02
45	1.077E-02
46	1.017E-02
47	8.973E-03
48	6.466E-03
49	7.605E-03
50	9.717E-03

SPECTRAL ESTIMATES FOR SILL 2 LINE H

ITEM A

P	WX(P)
0	----
1	3.469E 01
2	4.077E 00
3	1.342E 00
4	7.074E-01
5	3.865E-01
6	1.853E-01
7	1.196E-01
8	8.334E-02
9	5.525E-02
10	5.448E-02
11	4.154E-02
12	2.404E-02
13	2.607E-02
14	2.634E-02
15	1.712E-02
16	1.632E-02
17	1.431E-02
18	8.266E-03
19	1.049E-02
20	1.037E-02
21	7.043E-03
22	7.252E-03
23	6.250E-03
24	5.936E-03
25	8.731E-03
26	8.323E-03
27	7.559E-03
28	9.244E-03
29	6.715E-03
30	4.445E-03
31	4.353E-03
32	3.243E-03
33	6.118E-03
34	9.188E-03
35	5.945E-03
36	4.628E-03
37	6.348E-03
38	5.319E-03
39	6.480E-03
40	8.311E-03
41	5.677E-03
42	5.104E-03
43	6.289E-03
44	4.532E-03
45	4.892E-03
46	5.807E-03
47	5.060E-03
48	6.900E-03
49	6.405E-03
50	4.085E-03

SPECTRAL ESTIMATES FOR SILL 3 LINE J 2 TRACK -39-

ITEM A WITH ITEM B

P	WX(P)	WY(P)	WC(P)	WQ(P)
0	----	----	----	----
1	6.952E-01	3.442E-01	2.549E-01	4.647E-02
2	6.791E-02	5.308E-02	1.405E-03	1.532E-02
3	3.980E-02	2.693E-02	1.721E-03	5.795E-03
4	3.300E-02	2.133E-02	5.117E-03	3.269E-03
5	1.926E-02	1.259E-02	2.112E-03	2.695E-03
6	9.251E-03	7.634E-03	1.121E-03	1.155E-03
7	7.337E-03	1.391E-02	2.285E-03	-2.079E-03
8	9.890E-03	1.841E-02	1.476E-03	-3.354E-03
9	1.237E-02	1.314E-02	-7.704E-05	-1.531E-03
10	1.320E-02	9.343E-03	-2.552E-03	1.134E-03
11	1.409E-02	1.060E-02	-3.321E-03	1.591E-03
12	1.322E-02	1.251E-02	1.703E-04	-4.963E-04
13	1.420E-02	1.371E-02	1.211E-03	-2.805E-03
14	1.822E-02	1.407E-02	-2.861E-03	-3.105E-03
15	1.582E-02	1.202E-02	-4.394E-03	-1.178E-03
16	9.434E-03	7.609E-03	-3.099E-03	3.777E-04
17	8.507E-03	5.884E-03	-1.766E-03	-1.760E-04
18	1.021E-02	8.042E-03	1.565E-03	-2.040E-03
19	1.160E-02	1.076E-02	2.859E-03	-3.591E-03
20	1.275E-02	9.573E-03	1.719E-03	-3.181E-03
21	1.094E-02	6.726E-03	2.147E-03	-5.344E-04
22	9.513E-03	7.978E-03	3.028E-03	9.838E-04
23	9.229E-03	8.073E-03	1.777E-03	1.786E-04
24	8.047E-03	5.487E-03	-1.331E-03	-2.861E-05
25	8.402E-03	3.942E-03	-1.326E-03	4.780E-04
26	1.122E-02	4.294E-03	-4.909E-04	1.086E-03
27	1.578E-02	7.513E-03	-3.391E-03	7.769E-04
28	1.464E-02	8.818E-03	-3.845E-03	4.450E-04
29	1.028E-02	6.111E-03	-1.158E-03	7.118E-04
30	9.740E-03	3.748E-03	-1.263E-03	9.056E-04
31	9.486E-03	3.460E-03	-1.410E-03	9.677E-04
32	7.391E-03	4.622E-03	-7.361E-04	2.271E-04
33	4.787E-03	6.866E-03	-5.066E-04	-9.257E-04
34	4.715E-03	9.287E-03	-1.664E-04	-1.236E-03
35	5.857E-03	8.548E-03	-9.511E-05	2.524E-04
36	5.462E-03	5.922E-03	1.991E-04	7.685E-04
37	5.952E-03	4.574E-03	-4.960E-04	-3.255E-04
38	6.030E-03	5.105E-03	-1.631E-03	-8.664E-04
39	5.929E-03	6.479E-03	-1.183E-03	-1.184E-03
40	7.857E-03	7.122E-03	-4.772E-04	-3.805E-04
41	8.236E-03	9.177E-03	-1.598E-03	1.198E-03
42	8.376E-03	9.094E-03	-3.867E-03	1.296E-03
43	8.818E-03	5.224E-03	-2.958E-03	8.852E-04
44	8.387E-03	4.352E-03	6.095E-04	2.863E-04
45	8.888E-03	5.800E-03	1.122E-03	-1.902E-03
46	7.710E-03	7.096E-03	4.686E-04	-3.181E-03
47	6.695E-03	6.508E-03	1.039E-03	-1.709E-03
48	7.919E-03	4.433E-03	-3.506E-04	-8.232E-04
49	7.576E-03	5.131E-03	-8.002E-04	-8.701E-04
50	6.576E-03	6.372E-03	3.021E-04	0.

SPECTRAL ESTIMATES FOR SILL 4 LINE K 2 TRACK -40-

ITEM A WITH ITEM B

P	WX(P)	WY(P)	WC(P)	WQ(P)
0	----	----	----	----
1	7.638E-01	1.158E 00	8.063E-01	2.484E-02
2	6.560E-02	1.031E-01	5.867E-02	-1.207E-02
3	1.887E-02	4.012E-02	8.732E-03	-7.688E-03
4	2.137E-02	3.356E-02	5.033E-03	2.771E-03
5	2.492E-02	1.638E-02	3.125E-03	2.931E-03
6	2.279E-02	8.262E-03	1.036E-03	-1.511E-03
7	2.054E-02	9.300E-03	1.786E-03	-2.497E-03
8	1.873E-02	1.194E-02	2.574E-03	1.405E-03
9	1.314E-02	1.497E-02	6.365E-04	4.690E-03
10	9.401E-03	1.509E-02	-1.339E-03	2.402E-03
11	7.475E-03	1.559E-02	-2.021E-03	-2.849E-04
12	5.427E-03	1.462E-02	-1.463E-03	-1.450E-03
13	6.817E-03	1.127E-02	2.834E-05	-2.946E-03
14	7.619E-03	1.140E-02	2.268E-04	-1.336E-03
15	6.564E-03	1.037E-02	8.631E-04	8.333E-04
16	7.655E-03	7.413E-03	1.545E-03	3.287E-04
17	8.933E-03	8.067E-03	-7.799E-04	1.089E-03
18	9.797E-03	8.906E-03	-1.387E-03	3.145E-03
19	1.009E-02	7.751E-03	-5.787E-05	3.520E-03
20	7.135E-03	6.901E-03	-1.256E-03	2.503E-03
21	5.074E-03	6.328E-03	-2.304E-03	6.229E-04
22	7.739E-03	6.211E-03	-8.474E-04	-1.578E-03
23	1.054E-02	6.790E-03	7.669E-04	-2.783E-03
24	1.021E-02	6.711E-03	8.139E-04	-3.687E-03
25	7.901E-03	5.956E-03	1.290E-03	-3.294E-03
26	6.108E-03	4.518E-03	1.790E-03	-1.532E-03
27	7.296E-03	5.857E-03	1.443E-03	-1.072E-03
28	7.935E-03	8.148E-03	5.361E-04	-3.867E-04
29	5.540E-03	5.781E-03	-8.694E-04	8.913E-04
30	5.673E-03	4.227E-03	-6.702E-04	1.144E-03
31	8.589E-03	5.588E-03	4.455E-04	1.105E-04
32	9.075E-03	5.157E-03	1.663E-03	-4.125E-04
33	8.580E-03	3.878E-03	2.808E-03	-2.786E-04
34	9.247E-03	5.307E-03	3.042E-03	-1.332E-03
35	8.514E-03	7.179E-03	2.768E-03	-2.430E-03
36	7.511E-03	8.578E-03	2.678E-03	-2.573E-03
37	8.600E-03	8.905E-03	2.052E-03	-1.576E-03
38	8.658E-03	6.384E-03	6.844E-04	-5.820E-04
39	6.569E-03	6.281E-03	3.020E-04	9.971E-04
40	5.433E-03	8.334E-03	6.153E-04	2.631E-03
41	5.428E-03	7.162E-03	4.444E-04	1.716E-03
42	5.522E-03	5.030E-03	-9.690E-05	3.786E-04
43	5.896E-03	3.665E-03	1.772E-05	-4.448E-04
44	6.516E-03	3.309E-03	4.455E-04	-7.452E-04
45	6.190E-03	5.364E-03	-5.500E-04	4.609E-04
46	4.146E-03	8.488E-03	-1.800E-03	9.644E-04
47	3.157E-03	9.392E-03	-1.925E-03	-3.890E-04
48	4.501E-03	6.192E-03	-1.066E-03	-1.183E-03
49	5.707E-03	4.837E-03	6.694E-05	-5.094E-04
50	5.936E-03	6.134E-03	5.073E-04	0.

SPECTRAL ESTIMATES FOR SILL 1A LINE L 2 TRACK -41-

ITEM A WITH ITEM B

P	WX(P)	WY(P)	WC(P)	WQ(P)
0	----	----	----	----
1	6.735E 00	8.070E 00	6.607E 00	-2.643E 00
2	7.210E-01	1.204E 00	7.134E-01	-1.858E-01
3	1.890E-01	2.674E-01	1.354E-01	-1.732E-02
4	9.047E-02	6.703E-02	4.140E-02	-1.641E-02
5	5.561E-02	2.662E-02	2.094E-02	-3.908E-03
6	4.214E-02	1.929E-02	1.564E-02	9.358E-04
7	3.746E-02	1.888E-02	9.838E-03	5.569E-04
8	2.956E-02	2.523E-02	5.596E-03	-7.549E-05
9	2.193E-02	3.507E-02	9.065E-03	-4.137E-03
10	2.631E-02	3.198E-02	9.400E-03	-2.153E-03
11	2.663E-02	2.438E-02	2.013E-03	1.969E-03
12	1.749E-02	2.873E-02	-3.968E-03	3.858E-03
13	1.855E-02	2.932E-02	-2.944E-03	5.267E-03
14	2.548E-02	2.244E-02	2.517E-03	7.433E-03
15	2.775E-02	2.843E-02	6.566E-03	8.545E-03
16	2.493E-02	3.475E-02	6.573E-03	1.278E-03
17	1.831E-02	2.855E-02	2.627E-03	-2.410E-03
18	1.509E-02	2.391E-02	-3.218E-03	1.145E-03
19	1.438E-02	2.135E-02	-3.810E-03	-8.075E-04
20	1.449E-02	1.964E-02	-9.209E-04	-2.679E-04
21	2.085E-02	1.950E-02	-4.335E-03	2.817E-03
22	2.775E-02	1.671E-02	-7.538E-03	-2.100E-03
23	2.604E-02	1.458E-02	-4.962E-03	-4.058E-03
24	2.283E-02	1.589E-02	-2.146E-03	-1.519E-03
25	1.902E-02	1.532E-02	-4.345E-04	-4.556E-03
26	1.159E-02	1.400E-02	-4.435E-04	-3.757E-03
27	1.077E-02	1.736E-02	5.927E-04	2.510E-03
28	1.651E-02	1.582E-02	2.479E-03	4.818E-03
29	1.879E-02	1.010E-02	2.409E-03	3.423E-03
30	1.502E-02	1.086E-02	1.229E-03	2.314E-04
31	1.531E-02	1.133E-02	-2.753E-03	-1.952E-03
32	2.181E-02	1.629E-02	-2.071E-03	4.557E-03
33	1.914E-02	2.846E-02	4.641E-03	7.914E-03
34	8.986E-03	2.826E-02	5.591E-03	2.533E-03
35	7.553E-03	2.419E-02	2.976E-03	2.767E-04
36	1.108E-02	2.297E-02	-1.142E-04	1.252E-04
37	1.368E-02	1.545E-02	-2.791E-04	2.897E-04
38	1.729E-02	1.094E-02	3.241E-03	1.427E-03
39	1.597E-02	1.099E-02	2.937E-03	1.936E-03
40	9.981E-03	8.030E-03	1.292E-03	1.866E-03
41	7.972E-03	7.584E-03	1.744E-03	2.965E-03
42	1.121E-02	1.254E-02	9.426E-04	4.684E-03
43	1.414E-02	1.548E-02	-1.535E-04	3.775E-03
44	1.202E-02	1.916E-02	3.373E-03	6.307E-04
45	1.058E-02	2.470E-02	7.836E-03	-1.144E-03
46	1.377E-02	2.060E-02	4.600E-03	5.401E-04
47	1.528E-02	1.308E-02	5.617E-04	1.637E-03
48	1.414E-02	1.760E-02	1.554E-03	-6.991E-04
49	1.391E-02	2.838E-02	4.402E-04	-1.950E-03
50	1.432E-02	3.303E-02	-1.289E-03	0.

SPECTRAL ESTIMATES FOR SILL 2A LINE 1 TRK M -42-

ITEM A

P	WX(P)
0	----
1	2.546E-01
2	2.043E-02
3	1.063E-02
4	7.964E-03
5	5.857E-03
6	4.677E-03
7	3.856E-03
8	3.767E-03
9	3.413E-03
10	2.494E-03
11	1.987E-03
12	1.957E-03
13	2.420E-03
14	2.553E-03
15	1.692E-03
16	1.325E-03
17	1.815E-03
18	1.821E-03
19	1.444E-03
20	1.327E-03
21	1.299E-03
22	1.251E-03
23	1.000E-03
24	8.265E-04
25	1.087E-03
26	1.105E-03
27	9.580E-04
28	8.899E-04
29	6.888E-04
30	6.761E-04
31	7.910E-04
32	7.827E-04
33	8.633E-04
34	9.906E-04
35	1.120E-03
36	1.045E-03
37	7.976E-04
38	8.580E-04
39	7.903E-04
40	4.961E-04
41	4.901E-04
42	6.271E-04
43	6.490E-04
44	6.411E-04
45	5.758E-04
46	3.677E-04
47	3.079E-04
48	3.832E-04
49	5.823E-04
50	7.716E-04

SPECTRAL ESTIMATES FOR HOOD 1 LINE N -43-

ITEM A

P	WX(P)
0	----
1	3.876E 00
2	1.138E 00
3	3.470E-01
4	8.701E-02
5	2.371E-02
6	1.104E-02
7	1.049E-02
8	1.139E-02
9	1.304E-02
10	1.558E-02
11	1.295E-02
12	7.419E-03
13	5.910E-03
14	6.767E-03
15	6.680E-03
16	5.441E-03
17	4.473E-03
18	5.409E-03
19	6.756E-03
20	6.375E-03
21	4.524E-03
22	3.482E-03
23	3.830E-03
24	4.104E-03
25	4.871E-03
26	6.377E-03
27	6.295E-03
28	4.917E-03
29	4.209E-03
30	3.631E-03
31	3.204E-03
32	4.137E-03
33	5.626E-03
34	7.015E-03
35	8.010E-03
36	5.707E-03
37	4.472E-03
38	5.973E-03
39	5.967E-03
40	7.327E-03
41	7.776E-03
42	5.365E-03
43	4.556E-03
44	5.015E-03
45	5.803E-03
46	5.830E-03
47	4.188E-03
48	3.228E-03
49	3.445E-03
50	3.556E-03

SPECTRAL ESTIMATES FOR HOOD 2 LINE 0

ITEM A

P	WX(P)
0	-----
1	5.103E-01
2	6.514E-02
3	2.797E-02
4	1.971E-02
5	1.201E-02
6	6.580E-03
7	6.232E-03
8	7.684E-03
9	8.986E-03
10	1.129E-02
11	1.423E-02
12	1.763E-02
13	1.920E-02
14	1.598E-02
15	1.072E-02
16	6.966E-03
17	4.266E-03
18	2.297E-03
19	1.824E-03
20	2.131E-03
21	2.761E-03
22	3.380E-03
23	3.214E-03
24	2.596E-03
25	1.82[illegible]-03
26	1.70[illegible]-03
27	2.057E-03
28	1.663E-03
29	1.251E-03
30	1.117E-03
31	8.391E-04
32	8.855E-04
33	1.350E-03
34	1.879E-03
35	2.015E-03
36	2.085E-03
37	2.341E-03
38	2.101E-03
39	1.915E-03
40	2.167E-03
41	2.101E-03
42	1.715E-03
43	1.667E-03
44	1.838E-03
45	1.629E-03
46	1.423E-03
47	1.314E-03
48	1.092E-03
49	1.206E-03
50	1.415E-03

SPECTRAL ESTIMATES FOR POLK 1 LINE P -45-

ITEM A

P	WX(P)
0	----
1	5.966E 00
2	7.111E-01
3	4.693E-01
4	2.892E-01
5	1.555E-01
6	9.170E-02
7	6.343E-02
8	5.137E-02
9	5.256E-02
10	5.533E-02
11	5.101E-02
12	5.379E-02
13	5.920E-02
14	5.263E-02
15	4.841E-02
16	5.835E-02
17	6.054E-02
18	4.147E-02
19	3.281E-02
20	4.090E-02
21	4.187E-02
22	3.468E-02
23	2.616E-02
24	2.228E-02
25	1.787E-02
26	1.110E-02
27	9.468E-03
28	1.080E-02
29	1.191E-02
30	1.365E-02
31	1.614E-02
32	1.815E-02
33	1.755E-02
34	1.668E-02
35	1.458E-02
36	9.763E-03
37	6.975E-03
38	7.800E-03
39	8.930E-03
40	7.545E-03
41	5.710E-03
42	5.646E-03
43	5.583E-03
44	5.628E-03
45	5.972E-03
46	4.953E-03
47	3.265E-03
48	3.684E-03
49	6.266E-03
50	7.771E-03

SPECTRAL ESTIMATES FOR POLK 2 LINE Q -46-

ITEM A

P	WX(P)
0	----
1	8.006E 01
2	9.443E 00
3	3.610E 00
4	1.473E 00
5	1.169E 00
6	1.202E 00
7	8.202E-01
8	4.226E-01
9	2.274E-01
10	1.171E-01
11	6.953E-02
12	8.722E-02
13	1.097E-01
14	8.112E-02
15	8.318E-02
16	1.570E-01
17	1.518E-01
18	7.988E-02
19	9.450E-02
20	1.282E-01
21	8.606E-02
22	5.780E-02
23	5.860E-02
24	4.296E-02
25	4.932E-02
26	6.210E-02
27	4.751E-02
28	3.146E-02
29	3.371E-02
30	4.429E-02
31	5.382E-02
32	4.898E-02
33	3.489E-02
34	2.461E-02
35	1.987E-02
36	2.003E-02
37	1.984E-02
38	1.959E-02
39	1.573E-02
40	8.489E-03
41	6.527E-03
42	1.219E-02
43	2.114E-02
44	2.036E-02
45	1.108E-02
46	8.019E-03
47	1.093E-02
48	1.153E-02
49	1.114E-02
50	1.208E-02

SPECTRAL ESTIMATES FOR BENNING 1 LINE R -47-

ITEM A

P	WX(P)
0	———
1	6.135E 00
2	1.328E 00
3	6.736E-01
4	2.855E-01
5	1.328E-01
6	1.204E-01
7	9.200E-02
8	4.219E-02
9	3.108E-02
10	4.639E-02
11	4.549E-02
12	3.441E-02
13	3.159E-02
14	3.600E-02
15	3.629E-02
16	2.554E-02
17	1.489E-02
18	1.124E-02
19	1.256E-02
20	1.647E-02
21	1.791E-02
22	1.718E-02
23	1.626E-02
24	1.359E-02
25	1.070E-02
26	8.959E-03
27	8.736E-03
28	1.179E-02
29	1.332E-02
30	1.185E-02
31	1.020E-02
32	7.746E-03
33	9.297E-03
34	1.425E-02
35	1.458E-02
36	1.241E-02
37	9.952E-03
38	7.330E-03
39	5.136E-03
40	3.967E-03
41	5.548E-03
42	8.075E-03
43	1.010E-02
44	1.301E-02
45	1.433E-02
46	1.169E-02
47	9.461E-03
48	7.717E-03
49	5.603E-03
50	4.974E-03

SPECTRAL ESTIMATES FOR BENNING 2 LINE S -48-

: ITEM A

P	WX(P)
0	---
1	1.145E 00
2	1.566E-01
3	1.145E-01
4	1.449E-01
5	1.522E-01
6	1.102E-01
7	6.686E-02
8	4.708E-02
9	3.425E-02
10	2.275E-02
11	1.723E-02
12	1.556E-02
13	1.742E-02
14	1.936E-02
15	1.369E-02
16	8.478E-03
17	1.186E-02
18	1.583E-02
19	1.373E-02
20	1.160E-02
21	1.476E-02
22	1.692E-02
23	1.650E-02
24	1.659E-02
25	1.446E-02
26	1.048E-02
27	1.039E-02
28	1.232E-02
29	1.083E-02
30	8.285E-03
31	8.183E-03
32	7.564E-03
33	9.945E-03
34	1.503E-02
35	1.285E-02
36	7.019E-03
37	4.865E-03
38	5.648E-03
39	8.056E-03
40	9.917E-03
41	8.673E-03
42	6.083E-03
43	5.560E-03
44	5.904E-03
45	5.437E-03
46	5.589E-03
47	6.196E-03
48	6.362E-03
49	5.336E-03
50	4.253E-03

SPECTRAL ESTIMATES FOR MCCLELLAN 1 LINE T

ITEM A

P	WX(P)
0	----
1	1.711E 00
2	5.754E-01
3	2.937E-01
4	1.842E-01
5	1.276E-01
6	7.948E-02
7	5.577E-02
8	4.659E-02
9	4.523E-02
10	3.830E-02
11	2.450E-02
12	2.144E-02
13	2.398E-02
14	1.843E-02
15	1.024E-02
16	8.966E-03
17	1.365E-02
18	1.603E-02
19	1.265E-02
20	9.566E-03
21	9.606E-03
22	1.162E-02
23	1.255E-02
24	1.291E-02
25	1.169E-02
26	7.310E-03
27	7.545E-03
28	1.297E-02
29	1.747E-02
30	1.617E-02
31	1.212E-02
32	8.836E-03
33	6.726E-03
34	6.241E-03
35	7.803E-03
36	1.104E-02
37	1.232E-02
38	1.109E-02
39	9.863E-03
40	8.742E-03
41	1.050E-02
42	1.259E-02
43	1.031E-02
44	9.272E-03
45	9.000E-03
46	7.964E-03
47	8.902E-03
48	9.391E-03
49	8.535E-03
50	7.907E-03

SPECTRAL ESTIMATES FOR MCCLELLAN 2 LINE U -50-

ITEM A

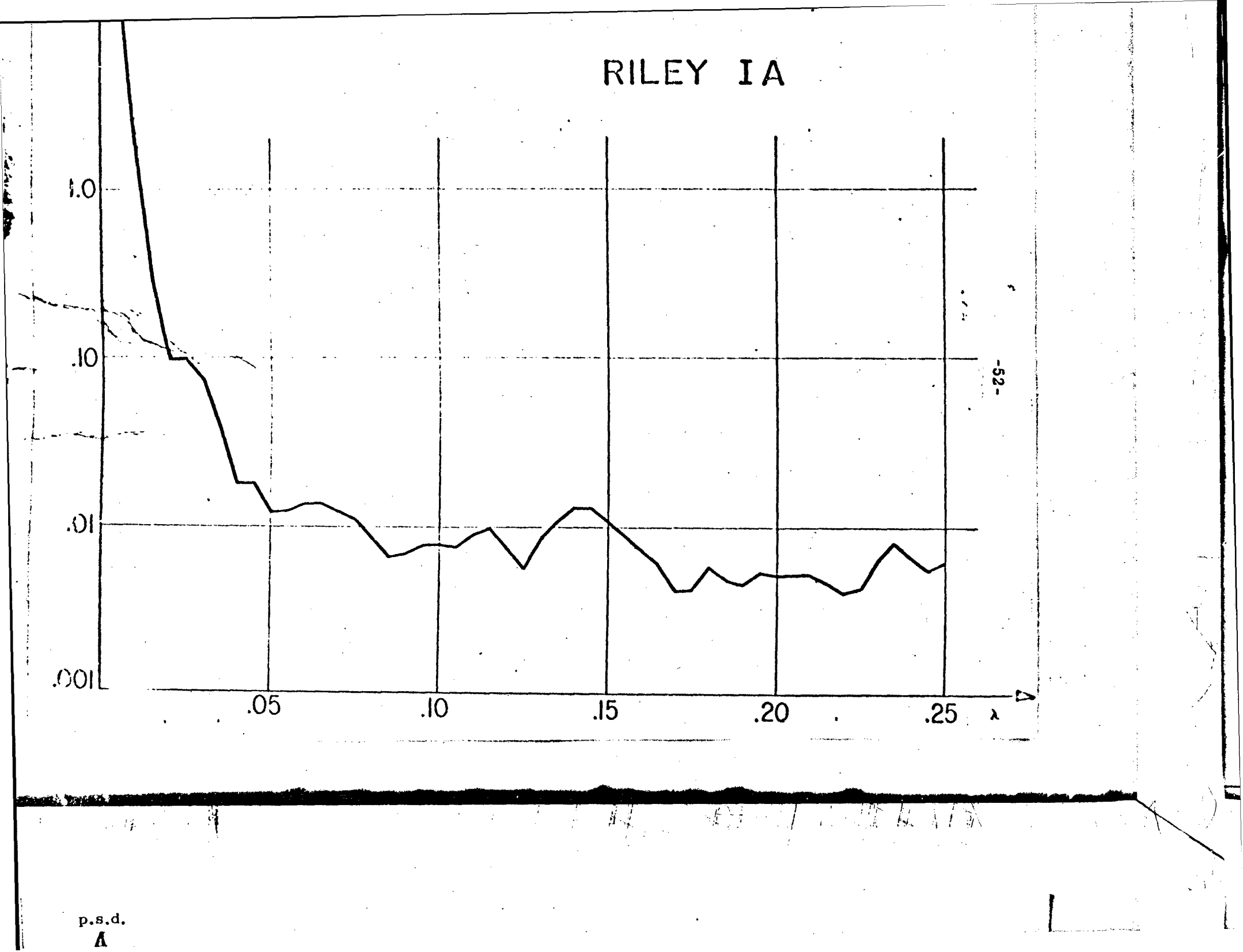
P	WX(P)
0	----
1	8.077E 00
2	1.399E 00
3	6.267E-01
4	3.132E-01
5	1.981E-01
6	1.847E-01
7	1.719E-01
8	1.128E-01
9	5.799E-02
10	5.017E-02
11	5.759E-02
12	4.475E-02
13	3.053E-02
14	3.013E-02
15	2.573E-02
16	1.611E-02
17	1.014E-02
18	8.613E-03
19	8.410E-03
20	9.478E-03
21	1.253E-02
22	1.082E-02
23	8.962E-03
24	1.299E-02
25	1.411E-02
26	9.774E-03
27	8.707E-03
28	8.809E-03
29	7.082E-03
30	7.660E-03
31	7.661E-03
32	4.857E-03
33	3.887E-03
34	5.162E-03
35	4.671E-03
36	2.731E-03
37	2.479E-03
38	4.467E-03
39	5.404E-03
40	4.343E-03
41	3.388E-03
42	2.884E-03
43	3.262E-03
44	4.114E-03
45	4.391E-03
46	4.060E-03
47	4.053E-03
48	4.739E-03
49	4.038E-03
50	3.048E-03

SPECTRAL ESTIMATES FOR NEV 2-TRACK -51-

ITEM A WITH ITEM B

P	WX(P)	WY(P)	WC(P)	WQ(P)
0	----	----	----	----
1	2.576E-01	-1.501E-01	3.892E-02	-1.999E-02
2	1.080E-01	2.796E-02	1.249E-02	-8.192E-04
3	8.461E-02	7.627E-02	1.410E-02	1.146E-02
4	6.418E-02	8.182E-02	1.922E-02	1.729E-03
5	3.906E-02	5.331E-02	1.129E-02	-1.348E-03
6	2.470E-02	2.678E-02	1.047E-03	-2.704E-03
7	2.947E-02	2.131E-02	4.175E-03	-7.479E-03
8	3.035E-02	2.713E-02	4.116E-03	-5.792E-03
9	1.941E-02	3.583E-02	-5.550E-03	-1.787E-04
10	1.416E-02	4.250E-02	-1.049E-03	-2.783E-03
11	1.442E-02	3.930E-02	7.805E-03	-5.561E-03
12	1.208E-02	2.603E-02	3.610E-03	-2.152E-03
13	9.760E-03	1.262E-02	-7.072E-04	-1.387E-04
14	8.982E-03	9.557E-03	-1.141E-03	-1.115E-03
15	9.288E-03	1.547E-02	-8.751E-04	-2.514E-04
16	1.279E-02	1.988E-02	2.791E-03	3.554E-03
17	1.503E-02	1.793E-02	3.761E-03	3.123E-03
18	1.119E-02	1.260E-02	-1.007E-04	4.699E-04
19	8.692E-03	8.740E-03	-1.481E-03	2.104E-03
20	1.070E-02	9.586E-03	-1.994E-03	9.929E-05
21	1.198E-02	1.299E-02	-3.177E-03	-4.703E-03
22	1.075E-02	1.559E-02	-2.494E-03	-1.695E-03
23	8.342E-03	1.642E-02	-1.675E-03	2.712E-03
24	7.883E-03	1.218E-02	-1.424E-03	1.334E-04
25	8.124E-03	1.137E-02	-3.852E-04	-3.342E-03
26	7.306E-03	1.711E-02	1.444E-03	-5.010E-03
27	7.526E-03	1.457E-02	8.968E-04	-5.691E-03
28	9.151E-03	8.864E-03	1.038E-05	-2.680E-03
29	9.814E-03	9.117E-03	3.477E-04	-5.262E-04
30	6.958E-03	1.035E-02	6.933E-04	-9.876E-04
31	4.342E-03	8.679E-03	2.428E-04	1.451E-04
32	4.496E-03	4.676E-03	-1.534E-04	2.691E-05
33	5.194E-03	4.288E-03	3.194E-04	-3.071E-04
34	5.263E-03	8.326E-03	2.469E-04	1.034E-03
35	5.838E-03	9.167E-03	-6.932E-04	5.036E-04
36	7.342E-03	7.446E-03	-1.692E-03	-3.582E-04
37	6.516E-03	7.631E-03	-3.773E-04	5.964E-04
38	3.912E-03	8.602E-03	7.847E-04	4.506E-04
39	2.168E-03	9.306E-03	6.980E-05	-6.066E-04
40	1.755E-03	8.534E-03	7.209E-04	-3.686E-04
41	2.461E-03	6.733E-03	1.613E-03	2.408E-04
42	3.697E-03	6.325E-03	1.172E-03	-3.048E-04
43	4.920E-03	7.852E-03	1.442E-04	-1.332E-03
44	4.475E-03	8.889E-03	-5.988E-04	-1.033E-03
45	3.684E-03	7.908E-03	-2.182E-04	-7.413E-04
46	4.293E-03	6.215E-03	7.746E-04	-8.203E-04
47	5.031E-03	5.247E-03	1.168E-03	-5.295E-04
48	5.457E-03	6.735E-03	7.820E-04	-8.038E-04
49	4.709E-03	7.036E-03	1.238E-03	-6.352E-04
50	3.775E-03	5.726E-03	1.932E-03	0.

41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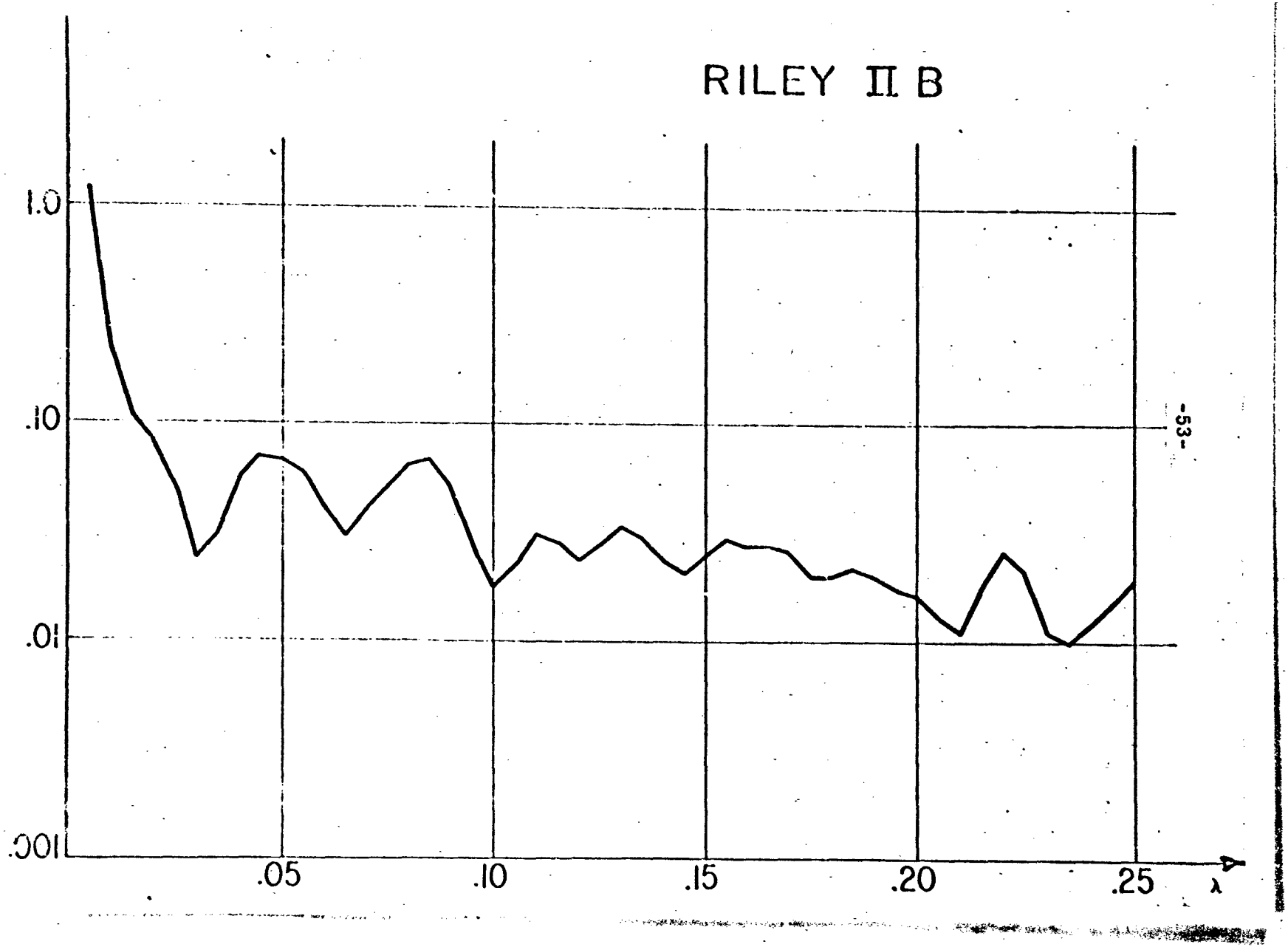
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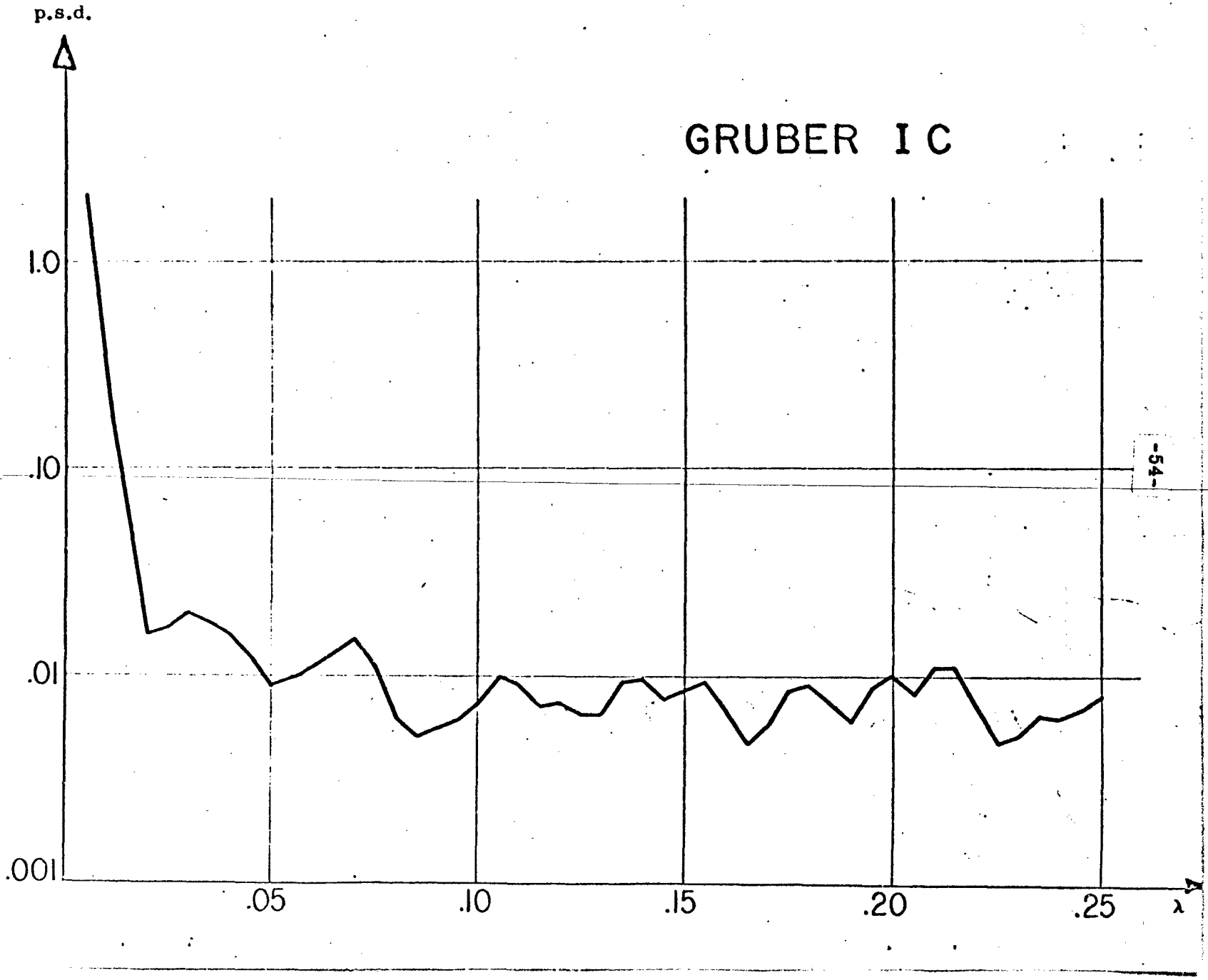
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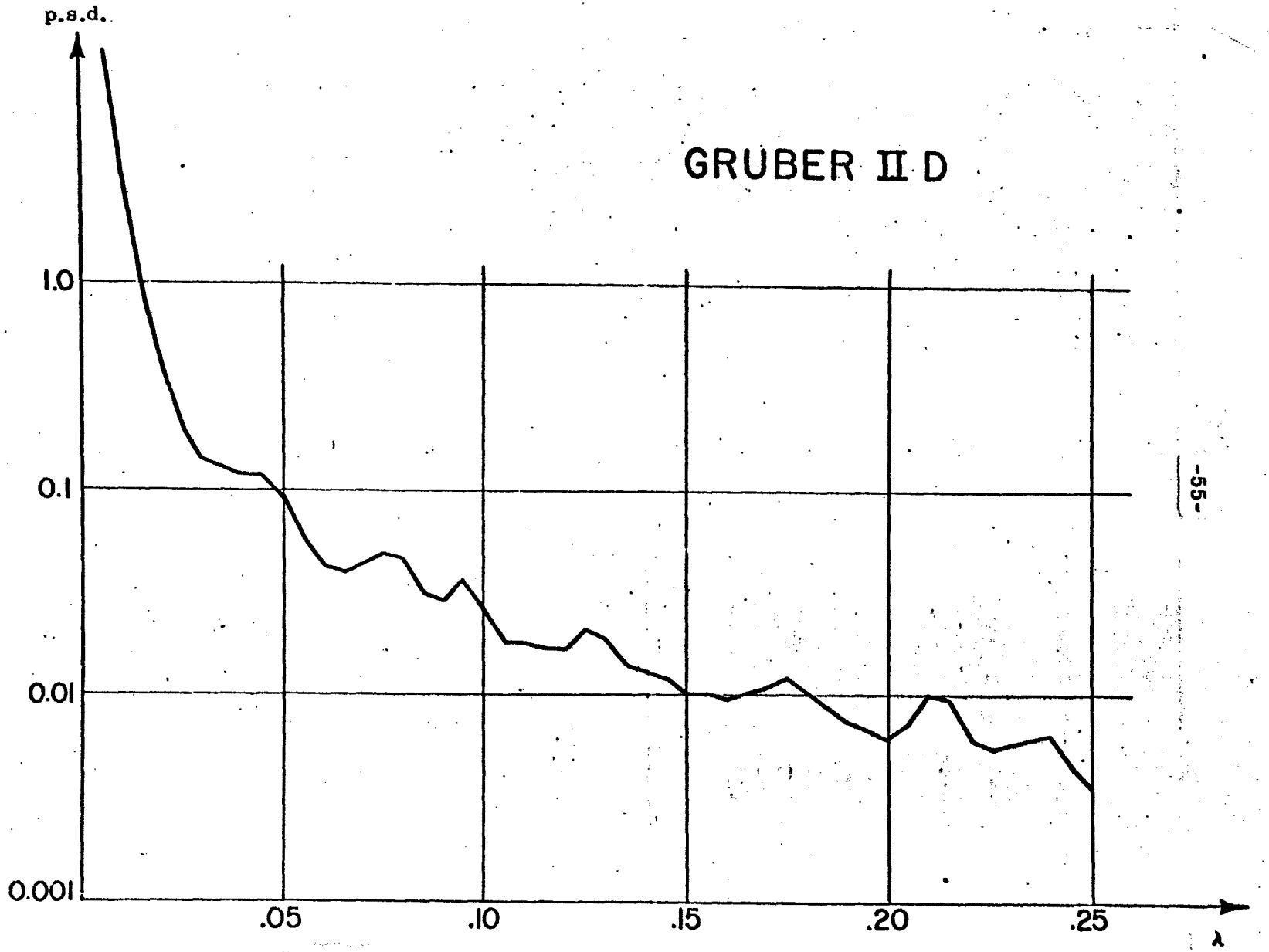
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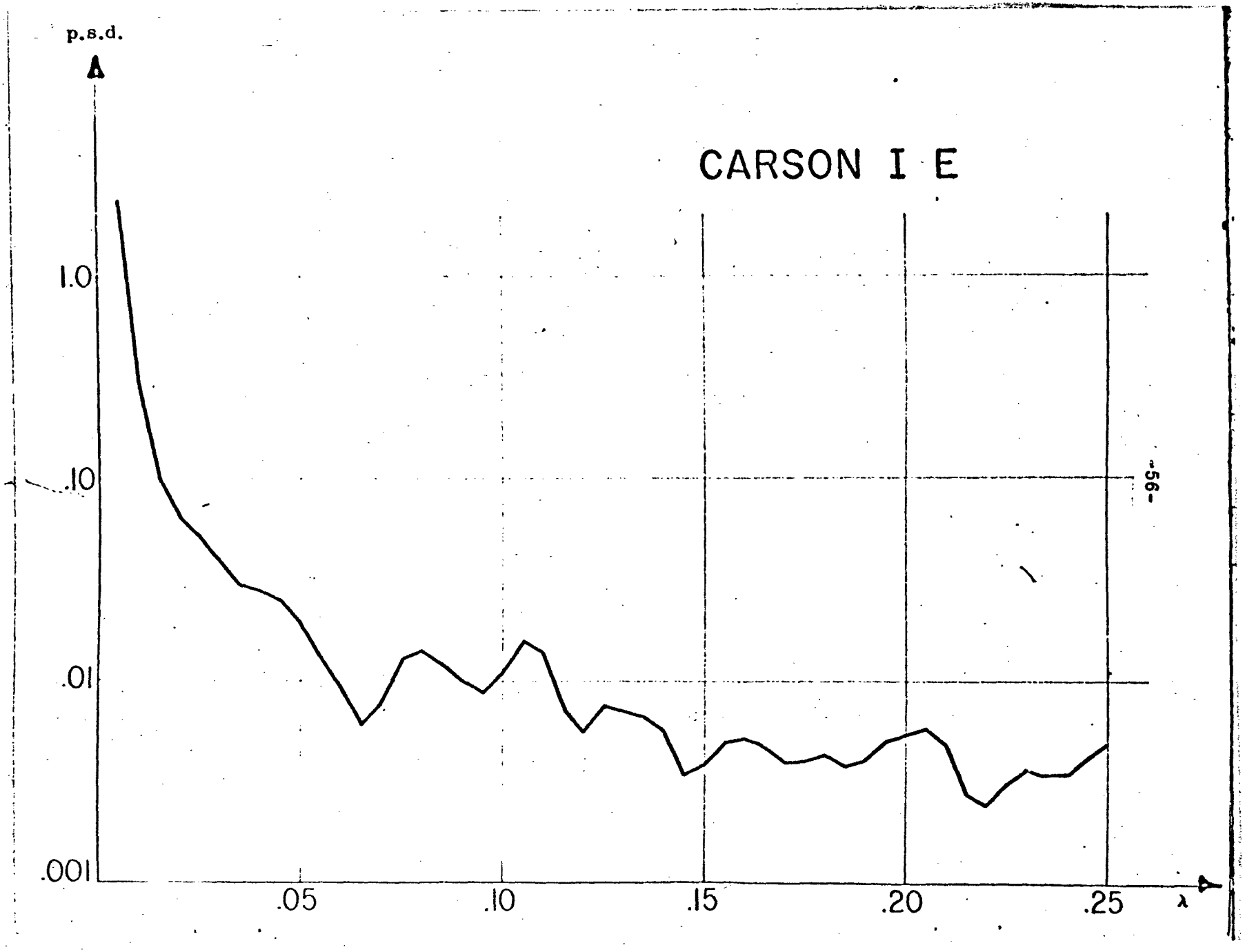
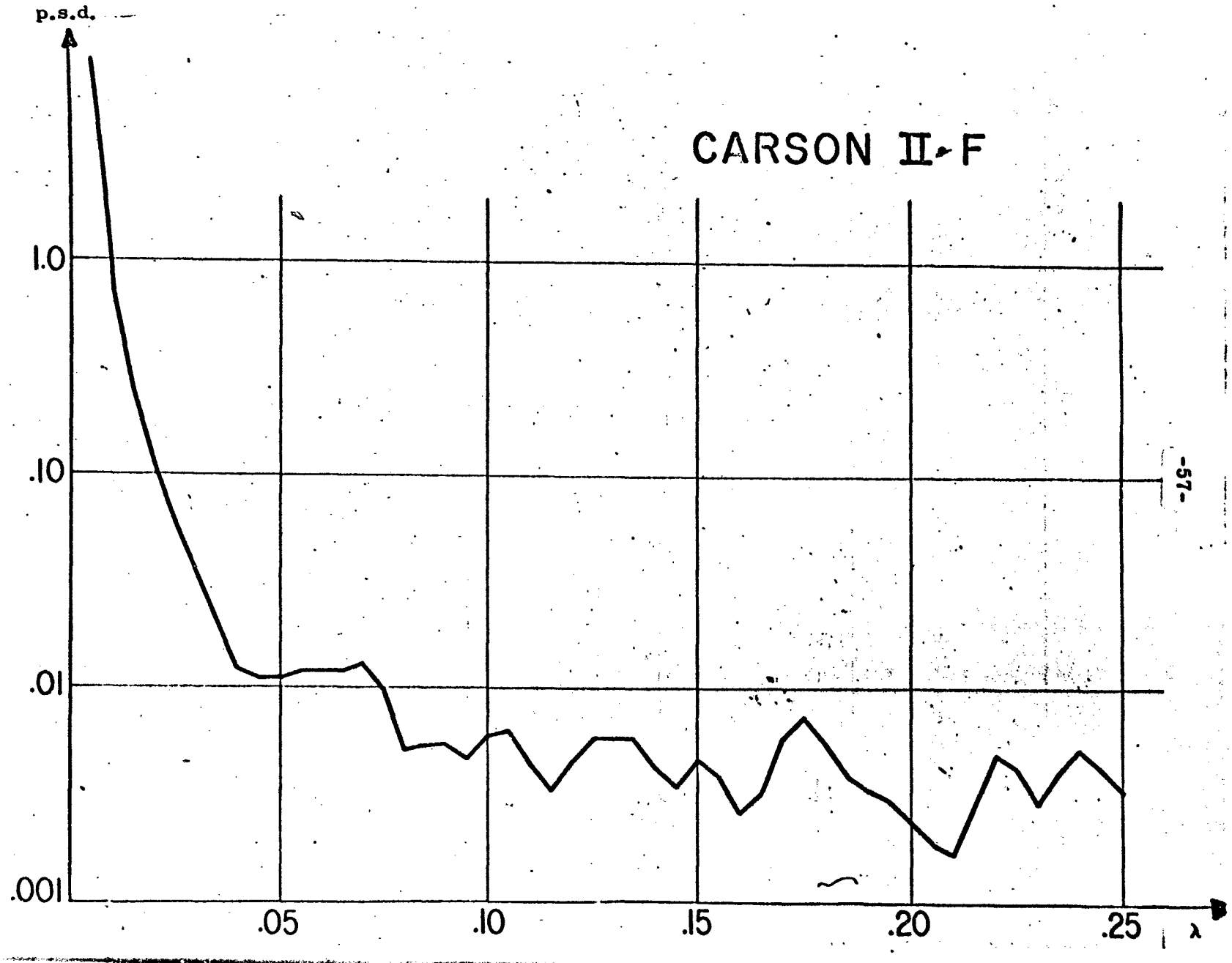
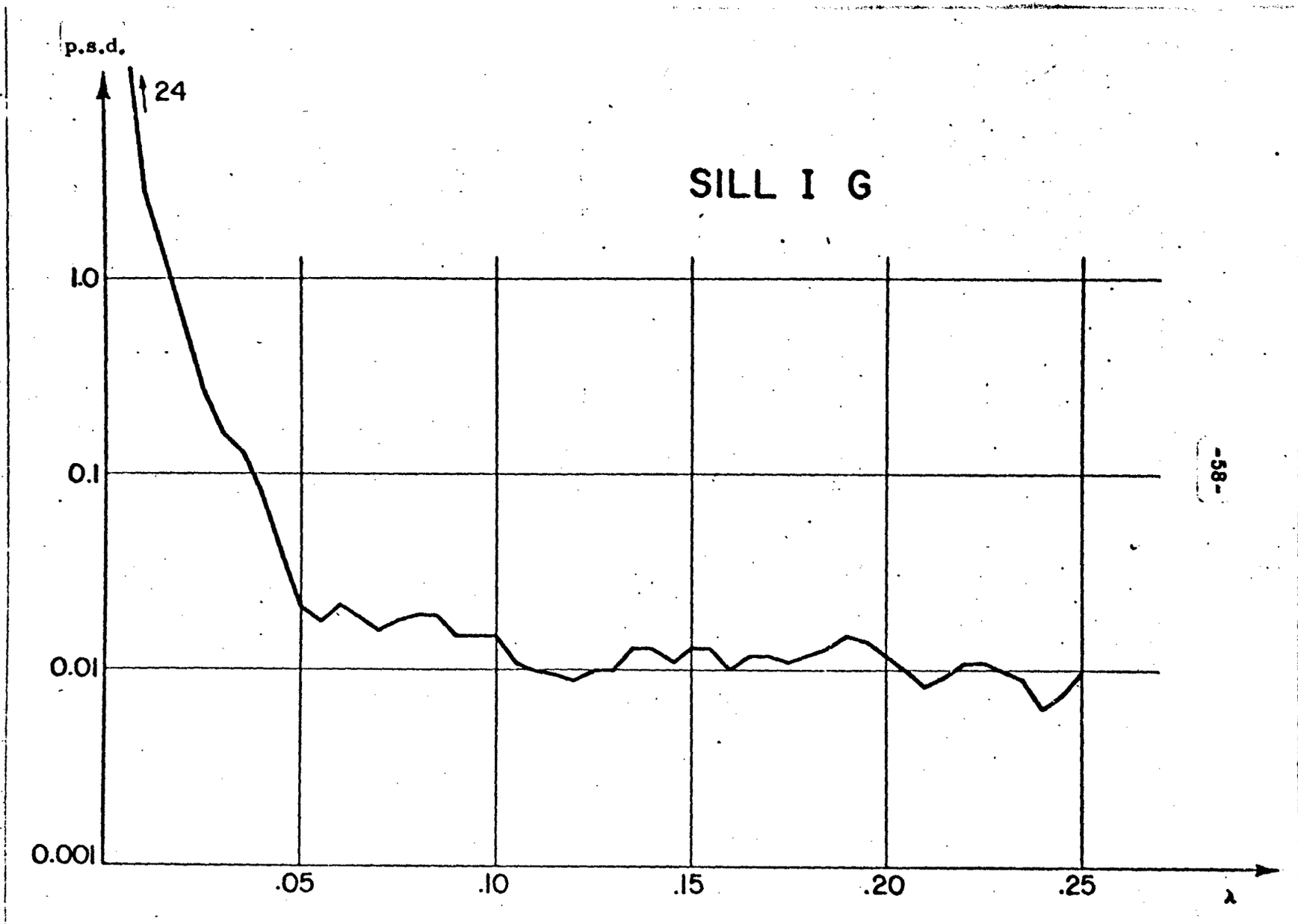
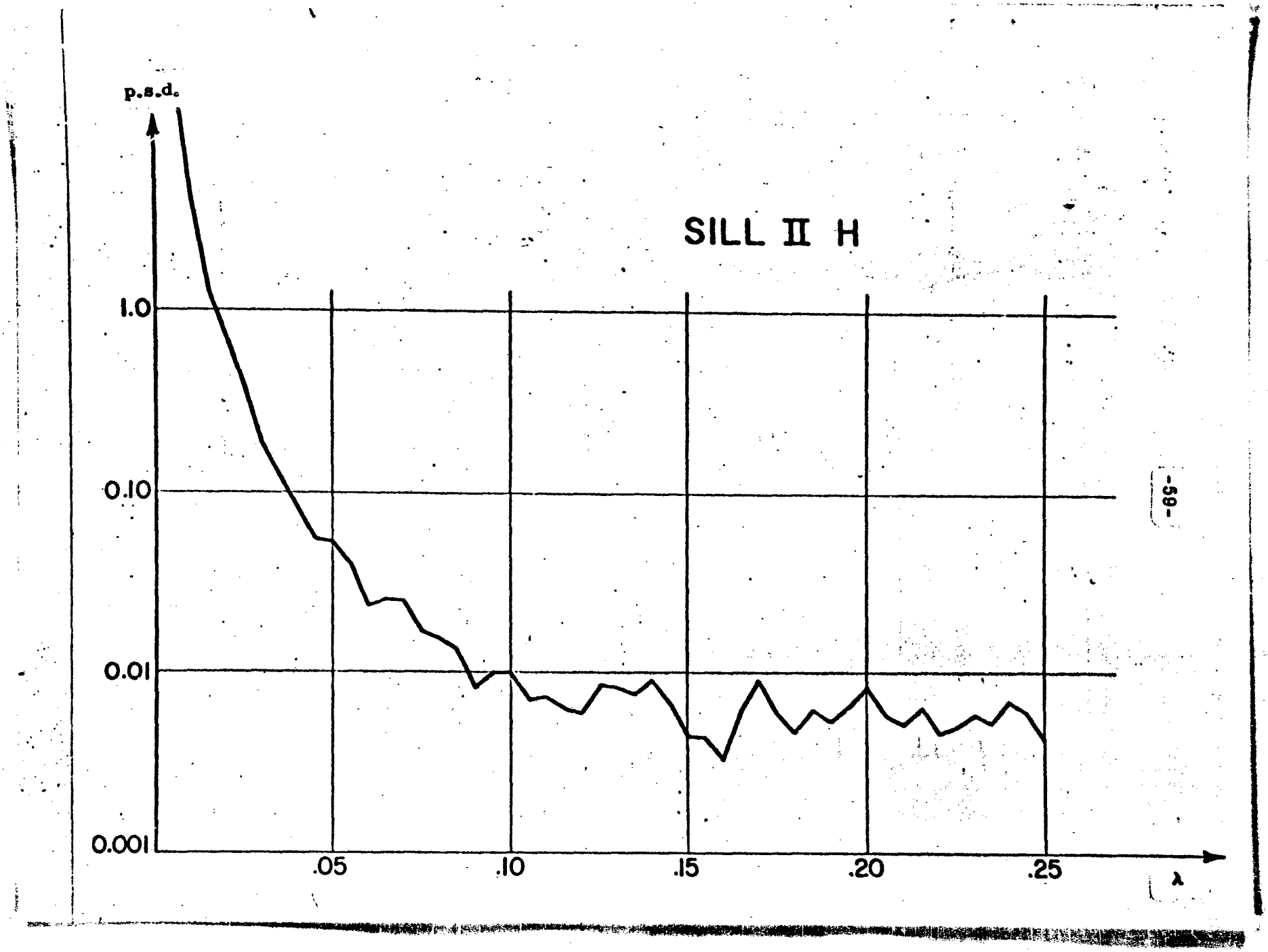
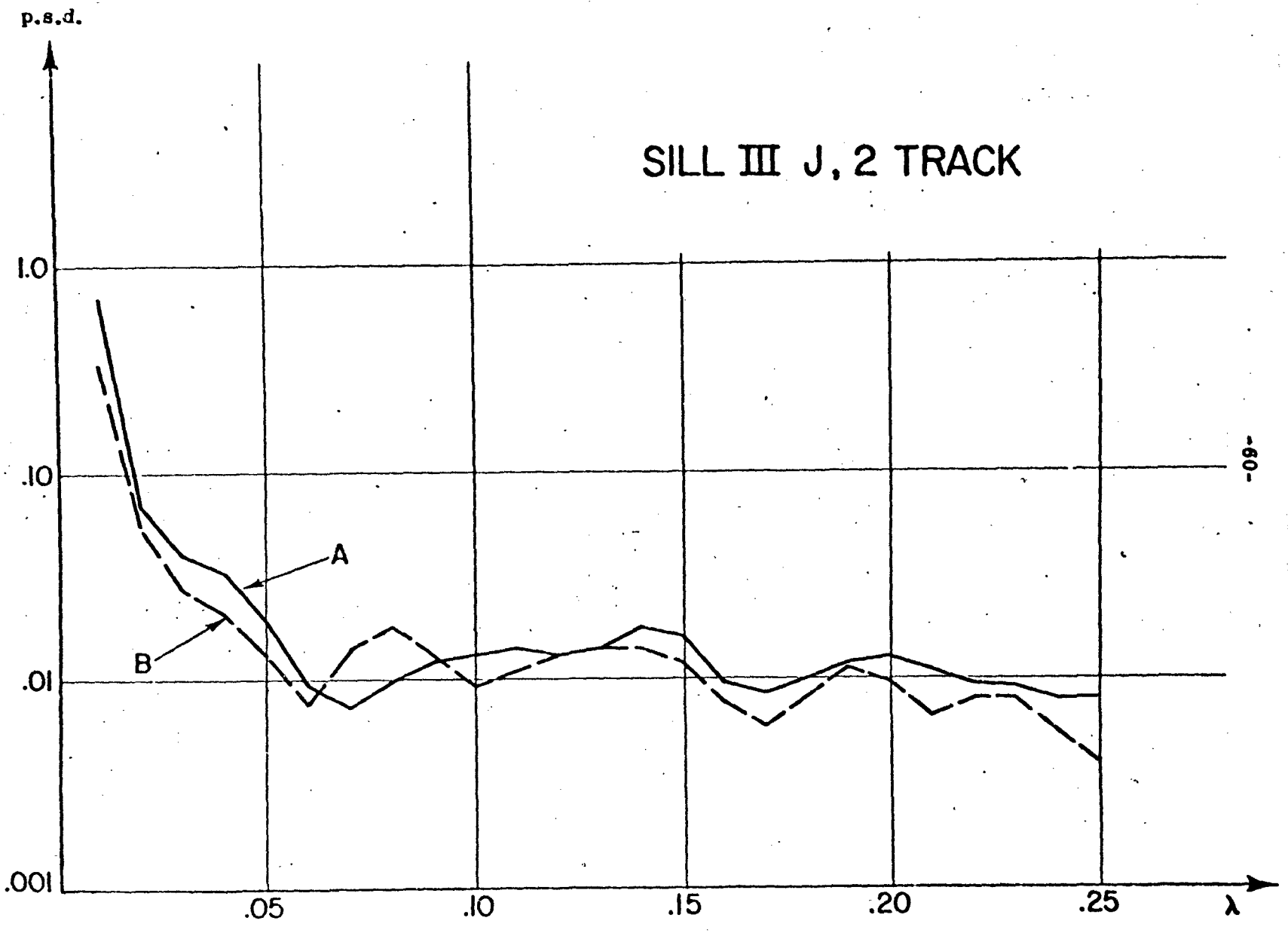
.25
λ

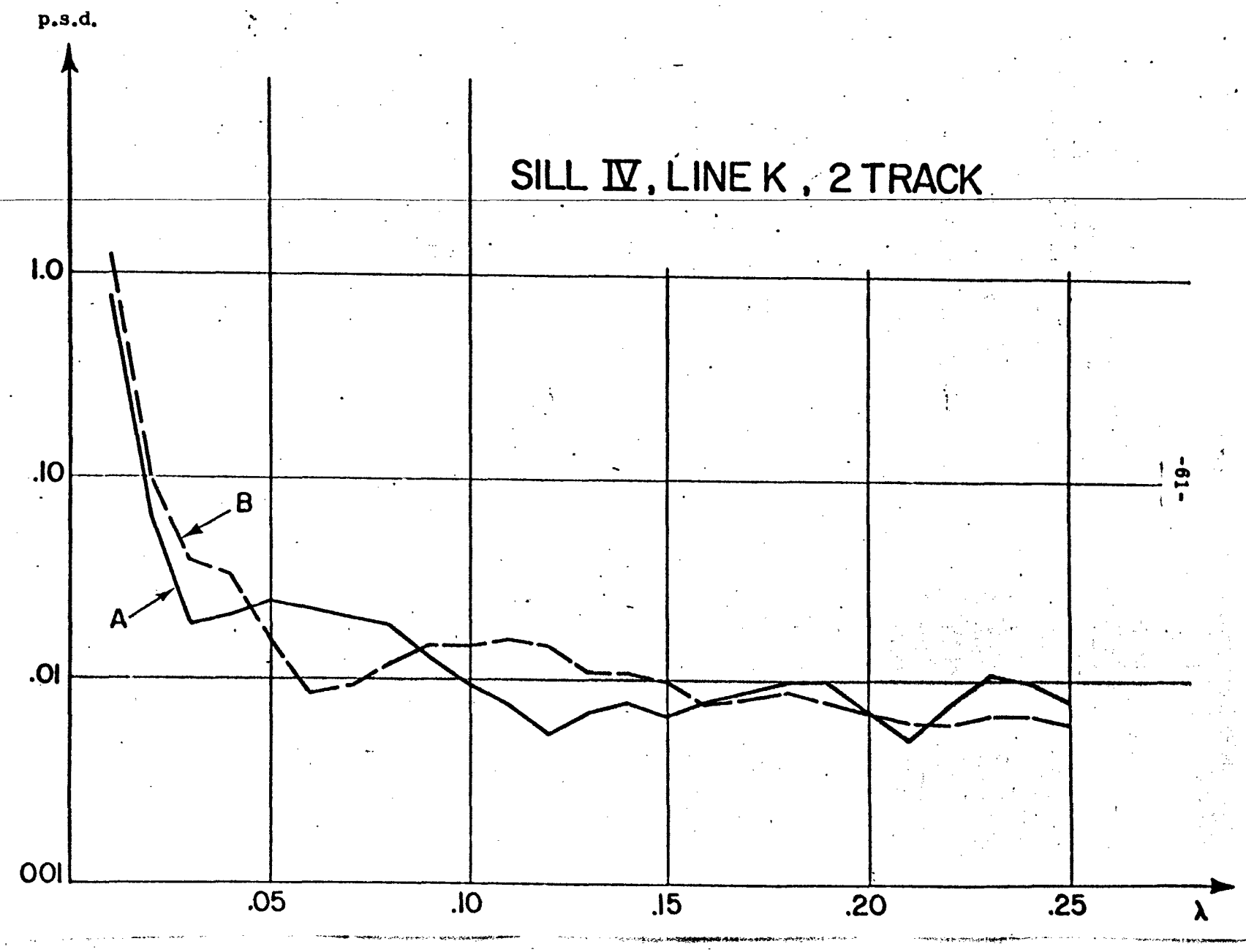

p.s.d.
CARSON I E
1.0
.10
.01
.001
.05
.10
.15
.20
.25
λ

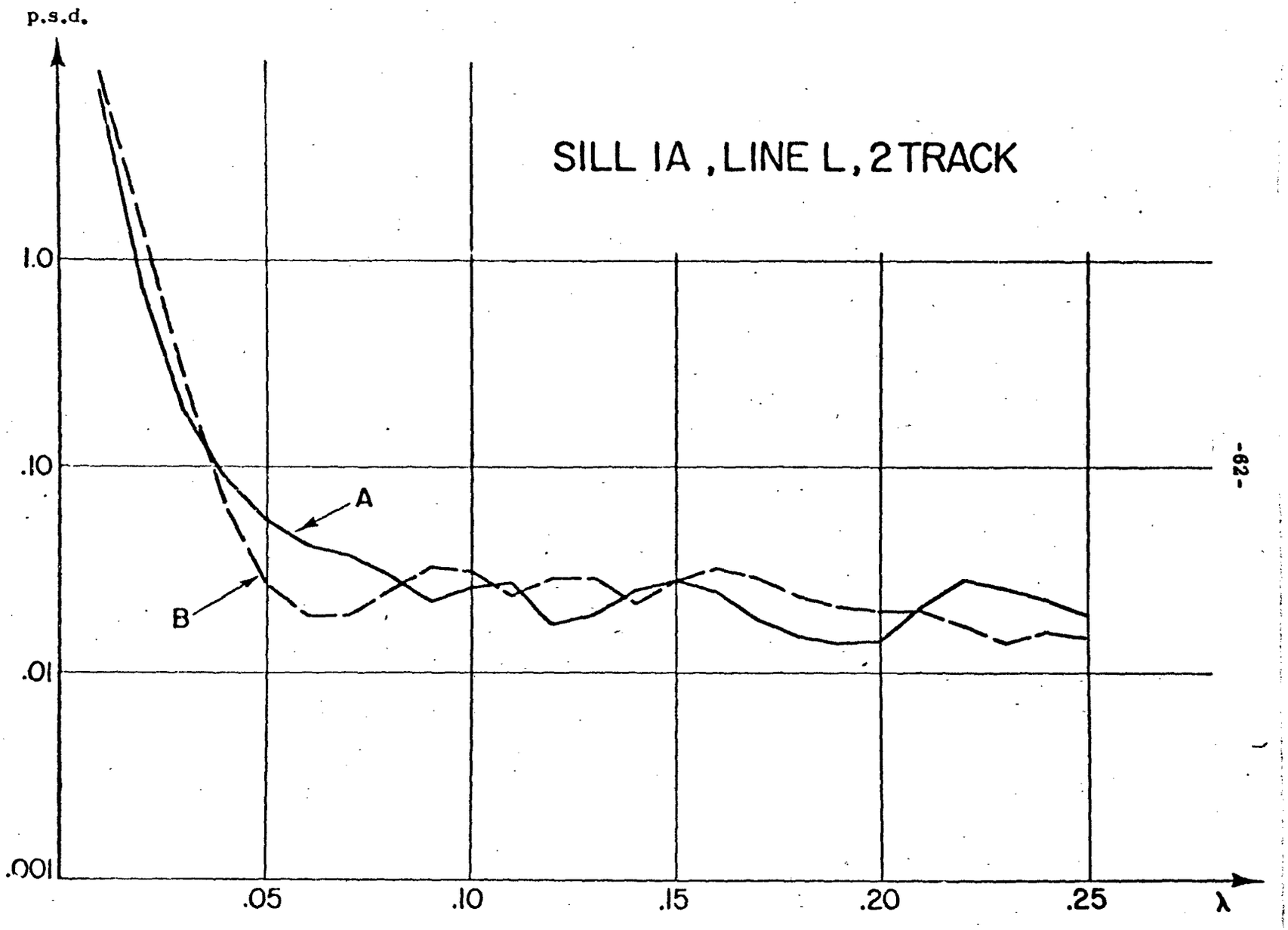

p.s.d.
CARSON II-F
1.0
.10
.01
.001
.05
.10
.15
.20
.25
λ

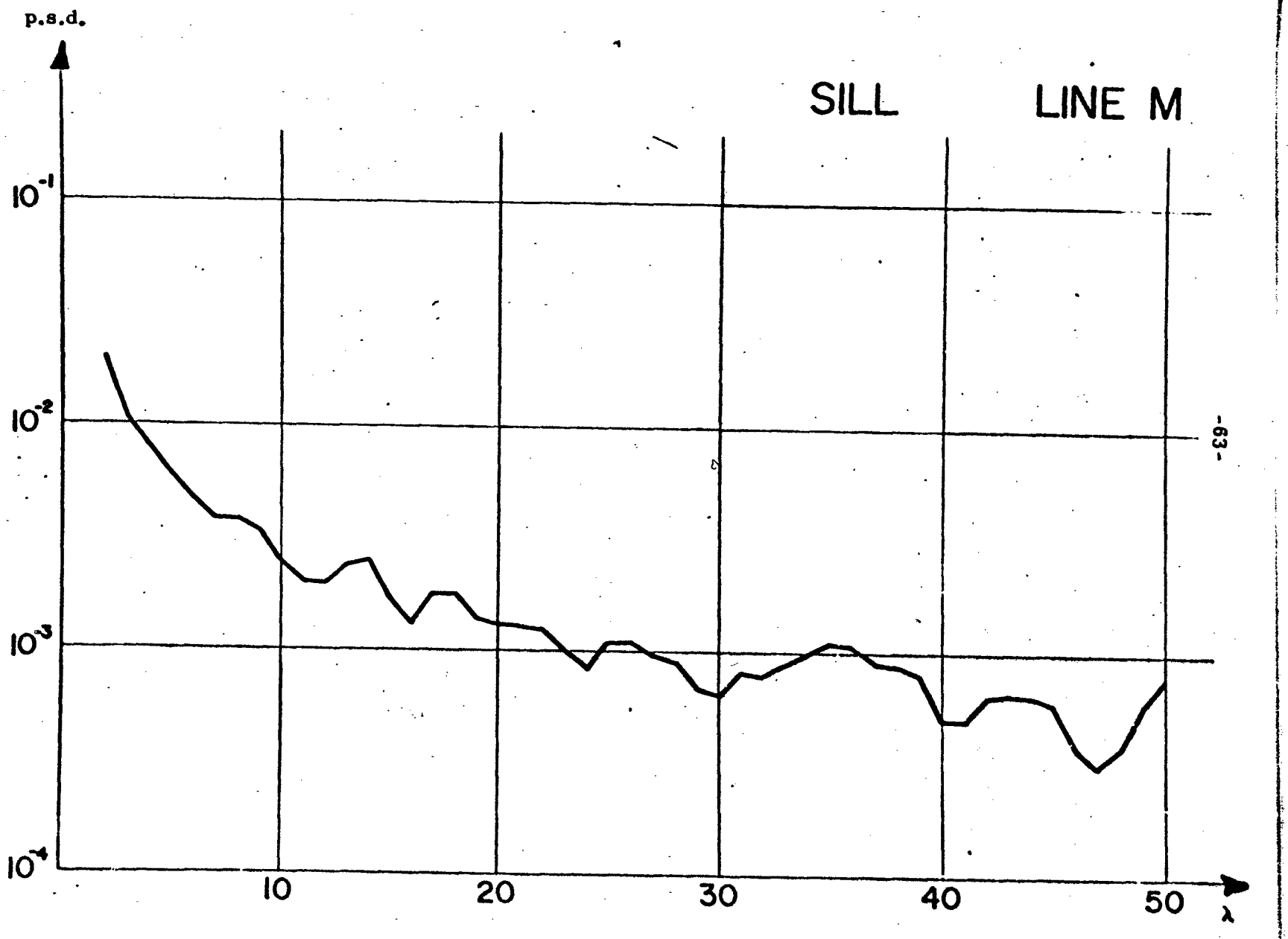

p.s.d.
24
SILL I G
1.0
0.1
0.01
0.001
.05
.10
.15
.20
.25
λ

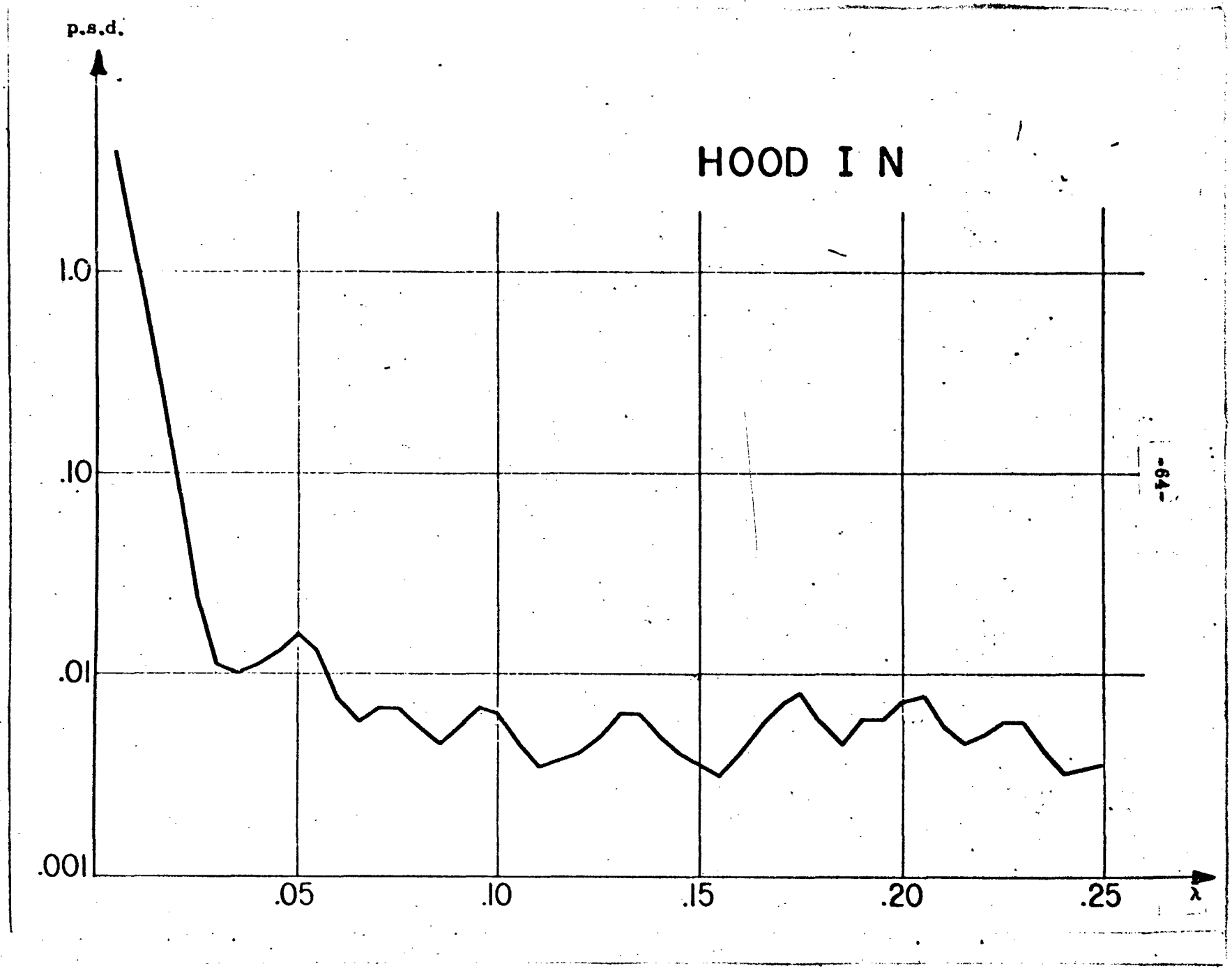

p.s.d.
SILL II H
1.0
0.10
0.01
0.001
.05
.10
.15
.20
.25
λ

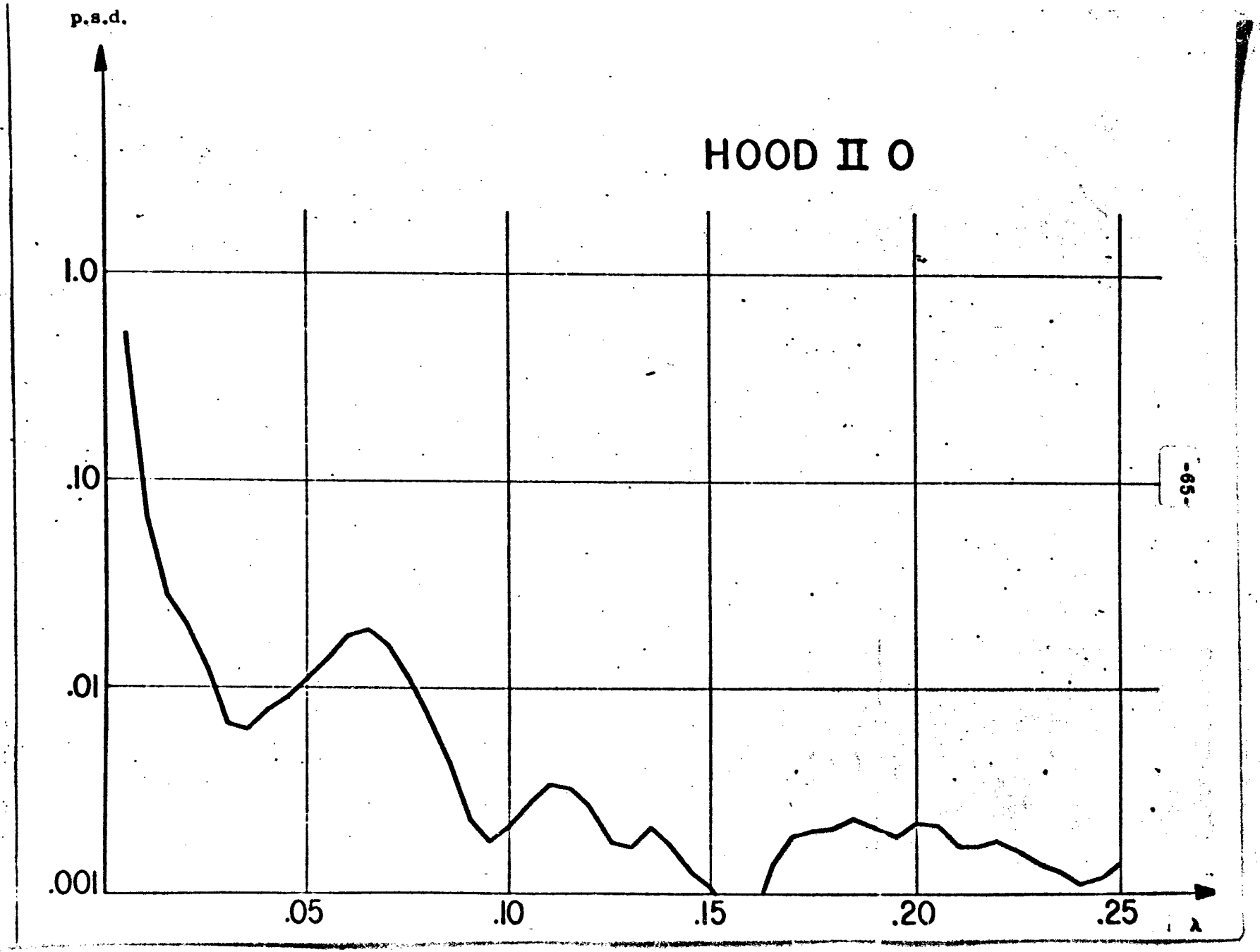

p.s.d.
SILL III J, 2 TRACK
1.0
.10
.01
.001
A
B
.05
.10
.15
.20
.25
λ

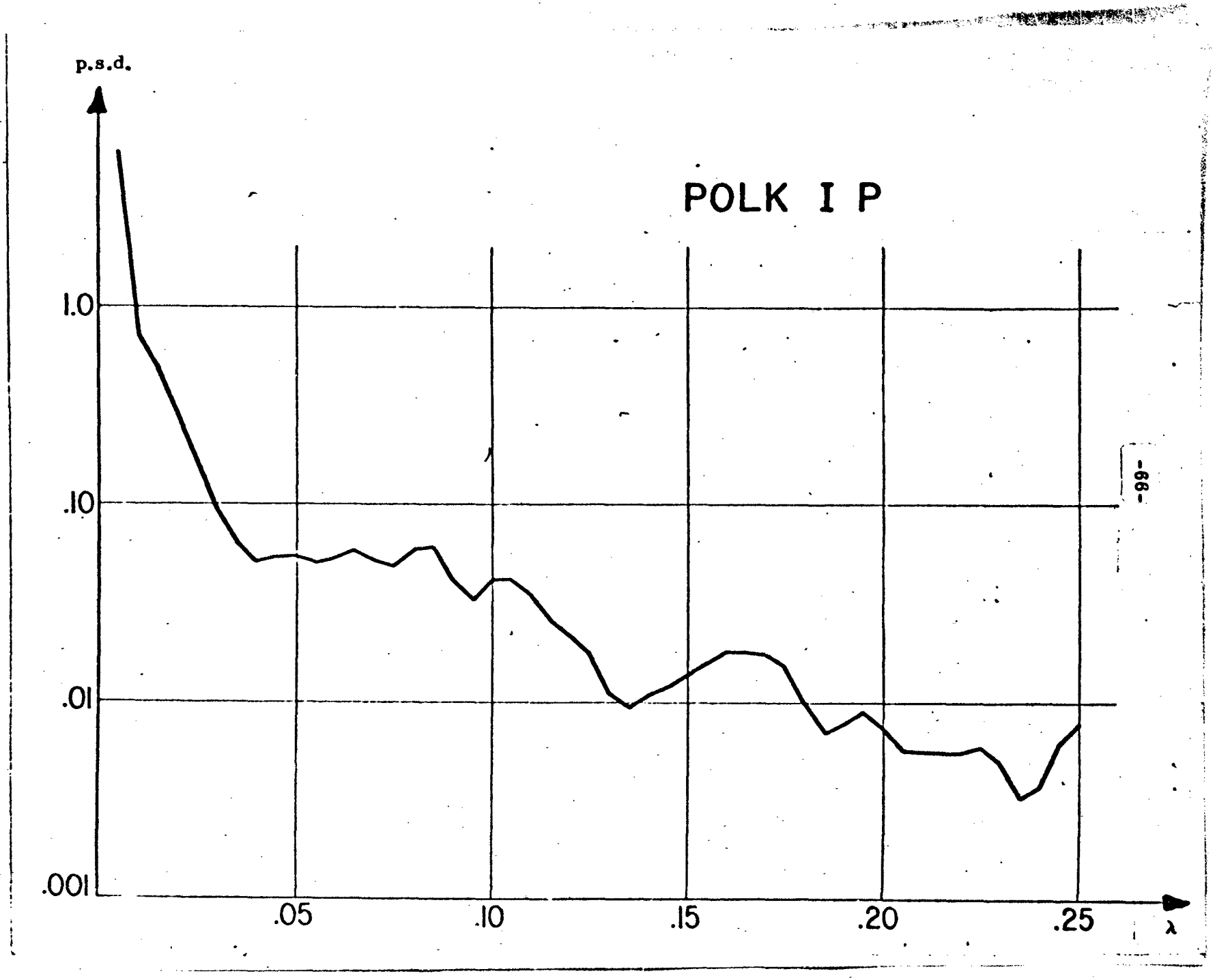

p.s.d.
SILL IV, LINE K , 2 TRACK
1.0
.10
.01
001
.05
.10
.15
.20
.25
λ
A
B

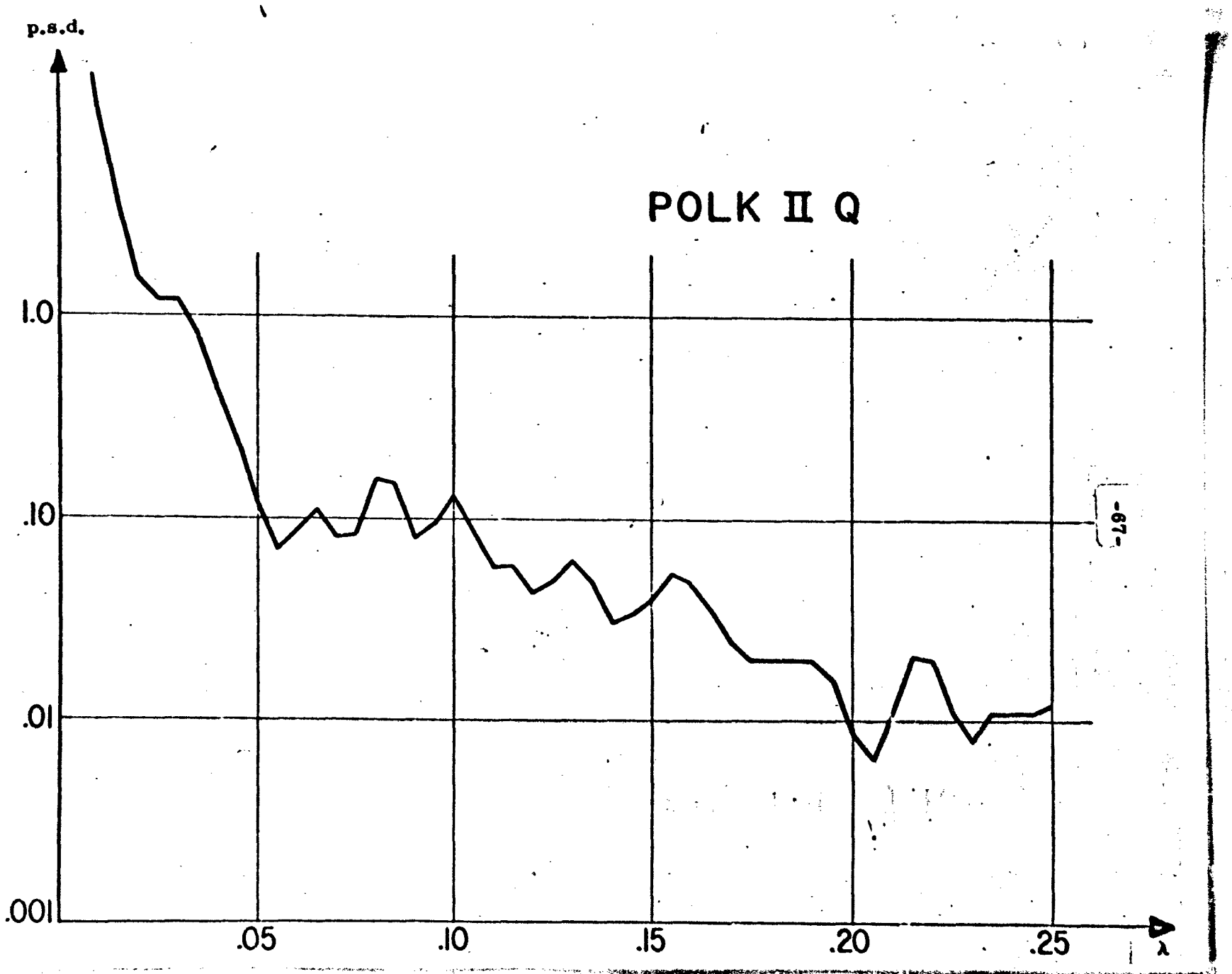

p.s.d.
SILL 1A , LINE L, 2 TRACK
1.0
.10
.01
.001
A
B
.05
.10
.15
.20
.25
λ

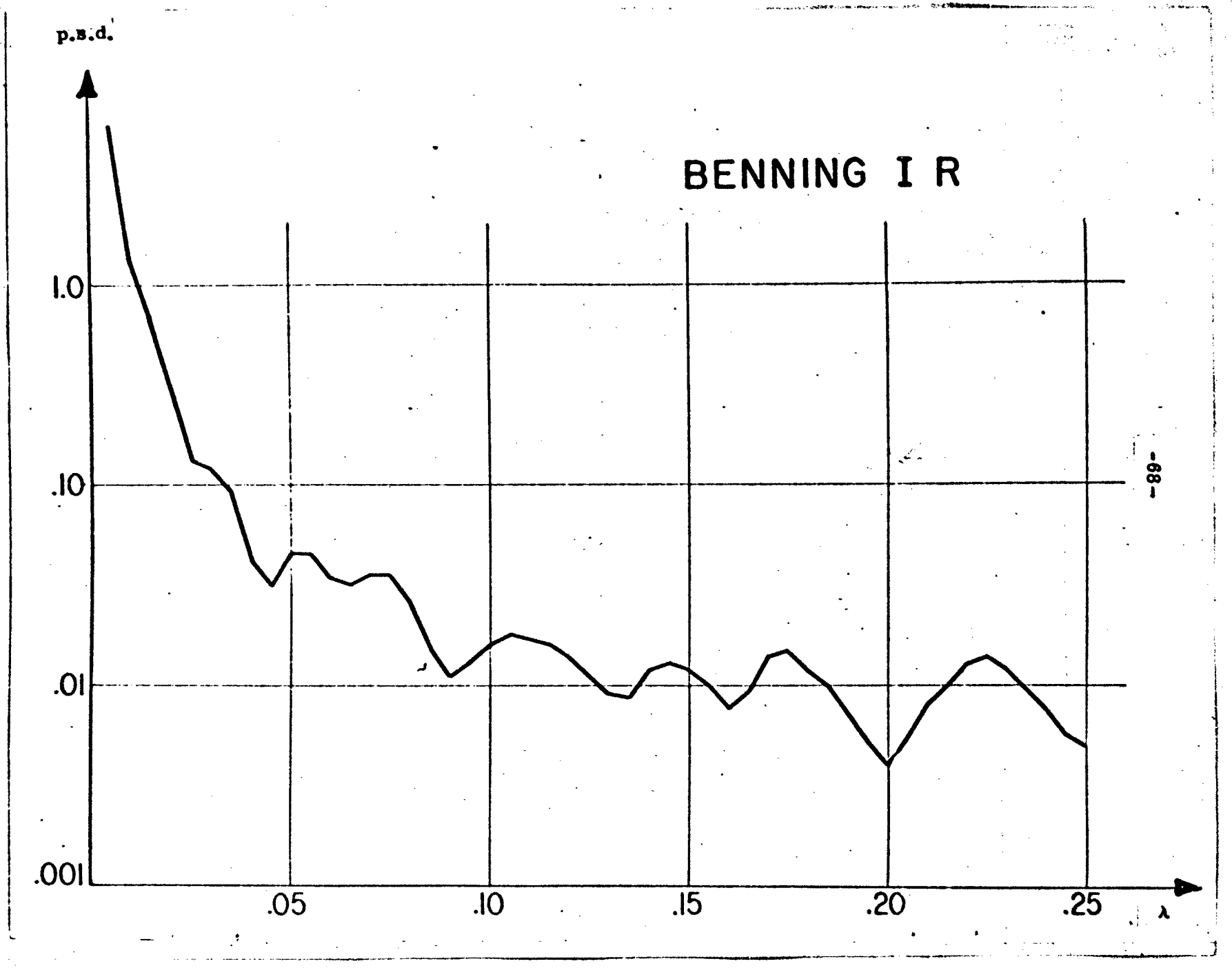

p.s.d.
SILL
LINE M
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10
20
30
40
50
λ

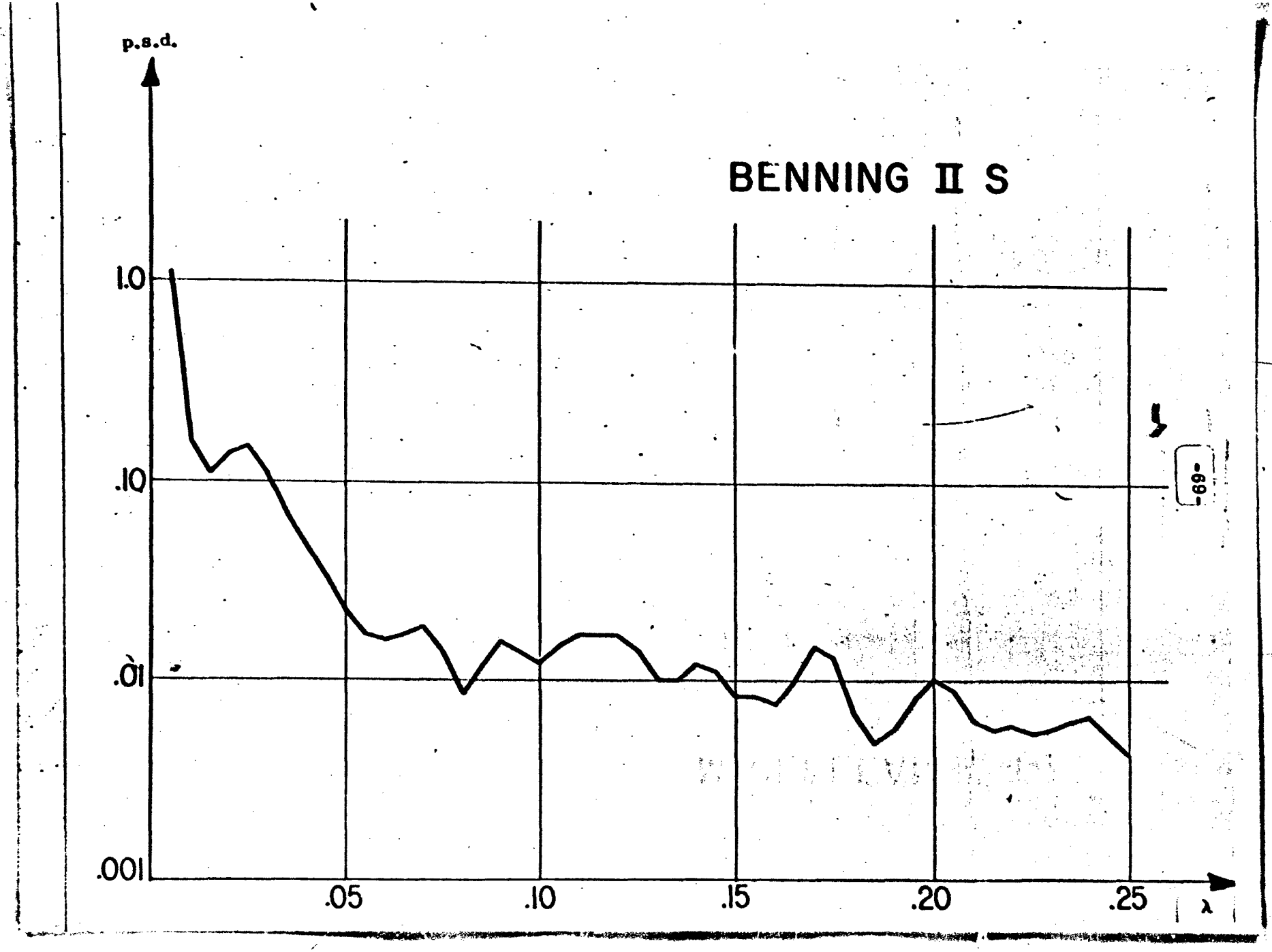

p.s.d.
HOOD I N
1.0
.10
.01
.001
.05
.10
.15
.20
.25
x

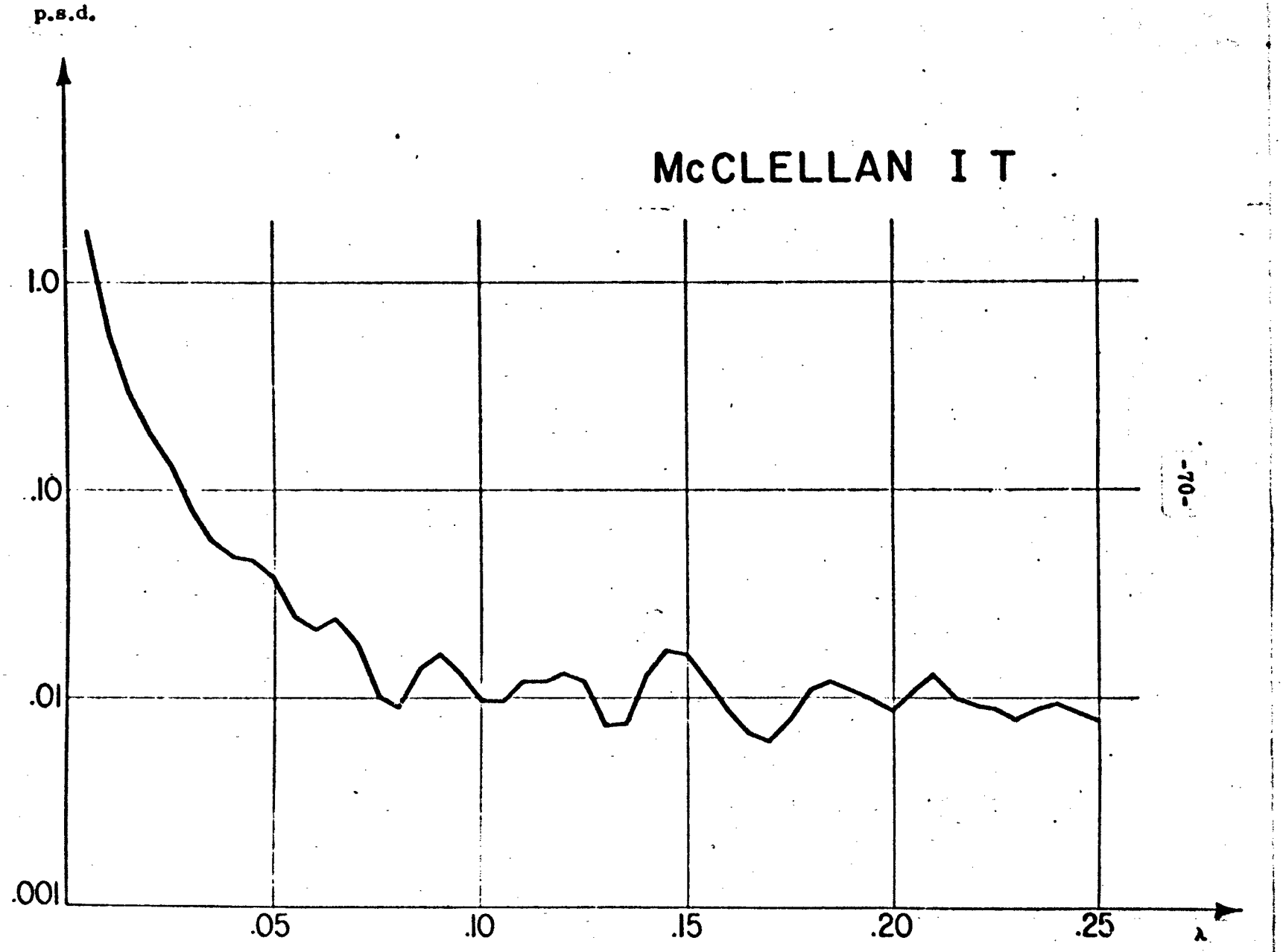

p.s.d.
HOOD II O
1.0
.10
.01
.001
.05
.10
.15
.20
.25
λ

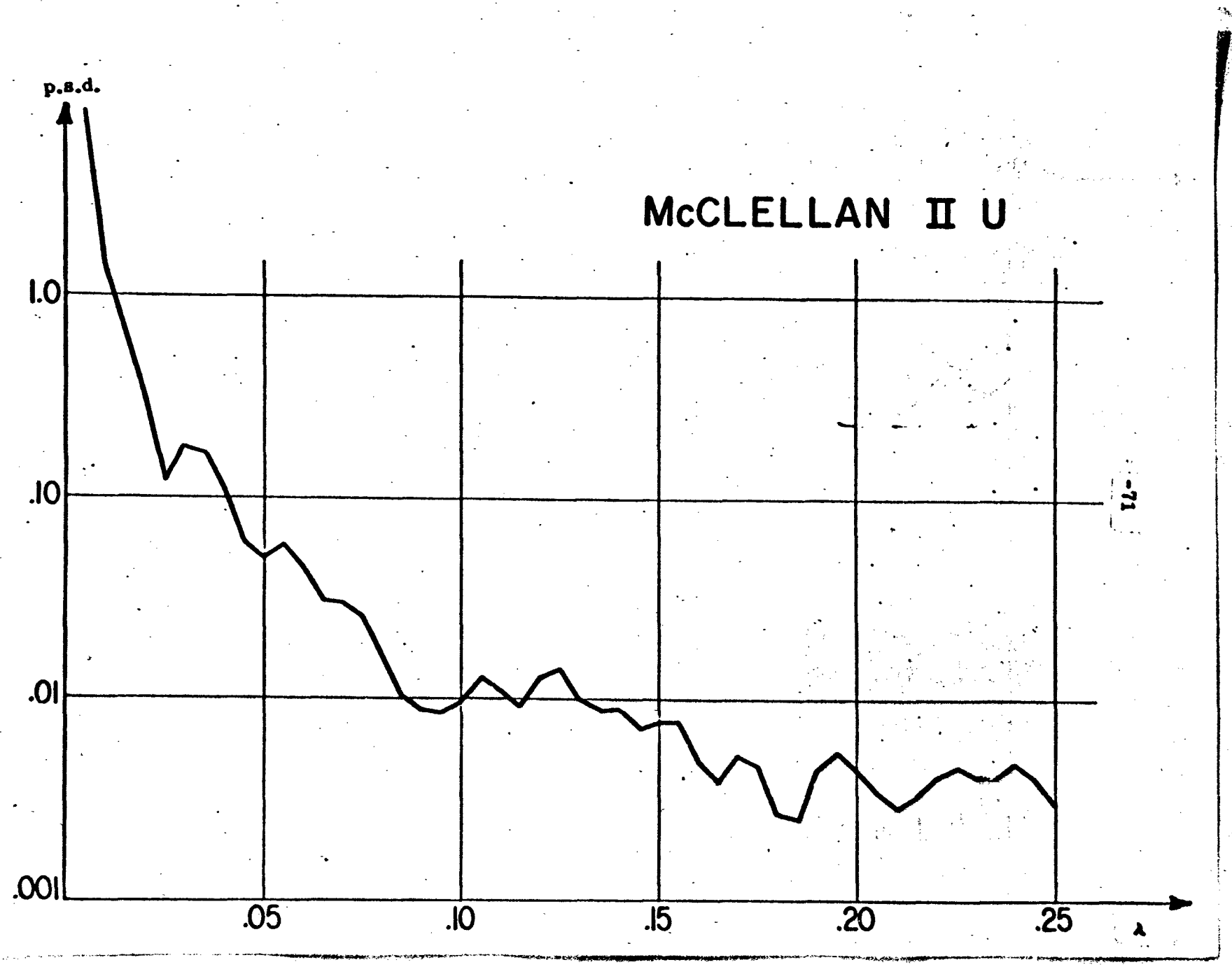

p.s.d.
POLK I P
1.0
.10
.01
.001
.05
.10
.15
.20
.25
λ

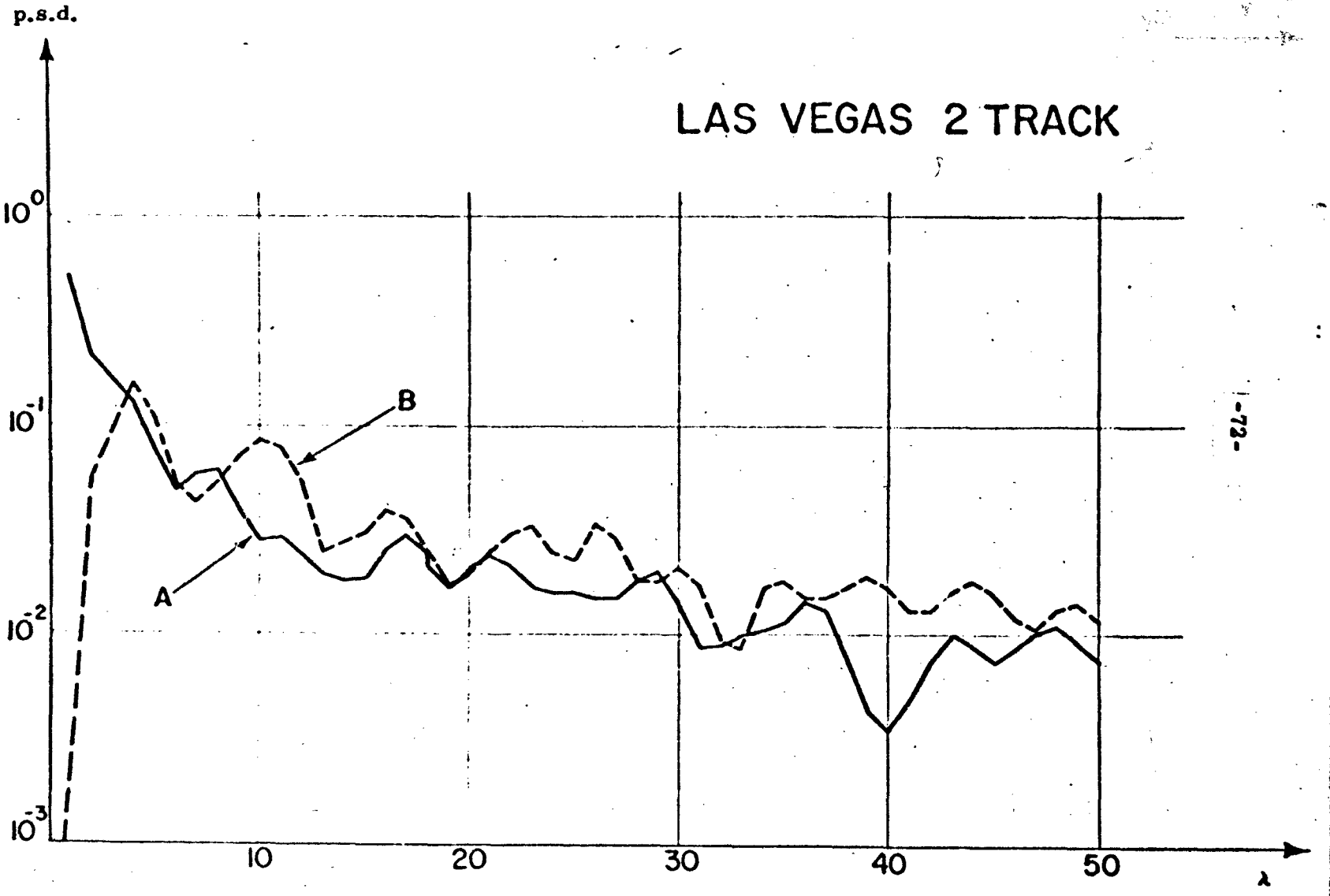

p.s.d.
POLK II Q
1.0
.10
.01
.001
.05
.10
.15
.20
.25
λ


p.s.d.
BENNING I R
1.0
.10
.01
.001
.05
.10
.15
.20
.25
λ


p.s.d.
BENNING II S
1.0
.10
.01
.001
.05
.10
.15
.20
.25
λ


p.s.d.
McCLELLAN I T
1.0
.10
.01
.001
.05
.10
.15
.20
.25
λ


McCLELLAN II U
p.s.d.
1.0
.10
.01
.001
.05
.10
.15
.20
.25
λ


p.s.d.
LAS VEGAS 2 TRACK
10^0
10^{-1}
10^{-2}
10^{-3}
A
B
10
20
30
40
50
λ

AREA SPECTRA

Again our methods of obtaining p.s.d. estimates of area data are described in [1]. The computer program used will be described in the section on computations.

In this section, we present the spectral estimates in numerical form and contour graphs. The raw data are too voluminous to present in this report; persons wishing to use this data may obtain it at cost in the more convenient form of IBM cards or magnetic tapes from MASC.

Because of symmetry, only half of the spectral estimates are presented in tabular form. Somewhat more complete contour graphs are given. The contour heights are in powers of 5 corresponding to the semi-logarithmic plots of the line spectra. On each contour diagram is an arrow indicating the direction North.

The statistical accuracy of the spectral estimates may be presented as on p 72 of [1]. Each estimate has 32 degrees of freedom. A 95% confidence interval may be given by the factors .648, 1.740. [We are 95% confident that a true spectral value is between .648 times the estimate and 1.740 times its estimate.]

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.010	0.010	0.007	0.005	0.007
-19	0.009	0.009	0.007	0.006	0.007
-18	0.008	0.008	0.007	0.007	0.007
-17	0.009	0.009	0.007	0.007	0.009
-16	0.013	0.013	0.010	0.009	0.010
-15	0.013	0.017	0.016	0.011	0.010
-14	0.013	0.019	0.016	0.012	0.014
-13	0.014	0.018	0.014	0.013	0.017
-12	0.015	0.016	0.017	0.017	0.018
-11	0.016	0.018	0.021	0.021	0.021
-10	0.018	0.020	0.021	0.022	0.022
-9	0.020	0.023	0.025	0.024	0.023
-8	0.021	0.029	0.031	0.029	0.028
-7	0.025	0.034	0.039	0.043	0.039
-6	0.033	0.047	0.059	0.058	0.043
-5	0.049	0.071	0.080	0.060	0.041
-4	0.091	0.141	0.141	0.074	0.047
-3	0.187	0.396	0.265	0.094	0.056
-2	0.648	0.900	0.322	0.118	0.080
-1	4.113	1.587	0.537	0.293	0.139
0		4.451	1.522	0.700	0.355
1	4.113	1.467	0.960	0.597	0.403
2	0.648	0.337	0.219	0.179	0.144
3	0.187	0.136	0.100	0.086	0.066
4	0.091	0.075	0.053	0.046	0.041
5	0.049	0.040	0.037	0.032	0.031
6	0.033	0.026	0.029	0.028	0.027
7	0.025	0.022	0.022	0.019	0.023
8	0.021	0.028	0.028	0.022	0.021
9	0.020	0.029	0.028	0.021	0.016
10	0.018	0.017	0.016	0.014	0.013
11	0.016	0.014	0.014	0.014	0.015
12	0.015	0.017	0.016	0.013	0.013
13	0.014	0.015	0.016	0.011	0.011
14	0.013	0.012	0.012	0.009	0.011
15	0.013	0.014	0.012	0.010	0.014
16	0.013	0.015	0.013	0.011	0.017
17	0.009	0.010	0.009	0.009	0.013
18	0.008	0.008	0.007	0.009	0.013
19	0.009	0.008	0.006	0.008	0.013
20	0.010	0.007	0.005	0.007	0.011

RILEY 1 GRID A

CORRECTED SPECTRUM, (E-STAR)

	5	6	7	8	9
-20	0.008	0.009	0.010	0.011	0.010
-19	0.008	0.010	0.009	0.010	0.010
-18	0.010	0.012	0.010	0.008	0.010
-17	0.010	0.012	0.012	0.010	0.011
-16	0.010	0.011	0.012	0.011	0.010
-15	0.011	0.011	0.011	0.011	0.009
-14	0.012	0.011	0.009	0.010	0.010
-13	0.015	0.012	0.012	0.011	0.011
-12	0.017	0.013	0.011	0.011	0.012
-11	0.022	0.017	0.015	0.013	0.011
-10	0.020	0.018	0.020	0.016	0.010
-9	0.017	0.016	0.019	0.015	0.010
-8	0.023	0.019	0.020	0.015	0.009
-7	0.030	0.028	0.027	0.015	0.011
-6	0.028	0.027	0.026	0.017	0.017
-5	0.028	0.022	0.020	0.019	0.019
-4	0.034	0.023	0.021	0.024	0.021
-3	0.037	0.032	0.031	0.027	0.027
-2	0.049	0.041	0.038	0.028	0.024
-1	0.072	0.049	0.038	0.034	0.030
0	0.221	0.120	0.067	0.055	0.046
1	0.295	0.177	0.109	0.077	0.064
2	0.128	0.106	0.090	0.075	0.070
3	0.052	0.046	0.066	0.071	0.056
4	0.037	0.033	0.049	0.061	0.048
5	0.030	0.027	0.030	0.036	0.033
6	0.021	0.019	0.020	0.025	0.024
7	0.018	0.014	0.012	0.015	0.020
8	0.019	0.013	0.010	0.009	0.014
9	0.016	0.015	0.012	0.010	0.010
10	0.013	0.014	0.013	0.012	0.012
11	0.013	0.012	0.012	0.013	0.014
12	0.012	0.010	0.011	0.010	0.009
13	0.012	0.011	0.013	0.011	0.008
14	0.014	0.014	0.016	0.013	0.009
15	0.017	0.016	0.012	0.010	0.011
16	0.020	0.017	0.011	0.009	0.012
17	0.015	0.013	0.011	0.009	0.009
18	0.013	0.011	0.010	0.009	0.008
19	0.014	0.011	0.010	0.009	0.010
20	0.012	0.011	0.010	0.010	0.012

RILEY 1 GRID A

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.008	0.008	0.007	0.007	0.007
-19	0.008	0.009	0.008	0.007	0.006
-18	0.011	0.012	0.010	0.009	0.007
-17	0.013	0.012	0.009	0.009	0.009
-16	0.009	0.009	0.008	0.009	0.010
-15	0.008	0.008	0.008	0.008	0.009
-14	0.009	0.010	0.008	0.006	0.008
-13	0.011	0.014	0.013	0.009	0.006
-12	0.012	0.014	0.015	0.012	0.009
-11	0.010	0.011	0.013	0.011	0.008
-10	0.008	0.010	0.012	0.011	0.010
-9	0.009	0.011	0.011	0.012	0.011
-8	0.010	0.011	0.012	0.011	0.009
-7	0.012	0.012	0.012	0.010	0.007
-6	0.017	0.014	0.012	0.011	0.009
-5	0.018	0.016	0.013	0.012	0.014
-4	0.020	0.017	0.014	0.014	0.016
-3	0.030	0.022	0.014	0.016	0.018
-2	0.027	0.022	0.016	0.020	0.021
-1	0.025	0.025	0.025	0.026	0.024
0	0.037	0.035	0.033	0.028	0.023
1	0.061	0.053	0.039	0.032	0.024
2	0.072	0.064	0.045	0.038	0.033
3	0.042	0.032	0.025	0.028	0.028
4	0.032	0.020	0.013	0.015	0.016
5	0.029	0.023	0.015	0.015	0.013
6	0.023	0.019	0.017	0.016	0.011
7	0.021	0.016	0.014	0.014	0.009
8	0.022	0.018	0.011	0.009	0.009
9	0.014	0.014	0.012	0.010	0.010
10	0.012	0.011	0.011	0.012	0.011
11	0.011	0.008	0.008	0.009	0.011
12	0.010	0.010	0.009	0.009	0.012
13	0.009	0.011	0.012	0.012	0.011
14	0.009	0.009	0.009	0.009	0.009
15	0.012	0.011	0.008	0.007	0.007
16	0.015	0.012	0.009	0.007	0.006
17	0.011	0.010	0.007	0.007	0.006
18	0.009	0.008	0.006	0.008	0.008
19	0.010	0.007	0.007	0.009	0.008
20	0.011	0.007	0.007	0.008	0.006

RILEY 1 GRID A

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.006	0.007	0.008	0.009	0.009
-19	0.006	0.007	0.007	0.009	0.008
-18	0.006	0.006	0.007	0.008	0.007
-17	0.006	0.007	0.008	0.008	0.008
-16	0.008	0.008	0.008	0.008	0.008
-15	0.008	0.007	0.008	0.010	0.008
-14	0.009	0.008	0.009	0.011	0.009
-13	0.010	0.009	0.010	0.010	0.009
-12	0.010	0.012	0.012	0.009	0.007
-11	0.010	0.014	0.012	0.008	0.007
-10	0.010	0.011	0.010	0.009	0.008
-9	0.009	0.009	0.009	0.010	0.009
-8	0.008	0.010	0.011	0.012	0.010
-7	0.006	0.009	0.011	0.010	0.009
-6	0.005	0.006	0.009	0.008	0.009
-5	0.011	0.010	0.011	0.008	0.010
-4	0.017	0.017	0.014	0.013	0.011
-3	0.018	0.016	0.014	0.013	0.014
-2	0.017	0.015	0.014	0.018	0.019
-1	0.022	0.023	0.021	0.026	0.032
0	0.025	0.028	0.026	0.033	0.043
1	0.021	0.024	0.022	0.022	0.028
2	0.028	0.030	0.025	0.022	0.020
3	0.029	0.035	0.032	0.029	0.025
4	0.018	0.021	0.020	0.019	0.022
5	0.013	0.012	0.010	0.010	0.013
6	0.011	0.012	0.010	0.009	0.010
7	0.009	0.011	0.011	0.011	0.009
8	0.009	0.011	0.013	0.011	0.009
9	0.011	0.012	0.012	0.011	0.009
10	0.011	0.010	0.011	0.011	0.009
11	0.010	0.009	0.009	0.009	0.007
12	0.011	0.008	0.009	0.008	0.006
13	0.011	0.009	0.008	0.008	0.008
14	0.008	0.008	0.007	0.007	0.008
15	0.006	0.007	0.007	0.006	0.007
16	0.006	0.006	0.007	0.006	0.006
17	0.006	0.006	0.007	0.008	0.008
18	0.006	0.007	0.006	0.007	0.008
19	0.007	0.008	0.007	0.006	0.007
20	0.007	0.008	0.007	0.006	0.006

RILEY 1 GRID A

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.009
-19	0.009
-18	0.006
-17	0.008
-16	0.009
-15	0.006
-14	0.007
-13	0.008
-12	0.008
-11	0.008
-10	0.009
-9	0.008
-8	0.009
-7	0.009
-6	0.013
-5	0.014
-4	0.013
-3	0.014
-2	0.018
-1	0.035
0	0.048
1	0.030
2	0.018
3	0.022
4	0.022
5	0.015
6	0.009
7	0.009
8	0.009
9	0.008
10	0.007
11	0.006
12	0.006
13	0.008
14	0.009
15	0.006
16	0.005
17	0.007
18	0.008
19	0.007
20	0.007

RILEY 2 GRID B

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.025	0.026	0.022	0.020	0.027
-19	0.027	0.027	0.023	0.023	0.031
-18	0.034	0.028	0.021	0.024	0.032
-17	0.052	0.046	0.025	0.020	0.029
-16	0.063	0.063	0.032	0.016	0.029
-15	0.053	0.058	0.038	0.025	0.032
-14	0.035	0.038	0.038	0.033	0.026
-13	0.023	0.023	0.028	0.026	0.018
-12	0.027	0.025	0.030	0.025	0.019
-11	0.028	0.026	0.032	0.032	0.028
-10	0.026	0.023	0.029	0.034	0.028
-9	0.029	0.028	0.037	0.036	0.022
-8	0.035	0.039	0.040	0.031	0.021
-7	0.041	0.050	0.047	0.034	0.031
-6	0.051	0.065	0.061	0.034	0.029
-5	0.095	0.105	0.071	0.034	0.030
-4	0.167	0.192	0.100	0.058	0.050
-3	0.327	0.333	0.216	0.191	0.114
-2	0.947	0.695	0.404	0.395	0.255
-1	7.432	3.037	1.402	1.005	0.802
0		8.790	3.096	1.423	0.949
1	7.432	2.734	1.244	0.594	0.336
2	0.947	0.730	0.383	0.266	0.144
3	0.327	0.275	0.229	0.164	0.129
4	0.167	0.108	0.098	0.076	0.083
5	0.095	0.063	0.060	0.051	0.053
6	0.051	0.048	0.057	0.047	0.046
7	0.041	0.049	0.051	0.033	0.029
8	0.035	0.041	0.043	0.032	0.028
9	0.029	0.030	0.028	0.034	0.041
10	0.026	0.030	0.030	0.034	0.044
11	0.028	0.044	0.046	0.033	0.028
12	0.027	0.048	0.052	0.030	0.017
13	0.023	0.045	0.054	0.033	0.019
14	0.035	0.050	0.055	0.034	0.025
15	0.053	0.057	0.051	0.028	0.022
16	0.063	0.057	0.046	0.031	0.028
17	0.052	0.042	0.039	0.044	0.040
18	0.034	0.033	0.037	0.049	0.044
19	0.027	0.030	0.029	0.033	0.038
20	0.025	0.025	0.021	0.024	0.037

RILEY 2 GRID B -80-

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.025	0.017	0.014	0.020	0.027
-19	0.025	0.015	0.014	0.020	0.027
-18	0.026	0.016	0.014	0.018	0.026
-17	0.028	0.026	0.024	0.020	0.023
-16	0.036	0.035	0.035	0.022	0.020
-15	0.036	0.034	0.036	0.027	0.023
-14	0.025	0.029	0.030	0.027	0.027
-13	0.024	0.038	0.036	0.035	0.034
-12	0.027	0.047	0.041	0.030	0.030
-11	0.026	0.036	0.035	0.030	0.029
-10	0.022	0.023	0.031	0.032	0.029
-9	0.018	0.024	0.036	0.035	0.026
-8	0.024	0.034	0.035	0.026	0.022
-7	0.032	0.032	0.025	0.024	0.031
-6	0.027	0.031	0.029	0.027	0.028
-5	0.034	0.042	0.040	0.037	0.035
-4	0.042	0.041	0.043	0.045	0.060
-3	0.057	0.048	0.056	0.051	0.059
-2	0.160	0.116	0.123	0.082	0.058
-1	0.445	0.268	0.226	0.151	0.124
0	0.456	0.287	0.228	0.174	0.176
1	0.202	0.200	0.205	0.174	0.152
2	0.113	0.141	0.162	0.158	0.140
3	0.210	0.238	0.203	0.189	0.159
4	0.234	0.418	0.486	0.397	0.222
5	0.131	0.367	0.670	0.727	0.407
6	0.084	0.189	0.363	0.509	0.363
7	0.060	0.086	0.124	0.190	0.167
8	0.043	0.050	0.078	0.136	0.117
9	0.045	0.049	0.046	0.063	0.074
10	0.040	0.041	0.034	0.028	0.037
11	0.024	0.034	0.041	0.035	0.023
12	0.013	0.021	0.044	0.058	0.036
13	0.015	0.018	0.031	0.041	0.028
14	0.025	0.023	0.018	0.022	0.021
15	0.025	0.026	0.022	0.021	0.023
16	0.025	0.028	0.038	0.034	0.023
17	0.027	0.029	0.041	0.034	0.023
18	0.025	0.024	0.030	0.029	0.027
19	0.027	0.023	0.028	0.026	0.020
20	0.029	0.024	0.029	0.028	0.020

RILEY 2 GRID 8

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.028	0.027	0.028	0.030	0.026
-19	0.030	0.031	0.029	0.029	0.026
-18	0.029	0.031	0.027	0.024	0.025
-17	0.027	0.030	0.028	0.021	0.022
-16	0.027	0.029	0.031	0.021	0.015
-15	0.027	0.024	0.029	0.028	0.020
-14	0.029	0.026	0.026	0.030	0.027
-13	0.032	0.032	0.032	0.038	0.040
-12	0.029	0.037	0.044	0.046	0.050
-11	0.028	0.036	0.039	0.038	0.042
-10	0.027	0.028	0.032	0.047	0.065
-9	0.025	0.023	0.032	0.053	0.069
-8	0.026	0.025	0.026	0.033	0.036
-7	0.037	0.030	0.023	0.025	0.031
-6	0.036	0.030	0.029	0.035	0.037
-5	0.039	0.033	0.034	0.039	0.041
-4	0.055	0.034	0.033	0.035	0.034
-3	0.049	0.032	0.032	0.032	0.032
-2	0.051	0.046	0.046	0.041	0.044
-1	0.097	0.060	0.042	0.052	0.069
0	0.128	0.074	0.042	0.047	0.056
1	0.105	0.064	0.038	0.035	0.039
2	0.101	0.061	0.037	0.039	0.050
3	0.139	0.100	0.056	0.046	0.060
4	0.173	0.156	0.098	0.057	0.054
5	0.198	0.139	0.095	0.059	0.051
6	0.198	0.119	0.073	0.053	0.065
7	0.140	0.128	0.102	0.072	0.067
8	0.101	0.128	0.135	0.114	0.094
9	0.072	0.092	0.119	0.158	0.180
10	0.049	0.061	0.087	0.144	0.205
11	0.030	0.049	0.073	0.095	0.161
12	0.024	0.037	0.062	0.073	0.114
13	0.019	0.041	0.079	0.075	0.083
14	0.022	0.037	0.066	0.077	0.088
15	0.023	0.024	0.037	0.059	0.067
16	0.021	0.022	0.025	0.032	0.044
17	0.026	0.025	0.024	0.025	0.030
18	0.031	0.032	0.033	0.026	0.024
19	0.029	0.038	0.036	0.024	0.022
20	0.028	0.035	0.030	0.026	0.026

RILEY 2 GRID B

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.025	0.032	0.032	0.042	0.067
-19	0.024	0.027	0.030	0.046	0.066
-18	0.026	0.025	0.029	0.044	0.054
-17	0.027	0.025	0.028	0.037	0.042
-16	0.019	0.023	0.027	0.044	0.050
-15	0.024	0.029	0.031	0.056	0.066
-14	0.030	0.035	0.034	0.050	0.057
-13	0.034	0.030	0.031	0.041	0.038
-12	0.040	0.032	0.033	0.033	0.024
-11	0.043	0.044	0.038	0.029	0.025
-10	0.075	0.066	0.042	0.029	0.029
-9	0.073	0.062	0.048	0.034	0.031
-8	0.034	0.034	0.041	0.034	0.029
-7	0.032	0.031	0.036	0.034	0.027
-6	0.043	0.042	0.041	0.040	0.027
-5	0.049	0.053	0.048	0.042	0.033
-4	0.044	0.053	0.051	0.047	0.040
-3	0.041	0.045	0.051	0.053	0.041
-2	0.039	0.035	0.046	0.047	0.031
-1	0.051	0.043	0.055	0.044	0.029
0	0.043	0.046	0.072	0.074	0.047
1	0.037	0.047	0.072	0.074	0.048
2	0.053	0.072	0.072	0.047	0.029
3	0.069	0.083	0.079	0.053	0.040
4	0.057	0.070	0.072	0.056	0.053
5	0.076	0.091	0.081	0.061	0.049
6	0.112	0.112	0.092	0.072	0.058
7	0.085	0.087	0.094	0.107	0.122
8	0.086	0.096	0.102	0.113	0.130
9	0.141	0.111	0.090	0.068	0.057
10	0.166	0.106	0.083	0.069	0.042
11	0.154	0.117	0.100	0.076	0.043
12	0.120	0.113	0.101	0.058	0.034
13	0.114	0.124	0.099	0.049	0.034
14	0.122	0.122	0.082	0.046	0.033
15	0.069	0.066	0.055	0.054	0.040
16	0.039	0.031	0.033	0.044	0.047
17	0.031	0.026	0.023	0.032	0.044
18	0.027	0.027	0.022	0.026	0.035
19	0.032	0.038	0.033	0.044	0.052
20	0.036	0.038	0.039	0.063	0.072

RILEY 2. GRID 8

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.084
-19	0.069
-18	0.048
-17	0.037
-16	0.040
-15	0.053
-14	0.048
-13	0.031
-12	0.022
-11	0.028
-10	0.034
-9	0.040
-8	0.037
-7	0.032
-6	0.026
-5	0.031
-4	0.036
-3	0.034
-2	0.025
-1	0.028
0	0.039
1	0.039
2	0.026
3	0.037
4	0.049
5	0.040
6	0.052
7	0.119
8	0.131
9	0.056
10	0.025
11	0.025
12	0.032
13	0.040
14	0.033
15	0.032
16	0.044
17	0.043
18	0.035
19	0.047
20	0.057

GRUBER 1 GRID C

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.021	0.018	0.012	0.009	0.007
-19	0.020	0.020	0.016	0.014	0.010
-18	0.021	0.020	0.016	0.010	0.010
-17	0.017	0.013	0.011	0.013	0.015
-16	0.016	0.011	0.010	0.013	0.015
-15	0.020	0.018	0.017	0.022	0.023
-14	0.023	0.022	0.016	0.016	0.020
-13	0.026	0.024	0.017	0.017	0.020
-12	0.028	0.027	0.022	0.018	0.016
-11	0.028	0.032	0.029	0.024	0.019
-10	0.033	0.035	0.028	0.022	0.019
-9	0.038	0.034	0.023	0.025	0.024
-8	0.038	0.035	0.025	0.028	0.027
-7	0.042	0.034	0.025	0.028	0.026
-6	0.045	0.032	0.021	0.011	0.015
-5	0.049	0.033	0.029	0.024	0.023
-4	0.073	0.040	0.041	0.016	0.034
-3	0.305	0.183	0.089	0.077	0.068
-2	1.683	1.112	0.291	0.108	0.080
-1	10.715	6.666	2.156	0.687	0.441
0		38.842	9.335	3.275	1.526
1	10.715	10.522	10.673	10.751	8.121
2	1.683	1.646	2.978	7.816	11.308
3	0.305	0.327	0.254	1.050	3.438
4	0.073	0.075	0.065	-0.004	0.102
5	0.049	0.054	0.047	0.018	0.013
6	0.045	0.048	0.037	0.033	0.025
7	0.042	0.037	0.029	0.024	0.018
8	0.038	0.028	0.025	0.026	0.022
9	0.038	0.030	0.025	0.021	0.024
10	0.033	0.028	0.026	0.029	0.029
11	0.028	0.024	0.021	0.025	0.028
12	0.028	0.021	0.018	0.022	0.024
13	0.026	0.016	0.014	0.015	0.016
14	0.023	0.015	0.012	0.014	0.015
15	0.020	0.015	0.009	0.008	0.012
16	0.016	0.017	0.012	0.010	0.013
17	0.017	0.017	0.013	0.011	0.010
18	0.021	0.021	0.019	0.019	0.015
19	0.020	0.020	0.019	0.016	0.014
20	0.021	0.020	0.019	0.021	0.019

GRUBER 1 GRID C

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.017	0.026	0.019	0.010	0.009
-19	0.003	0.006	0.015	0.017	0.013
-18	0.016	0.019	0.017	0.019	0.019
-17	0.008	0.005	0.014	0.024	0.028
-16	0.022	0.025	0.019	0.018	0.026
-15	0.020	0.018	0.024	0.029	0.028
-14	0.028	0.028	0.027	0.031	0.022
-13	0.019	0.013	0.021	0.029	0.019
-12	0.024	0.027	0.021	0.017	0.018
-11	0.015	0.012	0.014	0.019	0.024
-10	0.027	0.031	0.017	0.011	0.015
-9	0.015	0.014	0.017	0.014	0.011
-8	0.028	0.030	0.023	0.013	0.011
-7	0.014	0.011	0.025	0.027	0.021
-6	0.034	0.036	0.027	0.023	0.023
-5	0.009	0.005	0.018	0.025	0.020
-4	0.069	0.055	0.025	0.019	0.017
-3	0.039	0.022	0.034	0.035	0.029
-2	0.115	0.094	0.055	0.032	0.030
-1	0.279	0.167	0.142	0.125	0.093
0	0.763	0.395	0.294	0.251	0.172
1	4.081	1.440	0.455	0.237	0.142
2	10.488	6.720	2.925	0.846	0.207
3	6.423	7.378	5.177	2.086	0.585
4	0.756	1.919	2.303	1.539	0.685
5	0.032	0.092	0.210	0.335	0.268
6	0.017	0.024	0.037	0.052	0.060
7	0.038	0.053	0.039	0.028	0.028
8	0.014	0.017	0.028	0.028	0.026
9	0.038	0.044	0.028	0.020	0.023
10	0.022	0.021	0.032	0.038	0.027
11	0.031	0.032	0.027	0.028	0.021
12	0.018	0.012	0.020	0.027	0.020
13	0.026	0.028	0.021	0.016	0.013
14	0.008	0.007	0.017	0.023	0.019
15	0.018	0.022	0.018	0.015	0.017
16	0.006	0.001	0.008	0.014	0.016
17	0.015	0.017	0.012	0.010	0.010
18	0.005	0.003	0.013	0.018	0.014
19	0.018	0.020	0.014	0.011	0.012
20	0.008	0.005	0.011	0.014	0.012

GRUBER 1 GRID C

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.009	0.010	0.013	0.015	0.016
-19	0.009	0.010	0.014	0.018	0.017
-18	0.019	0.015	0.013	0.018	0.020
-17	0.027	0.020	0.015	0.016	0.017
-16	0.025	0.020	0.021	0.021	0.016
-15	0.025	0.020	0.021	0.022	0.019
-14	0.019	0.018	0.017	0.019	0.018
-13	0.016	0.019	0.021	0.020	0.020
-12	0.020	0.020	0.024	0.027	0.027
-11	0.022	0.016	0.018	0.020	0.022
-10	0.015	0.014	0.012	0.010	0.017
-9	0.012	0.015	0.013	0.011	0.015
-8	0.012	0.015	0.016	0.019	0.016
-7	0.013	0.015	0.018	0.021	0.017
-6	0.018	0.019	0.022	0.024	0.020
-5	0.019	0.021	0.027	0.030	0.023
-4	0.020	0.027	0.036	0.033	0.029
-3	0.025	0.033	0.040	0.032	0.026
-2	0.028	0.035	0.038	0.030	0.024
-1	0.070	0.076	0.072	0.055	0.045
0	0.130	0.149	0.136	0.092	0.072
1	0.101	0.112	0.105	0.067	0.053
2	0.092	0.065	0.054	0.035	0.036
3	0.169	0.071	0.051	0.035	0.034
4	0.227	0.128	0.091	0.054	0.033
5	0.156	0.144	0.147	0.120	0.071
6	0.060	0.077	0.124	0.141	0.124
7	0.024	0.035	0.054	0.070	0.086
8	0.019	0.023	0.030	0.030	0.033
9	0.017	0.016	0.020	0.022	0.023
10	0.012	0.011	0.017	0.020	0.017
11	0.011	0.013	0.014	0.014	0.014
12	0.014	0.017	0.017	0.014	0.013
13	0.015	0.020	0.017	0.014	0.015
14	0.016	0.019	0.016	0.012	0.015
15	0.018	0.021	0.015	0.011	0.017
16	0.016	0.017	0.014	0.014	0.017
17	0.010	0.012	0.014	0.017	0.015
18	0.009	0.009	0.013	0.015	0.012
19	0.011	0.009	0.009	0.010	0.011
20	0.010	0.008	0.008	0.008	0.011

GRUBER 1 GRID C

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.013	0.013	0.012	0.013	0.015
-19	0.013	0.014	0.012	0.012	0.014
-18	0.017	0.015	0.013	0.012	0.012
-17	0.017	0.014	0.013	0.013	0.012
-16	0.017	0.016	0.014	0.015	0.014
-15	0.020	0.018	0.017	0.019	0.016
-14	0.018	0.017	0.019	0.018	0.016
-13	0.019	0.017	0.019	0.019	0.016
-12	0.020	0.015	0.019	0.024	0.022
-11	0.016	0.015	0.024	0.033	0.033
-10	0.020	0.022	0.031	0.035	0.035
-9	0.021	0.023	0.024	0.022	0.024
-8	0.015	0.020	0.020	0.015	0.016
-7	0.018	0.021	0.020	0.015	0.014
-6	0.017	0.017	0.018	0.019	0.014
-5	0.016	0.014	0.013	0.017	0.017
-4	0.024	0.020	0.015	0.018	0.023
-3	0.031	0.035	0.032	0.025	0.025
-2	0.032	0.042	0.036	0.025	0.031
-1	0.048	0.055	0.049	0.046	0.053
0	0.075	0.079	0.073	0.075	0.071
1	0.055	0.050	0.042	0.042	0.041
2	0.038	0.032	0.030	0.029	0.024
3	0.038	0.033	0.034	0.033	0.031
4	0.031	0.029	0.027	0.024	0.031
5	0.044	0.033	0.029	0.024	0.026
6	0.072	0.044	0.040	0.034	0.028
7	0.067	0.055	0.061	0.061	0.043
8	0.042	0.042	0.063	0.089	0.067
9	0.028	0.027	0.037	0.058	0.056
10	0.016	0.017	0.018	0.022	0.027
11	0.015	0.016	0.016	0.016	0.016
12	0.015	0.016	0.014	0.016	0.016
13	0.014	0.014	0.013	0.014	0.013
14	0.016	0.013	0.012	0.011	0.012
15	0.020	0.018	0.012	0.008	0.012
16	0.024	0.024	0.013	0.009	0.014
17	0.019	0.017	0.012	0.013	0.016
18	0.011	0.011	0.011	0.013	0.015
19	0.011	0.012	0.015	0.015	0.014
20	0.012	0.014	0.017	0.016	0.013

CORRECTED SPECTRUM, (F-STAR)

	20
-20	0.014
-19	0.015
-18	0.014
-17	0.012
-16	0.012
-15	0.014
-14	0.015
-13	0.016
-12	0.020
-11	0.030
-10	0.036
-9	0.028
-8	0.019
-7	0.016
-6	0.013
-5	0.019
-4	0.029
-3	0.030
-2	0.033
-1	0.062
0	0.082
1	0.048
2	0.025
3	0.030
4	0.030
5	0.025
6	0.021
7	0.034
8	0.049
9	0.049
10	0.030
11	0.018
12	0.016
13	0.012
14	0.015
15	0.015
16	0.017
17	0.017
18	0.016
19	0.014
20	0.013

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.008	0.011	0.011	0.008	0.006
-19	0.008	0.010	0.010	0.008	0.009
-18	0.010	0.009	0.009	0.006	0.007
-17	0.010	0.008	0.008	0.007	0.008
-16	0.008	0.007	0.007	0.006	0.006
-15	0.010	0.008	0.008	0.008	0.009
-14	0.012	0.012	0.011	0.009	0.008
-13	0.014	0.017	0.016	0.012	0.010
-12	0.016	0.022	0.016	0.012	0.009
-11	0.014	0.018	0.017	0.014	0.011
-10	0.014	0.015	0.016	0.013	0.013
-9	0.015	0.016	0.017	0.016	0.019
-8	0.015	0.018	0.020	0.017	0.015
-7	0.016	0.017	0.020	0.022	0.026
-6	0.020	0.020	0.023	0.029	0.040
-5	0.027	0.029	0.042	0.058	0.072
-4	0.051	0.052	0.079	0.099	0.089
-3	0.156	0.195	0.217	0.166	0.125
-2	0.982	1.354	0.843	0.588	0.417
-1	25.216	21.198	8.198	4.012	2.158
0	.	115.255	19.082	6.327	2.640
1	25.216	13.010	5.132	1.824	0.685
2	0.982	0.613	0.487	0.399	0.242
3	0.156	0.092	0.134	0.269	0.213
4	0.051	0.035	0.050	0.098	0.103
5	0.027	0.032	0.035	0.028	0.027
6	0.020	0.029	0.034	0.031	0.028
7	0.016	0.017	0.017	0.018	0.019
8	0.015	0.012	0.011	0.012	0.015
9	0.015	0.013	0.013	0.014	0.012
10	0.014	0.016	0.018	0.016	0.016
11	0.014	0.013	0.015	0.013	0.014
12	0.016	0.011	0.011	0.011	0.015
13	0.014	0.011	0.009	0.010	0.015
14	0.012	0.010	0.008	0.010	0.013
15	0.010	0.010	0.009	0.009	0.008
16	0.008	0.009	0.009	0.010	0.010
17	0.010	0.009	0.008	0.008	0.007
18	0.010	0.009	0.009	0.010	0.010
19	0.008	0.010	0.011	0.010	0.010
20	0.008	0.010	0.012	0.011	0.011

GRUBER 2 GRID D

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.009	0.010	0.010	0.008	0.006
-19	0.011	0.012	0.013	0.011	0.008
-18	0.009	0.011	0.011	0.010	0.007
-17	0.008	0.009	0.010	0.009	0.008
-16	0.005	0.006	0.010	0.010	0.008
-15	0.009	0.010	0.012	0.013	0.012
-14	0.009	0.008	0.009	0.010	0.009
-13	0.009	0.009	0.011	0.011	0.011
-12	0.007	0.008	0.012	0.012	0.011
-11	0.011	0.014	0.014	0.012	0.012
-10	0.015	0.017	0.018	0.016	0.014
-9	0.022	0.023	0.024	0.022	0.017
-8	0.020	0.022	0.022	0.023	0.021
-7	0.030	0.028	0.029	0.034	0.041
-6	0.046	0.036	0.032	0.040	0.053
-5	0.069	0.069	0.054	0.045	0.057
-4	0.076	0.093	0.075	0.054	0.059
-3	0.103	0.107	0.093	0.079	0.083
-2	0.287	0.256	0.217	0.174	0.164
-1	1.100	0.757	0.492	0.349	0.334
0	1.182	0.703	0.392	0.274	0.263
1	0.324	0.209	0.131	0.106	0.107
2	0.134	0.106	0.075	0.067	0.075
3	0.099	0.084	0.064	0.051	0.047
4	0.061	0.058	0.051	0.035	0.023
5	0.029	0.035	0.038	0.027	0.017
6	0.027	0.033	0.034	0.023	0.018
7	0.021	0.024	0.022	0.018	0.023
8	0.017	0.023	0.025	0.028	0.035
9	0.013	0.018	0.025	0.028	0.025
10	0.015	0.013	0.018	0.020	0.019
11	0.014	0.011	0.013	0.016	0.013
12	0.017	0.013	0.014	0.012	0.009
13	0.014	0.009	0.010	0.009	0.007
14	0.011	0.008	0.011	0.011	0.009
15	0.007	0.009	0.012	0.012	0.009
16	0.009	0.010	0.011	0.011	0.008
17	0.006	0.006	0.008	0.011	0.008
18	0.009	0.007	0.010	0.013	0.009
19	0.008	0.008	0.011	0.012	0.007
20	0.011	0.011	0.014	0.012	0.008

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.008	0.008	0.007	0.008	0.006
-19	0.008	0.008	0.007	0.007	0.005
-18	0.007	0.006	0.006	0.008	0.007
-17	0.007	0.008	0.008	0.008	0.008
-16	0.008	0.008	0.007	0.007	0.010
-15	0.009	0.008	0.008	0.010	0.013
-14	0.007	0.009	0.010	0.010	0.010
-13	0.009	0.009	0.011	0.011	0.009
-12	0.011	0.009	0.011	0.013	0.011
-11	0.012	0.010	0.011	0.013	0.011
-10	0.013	0.012	0.014	0.014	0.010
-9	0.017	0.018	0.023	0.024	0.015
-8	0.023	0.024	0.031	0.032	0.016
-7	0.032	0.028	0.035	0.032	0.016
-6	0.045	0.033	0.039	0.036	0.021
-5	0.055	0.049	0.058	0.050	0.035
-4	0.071	0.078	0.077	0.056	0.042
-3	0.089	0.089	0.079	0.050	0.043
-2	0.158	0.130	0.110	0.094	0.078
-1	0.289	0.226	0.177	0.155	0.132
0	0.222	0.204	0.157	0.127	0.125
1	0.113	0.110	0.075	0.058	0.060
2	0.081	0.074	0.056	0.044	0.035
3	0.043	0.040	0.048	0.051	0.044
4	0.018	0.018	0.024	0.029	0.028
5	0.016	0.016	0.015	0.013	0.014
6	0.018	0.017	0.016	0.012	0.010
7	0.021	0.016	0.014	0.011	0.009
8	0.027	0.015	0.011	0.011	0.011
9	0.021	0.013	0.008	0.011	0.011
10	0.015	0.010	0.010	0.012	0.009
11	0.011	0.010	0.012	0.012	0.008
12	0.009	0.012	0.013	0.014	0.010
13	0.007	0.009	0.012	0.014	0.011
14	0.007	0.008	0.010	0.009	0.008
15	0.006	0.008	0.008	0.006	0.005
16	0.005	0.007	0.007	0.006	0.005
17	0.007	0.007	0.007	0.007	0.007
18	0.007	0.008	0.008	0.007	0.007
19	0.007	0.008	0.008	0.007	0.007
20	0.009	0.010	0.008	0.006	0.006

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.005	0.007	0.008	0.006	0.007
-19	0.004	0.006	0.009	0.007	0.006
-18	0.004	0.004	0.007	0.008	0.006
-17	0.006	0.006	0.007	0.008	0.009
-16	0.009	0.007	0.008	0.011	0.011
-15	0.013	0.007	0.008	0.010	0.008
-14	0.009	0.007	0.007	0.008	0.007
-13	0.007	0.008	0.009	0.009	0.009
-12	0.008	0.007	0.007	0.010	0.012
-11	0.008	0.008	0.008	0.010	0.013
-10	0.009	0.010	0.012	0.013	0.013
-9	0.013	0.013	0.013	0.012	0.012
-8	0.010	0.010	0.009	0.011	0.012
-7	0.012	0.014	0.014	0.015	0.015
-6	0.022	0.029	0.027	0.019	0.014
-5	0.032	0.034	0.026	0.015	0.013
-4	0.034	0.028	0.022	0.013	0.013
-3	0.045	0.032	0.028	0.019	0.013
-2	0.058	0.042	0.038	0.025	0.015
-1	0.099	0.068	0.048	0.035	0.031
0	0.093	0.060	0.043	0.043	0.046
1	0.037	0.027	0.037	0.036	0.031
2	0.030	0.026	0.031	0.024	0.018
3	0.043	0.032	0.022	0.018	0.014
4	0.026	0.024	0.017	0.014	0.012
5	0.010	0.010	0.011	0.012	0.013
6	0.007	0.008	0.009	0.010	0.011
7	0.007	0.008	0.010	0.010	0.011
8	0.009	0.011	0.012	0.010	0.011
9	0.009	0.011	0.011	0.009	0.009
10	0.008	0.009	0.009	0.008	0.007
11	0.006	0.007	0.008	0.009	0.008
12	0.007	0.009	0.011	0.012	0.011
13	0.009	0.011	0.012	0.011	0.009
14	0.009	0.011	0.011	0.012	0.010
15	0.007	0.010	0.010	0.015	0.017
16	0.007	0.009	0.008	0.010	0.013
17	0.008	0.008	0.005	0.005	0.005
18	0.007	0.007	0.006	0.005	0.006
19	0.006	0.006	0.006	0.006	0.006
20	0.006	0.007	0.006	0.005	0.006

CORRECTED SPECTRUM, (F-STAR)

20	
-20	0.007
-19	0.006
-18	0.006
-17	0.009
-16	0.009
-15	0.006
-14	0.006
-13	0.008
-12	0.011
-11	0.014
-10	0.013
-9	0.011
-8	0.011
-7	0.013
-6	0.011
-5	0.012
-4	0.014
-3	0.014
-2	0.017
-1	0.031
0	0.042
1	0.029
2	0.018
3	0.013
4	0.013
5	0.013
6	0.010
7	0.012
8	0.015
9	0.011
10	0.007
11	0.008
12	0.009
13	0.007
14	0.008
15	0.015
16	0.013
17	0.006
18	0.006
19	0.006
20	0.006

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.005	0.005	0.006	0.005	0.006
-19	0.005	0.005	0.007	0.006	0.006
-18	0.005	0.006	0.008	0.007	0.006
-17	0.005	0.006	0.007	0.008	0.008
-16	0.005	0.005	0.006	0.007	0.007
-15	0.007	0.006	0.005	0.005	0.007
-14	0.009	0.007	0.005	0.006	0.008
-13	0.009	0.006	0.006	0.006	0.007
-12	0.008	0.006	0.006	0.005	0.005
-11	0.009	0.006	0.006	0.006	0.007
-10	0.009	0.008	0.008	0.009	0.010
-9	0.013	0.011	0.011	0.011	0.011
-8	0.015	0.015	0.016	0.015	0.013
-7	0.018	0.021	0.021	0.020	0.018
-6	0.029	0.033	0.025	0.022	0.021
-5	0.050	0.042	0.036	0.032	0.028
-4	0.121	0.072	0.054	0.040	0.034
-3	0.319	0.195	0.102	0.054	0.041
-2	0.965	0.489	0.196	0.100	0.050
-1	8.177	1.590	0.379	0.175	0.070
0		5.347	0.568	0.208	0.077
1	8.177	2.673	0.519	0.171	0.072
2	0.965	0.822	0.313	0.125	0.075
3	0.319	0.328	0.158	0.081	0.064
4	0.121	0.137	0.082	0.057	0.043
5	0.050	0.052	0.047	0.037	0.028
6	0.029	0.027	0.031	0.025	0.024
7	0.018	0.018	0.020	0.025	0.029
8	0.015	0.016	0.015	0.022	0.031
9	0.013	0.015	0.017	0.020	0.029
10	0.009	0.014	0.016	0.017	0.028
11	0.009	0.014	0.015	0.013	0.021
12	0.008	0.014	0.015	0.011	0.011
13	0.009	0.012	0.011	0.010	0.008
14	0.009	0.010	0.011	0.010	0.008
15	0.007	0.009	0.011	0.008	0.006
16	0.005	0.007	0.008	0.007	0.006
17	0.005	0.006	0.007	0.006	0.007
18	0.005	0.007	0.006	0.004	0.006
19	0.005	0.006	0.005	0.004	0.004
20	0.005	0.006	0.006	0.005	0.004

CARSON 1 GRID E

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.006	0.005	0.006	0.007	0.010
-19	0.005	0.006	0.007	0.008	0.010
-18	0.005	0.007	0.009	0.009	0.009
-17	0.007	0.009	0.010	0.007	0.007
-16	0.008	0.008	0.007	0.006	0.006
-15	0.008	0.006	0.006	0.006	0.006
-14	0.008	0.008	0.008	0.007	0.007
-13	0.008	0.011	0.011	0.008	0.007
-12	0.007	0.009	0.009	0.007	0.007
-11	0.009	0.009	0.007	0.006	0.007
-10	0.011	0.012	0.012	0.010	0.008
-9	0.010	0.012	0.015	0.013	0.009
-8	0.012	0.012	0.013	0.011	0.012
-7	0.015	0.016	0.015	0.011	0.013
-6	0.018	0.018	0.016	0.014	0.014
-5	0.023	0.020	0.015	0.015	0.014
-4	0.028	0.021	0.015	0.012	0.011
-3	0.028	0.020	0.014	0.010	0.011
-2	0.028	0.021	0.017	0.014	0.015
-1	0.035	0.029	0.022	0.015	0.014
0	0.041	0.037	0.025	0.014	0.011
1	0.043	0.033	0.024	0.014	0.012
2	0.049	0.028	0.017	0.012	0.013
3	0.044	0.026	0.014	0.009	0.010
4	0.029	0.021	0.013	0.010	0.012
5	0.022	0.017	0.013	0.015	0.018
6	0.021	0.017	0.015	0.019	0.020
7	0.022	0.019	0.016	0.014	0.014
8	0.022	0.017	0.015	0.011	0.009
9	0.028	0.016	0.013	0.012	0.008
10	0.038	0.022	0.011	0.012	0.009
11	0.035	0.027	0.010	0.009	0.008
12	0.019	0.022	0.011	0.008	0.009
13	0.010	0.016	0.012	0.008	0.008
14	0.008	0.011	0.010	0.007	0.006
15	0.006	0.007	0.008	0.006	0.006
16	0.006	0.006	0.007	0.007	0.006
17	0.008	0.006	0.007	0.008	0.008
18	0.006	0.006	0.007	0.009	0.010
19	0.004	0.006	0.008	0.008	0.008
20	0.004	0.006	0.008	0.007	0.007

CARSON 1 GRID E

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.012	0.009	0.007	0.006	0.006
-19	0.012	0.009	0.007	0.007	0.006
-18	0.010	0.008	0.008	0.007	0.005
-17	0.008	0.008	0.008	0.008	0.007
-16	0.007	0.007	0.009	0.009	0.007
-15	0.006	0.005	0.007	0.007	0.006
-14	0.008	0.007	0.006	0.006	0.006
-13	0.010	0.010	0.008	0.008	0.007
-12	0.008	0.010	0.010	0.009	0.008
-11	0.006	0.008	0.009	0.007	0.007
-10	0.007	0.007	0.007	0.006	0.008
-9	0.009	0.009	0.008	0.006	0.008
-8	0.012	0.010	0.011	0.009	0.007
-7	0.013	0.011	0.012	0.011	0.008
-6	0.012	0.013	0.013	0.010	0.009
-5	0.012	0.015	0.015	0.012	0.012
-4	0.012	0.013	0.012	0.012	0.011
-3	0.012	0.011	0.009	0.009	0.007
-2	0.014	0.011	0.009	0.009	0.007
-1	0.014	0.013	0.011	0.010	0.008
0	0.012	0.015	0.015	0.012	0.011
1	0.014	0.015	0.013	0.012	0.012
2	0.014	0.013	0.010	0.012	0.013
3	0.012	0.013	0.010	0.011	0.014
4	0.013	0.012	0.009	0.011	0.014
5	0.015	0.012	0.009	0.009	0.010
6	0.016	0.013	0.012	0.010	0.009
7	0.017	0.018	0.016	0.013	0.009
8	0.013	0.020	0.020	0.013	0.009
9	0.008	0.013	0.015	0.012	0.008
10	0.006	0.007	0.008	0.008	0.009
11	0.007	0.007	0.007	0.007	0.009
12	0.009	0.007	0.006	0.006	0.008
13	0.007	0.007	0.006	0.007	0.008
14	0.006	0.007	0.008	0.008	0.008
15	0.006	0.007	0.008	0.008	0.008
16	0.005	0.005	0.006	0.007	0.007
17	0.006	0.005	0.006	0.006	0.006
18	0.008	0.007	0.006	0.006	0.007
19	0.009	0.010	0.010	0.007	0.007
20	0.008	0.011	0.011	0.007	0.006

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.007	0.006	0.006	0.006	0.006
-19	0.006	0.007	0.008	0.006	0.005
-18	0.004	0.006	0.008	0.006	0.004
-17	0.005	0.006	0.007	0.005	0.005
-16	0.006	0.006	0.006	0.007	0.008
-15	0.007	0.005	0.005	0.006	0.011
-14	0.006	0.005	0.005	0.008	0.011
-13	0.006	0.005	0.006	0.008	0.009
-12	0.007	0.006	0.005	0.004	0.006
-11	0.008	0.007	0.006	0.005	0.005
-10	0.008	0.007	0.006	0.006	0.008
-9	0.008	0.006	0.005	0.007	0.008
-8	0.006	0.007	0.007	0.007	0.008
-7	0.007	0.007	0.007	0.007	0.008
-6	0.010	0.009	0.006	0.006	0.008
-5	0.011	0.009	0.006	0.006	0.007
-4	0.008	0.006	0.005	0.006	0.007
-3	0.006	0.007	0.008	0.007	0.007
-2	0.007	0.009	0.010	0.007	0.007
-1	0.008	0.009	0.009	0.008	0.015
0	0.010	0.010	0.011	0.014	0.030
1	0.010	0.010	0.009	0.012	0.020
2	0.010	0.010	0.009	0.010	0.012
3	0.012	0.009	0.009	0.011	0.012
4	0.010	0.007	0.008	0.010	0.011
5	0.008	0.007	0.009	0.010	0.010
6	0.006	0.007	0.008	0.008	0.008
7	0.007	0.007	0.007	0.006	0.007
8	0.007	0.008	0.007	0.007	0.007
9	0.007	0.007	0.007	0.008	0.007
10	0.011	0.010	0.007	0.008	0.008
11	0.014	0.013	0.008	0.007	0.008
12	0.010	0.011	0.010	0.010	0.008
13	0.007	0.007	0.009	0.011	0.009
14	0.008	0.006	0.006	0.009	0.008
15	0.007	0.005	0.004	0.007	0.008
16	0.007	0.005	0.004	0.006	0.009
17	0.008	0.006	0.006	0.007	0.010
18	0.008	0.007	0.007	0.007	0.008
19	0.008	0.007	0.006	0.005	0.006
20	0.007	0.007	0.006	0.005	0.006

CARSON 1 GRID E

CORRECTED SPECTRUM, (F-STAR)

20	
-20	0.006
-19	0.005
-18	0.004
-17	0.005
-16	0.009
-15	0.012
-14	0.011
-13	0.008
-12	0.006
-11	0.006
-10	0.009
-9	0.010
-8	0.008
-7	0.008
-6	0.008
-5	0.008
-4	0.007
-3	0.007
-2	0.009
-1	0.024
0	0.045
1	0.028
2	0.011
3	0.012
4	0.011
5	0.010
6	0.009
7	0.009
8	0.008
9	0.008
10	0.009
11	0.009
12	0.008
13	0.007
14	0.007
15	0.007
16	0.009
17	0.011
18	0.009
19	0.008
20	0.007

CARSON 2 GRID F

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.009	0.010	0.008	0.009	0.009
-19	0.008	0.009	0.009	0.009	0.009
-18	0.007	0.009	0.010	0.013	0.011
-17	0.008	0.010	0.012	0.015	0.010
-16	0.010	0.012	0.013	0.012	0.010
-15	0.009	0.012	0.013	0.009	0.010
-14	0.010	0.012	0.011	0.007	0.007
-13	0.013	0.013	0.009	0.006	0.006
-12	0.013	0.012	0.008	0.008	0.011
-11	0.015	0.017	0.014	0.016	0.020
-10	0.017	0.021	0.021	0.025	0.024
-9	0.012	0.018	0.029	0.039	0.027
-8	0.010	0.015	0.041	0.054	0.030
-7	0.014	0.022	0.047	0.052	0.029
-6	0.024	0.029	0.039	0.036	0.023
-5	0.040	0.035	0.030	0.029	0.021
-4	0.087	0.060	0.047	0.042	0.026
-3	0.198	0.121	0.080	0.066	0.044
-2	0.831	0.299	0.133	0.095	0.071
-1	12.540	2.041	0.474	0.181	0.109
0		14.293	1.588	0.426	0.191
1	12.540	5.246	1.281	0.390	0.212
2	0.831	1.153	0.768	0.249	0.139
3	0.198	0.425	0.746	0.459	0.135
4	0.087	0.166	0.429	0.450	0.168
5	0.040	0.065	0.147	0.184	0.104
6	0.024	0.028	0.047	0.057	0.056
7	0.014	0.014	0.019	0.026	0.035
8	0.010	0.011	0.013	0.015	0.020
9	0.012	0.010	0.011	0.014	0.016
10	0.017	0.012	0.012	0.015	0.016
11	0.015	0.012	0.012	0.013	0.010
12	0.013	0.010	0.012	0.015	0.012
13	0.013	0.008	0.010	0.014	0.014
14	0.010	0.008	0.009	0.008	0.009
15	0.009	0.008	0.007	0.006	0.009
16	0.010	0.007	0.005	0.006	0.009
17	0.008	0.006	0.005	0.006	0.007
18	0.007	0.006	0.008	0.006	0.005
19	0.008	0.007	0.007	0.006	0.006
20	0.009	0.007	0.006	0.007	0.007

CARSON 2 GRID F

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.008	0.011	0.013	0.009	0.006
-19	0.008	0.011	0.012	0.008	0.007
-18	0.011	0.013	0.010	0.010	0.011
-17	0.013	0.015	0.011	0.013	0.015
-16	0.014	0.015	0.011	0.012	0.013
-15	0.016	0.017	0.014	0.012	0.012
-14	0.010	0.014	0.014	0.012	0.010
-13	0.008	0.010	0.013	0.010	0.008
-12	0.011	0.010	0.012	0.008	0.006
-11	0.017	0.015	0.014	0.011	0.009
-10	0.021	0.019	0.016	0.014	0.013
-9	0.019	0.017	0.013	0.012	0.014
-8	0.020	0.016	0.013	0.013	0.016
-7	0.019	0.013	0.013	0.017	0.019
-6	0.017	0.016	0.018	0.024	0.024
-5	0.017	0.023	0.028.	0.030	0.035
-4	0.019	0.027	0.036	0.034	0.037
-3	0.027	0.025	0.032	0.035	0.030
-2	0.044	0.029	0.024	0.025	0.023
-1	0.065	0.036	0.027	0.026	0.025
0	0.093	0.047	0.035	0.041	0.039
1	0.106	0.055	0.039	0.044	0.044
2	0.097	0.053	0.034	0.035	0.041
3	0.067	0.043	0.022	0.017	0.023
4	0.042	0.026	0.014	0.010	0.015
5	0.033	0.019	0.020	0.015	0.015
6	0.038	0.026	0.032	0.024	0.013
7	0.033	0.025	0.027	0.020	0.010
8	0.025	0.020	0.015	0.011	0.009
9	0.020	0.018	0.013	0.009	0.008
10	0.015	0.014	0.011	0.009	0.008
11	0.010	0.011	0.008	0.007	0.008
12	0.010	0.009	0.006	0.007	0.007
13	0.010	0.009	0.008	0.009	0.008
14	0.010	0.010	0.009	0.011	0.010
15	0.012	0.011	0.011	0.015	0.016
16	0.010	0.009	0.011	0.014	0.014
17	0.007	0.007	0.008	0.011	0.010
18	0.005	0.006	0.008	0.009	0.009
19	0.006	0.006	0.008	0.008	0.009
20	0.007	0.006	0.007	0.008	0.009

CARSON 2 GRID F

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.006	0.005	0.005	0.007	0.007
-19	0.006	0.005	0.006	0.008	0.008
-18	0.009	0.006	0.006	0.007	0.006
-17	0.011	0.008	0.006	0.005	0.004
-16	0.011	0.009	0.007	0.005	0.004
-15	0.010	0.010	0.009	0.007	0.005
-14	0.008	0.008	0.009	0.008	0.007
-13	0.007	0.007	0.007	0.008	0.010
-12	0.007	0.007	0.007	0.008	0.009
-11	0.008	0.008	0.007	0.007	0.007
-10	0.010	0.010	0.009	0.007	0.006
-9	0.017	0.017	0.011	0.007	0.007
-8	0.021	0.020	0.012	0.008	0.011
-7	0.018	0.017	0.020	0.028	0.026
-6	0.025	0.036	0.049	0.052	0.037
-5	0.050	0.060	0.051	0.034	0.022
-4	0.043	0.037	0.024	0.013	0.010
-3	0.022	0.017	0.014	0.010	0.010
-2	0.016	0.016	0.017	0.014	0.016
-1	0.023	0.026	0.023	0.018	0.018
0	0.032	0.032	0.025	0.017	0.015
1	0.030	0.021	0.016	0.017	0.017
2	0.036	0.022	0.018	0.020	0.019
3	0.028	0.024	0.023	0.025	0.020
4	0.017	0.013	0.015	0.018	0.015
5	0.013	0.009	0.011	0.013	0.011
6	0.011	0.009	0.009	0.011	0.012
7	0.010	0.008	0.008	0.012	0.013
8	0.009	0.006	0.006	0.010	0.011
9	0.009	0.006	0.006	0.008	0.009
10	0.008	0.006	0.005	0.007	0.008
11	0.007	0.006	0.007	0.006	0.005
12	0.006	0.006	0.008	0.006	0.005
13	0.006	0.007	0.008	0.006	0.006
14	0.007	0.007	0.007	0.006	0.008
15	0.011	0.008	0.007	0.007	0.007
16	0.010	0.008	0.008	0.009	0.008
17	0.008	0.008	0.009	0.009	0.007
18	0.008	0.007	0.007	0.009	0.008
19	0.008	0.007	0.007	0.007	0.007
20	0.009	0.008	0.008	0.006	0.005

CARSON 2 GRID F

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.006	0.005	0.004	0.004	0.006
-19	0.006	0.004	0.004	0.005	0.006
-18	0.005	0.004	0.004	0.005	0.005
-17	0.004	0.005	0.005	0.005	0.005
-16	0.003	0.006	0.007	0.005	0.007
-15	0.003	0.007	0.009	0.005	0.007
-14	0.006	0.009	0.011	0.006	0.006
-13	0.009	0.009	0.010	0.007	0.007
-12	0.010	0.010	0.010	0.009	0.008
-11	0.009	0.009	0.008	0.009	0.010
-10	0.008	0.007	0.006	0.008	0.012
-9	0.009	0.009	0.009	0.012	0.018
-8	0.013	0.013	0.013	0.015	0.018
-7	0.022	0.020	0.018	0.015	0.013
-6	0.029	0.024	0.019	0.016	0.014
-5	0.020	0.017	0.016	0.016	0.016
-4	0.010	0.014	0.014	0.013	0.014
-3	0.013	0.013	0.011	0.010	0.011
-2	0.017	0.014	0.011	0.010	0.011
-1	0.017	0.013	0.011	0.013	0.018
0	0.014	0.013	0.012	0.018	0.028
1	0.015	0.012	0.012	0.016	0.022
2	0.014	0.013	0.014	0.015	0.017
3	0.015	0.013	0.013	0.011	0.012
4	0.013	0.014	0.014	0.011	0.010
5	0.012	0.014	0.014	0.013	0.009
6	0.012	0.011	0.008	0.009	0.007
7	0.009	0.007	0.007	0.008	0.007
8	0.008	0.008	0.010	0.012	0.012
9	0.008	0.009	0.011	0.015	0.018
10	0.007	0.007	0.009	0.016	0.020
11	0.005	0.006	0.010	0.014	0.015
12	0.006	0.008	0.009	0.008	0.008
13	0.010	0.011	0.008	0.007	0.008
14	0.011	0.011	0.009	0.007	0.007
15	0.008	0.008	0.006	0.006	0.007
16	0.007	0.005	0.005	0.005	0.006
17	0.005	0.004	0.005	0.006	0.007
18	0.007	0.005	0.005	0.007	0.007
19	0.007	0.005	0.004	0.005	0.005
20	0.006	0.005	0.004	0.004	0.004

CARSON 2 GRID F

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.006
-19	0.006
-18	0.006
-17	0.007
-16	0.008
-15	0.008
-14	0.006
-13	0.006
-12	0.007
-11	0.009
-10	0.012
-9	0.019
-8	0.018
-7	0.014
-6	0.014
-5	0.016
-4	0.015
-3	0.013
-2	0.012
-1	0.019
0	0.032
1	0.024
2	0.015
3	0.010
4	0.010
5	0.010
6	0.007
7	0.006
8	0.010
9	0.016
10	0.018
11	0.013
12	0.008
13	0.007
14	0.007
15	0.008
16	0.008
17	0.007
18	0.007
19	0.006
20	0.005

SILL 1 GRID G

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.052	0.052	0.067	0.076	0.064
-19	0.040	0.045	0.064	0.073	0.070
-18	0.045	0.056	0.057	0.066	0.073
-17	0.059	0.063	0.057	0.066	0.060
-16	0.061	0.062	0.068	0.066	0.054
-15	0.058	0.051	0.064	0.072	0.067
-14	0.068	0.056	0.073	0.081	0.068
-13	0.074	0.074	0.093	0.082	0.065
-12	0.068	0.066	0.077	0.078	0.072
-11	0.059	0.045	0.048	0.061	0.070
-10	0.050	0.049	0.055	0.061	0.066
-9	0.057	0.057	0.053	0.061	0.066
-8	0.058	0.052	0.043	0.054	0.061
-7	0.059	0.056	0.051	0.060	0.073
-6	0.087	0.100	0.100	0.102	0.093
-5	0.103	0.126	0.115	0.095	0.078
-4	0.155	0.182	0.137	0.080	0.059
-3	0.409	0.565	0.410	0.182	0.087
-2	2.140	2.301	1.419	0.580	0.179
-1	47.237	13.681	3.900	1.341	0.330
0		56.097	3.779	1.120	0.321
1	47.237	8.872	1.408	0.529	0.202
2	2.140	1.368	0.658	0.310	0.146
3	0.409	0.293	0.246	0.172	0.140
4	0.155	0.116	0.094	0.094	0.128
5	0.103	0.070	0.056	0.066	0.110
6	0.087	0.067	0.054	0.069	0.104
7	0.059	0.067	0.080	0.081	0.078
8	0.058	0.067	0.075	0.076	0.066
9	0.057	0.054	0.063	0.073	0.070
10	0.050	0.054	0.069	0.070	0.062
11	0.059	0.068	0.065	0.057	0.052
12	0.068	0.073	0.058	0.049	0.055
13	0.074	0.077	0.059	0.047	0.052
14	0.068	0.078	0.074	0.059	0.052
15	0.058	0.071	0.069	0.060	0.059
16	0.061	0.061	0.055	0.054	0.058
17	0.059	0.048	0.053	0.061	0.066
18	0.045	0.044	0.055	0.060	0.070
19	0.040	0.051	0.055	0.052	0.056
20	0.052	0.069	0.059	0.048	0.051

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.050	0.041	0.048	0.054	0.057
-19	0.062	0.051	0.049	0.054	0.061
-18	0.075	0.067	0.055	0.056	0.062
-17	0.062	0.061	0.053	0.055	0.057
-16	0.049	0.049	0.050	0.054	0.047
-15	0.063	0.068	0.061	0.054	0.046
-14	0.066	0.075	0.071	0.061	0.053
-13	0.057	0.068	0.078	0.072	0.060
-12	0.059	0.066	0.069	0.061	0.060
-11	0.067	0.063	0.055	0.056	0.064
-10	0.062	0.062	0.064	0.070	0.076
-9	0.057	0.064	0.060	0.061	0.063
-8	0.070	0.075	0.056	0.052	0.053
-7	0.083	0.084	0.064	0.054	0.065
-6	0.077	0.079	0.062	0.055	0.065
-5	0.077	0.076	0.056	0.060	0.063
-4	0.074	0.087	0.075	0.068	0.065
-3	0.084	0.100	0.095	0.086	0.086
-2	0.105	0.102	0.084	0.076	0.083
-1	0.141	0.137	0.102	0.082	0.077
0	0.163	0.150	0.104	0.099	0.094
1	0.109	0.089	0.078	0.085	0.093
2	0.087	0.071	0.076	0.078	0.093
3	0.113	0.085	0.072	0.061	0.070
4	0.124	0.096	0.071	0.057	0.063
5	0.112	0.086	0.069	0.059	0.059
6	0.099	0.070	0.063	0.061	0.053
7	0.080	0.082	0.076	0.069	0.063
8	0.071	0.082	0.071	0.062	0.066
9	0.077	0.079	0.063	0.049	0.056
10	0.075	0.081	0.060	0.047	0.057
11	0.061	0.068	0.062	0.062	0.062
12	0.056	0.058	0.077	0.072	0.055
13	0.050	0.049	0.071	0.068	0.057
14	0.048	0.047	0.060	0.066	0.068
15	0.054	0.056	0.057	0.058	0.063
16	0.056	0.058	0.054	0.049	0.048
17	0.058	0.052	0.055	0.055	0.048
18	0.061	0.051	0.057	0.057	0.057
19	0.051	0.044	0.051	0.054	0.054
20	0.050	0.045	0.050	0.052	0.050

SILL 1 GRID G

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.058	0.060	0.059	0.064	0.060
-19	0.058	0.052	0.062	0.066	0.058
-18	0.056	0.046	0.057	0.056	0.045
-17	0.055	0.055	0.060	0.059	0.047
-16	0.048	0.062	0.068	0.069	0.071
-15	0.049	0.061	0.059	0.053	0.066
-14	0.055	0.069	0.057	0.046	0.050
-13	0.063	0.077	0.060	0.051	0.050
-12	0.054	0.053	0.043	0.042	0.057
-11	0.061	0.059	0.049	0.041	0.060
-10	0.066	0.067	0.061	0.050	0.057
-9	0.060	0.063	0.060	0.057	0.067
-8	0.057	0.060	0.053	0.048	0.059
-7	0.062	0.058	0.051	0.045	0.048
-6	0.061	0.052	0.046	0.053	0.052
-5	0.067	0.058	0.043	0.050	0.050
-4	0.070	0.067	0.062	0.058	0.057
-3	0.076	0.066	0.065	0.067	0.075
-2	0.073	0.062	0.066	0.071	0.081
-1	0.067	0.066	0.082	0.094	0.104
0	0.068	0.069	0.082	0.088	0.102
1	0.078	0.078	0.073	0.057	0.072
2	0.079	0.070	0.062	0.049	0.061
3	0.065	0.063	0.068	0.057	0.049
4	0.075	0.071	0.074	0.073	0.062
5	0.068	0.069	0.074	0.081	0.071
6	0.057	0.076	0.074	0.067	0.059
7	0.063	0.084	0.073	0.051	0.050
8	0.066	0.076	0.067	0.054	0.060
9	0.067	0.066	0.058	0.062	0.069
10	0.069	0.057	0.052	0.072	0.068
11	0.064	0.054	0.052	0.072	0.074
12	0.059	0.065	0.065	0.072	0.076
13	0.053	0.054	0.056	0.058	0.062
14	0.062	0.054	0.048	0.046	0.058
15	0.060	0.055	0.049	0.051	0.065
16	0.051	0.058	0.058	0.061	0.068
17	0.050	0.067	0.073	0.070	0.064
18	0.056	0.059	0.070	0.078	0.060
19	0.049	0.045	0.056	0.069	0.063
20	0.047	0.046	0.048	0.059	0.064

SILL 1 GRID G

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.058	0.063	0.084	0.077	0.047
-19	0.061	0.061	0.071	0.067	0.047
-18	0.051	0.051	0.051	0.054	0.050
-17	0.049	0.054	0.053	0.058	0.058
-16	0.071	0.061	0.055	0.058	0.065
-15	0.074	0.063	0.057	0.067	0.072
-14	0.052	0.051	0.062	0.076	0.063
-13	0.041	0.048	0.071	0.069	0.050
-12	0.056	0.054	0.064	0.056	0.046
-11	0.069	0.066	0.066	0.055	0.045
-10	0.070	0.068	0.066	0.059	0.056
-9	0.075	0.066	0.063	0.068	0.064
-8	0.062	0.064	0.070	0.073	0.059
-7	0.054	0.062	0.061	0.065	0.061
-6	0.058	0.061	0.056	0.055	0.061
-5	0.052	0.057	0.064	0.060	0.064
-4	0.058	0.066	0.074	0.068	0.061
-3	0.065	0.054	0.061	0.064	0.059
-2	0.068	0.053	0.061	0.065	0.062
-1	0.085	0.064	0.075	0.079	0.081
0	0.090	0.074	0.076	0.076	0.100
1	0.080	0.075	0.068	0.071	0.093
2	0.070	0.068	0.061	0.075	0.091
3	0.050	0.060	0.066	0.078	0.082
4	0.055	0.070	0.082	0.080	0.066
5	0.063	0.083	0.092	0.075	0.050
6	0.063	0.075	0.066	0.056	0.047
7	0.067	0.068	0.062	0.080	0.071
8	0.076	0.071	0.068	0.088	0.083
9	0.075	0.070	0.069	0.072	0.076
10	0.060	0.058	0.063	0.065	0.061
11	0.063	0.054	0.057	0.063	0.064
12	0.069	0.065	0.058	0.058	0.065
13	0.074	0.090	0.072	0.057	0.052
14	0.073	0.076	0.058	0.048	0.048
15	0.067	0.054	0.052	0.058	0.060
16	0.065	0.061	0.065	0.072	0.072
17	0.054	0.059	0.069	0.071	0.072
18	0.044	0.051	0.060	0.062	0.064
19	0.055	0.059	0.066	0.071	0.075
20	0.062	0.061	0.066	0.075	0.079

SILL 1 GRID G

CORRECTED SPECTRUM, (F-STAR)

	20
-20	0.044
-19	0.047
-18	0.052
-17	0.060
-16	0.070
-15	0.067
-14	0.049
-13	0.043
-12	0.047
-11	0.045
-10	0.056
-9	0.060
-8	0.050
-7	0.059
-6	0.069
-5	0.070
-4	0.060
-3	0.057
-2	0.060
-1	0.094
0	0.154
1	0.121
2	0.087
3	0.077
4	0.063
5	0.051
6	0.046
7	0.059
8	0.074
9	0.082
10	0.067
11	0.068
12	0.068
13	0.052
14	0.049
15	0.058
16	0.072
17	0.075
18	0.068
19	0.071
20	0.070

SILL 2 GRID H

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.012	0.011	0.011	0.011	0.010
-19	0.010	0.011	0.012	0.011	0.009
-18	0.008	0.009	0.012	0.011	0.009
-17	0.008	0.008	0.008	0.009	0.009
-16	0.008	0.008	0.009	0.010	0.009
-15	0.008	0.009	0.011	0.011	0.009
-14	0.008	0.009	0.011	0.010	0.007
-13	0.008	0.010	0.012	0.011	0.008
-12	0.009	0.009	0.009	0.010	0.008
-11	0.008	0.010	0.010	0.010	0.009
-10	0.010	0.012	0.013	0.011	0.010
-9	0.010	0.012	0.014	0.012	0.013
-8	0.011	0.014	0.017	0.017	0.018
-7	0.016	0.016	0.020	0.024	0.021
-6	0.025	0.027	0.024	0.024	0.026
-5	0.039	0.045	0.031	0.021	0.024
-4	0.069	0.056	0.034	0.028	0.024
-3	0.186	0.142	0.085	0.065	0.041
-2	0.996	0.642	0.357	0.199	0.091
-1	22.739	5.864	1.262	0.416	0.153
0		27.566	2.048	0.473	0.174
1	22.739	6.287	1.152	0.265	0.107
2	0.996	0.755	0.356	0.125	0.068
3	0.186	0.206	0.171	0.095	0.058
4	0.069	0.080	0.083	0.076	0.054
5	0.039	0.036	0.036	0.040	0.039
6	0.025	0.029	0.029	0.034	0.031
7	0.016	0.023	0.026	0.034	0.028
8	0.011	0.015	0.023	0.028	0.021
9	0.010	0.010	0.017	0.024	0.018
10	0.010	0.010	0.014	0.019	0.016
11	0.008	0.009	0.014	0.016	0.011
12	0.009	0.010	0.015	0.014	0.012
13	0.008	0.009	0.012	0.014	0.018
14	0.008	0.008	0.009	0.012	0.016
15	0.008	0.008	0.009	0.009	0.010
16	0.008	0.009	0.009	0.008	0.007
17	0.008	0.010	0.010	0.009	0.008
18	0.008	0.010	0.010	0.008	0.007
19	0.010	0.010	0.009	0.007	0.006
20	0.012	0.012	0.011	0.008	0.006

SILL 2 GRID H

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.008	0.007	0.007	0.008	0.008
-19	0.007	0.007	0.008	0.009	0.009
-18	0.008	0.008	0.010	0.012	0.010
-17	0.008	0.008	0.010	0.011	0.008
-16	0.008	0.008	0.008	0.007	0.005
-15	0.009	0.007	0.007	0.006	0.005
-14	0.008	0.008	0.010	0.009	0.007
-13	0.008	0.008	0.012	0.012	0.009
-12	0.008	0.008	0.010	0.011	0.010
-11	0.009	0.011	0.013	0.012	0.009
-10	0.011	0.012	0.013	0.013	0.011
-9	0.011	0.009	0.010	0.012	0.014
-8	0.013	0.009	0.010	0.011	0.015
-7	0.015	0.012	0.012	0.013	0.015
-6	0.021	0.018	0.015	0.018	0.016
-5	0.025	0.019	0.015	0.016	0.014
-4	0.024	0.020	0.014	0.012	0.013
-3	0.028	0.022	0.018	0.014	0.015
-2	0.051	0.038	0.027	0.018	0.018
-1	0.083	0.069	0.047	0.029	0.027
0	0.095	0.083	0.064	0.048	0.039
1	0.066	0.058	0.048	0.035	0.026
2	0.047	0.037	0.032	0.021	0.016
3	0.037	0.029	0.033	0.025	0.015
4	0.029	0.022	0.024	0.020	0.013
5	0.027	0.022	0.022	0.019	0.014
6	0.022	0.017	0.017	0.017	0.015
7	0.016	0.013	0.011	0.012	0.014
8	0.012	0.011	0.009	0.008	0.010
9	0.012	0.011	0.010	0.009	0.009
10	0.012	0.011	0.011	0.010	0.010
11	0.010	0.011	0.011	0.011	0.010
12	0.013	0.011	0.010	0.009	0.008
13	0.017	0.014	0.012	0.009	0.008
14	0.015	0.012	0.012	0.009	0.008
15	0.010	0.009	0.010	0.009	0.008
16	0.006	0.006	0.007	0.006	0.006
17	0.007	0.006	0.006	0.006	0.007
18	0.007	0.007	0.007	0.007	0.007
19	0.007	0.008	0.008	0.006	0.005
20	0.007	0.008	0.008	0.006	0.004

SILL 2 GRID H -111

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.005	0.005	0.007	0.008	0.007
-19	0.007	0.007	0.007	0.008	0.008
-18	0.008	0.008	0.008	0.009	0.010
-17	0.006	0.006	0.007	0.008	0.010
-16	0.005	0.005	0.006	0.007	0.007
-15	0.006	0.008	0.009	0.009	0.008
-14	0.009	0.011	0.011	0.010	0.009
-13	0.012	0.012	0.011	0.009	0.008
-12	0.011	0.010	0.009	0.008	0.008
-11	0.009	0.012	0.011	0.009	0.008
-10	0.012	0.017	0.015	0.010	0.007
-9	0.014	0.014	0.014	0.010	0.007
-8	0.014	0.012	0.011	0.010	0.008
-7	0.014	0.013	0.009	0.008	0.009
-6	0.013	0.012	0.010	0.010	0.013
-5	0.011	0.012	0.014	0.013	0.014
-4	0.011	0.009	0.011	0.010	0.011
-3	0.012	0.009	0.008	0.009	0.013
-2	0.016	0.012	0.010	0.009	0.012
-1	0.022	0.019	0.018	0.017	0.020
0	0.029	0.029	0.034	0.033	0.029
1	0.022	0.022	0.027	0.027	0.020
2	0.014	0.012	0.012	0.012	0.011
3	0.015	0.013	0.010	0.010	0.010
4	0.018	0.018	0.012	0.009	0.011
5	0.014	0.014	0.011	0.009	0.010
6	0.012	0.010	0.010	0.010	0.010
7	0.013	0.009	0.008	0.011	0.011
8	0.013	0.010	0.007	0.009	0.010
9	0.012	0.011	0.008	0.007	0.008
10	0.011	0.010	0.008	0.008	0.008
11	0.009	0.007	0.006	0.008	0.008
12	0.007	0.005	0.005	0.008	0.009
13	0.008	0.007	0.007	0.009	0.009
14	0.008	0.008	0.008	0.008	0.007
15	0.007	0.007	0.008	0.009	0.005
16	0.006	0.006	0.007	0.008	0.006
17	0.008	0.007	0.007	0.008	0.007
18	0.010	0.009	0.007	0.007	0.008
19	0.007	0.007	0.007	0.008	0.008
20	0.005	0.006	0.007	0.008	0.008

SILL 2 GRID H

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.007	0.009	0.008	0.009	0.010
-19	0.007	0.008	0.009	0.009	0.008
-18	0.010	0.008	0.010	0.010	0.008
-17	0.012	0.010	0.010	0.010	0.009
-16	0.007	0.008	0.009	0.008	0.007
-15	0.007	0.007	0.008	0.007	0.007
-14	0.007	0.006	0.007	0.007	0.007
-13	0.006	0.006	0.007	0.007	0.007
-12	0.007	0.006	0.007	0.006	0.007
-11	0.007	0.007	0.007	0.007	0.008
-10	0.007	0.007	0.008	0.008	0.011
-9	0.007	0.008	0.008	0.008	0.010
-8	0.007	0.007	0.007	0.007	0.009
-7	0.008	0.007	0.007	0.007	0.008
-6	0.011	0.008	0.008	0.007	0.007
-5	0.012	0.009	0.009	0.007	0.006
-4	0.011	0.011	0.012	0.010	0.011
-3	0.011	0.013	0.016	0.013	0.013
-2	0.011	0.011	0.012	0.011	0.012
-1	0.021	0.019	0.015	0.012	0.020
0	0.028	0.025	0.019	0.016	0.032
1	0.017	0.014	0.012	0.014	0.023
2	0.010	0.010	0.010	0.014	0.013
3	0.010	0.010	0.013	0.015	0.011
4	0.012	0.011	0.014	0.015	0.010
5	0.011	0.011	0.013	0.014	0.011
6	0.010	0.011	0.011	0.011	0.010
7	0.010	0.010	0.010	0.009	0.006
8	0.011	0.010	0.009	0.009	0.008
9	0.010	0.010	0.008	0.009	0.011
10	0.009	0.009	0.008	0.008	0.011
11	0.007	0.008	0.009	0.008	0.009
12	0.008	0.009	0.010	0.008	0.006
13	0.009	0.009	0.010	0.007	0.006
14	0.007	0.010	0.011	0.008	0.007
15	0.005	0.007	0.008	0.007	0.009
16	0.005	0.005	0.006	0.006	0.009
17	0.007	0.006	0.006	0.007	0.008
18	0.008	0.007	0.007	0.007	0.008
19	0.008	0.007	0.007	0.007	0.007
20	0.007	0.007	0.007	0.008	0.007

SILL 2 GRID H

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.011
-19	0.008
-18	0.007
-17	0.008
-16	0.006
-15	0.006
-14	0.007
-13	0.007
-12	0.009
-11	0.011
-10	0.013
-9	0.011
-8	0.008
-7	0.007
-6	0.007
-5	0.007
-4	0.013
-3	0.016
-2	0.013
-1	0.031
0	0.054
1	0.032
2	0.012
3	0.010
4	0.009
5	0.009
6	0.008
7	0.006
8	0.008
9	0.012
10	0.013
11	0.009
12	0.005
13	0.005
14	0.007
15	0.010
16	0.011
17	0.009
18	0.008
19	0.007
20	0.008

HOOD 1 GRID N

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.019	0.019	0.015	0.013	0.017
-19	0.017	0.016	0.014	0.012	0.015
-18	0.018	0.015	0.018	0.019	0.018
-17	0.020	0.013	0.013	0.014	0.014
-16	0.017	0.012	0.011	0.015	0.019
-15	0.014	0.013	0.013	0.010	0.011
-14	0.016	0.015	0.015	0.012	0.013
-13	0.017	0.018	0.016	0.014	0.017
-12	0.018	0.018	0.019	0.021	0.023
-11	0.022	0.019	0.024	0.027	0.022
-10	0.032	0.028	0.039	0.041	0.027
-9	0.035	0.037	0.065	0.064	0.041
-8	0.032	0.052	0.111	0.112	0.074
-7	0.035	0.069	0.130	0.127	0.083
-6	0.043	0.079	0.111	0.099	0.073
-5	0.063	0.083	0.079	0.049	0.034
-4	0.127	0.097	0.097	0.091	0.064
-3	0.249	0.176	0.157	0.102	0.084
-2	0.579	0.482	0.185	0.084	0.092
-1	-4.703	3.545	5.488	3.768	1.331
0	...	26.883	26.337	15.604	5.391
1	-4.703	4.268	10.098	8.039	3.276
2	0.579	0.427	0.286	0.249	0.173
3	0.249	0.216	0.122	0.055	0.040
4	0.127	0.111	0.074	0.058	0.044
5	0.063	0.057	0.064	0.080	0.069
6	0.043	0.041	0.047	0.059	0.053
7	0.035	0.037	0.043	0.064	0.064
8	0.032	0.034	0.032	0.038	0.045
9	0.035	0.036	0.031	0.034	0.044
10	0.032	0.032	0.028	0.026	0.031
11	0.022	0.023	0.026	0.027	0.026
12	0.018	0.018	0.018	0.017	0.016
13	0.017	0.015	0.014	0.012	0.012
14	0.016	0.016	0.012	0.008	0.010
15	0.014	0.015	0.014	0.011	0.016
16	0.017	0.017	0.012	0.009	0.013
17	0.020	0.023	0.016	0.014	0.015
18	0.018	0.022	0.015	0.011	0.013
19	0.017	0.017	0.013	0.012	0.017
20	0.019	0.017	0.010	0.006	0.011

HOOD 1 GRID N

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.020	0.017	0.013	0.014	0.014
-19	0.017	0.015	0.013	0.013	0.014
-18	0.016	0.017	0.016	0.012	0.015
-17	0.014	0.021	0.019	0.014	0.017
-16	0.017	0.023	0.023	0.015	0.013
-15	0.015	0.022	0.022	0.013	0.009
-14	0.015	0.018	0.021	0.015	0.011
-13	0.018	0.019	0.022	0.018	0.015
-12	0.021	0.020	0.022	0.021	0.019
-11	0.017	0.017	0.018	0.023	0.024
-10	0.021	0.016	0.016	0.018	0.021
-9	0.033	0.020	0.016	0.014	0.016
-8	0.043	0.027	0.024	0.020	0.018
-7	0.047	0.039	0.032	0.027	0.024
-6	0.052	0.046	0.040	0.044	0.044
-5	0.039	0.050	0.068	0.082	0.074
-4	0.079	0.131	0.165	0.136	0.077
-3	0.159	0.216	0.183	0.105	0.048
-2	0.134	0.139	0.096	0.056	0.039
-1	0.274	0.077	0.066	0.056	0.045
0	1.019	0.128	0.062	0.065	0.060
1	0.748	0.148	0.108	0.114	0.086
2	0.114	0.076	0.095	0.115	0.082
3	0.044	0.041	0.044	0.055	0.044
4	0.039	0.044	0.046	0.039	0.028
5	0.055	0.060	0.055	0.034	0.023
6	0.055	0.073	0.069	0.042	0.025
7	0.052	0.057	0.061	0.043	0.027
8	0.035	0.032	0.033	0.024	0.020
9	0.035	0.026	0.023	0.018	0.017
10	0.027	0.021	0.021	0.022	0.017
11	0.023	0.016	0.016	0.021	0.022
12	0.017	0.016	0.017	0.021	0.024
13	0.017	0.024	0.027	0.025	0.020
14	0.019	0.025	0.028	0.026	0.018
15	0.021	0.024	0.027	0.022	0.020
16	0.017	0.022	0.024	0.019	0.023
17	0.014	0.018	0.017	0.013	0.015
18	0.014	0.017	0.014	0.011	0.009
19	0.018	0.018	0.015	0.015	0.014
20	0.016	0.018	0.018	0.021	0.020

HOOD 1 GRID N -116-

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.014	0.015	0.019	0.020	0.019
-19	0.015	0.013	0.014	0.020	0.020
-18	0.017	0.011	0.010	0.015	0.016
-17	0.019	0.014	0.012	0.013	0.012
-16	0.015	0.014	0.012	0.011	0.011
-15	0.010	0.014	0.016	0.013	0.011
-14	0.014	0.018	0.019	0.013	0.011
-13	0.020	0.023	0.016	0.011	0.010
-12	0.021	0.022	0.015	0.011	0.009
-11	0.019	0.018	0.015	0.014	0.011
-10	0.019	0.017	0.015	0.013	0.014
-9	0.018	0.019	0.017	0.016	0.022
-8	0.019	0.020	0.022	0.031	0.045
-7	0.025	0.024	0.027	0.051	0.072
-6	0.043	0.034	0.029	0.041	0.053
-5	0.058	0.036	0.023	0.024	0.030
-4	0.045	0.029	0.021	0.021	0.023
-3	0.034	0.031	0.028	0.022	0.019
-2	0.032	0.030	0.026	0.019	0.019
-1	0.036	0.033	0.030	0.024	0.028
0	0.058	0.041	0.033	0.035	0.039
1	0.067	0.036	0.023	0.030	0.030
2	0.054	0.028	0.017	0.022	0.023
3	0.030	0.023	0.017	0.018	0.021
4	0.020	0.017	0.013	0.013	0.017
5	0.019	0.014	0.011	0.012	0.015
6	0.018	0.012	0.012	0.016	0.019
7	0.016	0.014	0.015	0.018	0.024
8	0.017	0.018	0.019	0.020	0.028
9	0.023	0.027	0.026	0.025	0.026
10	0.022	0.032	0.034	0.029	0.026
11	0.020	0.026	0.032	0.028	0.026
12	0.024	0.022	0.025	0.027	0.028
13	0.026	0.029	0.024	0.026	0.029
14	0.021	0.028	0.022	0.022	0.022
15	0.019	0.017	0.014	0.014	0.012
16	0.025	0.017	0.012	0.013	0.013
17	0.020	0.019	0.015	0.014	0.014
18	0.011	0.014	0.016	0.015	0.014
19	0.012	0.013	0.015	0.014	0.012
20	0.014	0.014	0.017	0.016	0.012

HOOD 1 GRID N

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.015	0.010	0.008	0.010	0.014
-19	0.014	0.009	0.008	0.009	0.012
-18	0.011	0.009	0.009	0.010	0.011
-17	0.011	0.011	0.010	0.012	0.013
-16	0.010	0.010	0.010	0.014	0.014
-15	0.008	0.009	0.013	0.015	0.012
-14	0.010	0.011	0.015	0.016	0.015
-13	0.011	0.013	0.015	0.018	0.018
-12	0.010	0.011	0.014	0.016	0.014
-11	0.010	0.011	0.014	0.014	0.014
-10	0.018	0.025	0.025	0.022	0.019
-9	0.054	0.090	0.090	0.054	0.023
-8	0.088	0.120	0.097	0.046	0.020
-7	0.073	0.057	0.034	0.017	0.016
-6	0.037	0.022	0.019	0.014	0.013
-5	0.026	0.025	0.025	0.020	0.015
-4	0.025	0.025	0.024	0.021	0.016
-3	0.021	0.021	0.019	0.017	0.016
-2	0.024	0.023	0.019	0.016	0.015
-1	0.031	0.028	0.029	0.029	0.028
0	0.034	0.034	0.040	0.044	0.042
1	0.025	0.031	0.030	0.031	0.027
2	0.024	0.032	0.030	0.023	0.018
3	0.028	0.034	0.030	0.025	0.027
4	0.021	0.025	0.025	0.024	0.030
5	0.016	0.018	0.021	0.018	0.016
6	0.020	0.020	0.023	0.019	0.013
7	0.025	0.019	0.016	0.015	0.014
8	0.029	0.021	0.013	0.013	0.017
9	0.027	0.022	0.014	0.015	0.018
10	0.026	0.022	0.017	0.016	0.019
11	0.025	0.026	0.022	0.019	0.023
12	0.025	0.028	0.024	0.020	0.022
13	0.026	0.024	0.019	0.014	0.015
14	0.020	0.017	0.013	0.011	0.012
15	0.011	0.010	0.011	0.012	0.012
16	0.012	0.013	0.016	0.018	0.018
17	0.014	0.014	0.018	0.020	0.021
18	0.013	0.014	0.018	0.020	0.019
19	0.013	0.017	0.020	0.020	0.016
20	0.013	0.019	0.023	0.020	0.016

HOOD 1 GRID N -11@

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.013
-19	0.013
-18	0.012
-17	0.012
-16	0.011
-15	0.011
-14	0.013
-13	0.015
-12	0.013
-11	0.015
-10	0.018
-9	0.014
-8	0.018
-7	0.020
-6	0.014
-5	0.013
-4	0.013
-3	0.015
-2	0.015
-1	0.024
0	0.036
1	0.025
2	0.018
3	0.024
4	0.026
5	0.015
6	0.014
7	0.017
8	0.020
9	0.018
10	0.020
11	0.024
12	0.021
13	0.017
14	0.013
15	0.013
16	0.018
17	0.021
18	0.019
19	0.015
20	0.014

HOOD 2 GRID 0

CORRECTED SPECTRUM, (F-STAR)

•	0	1	2	3	4
-20	0.004	0.003	0.003	0.002	0.002
-19	0.004	0.003	0.003	0.002	0.002
-18	0.004	0.003	0.003	0.003	0.002
-17	0.004	0.003	0.003	0.003	0.004
-16	0.003	0.003	0.003	0.004	0.004
-15	0.004	0.003	0.003	0.003	0.004
-14	0.004	0.003	0.002	0.003	0.003
-13	0.003	0.002	0.002	0.003	0.003
-12	0.002	0.002	0.003	0.003	0.003
-11	0.003	0.003	0.003	0.004	0.004
-10	0.003	0.003	0.003	0.004	0.005
-9	0.003	0.003	0.004	0.006	0.007
-8	0.003	0.004	0.005	0.007	0.010
-7	0.004	0.005	0.005	0.008	0.011
-6	0.005	0.006	0.006	0.008	0.013
-5	0.006	0.007	0.006	0.009	0.015
-4	0.008	0.008	0.005	0.008	0.014
-3	0.014	0.014	0.013	0.012	0.012
-2	0.088	0.097	0.045	0.020	0.011
-1	2.279	0.906	0.131	0.030	0.015
0		2.905	0.158	0.032	0.018
1	2.279	0.384	0.073	0.025	0.013
2	0.088	0.047	0.024	0.016	0.009
3	0.014	0.014	0.010	0.010	0.007
4	0.008	0.008	0.007	0.007	0.005
5	0.006	0.006	0.006	0.005	0.004
6	0.005	0.005	0.005	0.004	0.004
7	0.004	0.003	0.003	0.003	0.004
8	0.003	0.003	0.003	0.003	0.004
9	0.003	0.003	0.004	0.003	0.003
10	0.003	0.003	0.004	0.003	0.002
11	0.003	0.003	0.003	0.002	0.002
12	0.002	0.003	0.003	0.002	0.002
13	0.003	0.003	0.003	0.002	0.002
14	0.004	0.004	0.003	0.002	0.002
15	0.004	0.004	0.003	0.002	0.002
16	0.003	0.004	0.003	0.002	0.002
17	0.004	0.004	0.003	0.003	0.003
18	0.004	0.004	0.003	0.002	0.003
19	0.004	0.005	0.004	0.002	0.003
20	0.004	0.005	0.004	0.003	0.002

HOOD 2 GRID 0 -120-

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.002	0.003	0.003	0.003	0.003
-19	0.003	0.003	0.003	0.002	0.003
-18	0.004	0.004	0.003	0.002	0.003
-17	0.004	0.004	0.003	0.003	0.004
-16	0.004	0.003	0.004	0.004	0.004
-15	0.004	0.004	0.004	0.004	0.004
-14	0.005	0.004	0.004	0.004	0.005
-13	0.004	0.004	0.005	0.005	0.006
-12	0.003	0.003	0.004	0.005	0.006
-11	0.003	0.002	0.003	0.004	0.005
-10	0.004	0.003	0.003	0.004	0.005
-9	0.006	0.006	0.005	0.005	0.006
-8	0.009	0.008	0.007	0.006	0.005
-7	0.011	0.012	0.012	0.008	0.007
-6	0.017	0.018	0.014	0.009	0.007
-5	0.024	0.020	0.010	0.007	0.006
-4	0.018	0.011	0.005	0.005	0.005
-3	0.009	0.005	0.006	0.007	0.006
-2	0.008	0.007	0.008	0.009	0.008
-1	0.010	0.008	0.009	0.009	0.008
0	0.012	0.008	0.008	0.009	0.007
1	0.008	0.005	0.005	0.006	0.005
2	0.005	0.004	0.004	0.004	0.004
3	0.005	0.004	0.004	0.004	0.004
4	0.003	0.003	0.003	0.003	0.005
5	0.003	0.002	0.003	0.004	0.004
6	0.003	0.003	0.003	0.004	0.004
7	0.004	0.003	0.003	0.004	0.004
8	0.004	0.003	0.003	0.003	0.003
9	0.003	0.003	0.002	0.003	0.003
10	0.003	0.003	0.003	0.003	0.003
11	0.003	0.003	0.003	0.004	0.004
12	0.002	0.002	0.003	0.003	0.003
13	0.002	0.002	0.002	0.002	0.003
14	0.002	0.002	0.002	0.003	0.003
15	0.002	0.002	0.002	0.003	0.002
16	0.003	0.002	0.002	0.003	0.003
17	0.003	0.003	0.002	0.003	0.003
18	0.003	0.003	0.002	0.002	0.003
19	0.003	0.002	0.002	0.002	0.003
20	0.002	0.002	0.002	0.002	0.003

HOOD 2 GRID 0 -121-

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.002	0.002	0.003	0.003	0.004
-19	0.003	0.003	0.003	0.003	0.004
-18	0.004	0.004	0.003	0.003	0.003
-17	0.004	0.004	0.003	0.002	0.002
-16	0.004	0.004	0.004	0.003	0.003
-15	0.005	0.005	0.005	0.003	0.003
-14	0.005	0.006	0.006	0.005	0.003
-13	0.007	0.008	0.008	0.006	0.004
-12	0.008	0.008	0.009	0.008	0.005
-11	0.006	0.006	0.008	0.009	0.007
-10	0.005	0.005	0.006	0.007	0.008
-9	0.005	0.004	0.004	0.006	0.007
-8	0.004	0.003	0.004	0.004	0.005
-7	0.005	0.003	0.003	0.003	0.004
-6	0.005	0.004	0.004	0.003	0.003
-5	0.003	0.004	0.005	0.004	0.003
-4	0.004	0.004	0.005	0.005	0.004
-3	0.006	0.005	0.004	0.004	0.004
-2	0.007	0.005	0.005	0.004	0.003
-1	0.006	0.005	0.006	0.004	0.003
0	0.004	0.004	0.005	0.005	0.004
1	0.005	0.004	0.003	0.003	0.004
2	0.005	0.005	0.003	0.003	0.004
3	0.005	0.005	0.003	0.003	0.003
4	0.005	0.004	0.003	0.002	0.003
5	0.004	0.003	0.002	0.002	0.003
6	0.004	0.004	0.003	0.002	0.003
7	0.006	0.005	0.003	0.002	0.002
8	0.004	0.004	0.003	0.002	0.003
9	0.003	0.003	0.003	0.002	0.002
10	0.003	0.003	0.003	0.002	0.002
11	0.003	0.003	0.003	0.002	0.002
12	0.003	0.003	0.003	0.002	0.002
13	0.002	0.002	0.002	0.002	0.002
14	0.003	0.003	0.003	0.002	0.002
15	0.003	0.003	0.004	0.003	0.003
16	0.003	0.004	0.004	0.003	0.003
17	0.003	0.003	0.003	0.003	0.002
18	0.003	0.003	0.003	0.003	0.003
19	0.004	0.004	0.004	0.003	0.002
20	0.004	0.004	0.004	0.003	0.002

HOOD 2 GRID 0

CORRECTED SPECTRUM, (E-STAR)

	15	16	17	18	19
-20	0.004	0.004	0.004	0.005	0.004
-19	0.004	0.004	0.004	0.004	0.004
-18	0.003	0.003	0.003	0.003	0.004
-17	0.002	0.003	0.003	0.003	0.003
-16	0.003	0.003	0.003	0.003	0.004
-15	0.003	0.003	0.003	0.004	0.004
-14	0.003	0.003	0.003	0.003	0.004
-13	0.004	0.003	0.003	0.003	0.003
-12	0.004	0.003	0.002	0.002	0.002
-11	0.004	0.002	0.002	0.003	0.002
-10	0.005	0.004	0.004	0.003	0.003
-9	0.005	0.005	0.005	0.003	0.002
-8	0.004	0.004	0.004	0.003	0.003
-7	0.003	0.003	0.003	0.003	0.003
-6	0.003	0.004	0.004	0.003	0.002
-5	0.003	0.005	0.005	0.003	0.002
-4	0.004	0.003	0.003	0.003	0.004
-3	0.004	0.003	0.003	0.004	0.005
-2	0.004	0.004	0.003	0.005	0.005
-1	0.004	0.004	0.004	0.004	0.007
0	0.003	0.004	0.004	0.005	0.012
1	0.003	0.003	0.004	0.004	0.008
2	0.003	0.003	0.003	0.003	0.004
3	0.003	0.003	0.002	0.003	0.004
4	0.003	0.002	0.002	0.002	0.003
5	0.003	0.002	0.002	0.003	0.003
6	0.004	0.002	0.002	0.004	0.004
7	0.003	0.002	0.003	0.003	0.003
8	0.003	0.003	0.003	0.003	0.002
9	0.002	0.003	0.004	0.003	0.002
10	0.003	0.004	0.004	0.003	0.002
11	0.003	0.004	0.004	0.003	0.002
12	0.002	0.003	0.003	0.003	0.003
13	0.002	0.002	0.002	0.002	0.003
14	0.002	0.002	0.002	0.003	0.003
15	0.003	0.003	0.003	0.003	0.003
16	0.003	0.003	0.003	0.002	0.002
17	0.003	0.003	0.002	0.002	0.002
18	0.003	0.002	0.003	0.003	0.002
19	0.002	0.003	0.003	0.003	0.003
20	0.002	0.003	0.003	0.003	0.003

HOOD 2 GRID 0

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.003
-19	0.003
-18	0.004
-17	0.004
-16	0.004
-15	0.005
-14	0.005
-13	0.003
-12	0.002
-11	0.002
-10	0.002
-9	0.002
-8	0.002
-7	0.002
-6	0.002
-5	0.003
-4	0.005
-3	0.006
-2	0.004
-1	0.011
0	0.020
1	0.012
2	0.005
3	0.004
4	0.003
5	0.003
6	0.003
7	0.002
8	0.002
9	0.002
10	0.002
11	0.003
12	0.003
13	0.003
14	0.004
15	0.004
16	0.003
17	0.002
18	0.002
19	0.003
20	0.003

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.006	0.005	0.004	0.004	0.005
-19	0.006	0.005	0.005	0.005	0.005
-18	0.008	0.007	0.005	0.005	0.005
-17	0.009	0.010	0.009	0.008	0.007
-16	0.008	0.009	0.010	0.010	0.010
-15	0.007	0.009	0.010	0.010	0.012
-14	0.008	0.008	0.009	0.012	0.014
-13	0.013	0.012	0.010	0.013	0.013
-12	0.020	0.015	0.010	0.011	0.010
-11	0.025	0.018	0.013	0.014	0.013
-10	0.034	0.026	0.025	0.024	0.020
-9	0.044	0.043	0.042	0.032	0.025
-8	0.058	0.059	0.057	0.049	0.035
-7	0.095	0.091	0.094	0.086	0.060
-6	0.109	0.107	0.097	0.080	0.067
-5	0.099	0.094	0.081	0.070	0.068
-4	0.123	0.123	0.127	0.114	0.089
-3	0.223	0.195	0.220	0.199	0.124
-2	0.818	0.415	0.333	0.272	0.186
-1	12.616	2.548	0.689	0.425	0.270
0		11.042	0.811	0.381	0.263
1	12.616	3.320	0.543	0.254	0.181
2	0.818	0.824	0.394	0.194	0.129
3	0.223	0.300	0.236	0.141	0.093
4	0.123	0.147	0.138	0.097	0.071
5	0.099	0.120	0.130	0.106	0.068
6	0.109	0.120	0.116	0.093	0.064
7	0.095	0.097	0.084	0.075	0.061
8	0.058	0.056	0.056	0.061	0.050
9	0.044	0.047	0.042	0.045	0.036
10	0.034	0.039	0.033	0.030	0.024
11	0.025	0.026	0.023	0.018	0.016
12	0.020	0.018	0.017	0.014	0.013
13	0.013	0.012	0.011	0.011	0.012
14	0.008	0.008	0.008	0.010	0.010
15	0.007	0.005	0.007	0.009	0.009
16	0.008	0.006	0.008	0.008	0.007
17	0.009	0.007	0.008	0.008	0.007
18	0.008	0.009	0.009	0.009	0.008
19	0.006	0.008	0.008	0.007	0.008
20	0.006	0.007	0.007	0.008	0.008

POLK 1 GRID P -125-

CORRECTED SPECTRUM. (F-STAR)

	5	6	7	8	9
-20	0.005	0.005	0.006	0.005	0.005
-19	0.005	0.006	0.006	0.005	0.005
-18	0.007	0.008	0.006	0.004	0.005
-17	0.007	0.009	0.008	0.005	0.006
-16	0.011	0.010	0.008	0.006	0.007
-15	0.012	0.009	0.006	0.005	0.006
-14	0.012	0.008	0.007	0.005	0.004
-13	0.011	0.008	0.007	0.006	0.005
-12	0.010	0.009	0.008	0.006	0.007
-11	0.011	0.012	0.012	0.009	0.009
-10	0.016	0.015	0.014	0.011	0.010
-9	0.018	0.018	0.016	0.013	0.010
-8	0.026	0.027	0.022	0.015	0.013
-7	0.043	0.036	0.023	0.017	0.015
-6	0.052	0.041	0.026	0.023	0.019
-5	0.062	0.055	0.041	0.036	0.029
-4	0.075	0.070	0.054	0.040	0.033
-3	0.073	0.068	0.052	0.032	0.028
-2	0.104	0.066	0.041	0.028	0.028
-1	0.151	0.078	0.045	0.037	0.035
0	0.164	0.088	0.051	0.045	0.044
1	0.129	0.084	0.057	0.052	0.042
2	0.086	0.060	0.052	0.051	0.038
3	0.063	0.044	0.045	0.048	0.037
4	0.060	0.050	0.048	0.041	0.026
5	0.050	0.048	0.041	0.023	0.012
6	0.043	0.033	0.027	0.017	0.010
7	0.037	0.023	0.020	0.017	0.015
8	0.031	0.021	0.016	0.013	0.014
9	0.026	0.018	0.015	0.010	0.010
10	0.022	0.017	0.014	0.009	0.007
11	0.020	0.018	0.012	0.009	0.007
12	0.015	0.015	0.009	0.007	0.007
13	0.010	0.009	0.006	0.006	0.007
14	0.007	0.007	0.007	0.007	0.008
15	0.007	0.008	0.009	0.006	0.005
16	0.007	0.009	0.009	0.006	0.005
17	0.008	0.008	0.007	0.006	0.006
18	0.008	0.008	0.006	0.005	0.005
19	0.008	0.007	0.005	0.004	0.004
20	0.007	0.006	0.005	0.004	0.005

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.004	0.004	0.005	0.006	0.006
-19	0.005	0.005	0.006	0.006	0.006
-18	0.006	0.005	0.006	0.007	0.006
-17	0.006	0.005	0.005	0.007	0.008
-16	0.006	0.005	0.005	0.007	0.006
-15	0.006	0.004	0.005	0.006	0.005
-14	0.005	0.005	0.005	0.006	0.006
-13	0.006	0.007	0.006	0.006	0.007
-12	0.007	0.007	0.007	0.008	0.009
-11	0.010	0.009	0.008	0.008	0.009
-10	0.011	0.011	0.009	0.008	0.008
-9	0.010	0.009	0.008	0.008	0.009
-8	0.013	0.010	0.008	0.008	0.009
-7	0.013	0.011	0.009	0.008	0.010
-6	0.012	0.011	0.011	0.009	0.011
-5	0.018	0.016	0.016	0.011	0.009
-4	0.026	0.021	0.020	0.014	0.009
-3	0.025	0.019	0.015	0.012	0.008
-2	0.028	0.020	0.013	0.013	0.012
-1	0.037	0.028	0.020	0.020	0.017
0	0.040	0.035	0.029	0.026	0.019
1	0.032	0.028	0.028	0.025	0.017
2	0.025	0.018	0.016	0.016	0.015
3	0.027	0.019	0.011	0.011	0.013
4	0.018	0.015	0.010	0.010	0.010
5	0.011	0.010	0.009	0.009	0.008
6	0.012	0.014	0.011	0.008	0.008
7	0.016	0.015	0.011	0.008	0.008
8	0.014	0.011	0.008	0.008	0.009
9	0.011	0.010	0.007	0.008	0.009
10	0.008	0.010	0.007	0.006	0.006
11	0.008	0.011	0.008	0.006	0.006
12	0.006	0.007	0.009	0.009	0.008
13	0.006	0.005	0.007	0.008	0.007
14	0.007	0.006	0.007	0.007	0.006
15	0.006	0.007	0.006	0.005	0.004
16	0.005	0.005	0.005	0.004	0.004
17	0.005	0.005	0.005	0.005	0.006
18	0.004	0.004	0.005	0.005	0.005
19	0.004	0.005	0.006	0.005	0.005
20	0.005	0.005	0.006	0.005	0.005

POLK 1 GRID P

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.005	0.004	0.005	0.007	0.007
-19	0.005	0.004	0.005	0.006	0.006
-18	0.005	0.004	0.004	0.005	0.006
-17	0.006	0.005	0.004	0.005	0.007
-16	0.006	0.006	0.007	0.007	0.007
-15	0.005	0.006	0.008	0.009	0.008
-14	0.005	0.006	0.008	0.009	0.008
-13	0.006	0.006	0.007	0.009	0.008
-12	0.008	0.005	0.006	0.007	0.007
-11	0.007	0.006	0.007	0.007	0.006
-10	0.006	0.006	0.007	0.007	0.006
-9	0.008	0.007	0.006	0.006	0.006
-8	0.008	0.007	0.006	0.006	0.007
-7	0.009	0.008	0.008	0.009	0.009
-6	0.011	0.009	0.010	0.012	0.012
-5	0.010	0.009	0.008	0.010	0.011
-4	0.009	0.008	0.007	0.008	0.009
-3	0.008	0.008	0.007	0.009	0.011
-2	0.011	0.011	0.009	0.010	0.013
-1	0.015	0.018	0.016	0.016	0.027
0	0.015	0.022	0.022	0.021	0.040
1	0.014	0.018	0.019	0.018	0.028
2	0.013	0.013	0.014	0.014	0.014
3	0.012	0.009	0.010	0.010	0.011
4	0.011	0.009	0.008	0.007	0.007
5	0.010	0.010	0.008	0.007	0.006
6	0.010	0.011	0.009	0.009	0.009
7	0.010	0.010	0.009	0.010	0.010
8	0.009	0.008	0.008	0.011	0.009
9	0.010	0.009	0.007	0.008	0.008
10	0.010	0.010	0.006	0.005	0.007
11	0.008	0.009	0.007	0.005	0.006
12	0.006	0.006	0.007	0.007	0.006
13	0.006	0.007	0.007	0.006	0.005
14	0.006	0.007	0.007	0.006	0.006
15	0.005	0.005	0.006	0.006	0.006
16	0.004	0.005	0.006	0.007	0.007
17	0.005	0.005	0.007	0.007	0.006
18	0.006	0.006	0.006	0.005	0.006
19	0.006	0.006	0.006	0.005	0.006
20	0.006	0.006	0.006	0.005	0.006

POLK 1 GRID P

CORRECTED SPECTRUM, (F-STAR)

	20
-20	0.006
-19	0.006
-18	0.007
-17	0.007
-16	0.007
-15	0.006
-14	0.006
-13	0.007
-12	0.007
-11	0.006
-10	0.005
-9	0.006
-8	0.007
-7	0.010
-6	0.013
-5	0.010
-4	0.009
-3	0.012
-2	0.016
-1	0.047
0	0.081
1	0.047
2	0.017
3	0.012
4	0.008
5	0.006
6	0.007
7	0.008
8	0.006
9	0.006
10	0.007
11	0.007
12	0.006
13	0.006
14	0.006
15	0.006
16	0.007
17	0.006
18	0.007
19	0.007
20	0.006

POLK 2 GRID Q

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.016	0.014	0.017	0.016	0.014
-19	0.015	0.013	0.018	0.017	0.014
-18	0.012	0.010	0.016	0.019	0.018
-17	0.010	0.010	0.016	0.017	0.020
-16	0.013	0.015	0.018	0.015	0.014
-15	0.014	0.016	0.018	0.016	0.015
-14	0.013	0.014	0.017	0.015	0.018
-13	0.016	0.018	0.018	0.015	0.015
-12	0.024	0.033	0.032	0.023	0.017
-11	0.052	0.066	0.065	0.043	0.025
-10	0.085	0.108	0.098	0.066	0.046
-9	0.084	0.130	0.128	0.092	0.066
-8	0.099	0.156	0.174	0.143	0.081
-7	0.150	0.190	0.185	0.157	0.095
-6	0.309	0.301	0.188	0.127	0.108
-5	0.595	0.632	0.349	0.151	0.116
-4	0.979	1.079	0.597	0.231	0.122
-3	2.305	1.855	0.637	0.222	0.124
-2	7.340	4.250	0.739	0.255	0.163
-1	63.870	12.869	0.828	0.377	0.261
0		35.836	1.144	0.441	0.265
1	63.870	8.780	1.027	0.391	0.178
2	7.340	3.098	1.108	0.450	0.201
3	2.305	1.308	0.663	0.316	0.162
4	0.979	0.472	0.285	0.213	0.137
5	0.595	0.254	0.143	0.149	0.113
6	0.309	0.150	0.095	0.108	0.090
7	0.150	0.076	0.065	0.074	0.076
8	0.099	0.051	0.048	0.051	0.055
9	0.084	0.047	0.054	0.062	0.045
10	0.085	0.048	0.054	0.067	0.041
11	0.052	0.036	0.038	0.043	0.030
12	0.024	0.021	0.024	0.024	0.020
13	0.016	0.017	0.020	0.022	0.021
14	0.013	0.016	0.016	0.017	0.017
15	0.014	0.015	0.014	0.013	0.013
16	0.013	0.013	0.013	0.013	0.012
17	0.010	0.012	0.011	0.011	0.010
18	0.012	0.013	0.013	0.011	0.008
19	0.015	0.014	0.013	0.014	0.012
20	0.016	0.014	0.012	0.014	0.015

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.013	0.008	0.006	0.007	0.007
-19	0.013	0.008	0.006	0.007	0.007
-18	0.016	0.010	0.005	0.008	0.009
-17	0.020	0.012	0.008	0.011	0.012
-16	0.016	0.013	0.012	0.015	0.015
-15	0.017	0.016	0.014	0.017	0.019
-14	0.019	0.016	0.015	0.019	0.019
-13	0.017	0.019	0.020	0.023	0.022
-12	0.018	0.022	0.021	0.027	0.030
-11	0.019	0.019	0.020	0.031	0.034
-10	0.034	0.026	0.024	0.030	0.029
-9	0.049	0.044	0.045	0.037	0.028
-8	0.057	0.062	0.060	0.047	0.037
-7	0.069	0.071	0.068	0.050	0.042
-6	0.096	0.090	0.067	0.044	0.044
-5	0.106	0.098	0.065	0.043	0.050
-4	0.101	0.083	0.074	0.071	0.071
-3	0.120	0.100	0.085	0.080	0.078
-2	0.146	0.123	0.088	0.074	0.073
-1	0.158	0.125	0.094	0.080	0.077
0	0.131	0.100	0.076	0.069	0.070
1	0.106	0.086	0.059	0.064	0.064
2	0.144	0.106	0.068	0.074	0.073
3	0.133	0.100	0.066	0.064	0.067
4	0.121	0.097	0.072	0.063	0.064
5	0.105	0.103	0.080	0.065	0.056
6	0.092	0.089	0.061	0.048	0.041
7	0.067	0.077	[illegible]	0.041	0.039
8	0.060	0.063	0.049	0.035	0.032
9	0.035	0.042	0.043	0.029	0.019
10	0.027	0.029	0.033	0.027	0.016
11	0.025	0.023	0.025	0.024	0.018
12	0.019	0.018	0.020	0.022	0.018
13	0.018	0.017	0.019	0.022	0.019
14	0.015	0.014	0.017	0.018	0.017
15	0.012	0.011	0.013	0.015	0.013
16	0.009	0.008	0.012	0.014	0.011
17	0.008	0.007	0.008	0.009	0.007
18	0.007	0.006	0.006	0.006	0.005
19	0.009	0.007	0.007	0.008	0.005
20	0.012	0.008	0.009	0.010	0.006

POLK 2 GRID Q -131-

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.007	0.007	0.006	0.006	0.005
-19	0.007	0.007	0.006	0.006	0.005
-18	0.008	0.008	0.007	0.006	0.005
-17	0.010	0.009	0.008	0.007	0.006
-16	0.014	0.012	0.010	0.009	0.007
-15	0.015	0.013	0.010	0.008	0.007
-14	0.016	0.017	0.013	0.008	0.006
-13	0.021	0.020	0.013	0.010	0.008
-12	0.031	0.025	0.014	0.011	0.008
-11	0.030	0.024	0.018	0.017	0.011
-10	0.024	0.023	0.023	0.023	0.017
-9	0.021	0.025	0.028	0.024	0.020
-8	0.026	0.039	0.043	0.026	0.018
-7	0.037	0.053	0.057	0.030	0.020
-6	0.048	0.059	0.060	0.034	0.024
-5	0.062	0.065	0.051	0.032	0.023
-4	0.100	0.092	0.046	0.025	0.020
-3	0.103	0.092	0.043	0.021	0.018
-2	0.068	0.053	0.031	0.018	0.019
-1	0.055	0.036	0.024	0.019	0.022
0	0.050	0.032	0.026	0.023	0.025
1	0.041	0.028	0.028	0.030	0.034
2	0.051	0.035	0.027	0.027	0.036
3	0.057	0.042	0.026	0.021	0.027
4	0.057	0.045	0.031	0.020	0.020
5	0.043	0.043	0.039	0.022	0.015
6	0.031	0.030	0.033	0.018	0.011
7	0.031	0.024	0.027	0.018	0.012
8	0.026	0.023	0.022	0.015	0.014
9	0.019	0.025	0.022	0.014	0.013
10	0.012	0.019	0.021	0.013	0.010
11	0.012	0.016	0.016	0.010	0.009
12	0.014	0.014	0.013	0.011	0.011
13	0.015	0.013	0.011	0.011	0.012
14	0.013	0.009	0.008	0.009	0.010
15	0.008	0.007	0.008	0.010	0.010
16	0.007	0.006	0.006	0.008	0.009
17	0.006	0.006	0.005	0.005	0.007
18	0.005	0.005	0.005	0.005	0.007
19	0.004	0.005	0.005	0.005	0.006
20	0.004	0.005	0.005	0.005	0.005

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.006	0.005	0.004	0.004	0.004
-19	0.005	0.004	0.004	0.005	0.005
-18	0.004	0.004	0.005	0.006	0.007
-17	0.005	0.005	0.006	0.006	0.007
-16	0.007	0.006	0.007	0.006	0.008
-15	0.006	0.006	0.007	0.007	0.010
-14	0.006	0.006	0.007	0.009	0.012
-13	0.007	0.007	0.007	0.012	0.015
-12	0.008	0.009	0.009	0.016	0.018
-11	0.010	0.012	0.012	0.016	0.017
-10	0.015	0.015	0.019	0.021	0.015
-9	0.021	0.019	0.025	0.028	0.015
-8	0.021	0.020	0.025	0.024	0.016
-7	0.020	0.021	0.026	0.021	0.015
-6	0.022	0.026	0.031	0.020	0.012
-5	0.024	0.030	0.029	0.016	0.012
-4	0.025	0.029	0.026	0.016	0.014
-3	0.021	0.023	0.023	0.015	0.013
-2	0.022	0.023	0.020	0.014	0.016
-1	0.026	0.023	0.018	0.016	0.024
0	0.024	0.019	0.016	0.019	0.025
1	0.023	0.015	0.014	0.019	0.022
2	0.025	0.016	0.013	0.016	0.017
3	0.022	0.018	0.015	0.018	0.015
4	0.017	0.018	0.018	0.021	0.015
5	0.014	0.019	0.022	0.021	0.016
6	0.013	0.018	0.020	0.017	0.015
7	0.013	0.014	0.016	0.015	0.014
8	0.013	0.011	0.011	0.010	0.012
9	0.013	0.011	0.011	0.010	0.015
10	0.010	0.009	0.010	0.011	0.018
11	0.007	0.008	0.009	0.010	0.019
12	0.009	0.011	0.010	0.011	0.017
13	0.011	0.013	0.011	0.012	0.016
14	0.012	0.013	0.010	0.010	0.011
15	0.012	0.012	0.008	0.008	0.008
16	0.010	0.009	0.006	0.006	0.006
17	0.011	0.009	0.005	0.005	0.006
18	0.010	0.009	0.006	0.005	0.005
19	0.008	0.008	0.006	0.005	0.004
20	0.007	0.008	0.006	0.004	0.003

POLK 2 GRID Q

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.004
-19	0.005
-18	0.007
-17	0.007
-16	0.009
-15	0.011
-14	0.013
-13	0.013
-12	0.015
-11	0.014
-10	0.011
-9	0.010
-8	0.014
-7	0.018
-6	0.015
-5	0.014
-4	0.014
-3	0.013
-2	0.018
-1	0.026
0	0.026
1	0.019
2	0.014
3	0.012
4	0.012
5	0.015
6	0.018
7	0.018
8	0.016
9	0.020
10	0.024
11	0.024
12	0.019
13	0.016
14	0.011
15	0.007
16	0.005
17	0.006
18	0.006
19	0.004
20	0.003

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.006	0.005	0.004	0.004	0.004
-19	0.005	0.004	0.004	0.005	0.005
-18	0.004	0.004	0.005	0.006	0.007
-17	0.005	0.005	0.006	0.006	0.007
-16	0.007	0.006	0.007	0.006	0.008
-15	0.006	0.006	0.007	0.007	0.010
-14	0.006	0.006	0.007	0.009	0.012
-13	0.007	0.007	0.007	0.012	0.015
-12	0.008	0.009	0.009	0.016	0.018
-11	0.010	0.012	0.012	0.016	0.017
-10	0.015	0.015	0.019	0.021	0.015
-9	0.021	0.019	0.025	0.028	0.015
-8	0.021	0.020	0.025	0.024	0.016
-7	0.020	0.021	0.026	0.021	0.015
-6	0.022	0.026	0.031	0.020	0.012
-5	0.024	0.030	0.029	0.016	0.012
-4	0.025	0.029	0.026	0.016	0.014
-3	0.021	0.023	0.023	0.015	0.013
-2	0.022	0.023	0.020	0.014	0.016
-1	0.026	0.023	0.018	0.016	0.024
0	0.024	0.019	0.016	0.019	0.025
1	0.023	0.015	0.014	0.019	0.022
2	0.025	0.016	0.013	0.016	0.017
3	0.022	0.018	0.015	0.018	0.015
4	0.017	0.018	0.018	0.021	0.015
5	0.014	0.019	0.022	0.021	0.016
6	0.013	0.018	0.020	0.017	0.015
7	0.013	0.014	0.016	0.015	0.014
8	0.013	0.011	0.011	0.010	0.012
9	0.013	0.011	0.011	0.010	0.015
10	0.010	0.009	0.010	0.011	0.018
11	0.007	0.008	0.009	0.010	0.019
12	0.009	0.011	0.010	0.011	0.017
13	0.011	0.013	0.011	0.012	0.016
14	0.012	0.013	0.010	0.010	0.011
15	0.012	0.012	0.008	0.008	0.008
16	0.010	0.009	0.006	0.006	0.006
17	0.011	0.009	0.005	0.005	0.006
18	0.010	0.009	0.006	0.005	0.005
19	0.008	0.008	0.006	0.005	0.004
20	0.007	0.008	0.006	0.004	0.003

POLK 2 GRID Q -133-

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.004
-19	0.005
-18	0.007
-17	0.007
-16	0.009
-15	0.011
-14	0.013
-13	0.013
-12	0.015
-11	0.014
-10	0.011
-9	0.010
-8	0.014
-7	0.018
-6	0.015
-5	0.014
-4	0.014
-3	0.013
-2	0.018
-1	0.026
0	0.026
1	0.019
2	0.014
3	0.012
4	0.012
5	0.015
6	0.018
7	0.018
8	0.016
9	0.020
10	0.024
11	0.024
12	0.019
13	0.016
14	0.011
15	0.007
16	0.005
17	0.006
18	0.006
19	0.004
20	0.003

BENNING 1 GRID R -134-

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.009	0.008	0.009	0.009	0.006
-19	0.008	0.007	0.008	0.008	0.007
-18	0.008	0.008	0.008	0.007	0.007
-17	0.010	0.010	0.010	0.009	0.009
-16	0.011	0.010	0.010	0.010	0.010
-15	0.008	0.007	0.008	0.010	0.011
-14	0.006	0.007	0.008	0.008	0.008
-13	0.006	0.007	0.008	0.008	0.009
-12	0.005	0.006	0.007	0.008	0.010
-11	0.007	0.006	0.008	0.009	0.012
-10	0.008	0.006	0.007	0.007	0.009
-9	0.006	0.005	0.005	0.006	0.009
-8	0.007	0.007	0.007	0.007	0.008
-7	0.009	0.011	0.011	0.009	0.009
-6	0.012	0.016	0.017	0.012	0.010
-5	0.021	0.020	0.023	0.019	0.020
-4	0.051	0.028	0.036	0.024	0.027
-3	0.135	0.090	0.059	0.035	0.041
-2	0.337	0.561	0.119	0.093	0.027
-1	9.161	4.211	0.577	0.257	0.085
0		30.978	4.637	1.771	0.564
1	9.161	10.024	4.763	3.367	1.615
2	0.337	0.844	1.033	1.285	1.055
3	0.135	0.126	0.192	0.176	0.209
4	0.051	0.045	0.065	0.068	0.083
5	0.021	0.018	0.023	0.029	0.040
6	0.012	0.010	0.009	0.013	0.019
7	0.009	0.009	0.007	0.008	0.009
8	0.007	0.006	0.006	0.007	0.009
9	0.006	0.007	0.007	0.006	0.006
10	0.008	0.009	0.007	0.007	0.007
11	0.007	0.008	0.007	0.006	0.007
12	0.005	0.006	0.005	0.005	0.009
13	0.006	0.005	0.004	0.004	0.007
14	0.006	0.006	0.005	0.005	0.006
15	0.008	0.009	0.008	0.007	0.006
16	0.011	0.011	0.009	0.008	0.008
17	0.010	0.008	0.007	0.007	0.007
18	0.008	0.006	0.006	0.008	0.009
19	0.008	0.007	0.007	0.008	0.008
20	0.009	0.010	0.008	0.006	0.007

BENNING 1 GRID R -135-

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.005	0.004	0.006	0.009	0.008
-19	0.006	0.005	0.003	0.004	0.006
-18	0.005	0.005	0.006	0.009	0.007
-17	0.009	0.008	0.006	0.005	0.006
-16	0.009	0.011	0.013	0.016	0.013
-15	0.011	0.014	0.015	0.020	0.023
-14	0.009	0.012	0.015	0.018	0.019
-13	0.010	0.010	0.009	0.007	0.009
-12	0.009	0.008	0.009	0.010	0.009
-11	0.011	0.008	0.008	0.008	0.008
-10	0.009	0.008	0.009	0.012	0.009
-9	0.012	0.009	0.005	0.005	0.007
-8	0.008	0.009	0.011	0.012	0.010
-7	0.011	0.012	0.010	0.007	0.007
-6	0.012	0.014	0.014	0.013	0.009
-5	0.021	0.018	0.009	0.005	0.005
-4	0.022	0.024	0.019	0.016	0.010
-3	0.044	0.031	0.016	0.012	0.012
-2	0.030	0.020	0.027	0.021	0.016
-1	0.051	0.024	0.023	0.013	0.014
0	0.144	0.058	0.037	0.028	0.020
1	1.166	0.765	0.251	0.091	0.036
2	1.654	1.473	0.807	0.579	0.250
3	0.497	0.591	0.627	0.718	0.426
4	0.070	0.055	0.112	0.188	0.187
5	0.039	0.035	0.031	0.029	0.035
6	0.024	0.027	0.024	0.019	0.016
7	0.008	0.013	0.018	0.019	0.015
8	0.009	0.010	0.008	0.006	0.010
9	0.008	0.011	0.011	0.012	0.010
10	0.011	0.010	0.006	0.005	0.007
11	0.008	0.008	0.010	0.011	0.009
12	0.010	0.008	0.006	0.004	0.005
13	0.007	0.008	0.009	0.009	0.007
14	0.007	0.007	0.005	0.005	0.007
15	0.006	0.007	0.010	0.011	0.009
16	0.008	0.010	0.009	0.007	0.007
17	0.008	0.010	0.013	0.012	0.008
18	0.011	0.011	0.008	0.006	0.006
19	0.007	0.007	0.008	0.009	0.009
20	0.007	0.006	0.004	0.005	0.010

BENNING 1 GRID R

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.008	0.006	0.006	0.008	0.008
-19	0.007	0.006	0.006	0.007	0.008
-18	0.005	0.005	0.006	0.006	0.006
-17	0.009	0.009	0.007	0.005	0.004
-16	0.008	0.006	0.006	0.005	0.006
-15	0.015	0.008	0.007	0.007	0.007
-14	0.014	0.008	0.008	0.007	0.006
-13	0.011	0.011	0.009	0.007	0.006
-12	0.009	0.009	0.009	0.008	0.007
-11	0.010	0.010	0.008	0.007	0.009
-10	0.006	0.007	0.008	0.009	0.011
-9	0.009	0.008	0.009	0.010	0.011
-8	0.006	0.005	0.007	0.009	0.008
-7	0.007	0.008	0.007	0.007	0.007
-6	0.006	0.007	0.007	0.007	0.006
-5	0.009	0.010	0.008	0.006	0.005
-4	0.008	0.008	0.009	0.007	0.006
-3	0.012	0.011	0.011	0.009	0.008
-2	0.009	0.010	0.011	0.012	0.011
-1	0.013	0.014	0.013	0.014	0.013
0	0.019	0.017	0.019	0.020	0.017
1	0.024	0.017	0.019	0.018	0.019
2	0.085	0.044	0.023	0.014	0.014
3	0.266	0.177	0.077	0.043	0.023
4	0.222	0.191	0.130	0.102	0.058
5	0.055	0.065	0.076	0.078	0.060
6	0.020	0.025	0.032	0.035	0.035
7	0.012	0.013	0.018	0.019	0.019
8	0.013	0.011	0.012	0.012	0.010
9	0.008	0.007	0.008	0.010	0.008
10	0.010	0.010	0.010	0.008	0.006
11	0.005	0.005	0.010	0.009	0.007
12	0.007	0.007	0.005	0.005	0.006
13	0.005	0.004	0.003	0.004	0.005
14	0.010	0.009	0.006	0.005	0.006
15	0.008	0.007	0.006	0.007	0.007
16	0.007	0.006	0.005	0.006	0.008
17	0.004	0.003	0.004	0.005	0.006
18	0.006	0.005	0.005	0.004	0.005
19	0.006	0.005	0.005	0.005	0.006
20	0.010	0.007	0.006	0.007	0.007

BENNING 1 GRID R -137-

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.007	0.008	0.008	0.006	0.005
-19	0.008	0.009	0.008	0.006	0.005
-18	0.007	0.008	0.006	0.005	0.004
-17	0.006	0.006	0.006	0.006	0.005
-16	0.006	0.006	0.006	0.006	0.005
-15	0.006	0.006	0.006	0.004	0.004
-14	0.007	0.006	0.005	0.004	0.004
-13	0.007	0.007	0.006	0.005	0.005
-12	0.010	0.009	0.009	0.008	0.007
-11	0.013	0.013	0.013	0.013	0.014
-10	0.013	0.012	0.013	0.016	0.018
-9	0.012	0.011	0.012	0.014	0.014
-8	0.010	0.011	0.011	0.012	0.012
-7	0.008	0.009	0.010	0.010	0.012
-6	0.007	0.008	0.008	0.009	0.009
-5	0.005	0.007	0.007	0.007	0.006
-4	0.005	0.007	0.007	0.007	0.005
-3	0.006	0.006	0.006	0.007	0.005
-2	0.011	0.008	0.011	0.007	0.007
-1	0.014	0.015	0.018	0.013	0.011
0	0.016	0.016	0.015	0.014	0.013
1	0.018	0.018	0.012	0.012	0.008
2	0.015	0.017	0.009	0.009	0.005
3	0.017	0.010	0.009	0.007	0.009
4	0.039	0.024	0.017	0.009	0.010
5	0.054	0.046	0.031	0.017	0.014
6	0.037	0.041	0.033	0.025	0.026
7	0.020	0.028	0.024	0.018	0.022
8	0.010	0.016	0.015	0.010	0.012
9	0.006	0.006	0.007	0.009	0.013
10	0.005	0.004	0.005	0.007	0.009
11	0.006	0.004	0.004	0.005	0.008
12	0.006	0.005	0.005	0.006	0.006
13	0.006	0.006	0.007	0.006	0.006
14	0.006	0.006	0.006	0.006	0.005
15	0.006	0.005	0.006	0.005	0.005
16	0.007	0.006	0.006	0.005	0.005
17	0.006	0.005	0.005	0.006	0.006
18	0.005	0.006	0.005	0.006	0.006
19	0.007	0.006	0.005	0.005	0.005
20	0.008	0.006	0.004	0.005	0.004

BENNING 1 GRID R

CORRECTED SPECTRUM, (E-STAR)

	20
-20	0.005
-19	0.005
-18	0.004
-17	0.004
-16	0.005
-15	0.005
-14	0.004
-13	0.004
-12	0.007
-11	0.012
-10	0.016
-9	0.015
-8	0.015
-7	0.015
-6	0.010
-5	0.006
-4	0.008
-3	0.008
-2	0.004
-1	0.008
0	0.015
1	0.011
2	0.008
3	0.009
4	0.010
5	0.013
6	0.027
7	0.026
8	0.014
9	0.013
10	0.010
11	0.009
12	0.006
13	0.005
14	0.004
15	0.004
16	0.005
17	0.005
18	0.006
19	0.005
20	0.004

BENNING 2 GRID S

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.015	0.015	0.013	0.011	0.011
-19	0.013	0.013	0.011	0.010	0.011
-18	0.013	0.015	0.016	0.015	0.013
-17	0.017	0.020	0.024	0.023	0.019
-16	0.023	0.027	0.026	0.024	0.023
-15	0.029	0.030	0.025	0.022	0.023
-14	0.026	0.030	0.028	0.024	0.021
-13	0.031	0.036	0.033	0.027	0.020
-12	0.035	0.035	0.037	0.038	0.030
-11	0.033	0.036	0.043	0.046	0.041
-10	0.037	0.045	0.052	0.051	0.052
-9	0.041	0.049	0.050	0.053	0.059
-8	0.054	0.052	0.046	0.051	0.056
-7	0.071	0.059	0.055	0.057	0.055
-6	0.111	0.092	0.082	0.071	0.069
-5	0.189	0.156	0.131	0.108	0.104
-4	0.419	0.317	0.259	0.201	0.148
-3	1.297	0.867	0.547	0.369	0.235
-2	5.172	3.075	1.367	0.661	0.327
-1	66.068	17.541	3.122	0.882	0.384
0		72.457	5.157	1.117	0.490
1	66.068	22.291	4.882	1.367	0.609
2	5.172	4.569	2.774	1.296	0.550
3	1.297	1.333	1.124	0.896	0.473
4	0.419	0.482	0.466	0.463	0.346
5	0.189	0.229	0.265	0.257	0.220
6	0.111	0.127	0.147	0.148	0.140
7	0.071	0.076	0.083	0.098	0.099
8	0.054	0.050	0.053	0.065	0.062
9	0.041	0.038	0.041	0.040	0.038
10	0.037	0.035	0.033	0.030	0.038
11	0.033	0.029	0.025	0.029	0.033
12	0.035	0.028	0.026	0.030	0.028
13	0.031	0.024	0.024	0.027	0.023
14	0.026	0.021	0.023	0.025	0.020
15	0.029	0.022	0.021	0.023	0.019
16	0.023	0.015	0.013	0.017	0.017
17	0.017	0.011	0.011	0.015	0.016
18	0.013	0.009	0.010	0.017	0.019
19	0.013	0.011	0.011	0.015	0.016
20	0.015	0.014	0.014	0.014	0.013

BENNING 2 GRID S

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.012	0.012	0.014	0.016	0.017
-19	0.011	0.012	0.015	0.017	0.016
-18	0.011	0.011	0.014	0.018	0.015
-17	0.013	0.011	0.014	0.016	0.014
-16	0.017	0.013	0.016	0.018	0.019
-15	0.020	0.016	0.017	0.019	0.021
-14	0.017	0.017	0.024	0.024	0.022
-13	0.018	0.021	0.032	0.034	0.026
-12	0.028	0.026	0.032	0.043	0.034
-11	0.035	0.026	0.028	0.039	0.041
-10	0.038	0.025	0.034	0.044	0.047
-9	0.044	0.035	0.040	0.043	0.046
-8	0.050	0.047	0.043	0.043	0.050
-7	0.050	0.045	0.048	0.059	0.067
-6	0.066	0.055	0.054	0.070	0.078
-5	0.098	0.077	0.061	0.066	0.073
-4	0.114	0.095	0.071	0.078	0.103
-3	0.143	0.114	0.104	0.111	0.124
-2	0.179	0.163	0.156	0.128	0.103
-1	0.253	0.230	0.181	0.117	0.106
0	0.305	0.199	0.150	0.142	0.150
1	0.319	0.169	0.149	0.161	0.160
2	0.268	0.170	0.158	0.152	0.141
3	0.219	0.125	0.114	0.137	0.156
4	0.221	0.124	0.085	0.091	0.112
5	0.188	0.139	0.080	0.061	0.067
6	0.124	0.105	0.074	0.058	0.062
7	0.073	0.057	0.059	0.067	0.068
8	0.052	0.042	0.044	0.056	0.052
9	0.042	0.041	0.038	0.045	0.039
10	0.040	0.034	0.032	0.038	0.041
11	0.028	0.025	0.027	0.030	0.034
12	0.023	0.021	0.026	0.028	0.026
13	0.019	0.020	0.027	0.028	0.023
14	0.016	0.018	0.022	0.021	0.019
15	0.015	0.016	0.018	0.016	0.016
16	0.016	0.018	0.018	0.013	0.014
17	0.015	0.018	0.017	0.013	0.014
18	0.016	0.016	0.016	0.014	0.014
19	0.015	0.012	0.012	0.011	0.013
20	0.012	0.010	0.009	0.009	0.010

BENNING 2 GRID S

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.013	0.008	0.009	0.009	0.012
-19	0.011	0.010	0.010	0.009	0.011
-18	0.010	0.010	0.011	0.012	0.010
-17	0.014	0.015	0.015	0.017	0.012
-16	0.018	0.015	0.015	0.016	0.015
-15	0.020	0.019	0.016	0.013	0.017
-14	0.018	0.017	0.016	0.016	0.020
-13	0.024	0.028	0.027	0.022	0.022
-12	0.031	0.031	0.028	0.024	0.020
-11	0.036	0.033	0.025	0.022	0.020
-10	0.038	0.026	0.023	0.024	0.020
-9	0.038	0.034	0.038	0.034	0.025
-8	0.045	0.036	0.039	0.033	0.029
-7	0.058	0.038	0.031	0.026	0.025
-6	0.058	0.035	0.031	0.029	0.032
-5	0.065	0.059	0.048	0.042	0.042
-4	0.107	0.098	0.066	0.058	0.062
-3	0.125	0.109	0.068	0.070	0.078
-2	0.096	0.093	0.076	0.084	0.084
-1	0.103	0.103	0.102	0.090	0.088
0	0.117	0.110	0.110	0.092	0.095
1	0.117	0.107	0.109	0.099	0.095
2	0.127	0.135	0.116	0.090	0.090
3	0.232	0.320	0.205	0.096	0.096
4	0.207	0.329	0.234	0.111	0.092
5	0.083	0.122	0.103	0.064	0.062
6	0.057	0.062	0.046	0.026	0.029
7	0.051	0.044	0.033	0.021	0.022
8	0.043	0.043	0.038	0.028	0.029
9	0.033	0.033	0.033	0.025	0.023
10	0.041	0.040	0.030	0.016	0.015
11	0.036	0.037	0.030	0.016	0.016
12	0.027	0.027	0.024	0.017	0.015
13	0.018	0.014	0.014	0.017	0.018
14	0.023	0.023	0.017	0.016	0.017
15	0.019	0.017	0.014	0.013	0.016
16	0.013	0.014	0.015	0.014	0.014
17	0.012	0.011	0.014	0.014	0.013
18	0.017	0.021	0.019	0.012	0.011
19	0.015	0.018	0.019	0.019	0.018
20	0.012	0.016	0.021	0.025	0.022

BENNING 2 GRID S

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.014	0.011	0.009	0.008	0.010
-19	0.013	0.012	0.010	0.010	0.013
-18	0.011	0.013	0.013	0.015	0.016
-17	0.010	0.014	0.016	0.017	0.017
-16	0.012	0.012	0.012	0.014	0.015
-15	0.015	0.011	0.010	0.011	0.013
-14	0.017	0.011	0.013	0.016	0.016
-13	0.018	0.012	0.013	0.019	0.017
-12	0.016	0.013	0.012	0.014	0.011
-11	0.019	0.016	0.013	0.012	0.010
-10	0.017	0.016	0.016	0.014	0.011
-9	0.021	0.020	0.020	0.017	0.014
-8	0.029	0.026	0.025	0.021	0.017
-7	0.025	0.025	0.024	0.023	0.023
-6	0.030	0.031	0.033	0.035	0.034
-5	0.039	0.037	0.046	0.052	0.048
-4	0.053	0.042	0.049	0.054	0.061
-3	0.081	0.085	0.070	0.072	0.111
-2	0.109	0.138	0.118	0.113	0.145
-1	0.114	0.135	0.120	0.114	0.118
0	0.104	0.109	0.111	0.110	0.098
1	0.080	0.091	0.110	0.098	0.085
2	0.080	0.093	0.095	0.073	0.072
3	0.083	0.070	0.063	0.049	0.053
4	0.071	0.051	0.048	0.046	0.051
5	0.065	0.057	0.046	0.040	0.046
6	0.044	0.052	0.042	0.031	0.030
7	0.028	0.033	0.037	0.033	0.023
8	0.027	0.023	0.026	0.027	0.020
9	0.023	0.023	0.022	0.019	0.014
10	0.022	0.026	0.019	0.014	0.013
11	0.020	0.019	0.015	0.013	0.012
12	0.015	0.014	0.015	0.015	0.013
13	0.017	0.017	0.018	0.018	0.016
14	0.019	0.019	0.017	0.018	0.016
15	0.021	0.018	0.015	0.018	0.017
16	0.018	0.018	0.014	0.018	0.017
17	0.013	0.016	0.014	0.014	0.012
18	0.012	0.017	0.018	0.016	0.013
19	0.017	0.018	0.019	0.020	0.020
20	0.019	0.016	0.016	0.020	0.022

BENNING 2 GRID S

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.014
-19	0.016
-18	0.016
-17	0.014
-16	0.014
-15	0.013
-14	0.014
-13	0.015
-12	0.010
-11	0.010
-10	0.012
-9	0.013
-8	0.015
-7	0.024
-6	0.034
-5	0.046
-4	0.068
-3	0.138
-2	0.172
-1	0.137
0	0.124
1	0.094
2	0.065
3	0.052
4	0.056
5	0.050
6	0.032
7	0.020
8	0.017
9	0.013
10	0.012
11	0.012
12	0.011
13	0.014
14	0.016
15	0.016
16	0.014
17	0.011
18	0.011
19	0.017
20	0.019

MCCLELLAN 1 GRID T -144-

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.012	0.008	0.009	0.011	0.015
-19	0.012	0.010	0.010	0.010	0.012
-18	0.010	0.009	0.008	0.008	0.007
-17	0.009	0.011	0.010	0.008	0.007
-16	0.011	0.015	0.013	0.009	0.008
-15	0.015	0.018	0.015	0.010	0.010
-14	0.015	0.018	0.015	0.012	0.012
-13	0.012	0.015	0.016	0.015	0.014
-12	0.014	0.017	0.018	0.014	0.014
-11	0.022	0.022	0.016	0.015	0.019
-10	0.025	0.024	0.017	0.019	0.026
-9	0.025	0.020	0.020	0.026	0.034
-8	0.025	0.017	0.020	0.030	0.037
-7	0.034	0.025	0.025	0.034	0.032
-6	0.053	0.047	0.043	0.049	0.040
-5	0.076	0.073	0.061	0.052	0.045
-4	0.099	0.121	0.093	0.058	0.042
-3	0.173	0.178	0.120	0.071	0.045
-2	0.567	0.317	0.148	0.074	0.062
-1	6.898	1.591	0.302	0.099	0.064
0		8.736	0.730	0.142	0.056
1	6.898	4.276	1.149	0.332	0.128
2	0.567	1.031	0.905	0.483	0.207
3	0.173	0.304	0.367	0.267	0.156
4	0.099	0.131	0.130	0.106	0.102
5	0.076	0.075	0.057	0.052	0.066
6	0.053	0.043	0.037	0.042	0.042
7	0.034	0.035	0.032	0.043	0.039
8	0.025	0.029	0.027	0.032	0.033
9	0.025	0.021	0.020	0.024	0.027
10	0.025	0.018	0.016	0.017	0.022
11	0.022	0.017	0.017	0.016	0.018
12	0.014	0.012	0.014	0.013	0.014
13	0.012	0.010	0.011	0.010	0.012
14	0.015	0.011	0.011	0.013	0.017
15	0.015	0.011	0.014	0.016	0.017
16	0.011	0.009	0.013	0.014	0.018
17	0.009	0.008	0.008	0.010	0.012
18	0.010	0.011	0.007	0.008	0.010
19	0.012	0.011	0.009	0.010	0.011
20	0.012	0.013	0.010	0.011	0.012

MCCLELLAN 1 GRID T

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.016	0.015	0.013	0.014	0.016
-19	0.013	0.013	0.013	0.014	0.015
-18	0.010	0.011	0.010	0.011	0.014
-17	0.012	0.014	0.008	0.008	0.014
-16	0.010	0.011	0.010	0.013	0.015
-15	0.010	0.011	0.014	0.019	0.017
-14	0.012	0.014	0.015	0.016	0.014
-13	0.015	0.015	0.012	0.010	0.009
-12	0.018	0.017	0.012	0.010	0.010
-11	0.017	0.018	0.015	0.012	0.012
-10	0.020	0.019	0.019	0.013	0.013
-9	0.026	0.019	0.018	0.014	0.016
-8	0.026	0.018	0.018	0.018	0.020
-7	0.022	0.021	0.019	0.022	0.023
-6	0.032	0.031	0.024	0.026	0.024
-5	0.041	0.037	0.030	0.025	0.023
-4	0.039	0.040	0.035	0.030	0.030
-3	0.036	0.035	0.036	0.037	0.036
-2	0.047	0.036	0.040	0.038	0.036
-1	0.050	0.047	0.051	0.039	0.034
0	0.050	0.045	0.051	0.046	0.034
1	0.060	0.039	0.039	0.041	0.030
2	0.081	0.040	0.032	0.029	0.028
3	0.084	0.039	0.032	0.037	0.041
4	0.072	0.042	0.056	0.074	0.068
5	0.068	0.053	0.061	0.077	0.082
6	0.047	0.042	0.034	0.039	0.048
7	0.031	0.033	0.028	0.027	0.027
8	0.031	0.046	0.043	0.029	0.025
9	0.028	0.043	0.043	0.023	0.021
10	0.025	0.034	0.037	0.022	0.016
11	0.024	0.036	0.039	0.026	0.017
12	0.021	0.032	0.029	0.022	0.023
13	0.016	0.021	0.017	0.019	0.021
14	0.015	0.016	0.014	0.013	0.016
15	0.015	0.014	0.013	0.011	0.012
16	0.017	0.015	0.013	0.011	0.012
17	0.015	0.013	0.012	0.011	0.012
18	0.010	0.009	0.012	0.013	0.011
19	0.009	0.009	0.013	0.013	0.010
20	0.010	0.011	0.013	0.010	0.009

MCCLELLAN 1 GRID T

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.017	0.017	0.013	0.014	0.020
-19	0.016	0.019	0.014	0.013	0.017
-18	0.014	0.019	0.017	0.013	0.014
-17	0.014	0.015	0.016	0.012	0.014
-16	0.012	0.010	0.012	0.013	0.013
-15	0.012	0.010	0.014	0.016	0.013
-14	0.012	0.012	0.013	0.013	0.012
-13	0.010	0.012	0.011	0.009	0.011
-12	0.008	0.008	0.009	0.010	0.014
-11	0.008	0.009	0.012	0.014	0.015
-10	0.011	0.010	0.014	0.016	0.015
-9	0.018	0.015	0.016	0.016	0.013
-8	0.023	0.017	0.014	0.015	0.016
-7	0.022	0.016	0.014	0.015	0.021
-6	0.017	0.015	0.015	0.018	0.024
-5	0.018	0.018	0.017	0.017	0.020
-4	0.021	0.017	0.018	0.020	0.021
-3	0.024	0.021	0.026	0.028	0.028
-2	0.030	0.028	0.035	0.035	0.031
-1	0.032	0.028	0.030	0.037	0.033
0	0.029	0.029	0.028	0.033	0.033
1	0.027	0.030	0.033	0.036	0.033
2	0.027	0.028	0.033	0.039	0.035
3	0.035	0.027	0.027	0.035	0.036
4	0.050	0.032	0.025	0.031	0.028
5	0.065	0.034	0.021	0.023	0.018
6	0.042	0.026	0.018	0.015	0.014
7	0.021	0.020	0.017	0.014	0.017
8	0.018	0.019	0.017	0.015	0.016
9	0.018	0.015	0.015	0.015	0.014
10	0.015	0.013	0.015	0.017	0.016
11	0.014	0.014	0.016	0.020	0.017
12	0.018	0.016	0.016	0.019	0.016
13	0.017	0.017	0.014	0.016	0.017
14	0.017	0.017	0.015	0.017	0.018
15	0.012	0.014	0.019	0.022	0.017
16	0.010	0.011	0.019	0.025	0.020
17	0.014	0.016	0.018	0.029	0.026
18	0.015	0.019	0.022	0.028	0.022
19	0.012	0.014	0.019	0.022	0.018
20	0.011	0.012	0.015	0.018	0.018

MCCLELLAN 1 GRID T

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.024	0.023	0.020	0.015	0.013
-19	0.018	0.019	0.018	0.014	0.013
-18	0.013	0.013	0.012	0.011	0.012
-17	0.016	0.014	0.010	0.008	0.009
-16	0.015	0.014	0.010	0.009	0.011
-15	0.013	0.014	0.011	0.011	0.014
-14	0.016	0.020	0.015	0.012	0.012
-13	0.014	0.019	0.016	0.012	0.012
-12	0.014	0.013	0.013	0.013	0.015
-11	0.014	0.013	0.012	0.013	0.013
-10	0.016	0.016	0.011	0.010	0.011
-9	0.017	0.018	0.013	0.010	0.011
-8	0.020	0.019	0.014	0.016	0.018
-7	0.024	0.017	0.015	0.024	0.021
-6	0.025	0.016	0.017	0.026	0.020
-5	0.020	0.019	0.019	0.022	0.021
-4	0.018	0.023	0.025	0.020	0.021
-3	0.023	0.023	0.026	0.024	0.021
-2	0.029	0.024	0.024	0.025	0.024
-1	0.026	0.025	0.026	0.029	0.034
0	0.026	0.025	0.028	0.032	0.039
1	0.027	0.026	0.030	0.031	0.031
2	0.023	0.018	0.022	0.023	0.024
3	0.022	0.015	0.017	0.021	0.026
4	0.019	0.016	0.018	0.021	0.025
5	0.016	0.017	0.017	0.018	0.018
6	0.015	0.015	0.015	0.016	0.014
7	0.017	0.015	0.013	0.014	0.015
8	0.017	0.015	0.012	0.011	0.014
9	0.018	0.021	0.020	0.017	0.017
1	0.017	0.020	0.023	0.022	0.019
1_	0.016	0.016	0.018	0.019	0.015
12	0.016	0.020	0.017	0.012	0.011
13	0.018	0.021	0.014	0.010	0.012
14	0.019	0.017	0.014	0.013	0.014
15	0.014	0.011	0.011	0.015	0.016
16	0.016	0.012	0.011	0.016	0.017
17	0.019	0.014	0.012	0.016	0.015
18	0.019	0.016	0.013	0.013	0.013
19	0.019	0.016	0.012	0.012	0.012
20	0.021	0.016	0.012	0.013	0.013

MCCLELLAN 1 GRID T

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.014
-19	0.015
-18	0.015
-17	0.011
-16	0.011
-15	0.013
-14	0.012
-13	0.013
-12	0.016
-11	0.014
-10	0.013
-9	0.013
-8	0.017
-7	0.016
-6	0.014
-5	0.018
-4	0.020
-3	0.019
-2	0.023
-1	0.037
0	0.046
1	0.031
2	0.021
3	0.025
4	0.027
5	0.018
6	0.013
7	0.016
8	0.016
9	0.017
10	0.017
11	0.013
12	0.011
13	0.013
14	0.014
15	0.016
16	0.016
17	0.015
18	0.016
19	0.013
20	0.012

MCCLELLAN 2 GRID DEF. U

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.009	0.012	0.013	0.014	0.018
-19	0.012	0.013	0.012	0.013	0.020
-18	0.016	0.015	0.011	0.013	0.020
-17	0.016	0.013	0.011	0.014	0.018
-16	0.014	0.015	0.018	0.019	0.020
-15	0.016	0.022	0.026	0.022	0.023
-14	0.018	0.029	0.032	0.023	0.022
-13	0.021	0.028	0.032	0.026	0.019
-12	0.027	0.025	0.031	0.030	0.021
-11	0.028	0.025	0.028	0.028	0.024
-10	0.024	0.028	0.031	0.028	0.028
-9	0.037	0.036	0.042	0.035	0.028
-8	0.070	0.060	0.058	0.050	0.039
-7	0.117	0.108	0.083	0.064	0.066
-6	0.192	0.196	0.161	0.103	0.117
-5	0.411	0.402	0.341	0.216	0.198
-4	1.217	1.131	0.819	0.532	0.364
-3	4.538	3.872	2.337	1.396	0.791
-2	27.196	17.630	7.970	3.583	1.829
-1	462.179	123.871	22.637	7.272	3.100
0		503.115	33.882	8.260	3.037
1	462.179	126.645	21.546	5.679	2.268
2	27.196	19.853	7.934	3.116	1.541
3	4.538	3.829	2.565	1.439	0.835
4	1.217	1.206	0.937	0.626	0.420
5	0.411	0.436	0.339	0.264	0.185
6	0.192	0.180	0.184	0.175	0.121
7	0.117	0.123	0.140	0.128	0.089
8	0.070	0.082	0.093	0.080	0.073
9	0.037	0.045	0.052	0.055	0.081
10	0.024	0.033	0.038	0.042	0.064
11	0.028	0.035	0.036	0.034	0.036
12	0.027	0.027	0.027	0.030	0.026
13	0.021	0.021	0.024	0.028	0.028
14	0.018	0.018	0.019	0.023	0.025
15	0.016	0.015	0.015	0.020	0.019
16	0.014	0.016	0.015	0.020	0.020
17	0.016	0.016	0.014	0.018	0.019
18	0.016	0.013	0.010	0.015	0.015
19	0.012	0.011	0.013	0.013	0.013
20	0.009	0.011	0.015	0.014	0.016

MCCLELLAN 2 GRID DEF. U

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.017	0.010	0.007	0.010	0.012
-19	0.017	0.009	0.008	0.012	0.012
-18	0.018	0.010	0.009	0.010	0.013
-17	0.016	0.010	0.009	0.010	0.013
-16	0.015	0.014	0.016	0.015	0.017
-15	0.018	0.016	0.019	0.021	0.018
-14	0.018	0.015	0.015	0.019	0.018
-13	0.017	0.016	0.017	0.021	0.023
-12	0.020	0.020	0.018	0.020	0.024
-11	0.026	0.026	0.020	0.018	0.020
-10	0.032	0.030	0.023	0.022	0.022
-9	0.030	0.029	0.027	0.029	0.029
-8	0.035	0.030	0.030	0.035	0.039
-7	0.071	0.055	0.051	0.050	0.045
-6	0.124	0.111	0.092	0.056	0.049
-5	0.165	0.157	0.140	0.088	0.068
-4	0.261	0.233	0.190	0.150	0.118
-3	0.461	0.329	0.261	0.231	0.164
-2	0.907	0.452	0.373	0.348	0.249
-1	1.239	0.593	0.433	0.414	0.355
0	1.156	0.620	0.460	0.450	0.406
1	1.068	0.625	0.428	0.337	0.279
2	0.854	0.604	0.373	0.245	0.179
3	0.503	0.448	0.334	0.212	0.157
4	0.283	0.244	0.199	0.152	0.130
5	0.142	0.132	0.103	0.080	0.083
6	0.079	0.085	0.079	0.055	0.052
7	0.069	0.068	0.049	0.036	0.040
8	0.080	0.067	0.035	0.027	0.033
9	0.091	0.070	0.039	0.024	0.034
10	0.070	0.058	0.041	0.024	0.028
11	0.038	0.044	0.038	0.022	0.023
12	0.024	0.031	0.027	0.018	0.021
13	0.026	0.021	0.013	0.014	0.021
14	0.023	0.017	0.011	0.017	0.024
15	0.017	0.019	0.016	0.020	0.025
16	0.016	0.019	0.020	0.019	0.017
17	0.013	0.013	0.014	0.012	0.010
18	0.011	0.011	0.013	0.012	0.008
19	0.014	0.014	0.013	0.012	0.010
20	0.018	0.016	0.014	0.013	0.014

MCCLELLAN 2 GRID DEF. U

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.013	0.012	0.011	0.010	0.010
-19	0.013	0.010	0.009	0.010	0.009
-18	0.017	0.013	0.013	0.015	0.014
-17	0.017	0.013	0.009	0.012	0.012
-16	0.017	0.013	0.014	0.016	0.016
-15	0.014	0.013	0.016	0.019	0.018
-14	0.016	0.017	0.023	0.024	0.024
-13	0.020	0.019	0.019	0.019	0.017
-12	0.026	0.028	0.029	0.024	0.019
-11	0.021	0.020	0.018	0.018	0.014
-10	0.022	0.020	0.019	0.016	0.017
-9	0.030	0.028	0.027	0.027	0.022
-8	0.041	0.037	0.041	0.048	0.039
-7	0.042	0.043	0.035	0.029	0.036
-6	0.052	0.067	0.053	0.030	0.050
-5	0.084	0.087	0.061	0.051	0.057
-4	0.139	0.148	0.124	0.112	0.112
-3	0.147	0.160	0.143	0.143	0.165
-2	0.221	0.208	0.205	0.204	0.205
-1	0.312	0.318	0.359	0.367	0.325
0	0.361	0.421	0.490	0.455	0.449
1	0.329	0.410	0.388	0.335	0.403
2	0.222	0.287	0.203	0.176	0.263
3	0.151	0.156	0.117	0.106	0.152
4	0.117	0.102	0.090	0.090	0.083
5	0.075	0.073	0.093	0.084	0.070
6	0.040	0.034	0.048	0.052	0.041
7	0.038	0.027	0.036	0.043	0.030
8	0.033	0.024	0.027	0.029	0.019
9	0.031	0.022	0.027	0.029	0.025
10	0.027	0.024	0.029	0.028	0.021
11	0.027	0.027	0.031	0.025	0.022
12	0.022	0.019	0.019	0.018	0.016
13	0.019	0.017	0.022	0.022	0.018
14	0.018	0.012	0.012	0.015	0.013
15	0.020	0.013	0.013	0.014	0.016
16	0.016	0.012	0.007	0.009	0.012
17	0.014	0.014	0.010	0.009	0.012
18	0.009	0.011	0.010	0.008	0.008
19	0.010	0.013	0.014	0.011	0.013
20	0.013	0.013	0.011	0.008	0.011

MCCLELLAN 2 GRID DEF. U

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.017	0.017	0.011	0.010	0.011
-19	0.014	0.015	0.010	0.009	0.010
-18	0.019	0.017	0.010	0.009	0.010
-17	0.015	0.016	0.011	0.010	0.011
-16	0.014	0.013	0.014	0.012	0.012
-15	0.015	0.014	0.013	0.013	0.012
-14	0.019	0.014	0.012	0.012	0.011
-13	0.014	0.015	0.015	0.012	0.012
-12	0.017	0.016	0.014	0.012	0.012
-11	0.013	0.015	0.012	0.013	0.014
-10	0.018	0.019	0.016	0.016	0.018
-9	0.018	0.024	0.021	0.018	0.019
-8	0.028	0.022	0.021	0.021	0.025
-7	0.040	0.031	0.024	0.031	0.037
-6	0.060	0.043	0.032	0.038	0.039
-5	0.057	0.041	0.041	0.049	0.049
-4	0.087	0.057	0.065	0.077	0.074
-3	0.145	0.116	0.118	0.131	0.130
-2	0.235	0.228	0.176	0.165	0.173
-1	0.397	0.423	0.270	0.195	0.190
0	0.535	0.502	0.343	0.258	0.233
1	0.458	0.396	0.319	0.273	0.242
2	0.273	0.241	0.220	0.197	0.171
3	0.155	0.137	0.137	0.136	0.114
4	0.080	0.078	0.074	0.088	0.083
5	0.069	0.067	0.059	0.064	0.060
6	0.042	0.048	0.048	0.053	0.044
7	0.031	0.036	0.032	0.034	0.034
8	0.018	0.022	0.021	0.022	0.023
9	0.020	0.017	0.016	0.017	0.017
10	0.017	0.018	0.025	0.026	0.020
11	0.021	0.018	0.023	0.025	0.022
12	0.016	0.018	0.018	0.019	0.023
13	0.019	0.020	0.021	0.018	0.019
14	0.013	0.016	0.018	0.016	0.013
15	0.015	0.015	0.018	0.018	0.014
16	0.012	0.015	0.017	0.017	0.015
17	0.014	0.014	0.016	0.014	0.014
18	0.010	0.014	0.014	0.012	0.013
19	0.015	0.013	0.013	0.012	0.012
20	0.014	0.012	0.011	0.011	0.011

MCCLELLAN 2 GRID DEF. U

CORRECTED SPECTRUM, (F-STAR)

	20
-20	0.010
-19	0.011
-18	0.011
-17	0.012
-16	0.013
-15	0.011
-14	0.010
-13	0.010
-12	0.010
-11	0.012
-10	0.016
-9	0.019
-8	0.025
-7	0.034
-6	0.034
-5	0.049
-4	0.074
-3	0.125
-2	0.185
-1	0.203
0	0.224
1	0.243
2	0.170
3	0.100
4	0.071
5	0.047
6	0.036
7	0.029
8	0.019
9	0.015
10	0.018
11	0.021
12	0.022
13	0.018
14	0.013
15	0.013
16	0.016
17	0.016
18	0.015
19	0.012
20	0.010

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS -2 TO -0

	-2	-1	0
-20	0.0278198	0.0274538	0.0342357
-19	0.0315925	0.0298364	0.0340821
-18	0.0358539	0.0282403	0.0404742
-17	0.0342975	0.0429933	0.0495046
-16	0.0240074	0.0396936	0.0519682
-15	0.0264078	0.0349720	0.0387617
-14	0.0327582	0.0360552	0.0324402
-13	0.0450519	0.0565207	0.0472906
-12	0.0488183	0.0580606	0.0526357
-11	0.0710358	0.0636440	0.0566222
-10	0.0983588	0.0835941	0.0789193
-9	0.1103469	0.1460026	0.1739589
-8	0.1714545	0.2349432	0.3067419
-7	0.3459855	0.4651871	0.4870527
-6	0.6489867	1.0978140	1.1499376
-5	1.3972340	2.5610043	2.8454378
-4	3.5982272	9.5555704	15.1048503
-3	10.3524969	38.8668232	79.7536631
-2	23.7091520	101.9967728	274.2427216
-1	32.0631456	176.9115849	1106.2592621
0	45.1102943	387.1688156	
1	47.6787000	358.7478828	1106.2592621
2	25.3786037	146.6065769	274.2427216
3	11.5172086	47.9258504	79.7536640
4	3.5826627	10.2196643	15.1048503
5	1.2911191	2.0103017	2.8454377
6	0.8727438	0.9095381	1.1499376
7	0.3929996	0.4200314	0.4870527
8	0.1618061	0.2523428	0.3067419
9	0.0951332	0.1299738	0.1739589
10	0.0771728	0.0820144	0.0789193
11	0.0720254	0.0627293	0.0566222
12	0.0782136	0.0573801	0.0526357
13	0.0791790	0.0462656	0.0472906
14	0.0522328	0.0358688	0.0324402
15	0.0323839	0.0345428	0.0387617
16	0.0382133	0.0446882	0.0519683
17	0.0410682	0.0426793	0.0495047
18	0.0339936	0.0472670	0.0404742
19	0.0281095	0.0343629	0.0340821
20	0.0357307	0.0383667	0.0342357

ABERDEEN 1

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0383667	0.0357307	0.0380461
-19	0.0343628	0.0281095	0.0305940
-18	0.0472670	0.0339936	0.0251350
-17	0.0426793	0.0410682	0.0345175
-16	0.0446881	0.0382133	0.0365646
-15	0.0345428	0.0323838	0.0352100
-14	0.0358687	0.0522328	0.0506876
-13	0.0462656	0.0791790	0.0791502
-12	0.0573800	0.0782136	0.0757593
-11	0.0627293	0.0720254	0.0638101
-10	0.0820144	0.0771728	0.0638834
-9	0.1299738	0.0951332	0.0881613
-8	0.2523428	0.1618061	0.1263592
-7	0.4200314	0.3929996	0.2942747
-6	0.9095381	0.8727438	0.6872812
-5	2.0103019	1.2911193	0.8696387
-4	10.2196647	3.5826629	1.4315374
-3	47.9258404	11.5172087	3.3456086
-2	146.6065502	25.3786039	4.9282635
-1	358.7483864	47.6787319	9.0379821
0	387.1686134	45.1102705	13.1539875
1	176.9118347	32.0631666	10.4408157
2	101.9967575	23.7091522	7.2738684
3	38.8668160	10.3524971	3.1975331
4	9.5555704	3.5982273	1.2189594
5	2.5610044	1.3972341	0.6884835
6	1.0978140	0.6489867	0.4574072
7	0.4651871	0.3459856	0.2835481
8	0.2349432	0.1714545	0.1502733
9	0.1460026	0.1103469	0.1015710
10	0.0835941	0.0983589	0.0949005
11	0.0636440	0.0710358	0.0634980
12	0.0580606	0.0488183	0.0386571
13	0.0565208	0.0450519	0.0347279
14	0.0360553	0.0327582	0.0311405
15	0.0349721	0.0264079	0.0346501
16	0.0396937	0.0240074	0.0305493
17	0.0429934	0.0342975	0.0295009
18	0.0282404	0.0358539	0.0324825
19	0.0298364	0.0315925	0.0274236
20	0.0274538	0.0278198	0.0253197

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0332687	0.0281385	0.0263513
-19	0.0274642	0.0248273	0.0258882
-18	0.0229779	0.0276259	0.0317652
-17	0.0261456	0.0275483	0.0325832
-16	0.0309326	0.0311448	0.0348620
-15	0.0346666	0.0329370	0.0305813
-14	0.0441501	0.0414079	0.0356227
-13	0.0656859	0.0448933	0.0384691
-12	0.0618913	0.0421126	0.0446534
-11	0.0501960	0.0502251	0.0566099
-10	0.0589808	0.0756922	0.0869337
-9	0.0745816	0.0932598	0.1086516
-8	0.1115809	0.1207822	0.1113805
-7	0.2138034	0.1736781	0.1209630
-6	0.3946417	0.2472104	0.1503801
-5	0.4688126	0.2812661	0.1693939
-4	0.6951615	0.5080618	0.3048529
-3	1.1488654	0.8137832	0.5962611
-2	1.7977951	1.2450608	1.0285755
-1	4.1893657	3.1408068	2.8132848
0	7.2666095	5.4395682	5.1389312
1	4.9211357	3.2498768	3.0752149
2	2.9591005	1.7627579	1.1949056
3	1.6078945	1.2055740	0.9496831
4	0.6642014	0.5239009	0.7123193
5	0.4283145	0.2643856	0.3163558
6	0.3155664	0.1723274	0.1215059
7	0.2076794	0.1330003	0.1123732
8	0.1449020	0.1044646	0.0906931
9	0.0996086	0.0753146	0.0661809
10	0.0677038	0.0489952	0.0493455
11	0.0456714	0.0430598	0.0549519
12	0.0307581	0.0383399	0.0500409
13	0.0304607	0.0389410	0.0433605
14	0.0344376	0.0361005	0.0302052
15	0.0442588	0.0362837	0.0243639
16	0.0347306	0.0268522	0.0246356
17	0.0307977	0.0324066	0.0324956
18	0.0295569	0.0335998	0.0312070
19	0.0271212	0.0353817	0.0354224
20	0.0265758	0.0347515	0.0386289

ABERDEEN 1

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 7 TO 9

	7	8	9
-20	0.0257613	0.0202447	0.0209777
-19	0.0258604	0.0264372	0.0283459
-18	0.0311400	0.0290091	0.0298243
-17	0.0281876	0.0296648	0.0332417
-16	0.0329375	0.0285413	0.0327781
-15	0.0275111	0.0361779	0.0469889
-14	0.0337025	0.0351654	0.0509169
-13	0.0395529	0.0399245	0.0536742
-12	0.0496744	0.0465937	0.0389607
-11	0.0582595	0.0644613	0.0552461
-10	0.0773310	0.0671114	0.0606974
-9	0.0816157	0.0801263	0.0936118
-8	0.0847913	0.0742155	0.0994154
-7	0.0956388	0.0870363	0.0944140
-6	0.1144812	0.1145315	0.0952369
-5	0.1266999	0.1675449	0.1683079
-4	0.2871038	0.3068571	0.2858534
-3	0.6150948	0.5970255	0.5740639
-2	1.0428883	0.9570691	0.8637099
-1	2.2123089	2.2628976	2.3704804
0	4.1029652	4.2824042	4.4424255
1	3.5000469	4.1802165	3.4853306
2	1.6553764	2.5932249	2.0782286
3	0.7404244	0.8476619	0.9516550
4	0.5225415	0.3102607	0.4168478
5	0.3407775	0.2395892	0.2891974
6	0.1760392	0.1914387	0.2036704
7	0.1246300	0.1295693	0.1084381
8	0.0942666	0.0985079	0.0831090
9	0.0699735	0.0662157	0.0557290
10	0.0529135	0.0509568	0.0504832
11	0.0643587	0.0496464	0.0366499
12	0.0514121	0.0476478	0.0411456
13	0.0350289	0.0266271	0.0281004
14	0.0246361	0.0326463	0.0350144
15	0.0256876	0.0280867	0.0292249
16	0.0311049	0.0397421	0.0418367
17	0.0354184	0.0369101	0.0374377
18	0.0280050	0.0367238	0.0336206
19	0.0319480	0.0344340	0.0312889
20	0.0317058	0.0345954	0.0367707

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

	10	11	12
-20	0.0246967	0.0233697	0.0270424
-19	0.0314059	0.0289618	0.0282020
-18	0.0393519	0.0451680	0.0424658
-17	0.0392413	0.0400600	0.0395814
-16	0.0377313	0.0427453	0.0395985
-15	0.0383117	0.0331491	0.0300876
-14	0.0451591	0.0402192	0.0371232
-13	0.0508752	0.0460693	0.0440455
-12	0.0355362	0.0384914	0.0395369
-11	0.0407405	0.0304371	0.0252659
-10	0.0569127	0.0479317	0.0327005
-9	0.0837175	0.0621380	0.0472184
-8	0.1083097	0.0926335	0.0828890
-7	0.0998407	0.1180519	0.1160082
-6	0.0753483	0.1200046	0.1337713
-5	0.1539150	0.1771588	0.1663732
-4	0.3245636	0.4003229	0.3029212
-3	0.5274687	0.5674822	0.4314462
-2	0.7882790	0.7562298	0.5638332
-1	2.4007970	1.8836803	1.2917308
0	4.0619400	2.9474705	2.1749087
1	2.3212430	1.5718932	1.2638099
2	0.9874966	0.6426898	0.6441858
3	0.7499514	0.5814906	0.5570794
4	0.4530448	0.3517100	0.3164995
5	0.3067640	0.2404223	0.2342096
6	0.2100328	0.1752247	0.1722367
7	0.1034101	0.1123442	0.1020864
8	0.0818217	0.0879462	0.0720443
9	0.0629921	0.0768958	0.0742151
10	0.0526936	0.0638023	0.0686471
11	0.0394955	0.0461899	0.0554692
12	0.0432640	0.0350221	0.0388435
13	0.0403398	0.0412517	0.0446805
14	0.0366557	0.0329766	0.0322527
15	0.0341955	0.0348637	0.0319473
16	0.0325289	0.0254091	0.0294606
17	0.0321206	0.0246880	0.0271558
18	0.0300637	0.0253919	0.0314820
19	0.0365419	0.0363890	0.0420552
20	0.0403132	0.0360718	0.0373620

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0293677	0.0297808	0.0286747
-19	0.0308797	0.0309043	0.0292338
-18	0.0378954	0.0311691	0.0281128
-17	0.0371560	0.0321067	0.0380672
-16	0.0276127	0.0316309	0.0434074
-15	0.0271653	0.0417063	0.0484001
-14	0.0329516	0.0512941	0.0469142
-13	0.0317333	0.0376330	0.0375764
-12	0.0280459	0.0321067	0.0397391
-11	0.0232046	0.0324071	0.0513126
-10	0.0311472	0.0485362	0.0701915
-9	0.0520365	0.0586180	0.0798387
-8	0.0829483	0.0770658	0.0947436
-7	0.0953151	0.0894380	0.1284669
-6	0.1103559	0.1011119	0.1478229
-5	0.1708155	0.1493232	0.1609701
-4	0.2438885	0.2337732	0.2508107
-3	0.3169427	0.3361767	0.4337983
-2	0.4329746	0.3931466	0.4342779
-1	1.0516924	0.8674832	0.7807641
0	1.7978243	1.5505643	1.4051325
1	1.0675715	1.0423768	1.0040811
2	0.5351865	0.5038495	0.4878373
3	0.4519963	0.4270173	0.4812434
4	0.3309060	0.3828022	0.4419337
5	0.2762479	0.2635297	0.2028640
6	0.1905674	0.1565562	0.1169273
7	0.0995434	0.1129027	0.1079088
8	0.0620233	0.0718980	0.0890772
9	0.0619225	0.0502472	0.0625397
10	0.0607133	0.0400962	0.0482072
11	0.0546664	0.0449281	0.0473621
12	0.0452656	0.0423777	0.0464672
13	0.0479702	0.0483434	0.0452600
14	0.0366648	0.0345436	0.0376233
15	0.0371400	0.0340221	0.0283257
16	0.0387311	0.0306332	0.0253266
17	0.0315258	0.0272609	0.0226674
18	0.0363730	0.0253639	0.0223564
19	0.0437887	0.0324484	0.0210349
20	0.0381613	0.0339078	0.0230359

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 16 TO 18

	16	17	18
-20	0.0311131	0.0315058	0.0303450
-19	0.0320050	0.0321471	0.0280771
-18	0.0323936	0.0318400	0.0321995
-17	0.0387377	0.0274356	0.0290400
-16	0.0423374	0.0309779	0.0291646
-15	0.0356632	0.0278477	0.0338258
-14	0.0298374	0.0301204	0.0402334
-13	0.0348258	0.0465179	0.0544700
-12	0.0481607	0.0700497	0.0858292
-11	0.0572813	0.0599676	0.0672238
-10	0.0680570	0.0540092	0.0488212
-9	0.0787570	0.0638308	0.0555349
-8	0.0988841	0.0984423	0.0911435
-7	0.1305907	0.1287067	0.1327503
-6	0.1547458	0.1446573	0.1458467
-5	0.1741192	0.1472550	0.1438692
-4	0.2647177	0.2428830	0.2192468
-3	0.4257984	0.3579899	0.3203534
-2	0.4673993	0.4908851	0.4760160
-1	0.6648124	0.6595109	0.6315914
0	1.0507628	0.8238309	0.6892039
1	0.8344093	0.7885109	0.6777073
2	0.4961061	0.5859755	0.5866534
3	0.4887014	0.4632540	0.4502878
4	0.3813454	0.3154534	0.3017457
5	0.1832388	0.1814306	0.1757539
6	0.1147905	0.1246388	0.1247753
7	0.1095425	0.1110759	0.0958781
8	0.1044279	0.0881704	0.0687791
9	0.0825533	0.0791454	0.0820645
10	0.0647154	0.0745781	0.0821974
11	0.0521436	0.0623040	0.0613520
12	0.0553628	0.0592090	0.0413795
13	0.0553251	0.0652672	0.0448618
14	0.0503517	0.0531498	0.0382531
15	0.0381850	0.0388871	0.0323350
16	0.0302166	0.0304137	0.0308131
17	0.0238342	0.0266291	0.0296844
18	0.0253851	0.0230591	0.0250677
19	0.0261074	0.0284068	0.0286068
20	0.0259861	0.0285486	0.0316625

ABERDEEN 1

THE CORRECTED SPECTRUM. (F-STAR)

COLUMNS 19 TO 21

	19	20	21
-20	0.0313828	0.0285176	0.
-19	0.0272223	0.0264370	0.
-18	0.0325598	0.0279430	0.
-17	0.0315641	0.0245279	0.
-16	0.0285395	0.0243104	0.
-15	0.0357228	0.0325789	0.
-14	0.0467582	0.0443348	0.
-13	0.0574596	0.0509646	0.
-12	0.0749854	0.0556984	0.
-11	0.0605105	0.0476754	0.
-10	0.0599040	0.0614403	0.
-9	0.0722839	0.0796949	0.
-8	0.0786199	0.0737540	0.
-7	0.0835455	0.0706128	0.
-6	0.1083271	0.0971388	0.
-5	0.1889523	0.1977556	0.
-4	0.2447439	0.2482429	0.
-3	0.3177641	0.2944727	0.
-2	0.5152062	0.5370281	0.
-1	0.5323121	0.5524264	0.
0	0.4797850	0.4387938	0.
1	0.5414007	0.4721823	0.
2	0.5377045	0.5207231	0.
3	0.4081773	0.4206351	0.
4	0.2946810	0.2884251	0.
5	0.2096932	0.2188908	0.
6	0.1383121	0.1268437	0.
7	0.0971311	0.0817463	0.
8	0.0785695	0.0744080	0.
9	0.0855457	0.0756488	0.
10	0.0803386	0.0757377	0.
11	0.0598366	0.0611414	0.
12	0.0363083	0.0363007	0.
13	0.0289255	0.0257001	0.
14	0.0318487	0.0318515	0.
15	0.0416948	0.0451661	0.
16	0.0417981	0.0433553	0.
17	0.0339542	0.0359854	0.
18	0.0301690	0.0337683	0.
19	0.0302155	0.0308973	0.
20	0.0307728	0.0297898	0.

ABERDEEN 2

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS -2 TO -0

	-2	-1	0
-20	0.0743054	0.0708393	0.0595038
-19	0.1084097	0.1011915	0.0774864
-18	0.1268283	0.1255911	0.1102049
-17	0.1325654	0.1074179	0.1030235
-16	0.1383869	0.1188853	0.1025851
-15	0.1356610	0.1426038	0.1165331
-14	0.0962707	0.0924363	0.0958991
-13	0.0758306	0.0744857	0.0928864
-12	0.0735147	0.1082429	0.1578135
-11	0.1051727	0.1561569	0.2129002
-10	0.1660107	0.2312500	0.3257459
-9	0.2022388	0.3225246	0.5990151
-8	0.1991903	0.3408803	0.6383777
-7	0.2179398	0.3522593	0.5761743
-6	0.2838203	0.4288296	0.7009215
-5	0.5990654	0.8160261	1.0321509
-4	1.2983709	1.9814663	1.8760685
-3	3.8927696	5.4098781	5.1154030
-2	18.3147862	18.7220552	17.0516348
-1	79.0035963	123.1675091	142.2067280
0	112.8339157	488.8446007	~~217.8251572~~
1	51.7477341	117.0818882	142.2067184
2	14.0895617	18.1684973	17.0516338
3	3.0069965	4.1838364	5.1154027
4	1.0872036	1.4740255	1.8760685
5	0.4810254	0.7867245	1.0321509
6	0.3692588	0.5770292	0.7009215
7	0.3690671	0.5198358	0.5761742
8	0.4099894	0.5900781	0.6383777
9	0.4464726	0.6279109	0.5990151
10	0.3199062	0.3685296	0.3257459
11	0.1594400	0.2036361	0.2129002
12	0.1257499	0.1664957	0.1578135
13	0.0978101	0.1165352	0.0928864
14	0.1197419	0.1135722	0.0958991
15	0.1624007	0.1037734	0.1165331
16	0.1752184	0.1155001	0.1025851
17	0.1430601	0.1328912	0.1030235
18	0.1037102	0.1047692	0.1102049
19	0.0597437	0.0573658	0.0774864
20	0.0631260	0.0562004	0.0595038

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0562004	0.0631259	0.0541328
-19	0.0573658	0.0597437	0.0620134
-18	0.1047692	0.1037102	0.1033848
-17	0.1328912	0.1430601	0.1353739
-16	0.1155001	0.1752184	0.1753325
-15	0.1037734	0.1624007	0.1735457
-14	0.1135722	0.1197419	0.1194233
-13	0.1165353	0.0978101	0.0853628
-12	0.1664957	0.1257499	0.0899367
-11	0.2036361	0.1594400	0.1254520
-10	0.3685297	0.3199062	0.2219425
-9	0.6279109	0.4464726	0.3319846
-8	0.5900781	0.4099894	0.3432074
-7	0.5198358	0.3690671	0.2521163
-6	0.5770292	0.3692588	0.2734223
-5	0.7867246	0.4810254	0.3552686
-4	1.4740256	1.0872036	0.5494031
-3	4.1838356	3.0069964	1.0784853
-2	18.1684947	14.0895615	5.3514383
-1	117.0820522	51.7477684	26.0047507
0	488.8443451	112.8338547	57.6409593
1	123.1676817	79.0036469	41.7935910
2	18.7220521	18.3147864	11.4639678
3	5.4098770	3.8927696	1.9784536
4	1.9814663	1.2983709	0.5666785
5	0.8160261	0.5990654	0.3881913
6	0.4288296	0.2838203	0.2959131
7	0.3522593	0.2179398	0.2168312
8	0.3408803	0.1991903	0.2081636
9	0.3225246	0.2022389	0.1867097
10	0.2312500	0.1660107	0.1175860
11	0.1561569	0.1052727	0.0741795
12	0.1082429	0.0735147	0.0598936
13	0.0744856	0.0758306	0.0686569
14	0.0924363	0.0962707	0.1107965
15	0.1426038	0.1356610	0.1485586
16	0.1188853	0.1383869	0.1468632
17	0.1074179	0.1325653	0.1250070
18	0.1255911	0.1268283	0.1163335
19	0.1011915	0.1084097	0.1033588
20	0.0708393	0.0743054	0.0686436

ABERDEEN 2

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0457539	0.0596948	0.0765529
-19	0.0666980	0.0729976	0.0769338
-18	0.1169901	0.1107575	0.0883637
-17	0.1588560	0.1484034	0.1044740
-16	0.1523806	0.1348309	0.1073795
-15	0.1689065	0.1334806	0.1042968
-14	0.1366928	0.1184284	0.1164389
-13	0.0844844	0.0719081	0.0798920
-12	0.0683147	0.0621214	0.0625942
-11	0.0948227	0.0925573	0.0773210
-10	0.1700942	0.1598467	0.1192758
-9	0.3098031	0.2225577	0.1481581
-8	0.3082578	0.2429700	0.1886050
-7	0.1982380	0.2021276	0.1766616
-6	0.2216075	0.2115998	0.1908398
-5	0.2593486	0.2410887	0.1982629
-4	0.2339643	0.2284039	0.2269167
-3	0.3118317	0.3380941	0.4108939
-2	1.5370810	0.7853413	0.7672264
-1	13.4320400	4.7202604	1.8567151
0	29.5646057	10.3107179	3.6183653
1	17.3779602	6.0812518	2.7026721
2	4.4459181	1.5477606	0.8803145
3	0.8856216	0.4536080	0.3366179
4	0.3489801	0.2953416	0.2973811
5	0.2935626	0.2687614	0.2240237
6	0.2718551	0.2146341	0.1714333
7	0.1925958	0.1651374	0.1885550
8	0.1512076	0.1253232	0.1685889
9	0.1231862	0.0886270	0.1001424
10	0.0861853	0.1021914	0.0941297
11	0.0700615	0.1186531	0.1214157
12	0.0604645	0.0869069	0.0861822
13	0.0507162	0.0581194	0.0621388
14	0.0934525	0.0688769	0.0613179
15	0.1539358	0.1463764	0.1146208
16	0.1424854	0.1645110	0.1287344
17	0.0842270	0.0929589	0.0927549
18	0.0906569	0.0857476	0.0694453
19	0.0845371	0.0901880	0.0736147
20	0.0634247	0.0717676	0.0630734

ABERDEEN 2

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 7 TO 9

	7	8	9
-20	0.0779450	0.0702540	0.0412511
-19	0.0772379	0.0762345	0.0550229
-18	0.0739695	0.0792051	0.0709494
-17	0.0815242	0.1115655	0.0966265
-16	0.0904842	0.1103225	0.0956075
-15	0.1009992	0.0933306	0.0791423
-14	0.1345340	0.1170037	0.0838525
-13	0.1114357	0.1086832	0.0852126
-12	0.0643960	0.0628287	0.0643875
-11	0.0535888	0.0529512	0.0650909
-10	0.0906188	0.0819466	0.0809099
-9	0.1235246	0.1053113	0.1128981
-8	0.1269084	0.0882933	0.1093672
-7	0.1362246	0.1040126	0.1002015
-6	0.1636980	0.1261586	0.1120657
-5	0.1587473	0.1528416	0.1459550
-4	0.1982889	0.2175793	0.2203231
-3	0.3467149	0.3386810	0.3150238
-2	0.5767537	0.4392785	0.3333858
-1	1.2312998	1.2389344	1.1998470
0	2.1718406	2.2505217	2.2952055
1	1.7514337	1.5808729	1.3426357
2	0.7441375	0.6933921	0.4422924
3	0.2989253	0.2684439	0.1972207
4	0.2470260	0.1744666	0.1562545
5	0.1772216	0.1229896	0.1047611
6	0.1520257	0.1113383	0.0874907
7	0.1665049	0.1154192	0.0832458
8	0.1475700	0.1462481	0.1610498
9	0.1025291	0.1297143	0.1689104
10	0.0870549	0.1141291	0.1271403
11	0.1038550	0.1412319	0.1256425
12	0.0819072	0.1096164	0.0936498
13	0.0648871	0.0733373	0.0529463
14	0.0564205	0.0570007	0.0481087
15	0.0673286	0.0531554	0.0593181
16	0.0701145	0.0645512	0.0880391
17	0.0731455	0.0629795	0.0794358
18	0.0560138	0.0538049	0.0507355
19	0.0554999	0.0628431	0.0512291
20	0.0563080	0.0689162	0.0592425

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

	10	11	12
-20	0.0329113	0.0468523	0.0544895
-19	0.0432168	0.0492131	0.0553971
-18	0.0634390	0.0496456	0.0498323
-17	0.0709226	0.0545143	0.0543456
-16	0.0593880	0.0516675	0.0566203
-15	0.0551954	0.0462717	0.0488550
-14	0.0644350	0.0611262	0.0658748
-13	0.0721539	0.0728107	0.0713602
-12	0.0647588	0.0668528	0.0608379
-11	0.0599462	0.0594648	0.0637703
-10	0.0645157	0.0555962	0.0682686
-9	0.1039605	0.0773276	0.0618212
-8	0.1283221	0.1022240	0.0623817
-7	0.1130167	0.0972665	0.0634608
-6	0.1016905	0.0776932	0.0581986
-5	0.1308435	0.1060245	0.0926227
-4	0.1813410	0.1297573	0.1094139
-3	0.2351729	0.1838987	0.1403964
-2	0.2750446	0.2812425	0.2318199
-1	0.8030274	0.4992883	0.4591503
0	1.5489755	0.8274261	0.7544518
1	0.9378727	0.6087899	0.5245765
2	0.2849361	0.2501873	0.2095568
3	0.1318528	0.1005287	0.1180660
4	0.1241122	0.1089465	0.1376976
5	0.0984853	0.1110954	0.1404540
6	0.0744010	0.0876829	0.1105902
7	0.0733866	0.0855023	0.0950854
8	0.1327740	0.1012614	0.0870602
9	0.1581308	0.1103856	0.0811972
10	0.1259675	0.1001263	0.0679559
11	0.0846776	0.0687673	0.0600799
12	0.0572382	0.0483100	0.0461186
13	0.0331673	0.0349817	0.0465628
14	0.0333653	0.0458832	0.0684812
15	0.0555764	0.0579867	0.0771130
16	0.0793651	0.0623798	0.0659217
17	0.0697057	0.0615752	0.0553414
18	0.0446186	0.0531121	0.0453614
19	0.0363422	0.0495601	0.0551729
20	0.0409697	0.0565958	0.0670757

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0507649	0.0558101	0.0609762
-19	0.0589422	0.0630147	0.0555049
-18	0.0618041	0.0727929	0.0604606
-17	0.0562209	0.0659051	0.0546799
-16	0.0543323	0.0511936	0.0426224
-15	0.0493482	0.0440673	0.0488565
-14	0.0478058	0.0397762	0.0546052
-13	0.0604091	0.0568695	0.0487706
-12	0.0617766	0.0537394	0.0409612
-11	0.0689581	0.0482607	0.0431318
-10	0.0780562	0.0563899	0.0472318
-9	0.0695712	0.0735614	0.0686677
-8	0.0617082	0.0729162	0.1021610
-7	0.0549458	0.0575715	0.0992100
-6	0.0574915	0.0606951	0.0882639
-5	0.1036484	0.1145544	0.1158405
-4	0.1130048	0.1468276	0.1643009
-3	0.1185529	0.1526297	0.1811955
-2	0.1702687	0.2200188	0.2782209
-1	0.5291860	0.6059876	0.5140405
0	0.9229181	0.9402079	0.6978213
1	0.5371938	0.5712734	0.4852295
2	0.1930569	0.2511726	0.2341281
3	0.1202352	0.1404055	0.1626876
4	0.1093020	0.1130340	0.1627232
5	0.1017616	0.1000296	0.1427137
6	0.1039946	0.1096540	0.1048742
7	0.1332768	0.1490417	0.0970293
8	0.1228376	0.1391282	0.1022208
9	0.0930778	0.0977513	0.0968247
10	0.0752548	0.0722761	0.0642455
11	0.0537159	0.0580680	0.0583874
12	0.0447456	0.0512273	0.0518142
13	0.0455969	0.0370120	0.0383926
14	0.0571465	0.0370090	0.0390092
15	0.0707102	0.0498786	0.0442643
16	0.0667835	0.0499846	0.0376353
17	0.0462331	0.0345660	0.0354370
18	0.0426053	0.0437614	0.0531889
19	0.0486324	0.0525564	0.0688738
20	0.0544402	0.0584294	0.0803557

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 16 TO 18

	16	17	18
-20	0.0564720	0.0445448	0.0468086
-19	0.0488736	0.0457570	0.0466668
-18	0.0464629	0.0487280	0.0521151
-17	0.0426271	0.0461848	0.0567265
-16	0.0374983	0.0403006	0.0575694
-15	0.0481531	0.0394381	0.0455485
-14	0.0525481	0.0267730	0.0290285
-13	0.0407076	0.0314085	0.0324440
-12	0.0378099	0.0408653	0.0436177
-11	0.0478515	0.0452818	0.0490129
-10	0.0501335	0.0457988	0.0507989
-9	0.0657108	0.0647022	0.0618348
-8	0.0931780	0.0742906	0.0781412
-7	0.1117697	0.0905736	0.0908332
-6	0.1144931	0.1077837	0.0899780
-5	0.1082215	0.1047951	0.0909339
-4	0.1302014	0.0996431	0.0930708
-3	0.1460629	0.1092954	0.1084555
-2	0.2722140	0.2424515	0.1880670
-1	0.4534730	0.5320258	0.5351751
0	0.5379362	0.6378690	0.7811717
1	0.3777352	0.3614116	0.4067258
2	0.1957638	0.1742753	0.1526653
3	0.1578220	0.1202279	0.0858762
4	0.1653563	0.1050160	0.0561780
5	0.1540561	0.1190470	0.0748437
6	0.1096702	0.1239566	0.1041308
7	0.0746916	0.0809661	0.0751672
8	0.0648574	0.0589414	0.0695611
9	0.0717796	0.0782791	0.1035656
10	0.0702646	0.1066202	0.1345761
11	0.0762640	0.1007971	0.1060895
12	0.0708744	0.0803806	0.0624421
13	0.0541303	0.0559694	0.0509553
14	0.0433287	0.0472520	0.0479298
15	0.0396695	0.0415885	0.0371477
16	0.0354601	0.0396010	0.0388768
17	0.0432649	0.0435266	0.0424250
18	0.0611219	0.0478673	0.0371990
19	0.0777287	0.0636794	0.0387296
20	0.0866289	0.0704404	0.0423171

ABERDEEN 2

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 19 TO 21

	19	20	21
-20	0.0573713	0.0595749	0.
-19	0.0442506	0.0425680	0.
-18	0.0403490	0.0345807	0.
-17	0.0532820	0.0432708	0.
-16	0.0639919	0.0547322	0.
-15	0.0510622	0.0490659	0.
-14	0.0438430	0.0496635	0.
-13	0.0470606	0.0531043	0.
-12	0.0501503	0.0565429	0.
-11	0.0569855	0.0582737	0.
-10	0.0647727	0.0640764	0.
-9	0.0576368	0.0567302	0.
-8	0.0726975	0.0695997	0.
-7	0.0928982	0.0943792	0.
-6	0.0731095	0.0686386	0.
-5	0.0793438	0.0755718	0.
-4	0.1005666	0.1031612	0.
-3	0.1017591	0.0942739	0.
-2	0.1083256	0.0784992	0.
-1	0.3573219	0.2320560	0.
0	0.6604056	0.4724736	0.
1	0.3761336	0.2977621	0.
2	0.1388816	0.1249842	0.
3	0.0815905	0.0819385	0.
4	0.0505607	0.0620932	0.
5	0.0596325	0.0726189	0.
6	0.0627025	0.0468177	0.
7	0.0493885	0.0323885	0.
8	0.0688376	0.0593809	0.
9	0.1045835	0.0960993	0.
10	0.0976389	0.0793709	0.
11	0.0666847	0.0537599	0.
12	0.0477027	0.0495032	0.
13	0.0581133	0.0612034	0.
14	0.0501321	0.0514926	0.
15	0.0323214	0.0334341	0.
16	0.0325525	0.0281517	0.
17	0.0367869	0.0285680	0.
18	0.0313281	0.0248403	0.
19	0.0283274	0.0244529	0.
20	0.0303714	0.0251610	0.

KNOX 1

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS -2 TO -0

	-2	-1	0
-20	0.1272107	0.0864814	0.0844855
-19	0.2010619	0.1304863	0.0909311
-18	0.1932322	0.1628502	0.1228667
-17	0.1419995	0.1474041	0.1581444
-16	0.1998643	0.1856363	0.1526455
-15	0.2280674	0.1900898	0.1333186
-14	0.1790974	0.1497012	0.1082088
-13	0.1149561	0.1033960	0.0900108
-12	0.1197504	0.0936101	0.1059158
-11	0.2663172	0.2114950	0.1611224
-10	0.5925099	0.5385110	0.2940069
-9	1.1497118	0.9830367	0.5480918
-8	1.3676932	1.2360228	0.8796579
-7	1.0122930	1.1040975	1.1046756
-6	0.7162222	0.9113233	1.2338899
-5	0.7232239	0.9385373	1.3122940
-4	1.4249908	2.0962933	2.3556215
-3	3.5167292	6.9591979	7.1229646
-2	8.1449935	20.1443622	25.2384474
-1	14.3806163	67.6661806	194.5325775
0	19.1320381	192.1740417	
1	15.5062995	55.6951785	194.5325794
2	9.9295180	16.0265045	25.2384479
3	3.9568072	5.2020443	7.1229647
4	1.3362298	1.9177225	2.3556215
5	0.6849147	1.0358326	1.3122940
6	0.5550323	0.8582522	1.2338899
7	0.4830385	0.7305766	1.1046756
8	0.3848409	0.5747663	0.8796579
9	0.3077211	0.3810546	0.5480918
10	0.2401798	0.2227862	0.2940069
11	0.2104368	0.1960426	0.1611224
12	0.1557494	0.1568108	0.1059158
13	0.1168016	0.1097577	0.0900108
14	0.1335438	0.1139984	0.1082088
15	0.1808916	0.1462657	0.1333186
16	0.2744058	0.2101301	0.1526455
17	0.2458591	0.2051493	0.1581444
18	0.1376253	0.1318486	0.1228667
19	0.0688005	0.0850268	0.0909312
20	0.0706619	0.0769692	0.0844855

KNOX 1

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0769692	0.0706619	0.0746394
-19	0.0850268	0.0688005	0.0750857
-18	0.1318486	0.1376253	0.1307370
-17	0.2051493	0.2458591	0.2037846
-16	0.2101301	0.2744057	0.2080846
-15	0.1462657	0.1808916	0.1573641
-14	0.1139984	0.1335438	0.1210458
-13	0.1097578	0.1168016	0.1066033
-12	0.1568108	0.1557494	0.0967056
-11	0.1960426	0.2104368	0.1358051
-10	0.2227862	0.2401798	0.1932147
-9	0.3810546	0.3077211	0.2807809
-8	0.5747663	0.3848409	0.4161863
-7	0.7305766	0.4830385	0.4850798
-6	0.8582522	0.5550323	0.4617475
-5	1.0358326	0.6849147	0.4693919
-4	1.9177226	1.3362299	0.8099744
-3	5.2020433	3.9568072	1.9856123
-2	16.0265019	9.9295180	4.1207638
-1	55.6952553	15.5063092	5.3C01947
0	192.1739407	19.1320283	5.3724184
1	67.6662760	14.3806255	6.2729246
2	20.1443591	8.1449934	5.0321791
3	6.9591967	3.5167292	2.2442219
4	2.0962933	1.4249908	1.2115444
5	0.9385373	0.7232240	0.9731313
6	0.9113234	0.7162222	0.9C00147
7	1.1040975	1.0122930	0.8863152
8	1.2360229	1.3676933	0.9755242
9	0.9830367	1.1497118	0.8389395
10	0.5385110	0.5925099	0.4927411
11	0.2114950	0.2663172	0.2685119
12	0.0936101	0.1197504	0.1403630
13	0.1033960	0.1149561	0.0957424
14	0.1497012	0.1790974	0.1553587
15	0.1900898	0.2280674	0.2145525
16	0.1856363	0.1998643	0.2121421
17	0.1474041	0.1419996	0.1695699
18	0.1628502	0.1932322	0.1619064
19	0.1304863	0.2010619	0.1669440
20	0.0864814	0.1272108	0.1273565

KNOX 1

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0598721	0.0534923	0.0571420
-19	0.0716032	0.0693797	0.0753291
-18	0.1284656	0.1191770	0.1242553
-17	0.1776155	0.1405380	0.1305327
-16	0.1752970	0.1426170	0.1180612
-15	0.1146493	0.0930880	0.0973491
-14	0.0690591	0.0589222	0.0893358
-13	0.0683922	0.0528928	0.0703528
-12	0.0672077	0.0611197	0.0587076
-11	0.0937755	0.0816663	0.0535272
-10	0.1280717	0.0888543	0.0768712
-9	0.1967944	0.1238017	0.1080584
-8	0.3265937	0.1849999	0.1402236
-7	0.4103553	0.2493693	0.1571921
-6	0.4287665	0.3160897	0.1985019
-5	0.4172999	0.3145055	0.2128228
-4	0.4968512	0.3330056	0.2255911
-3	0.8184550	0.4242771	0.2496342
-2	1.2525779	0.5171044	0.3374651
-1	1.6466021	0.5588398	0.3388922
0	2.1918710	0.8540229	0.4299859
1	4.0949972	2.1946326	0.9294254
2	4.1386778	3.0180928	1.6836408
3	1.6899977	1.5513428	1.3773080
4	0.7858310	0.6087477	0.7053279
5	0.8303102	0.6894067	0.6218869
6	0.6691388	0.7645505	1.1036397
7	0.4897207	0.6768697	1.2714997
8	0.5156120	0.4389988	0.6411617
9	0.5230557	0.3232734	0.2620016
10	0.3750592	0.2886550	0.1937584
11	0.2145048	0.2061212	0.1412944
12	0.1124205	0.1111544	0.1050124
13	0.0771137	0.0806668	0.1206692
14	0.1243051	0.1172672	0.1251296
15	0.2011105	0.1888996	0.1495726
16	0.2792737	0.2944583	0.2124978
17	0.2535326	0.2993751	0.2269423
18	0.1399991	0.1547816	0.1444613
19	0.0987554	0.1027557	0.1176172
20	0.0823059	0.0884054	0.0973968

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 7 TO 9

	7	8	9
-20	0.0564868	0.0501840	0.0507205
-19	0.0744033	0.0632723	0.0584369
-18	0.1110722	0.0852098	0.0700733
-17	0.1174556	0.0973151	0.0819857
-16	0.1042882	0.0875643	0.0762492
-15	0.0906858	0.0717018	0.0693983
-14	0.0833703	0.0622659	0.0600472
-13	0.0680823	0.0626518	0.0543479
-12	0.0568287	0.0612461	0.0604138
-11	0.0565950	0.0571142	0.0474702
-10	0.0905506	0.0683797	0.0421562
-9	0.1007125	0.0796094	0.0645835
-8	0.1244402	0.1042024	0.0903090
-7	0.1466364	0.1362894	0.1157512
-6	0.1665140	0.1465228	0.1238415
-5	0.1617892	0.1256715	0.1006429
-4	0.1478299	0.1113609	0.0928473
-3	0.1591024	0.1398960	0.1036195
-2	0.1884144	0.1497379	0.1213056
-1	0.2152143	0.1591764	0.1458143
0	0.2841817	0.1842551	0.1580712
1	0.3819932	0.2155680	0.1896794
2	0.7446987	0.3753708	0.2860966
3	0.9600953	0.6063291	0.4312045
4	0.7043938	0.5438879	0.4542093
5	0.5093301	0.3517390	0.2995677
6	0.7425468	0.3218443	0.1932292
7	0.9779208	0.3337389	0.1372194
8	0.5976501	0.2808618	0.1331633
9	0.2583123	0.2148783	0.1337742
10	0.1445123	0.1623767	0.1684509
11	0.1061132	0.1431529	0.1819801
12	0.1084740	0.1252833	0.1335618
13	0.1437617	0.1082140	0.1019401
14	0.1418444	0.1090803	0.0934615
15	0.1236866	0.0995698	0.0938206
16	0.1274320	0.1136747	0.1079087
17	0.1353126	0.1237658	0.1269655
18	0.1205490	0.1030120	0.1022178
19	0.0901769	0.0831680	0.0605207
20	0.0663836	0.0485954	0.0442519

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

	10	11	12
-20	0.0485654	0.0399553	0.0341383
-19	0.0632739	0.0529808	0.0436185
-18	0.0760804	0.0616187	0.0549902
-17	0.0644195	0.0483566	0.0555648
-16	0.0592501	0.0465203	0.0508764
-15	0.0609360	0.0601275	0.0697712
-14	0.0541081	0.0604749	0.0748228
-13	0.0510636	0.0586150	0.0634225
-12	0.0720739	0.0704272	0.0501424
-11	0.0522239	0.0620729	0.0553393
-10	0.0357476	0.0514252	0.0546550
-9	0.0515943	0.0487047	0.0370917
-8	0.0759010	0.0559409	0.0474973
-7	0.0773878	0.0510449	0.0601478
-6	0.0799135	0.0587309	0.0667351
-5	0.0685097	0.0493805	0.0493351
-4	0.0710147	0.0480933	0.0402422
-3	0.0741985	0.0612944	0.0522726
-2	0.0941277	0.0763607	0.0608828
-1	0.1277868	0.1006561	0.0714529
0	0.1284681	0.0925775	0.0608936
1	0.1190692	0.0690194	0.0579227
2	0.1641388	0.0859354	0.0874906
3	0.2599189	0.1448315	0.1533360
4	0.3724217	0.2621220	0.2191775
5	0.3394437	0.3246724	0.2940645
6	0.1733225	0.1999202	0.2389425
7	0.0888014	0.0986167	0.1314930
8	0.0883848	0.0863915	0.0898081
9	0.1131821	0.1053096	0.0843158
10	0.1433025	0.1074536	0.0964557
11	0.1693444	0.1353450	0.1305075
12	0.1576024	0.1968305	0.2151757
13	0.1355276	0.1727906	0.2119473
14	0.1090328	0.1083221	0.1304261
15	0.0928326	0.0929706	0.0905446
16	0.0791723	0.0771308	0.0653007
17	0.0884564	0.0623479	0.0519741
18	0.0813527	0.0579593	0.0528159
19	0.0576028	0.0616686	0.0565913
20	0.0412005	0.0558549	0.0581100

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0284687	0.0322691	0.0430109
-19	0.0311517	0.0282661	0.0357402
-18	0.0401660	0.0323075	0.0320749
-17	0.0511564	0.0403152	0.0400783
-16	0.0480080	0.0374338	0.0515893
-15	0.0613508	0.0412006	0.0452535
-14	0.0684958	0.0414497	0.0323572
-13	0.0644631	0.0457504	0.0371529
-12	0.0507377	0.0572471	0.0482397
-11	0.0497008	0.0660495	0.0686000
-10	0.0522952	0.0570788	0.0695390
-9	0.0421722	0.0407206	0.0600482
-8	0.0452506	0.0440618	0.0572399
-7	0.0462291	0.0394464	0.0497817
-6	0.0523241	0.0353917	0.0391719
-5	0.0452867	0.0382255	0.0334249
-4	0.0433260	0.0315016	0.0296438
-3	0.0518094	0.0388089	0.0416997
-2	0.0567804	0.0572971	0.0615985
-1	0.0761259	0.0815055	0.0766169
0	0.0612259	0.0715219	0.0886182
1	0.0556533	0.0625944	0.0883034
2	0.0927885	0.0789636	0.0655195
3	0.1654249	0.1204147	0.0593194
4	0.1826915	0.1360820	0.0966396
5	0.2214255	0.1204352	0.0919957
6	0.2130904	0.1035011	0.0630223
7	0.1587235	0.1094743	0.0820838
8	0.1194315	0.1219123	0.0923271
9	0.0738392	0.1131050	0.0936134
10	0.0766357	0.0843818	0.0800377
11	0.1052957	0.0727709	0.0684234
12	0.1711366	0.1003697	0.0623784
13	0.1793737	0.1030696	0.0549608
14	0.1154749	0.0743919	0.0527153
15	0.0780432	0.0610681	0.0543666
16	0.0666699	0.0568860	0.0397881
17	0.0564270	0.0533845	0.0397300
18	0.0601330	0.0545349	0.0467567
19	0.0453051	0.0695204	0.0564650
20	0.0673247	0.0737883	0.0573761

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 16 TO 18

	16	17	18
-20	0.0387676	0.0362570	0.0301265
-19	0.0398422	0.0374602	0.0371986
-18	0.0378125	0.0376572	0.0465919
-17	0.0398475	0.0376286	0.0473649
-16	0.0538551	0.0433784	0.0432568
-15	0.0611732	0.0550376	0.0377001
-14	0.0486392	0.0500128	0.0376566
-13	0.0463868	0.0430294	0.0352414
-12	0.0393438	0.0377297	0.0387886
-11	0.0458879	0.0431520	0.0479858
-10	0.0532641	0.0450224	0.0470383
-9	0.0652575	0.0624218	0.0565721
-8	0.0795126	0.0745079	0.0646492
-7	0.0771183	0.0800352	0.0616840
-6	0.0586801	0.0646976	0.0435060
-5	0.0386320	0.0429029	0.0291759
-4	0.0472100	0.0586301	0.0411238
-3	0.0507776	0.0628344	0.0570150
-2	0.0670296	0.0698278	0.0616415
-1	0.0934516	0.0986776	0.0665297
0	0.1028590	0.0976407	0.0770950
1	0.1112169	0.1111828	0.0932637
2	0.0770464	0.0780362	0.0647454
3	0.0484705	0.0469258	0.0385972
4	0.0868803	0.0715782	0.0512806
5	0.1153C84	0.1043859	0.0632617
6	0.0776980	0.0917937	0.0795121
7	0.0616303	0.0586053	0.0669318
8	0.0558662	0.0486230	0.0591752
9	0.0608952	0.0496162	0.0523861
10	0.0838645	0.0673388	0.0451895
11	0.0791287	0.0660996	0.0433860
12	0.0562468	0.0480152	0.0352000
13	0.0468131	0.0448044	0.0339244
14	0.0457168	0.0442016	0.0407049
15	0.0444784	0.0418728	0.0464402
16	0.0365774	0.0438191	0.0502657
17	0.0406204	0.0486731	0.0493279
18	0.0459661	0.0449832	0.0400872
19	0.0417674	0.0342783	0.0339377
20	0.0391068	0.0329399	0.0364138

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 19 TO 21

	19	20	21
-20	0.0372C17	0.0440921	0.
-19	0.0408C50	0.0405318	0.
-18	0.0423934	0.0356298	0.
-17	0.0382228	0.0319543	0.
-16	0.0365C11	0.0298433	0.
-15	0.0368760	0.0409617	0.
-14	0.0448968	0.0600199	0.
-13	0.0453724	0.0548783	0.
-12	0.0442591	0.0459265	0.
-11	0.0429406	0.0409090	0.
-10	0.0417502	0.0355348	0.
-9	0.0496844	0.0398904	0.
-8	0.0502407	0.0449174	0.
-7	0.0373499	0.0401172	0.
-6	0.0337309	0.0464373	0.
-5	0.0286839	0.0419349	0.
-4	0.0312596	0.0355824	0.
-3	0.0463109	0.0475183	0.
-2	0.0566C57	0.0611135	0.
-1	0.0581802	0.0649105	0.
0	0.0626728	0.0565123	0.
1	0.0669941	0.0443763	0.
2	0.0524302	0.0356022	0.
3	0.0449135	0.0455810	0.
4	0.0450785	0.0439474	0.
5	0.0361847	0.0323148	0.
6	0.0471168	0.0297697	0.
7	0.0679898	0.0496751	0.
8	0.0744C14	0.0695827	0.
9	0.0576226	0.0643085	0.
10	0.0453341	0.0536131	0.
11	0.0450861	0.0502529	0.
12	0.0399290	0.0454096	0.
13	0.0329771	0.0378452	0.
14	0.0380370	0.0379366	0.
15	0.0440C40	0.0403837	0.
16	0.0457613	0.0449186	0.
17	0.0453822	0.0432554	0.
18	0.0421495	0.0405826	0.
19	0.0403C90	0.0388356	0.
20	0.0424230	0.0401267	0.

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS -2 TO -0

	-2	-1	0
-20	0.0070581	0.0105714	0.0098282
-19	0.0062749	0.0085756	0.0098886
-18	0.0069679	0.0072791	0.0090191
-17	0.0088049	0.0088917	0.0087310
-16	0.0073754	0.0078702	0.0087848
-15	0.0071530	0.0076052	0.0098128
-14	0.0086548	0.0091549	0.0133187
-13	0.0106120	0.0111207	0.0142220
-12	0.0124117	0.0144142	0.0152064
-11	0.0146030	0.0154355	0.0152793
-10	0.0201077	0.0198589	0.0170468
-9	0.0247354	0.0227797	0.0195338
-8	0.0309576	0.0270114	0.0251610
-7	0.0426797	0.0425972	0.0384874
-6	0.0470874	0.0532012	0.0584598
-5	0.0625143	0.0809758	0.1141492
-4	0.0877669	0.1456647	0.2256570
-3	0.2669641	0.3898418	0.4809730
-2	0.8780789	1.7661244	1.9425514
-1	4.6125424	14.6153409	25.6133523
0	12.5290922	75.9200468	
1	5.9286816	14.7980665	25.6133525
2	1.5507860	2.1246417	1.9425514
3	0.7103546	0.6135511	0.4809730
4	0.3564850	0.2655522	0.2256570
5	0.1340037	0.1297927	0.1141492
6	0.0728431	0.0697025	0.0584598
7	0.0553185	0.0494811	0.0384874
8	0.0320669	0.0308129	0.0251610
9	0.0178098	0.0177520	0.0195338
10	0.0142318	0.0145080	0.0170468
11	0.0130455	0.0144338	0.0152793
12	0.0113678	0.0146147	0.0152064
13	0.0102180	0.0138129	0.0142220
14	0.0133004	0.0151780	0.0133187
15	0.0125247	0.0133751	0.0098128
16	0.0094259	0.0110502	0.0087848
17	0.0090064	0.0097845	0.0087310
18	0.0109496	0.0107743	0.0090191
19	0.0084056	0.0089587	0.0098886
20	0.0062236	0.0070566	0.0098282

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0070566	0.0062236	0.0083846
-19	0.0089587	0.0084056	0.0085496
-18	0.0107743	0.0109496	0.0081190
-17	0.0097845	0.0090064	0.0073432
-16	0.0110502	0.0094259	0.0076523
-15	0.0133751	0.0125247	0.0100748
-14	0.0151780	0.0133004	0.0123361
-13	0.0138129	0.0102180	0.0112762
-12	0.0146147	0.0113678	0.0108135
-11	0.0144338	0.0130455	0.0142382
-10	0.0145080	0.0142318	0.0181572
-9	0.0177520	0.0178098	0.0242179
-8	0.0308129	0.0320669	0.0357342
-7	0.0494811	0.0553185	0.0539886
-6	0.0697025	0.0728431	0.0850776
-5	0.1297927	0.1340037	0.1708625
-4	0.2655522	0.3564850	0.3841622
-3	0.6135510	0.7103546	0.5325553
-2	2.1246413	1.5507860	0.6755601
-1	14.7980872	5.9286854	2.3291498
0	75.9200087	12.5290855	4.4793640
1	14.6153620	4.6125455	1.8248643
2	1.7661242	0.8780791	0.3613890
3	0.3898418	0.2669642	0.1708880
4	0.1456647	0.0877669	0.0607165
5	0.0809758	0.0625143	0.0450157
6	0.0532012	0.0470674	0.0329301
7	0.0425972	0.0426797	0.0291237
8	0.0270114	0.0309576	0.0265843
9	0.0227797	0.0247354	0.0243186
10	0.0198589	0.0201077	0.0193686
11	0.0154355	0.0146030	0.0129261
12	0.0144142	0.0124117	0.0108747
13	0.0111207	0.0106120	0.0093943
14	0.0091549	0.0086548	0.0080964
15	0.0076052	0.0071530	0.0065677
16	0.0078702	0.0073754	0.0055891
17	0.0088917	0.0088049	0.0063110
18	0.0072791	0.0069679	0.0077073
19	0.0085756	0.0062749	0.0064600
20	0.0105714	0.0070581	0.0058216

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0093619	0.0073998	0.0054893
-19	0.0083758	0.0076465	0.0061776
-18	0.0072074	0.0086163	0.0083474
-17	0.0089694	0.0096522	0.0088169
-16	0.0100445	0.0095355	0.0076405
-15	0.0118678	0.0102363	0.0067319
-14	0.0148313	0.0128920	0.0077840
-13	0.0150325	0.0135953	0.0096845
-12	0.0133916	0.0140479	0.0152418
-11	0.0155296	0.0157525	0.0187391
-10	0.0215866	0.0268185	0.0268352
-9	0.0304499	0.0462362	0.0445213
-8	0.0456924	0.0646090	0.0594680
-7	0.0743930	0.0766215	0.0555124
-6	0.1111677	0.0713757	0.0388349
-5	0.1421638	0.0740930	0.0515573
-4	0.2147403	0.1154015	0.0964006
-3	0.2594315	0.1341274	0.1138036
-2	0.2770351	0.1613186	0.1559064
-1	1.0633673	0.6876467	0.4991864
0	2.0331474	1.2727109	0.8170590
1	0.8697347	0.5672021	0.3627931
2	0.1307611	0.0888902	0.0613468
3	0.0887976	0.0692483	0.0684787
4	0.0617470	0.0655193	0.0720718
5	0.0365616	0.0414037	0.0434504
6	0.0259299	0.0293979	0.0292128
7	0.0223619	0.0309971	0.0302355
8	0.0217781	0.0286512	0.0275852
9	0.0210348	0.0197637	0.0206473
10	0.0173349	0.0145423	0.0160653
11	0.0129208	0.0128856	0.0130974
12	0.0099221	0.0105840	0.0111384
13	0.0061701	0.0063551	0.0084423
14	0.0060529	0.0052482	0.0070148
15	0.0062681	0.0059978	0.0073653
16	0.0053910	0.0058338	0.0068066
17	0.0053452	0.0060548	0.0077273
18	0.0068975	0.0069762	0.0078993
19	0.0059027	0.0067380	0.0064512
20	0.0051611	0.0063744	0.0060227

YUMA 1

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 7 TO 9

	7	8	9
-20	0.0055708	0.0049059	0.0082446
-19	0.0058806	0.0057088	0.0076918
-18	0.0075728	0.0064265	0.0070184
-17	0.0102358	0.0095372	0.0089919
-16	0.0093250	0.0111016	0.0103499
-15	0.0067637	0.0082952	0.0093739
-14	0.0074421	0.0090816	0.0113279
-13	0.0113890	0.0148242	0.0178284
-12	0.0160415	0.0160213	0.0165610
-11	0.0202103	0.0158084	0.0124013
-10	0.0214587	0.0167385	0.0151182
-9	0.0244247	0.0173951	0.0166086
-8	0.0285246	0.0179760	0.0162899
-7	0.0288256	0.0215414	0.0240676
-6	0.0322923	0.0319135	0.0265597
-5	0.0543607	0.0513748	0.0334464
-4	0.0805801	0.0586424	0.0458328
-3	0.0977407	0.0637066	0.0515180
-2	0.1478143	0.0945958	0.0544320
-1	0.4364416	0.3126429	0.2085860
0	0.6893901	0.5320568	0.3904810
1	0.3034022	0.2598935	0.1973588
2	0.0509584	0.0583839	0.0517429
3	0.0536547	0.0391014	0.0414503
4	0.0595241	0.0410529	0.0404954
5	0.0377572	0.0319822	0.0298117
6	0.0244464	0.0231119	0.0183823
7	0.0208051	0.0203003	0.0156303
8	0.0190152	0.0184344	0.0183002
9	0.0180558	0.0165418	0.0175482
10	0.0149851	0.0122962	0.0115644
11	0.0109700	0.0080259	0.0091873
12	0.0107463	0.0084023	0.0096978
13	0.0109610	0.0100842	0.0084389
14	0.0089964	0.0089046	0.0089694
15	0.0075422	0.0072336	0.0090436
16	0.0072732	0.0076480	0.0092702
17	0.0074354	0.0077888	0.0076919
18	0.0082868	0.0087942	0.0073390
19	0.0075788	0.0092509	0.0076513
20	0.0069126	0.0084489	0.0072707

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

	10	11	12
-20	0.0106864	0.0094777	0.0085927
-19	0.0094823	0.0097914	0.0086333
-18	0.0072507	0.0077501	0.0082455
-17	0.0073904	0.0063304	0.0074168
-16	0.0077112	0.0056027	0.0059523
-15	0.0084777	0.0067699	0.0083726
-14	0.0091316	0.0056095	0.0086290
-13	0.0124178	0.0072846	0.0096065
-12	0.0123110	0.0089108	0.0107783
-11	0.0140396	0.0130240	0.0130890
-10	0.0158075	0.0129241	0.0124620
-9	0.0154708	0.0157801	0.0142305
-8	0.0151535	0.0169361	0.0166503
-7	0.0268335	0.0267710	0.0213649
-6	0.0292595	0.0346265	0.0279594
-5	0.0312338	0.0443127	0.0378318
-4	0.0388518	0.0478531	0.0410468
-3	0.0382326	0.0338765	0.0296193
-2	0.0364056	0.0352532	0.0329451
-1	0.1769629	0.1825897	0.1541685
0	0.3550461	0.3499864	0.2926788
1	0.1782697	0.1678830	0.1482118
2	0.0431029	0.0386255	0.0412767
3	0.0384872	0.0301156	0.0324384
4	0.0367392	0.0275287	0.0268521
5	0.0226209	0.0186365	0.0198596
6	0.0148706	0.0185488	0.0193750
7	0.0145447	0.0172824	0.0185483
8	0.0188796	0.0173116	0.0160901
9	0.0185421	0.0159372	0.0126097
10	0.0138504	0.0159033	0.0128775
11	0.0128407	0.0145024	0.0134279
12	0.0137239	0.0141815	0.0119275
13	0.0103899	0.0108260	0.0089670
14	0.0102201	0.0103355	0.0094502
15	0.0097534	0.0077752	0.0074099
16	0.0091203	0.0079122	0.0068528
17	0.0065596	0.0072098	0.0071628
18	0.0062753	0.0076810	0.0079871
19	0.0055424	0.0051872	0.0063127
20	0.0055412	0.0054544	0.0065208

YUMA 1

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0070231	0.0057194	0.0057668
-19	0.0059610	0.0046819	0.0052158
-18	0.0058657	0.0036928	0.0047861
-17	0.0066274	0.0049840	0.0053318
-16	0.0069718	0.0062077	0.0059092
-15	0.0099104	0.0087701	0.0091987
-14	0.0120893	0.0118252	0.0123177
-13	0.0113268	0.0109500	0.0119686
-12	0.0113688	0.0096641	0.0112789
-11	0.0146486	0.0120354	0.0107051
-10	0.0167559	0.0150404	0.0107752
-9	0.0132689	0.0146776	0.0151478
-8	0.0133593	0.0162820	0.0186825
-7	0.0169495	0.0191010	0.0212940
-6	0.0211936	0.0209861	0.0239473
-5	0.0256426	0.0275546	0.0322745
-4	0.0282267	0.0291173	0.0399763
-3	0.0259607	0.0274374	0.0338151
-2	0.0283633	0.0289029	0.0328114
-1	0.1481070	0.1413862	0.1388570
0	0.3086516	0.2794686	0.2542610
1	0.1638790	0.1403509	0.1124694
2	0.0418402	0.0368000	0.0250797
3	0.0436636	0.0457366	0.0325698
4	0.0395501	0.0463670	0.0355843
5	0.0229116	0.0268375	0.0267333
6	0.0179351	0.0251077	0.0265387
7	0.0163394	0.0204731	0.0219567
8	0.0157184	0.0134883	0.0131140
9	0.0121174	0.0105735	0.0129070
10	0.0091545	0.0089753	0.0112562
11	0.0101374	0.0082053	0.0096708
12	0.0100533	0.0101065	0.0116504
13	0.0093577	0.0112918	0.0123679
14	0.0107038	0.0109071	0.0100280
15	0.0098368	0.0087747	0.0072654
16	0.0066161	0.0074282	0.0075612
17	0.0057467	0.0067421	0.0082276
18	0.0069555	0.0072749	0.0083676
19	0.0064114	0.0067772	0.0082877
20	0.0059368	0.0062321	0.0083906

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 16 TO 18

	16	17	18
-20	0.0053124	0.0054413	0.0064385
-19	0.0049046	0.0048642	0.0058880
-18	0.0063394	0.0070588	0.0077913
-17	0.0087570	0.0111685	0.0105063
-16	0.0083041	0.0103840	0.0094908
-15	0.0091472	0.0076934	0.0077460
-14	0.0107330	0.0087176	0.0085746
-13	0.0106258	0.0095226	0.0094445
-12	0.0132107	0.0124607	0.0101827
-11	0.0134716	0.0149298	0.0112631
-10	0.0115222	0.0157069	0.0137569
-9	0.0158064	0.0212213	0.0191897
-8	0.0175901	0.0229433	0.0196646
-7	0.0172852	0.0176946	0.0162295
-6	0.0207765	0.0186560	0.0174060
-5	0.0308260	0.0241325	0.0202031
-4	0.0429821	0.0322002	0.0277164
-3	0.0309149	0.0257560	0.0258754
-2	0.0262336	0.0211998	0.0211503
-1	0.1135899	0.0994579	0.1094569
0	0.2147878	0.1977477	0.2265415
1	0.1018378	0.0980103	0.1090359
2	0.0235470	0.0230596	0.0202938
3	0.0299989	0.0288360	0.0233218
4	0.0293833	0.0287771	0.0285280
5	0.0222761	0.0218497	0.0226647
6	0.0185704	0.0183572	0.0192581
7	0.0189440	0.0201244	0.0177935
8	0.0165383	0.0197493	0.0172055
9	0.0155831	0.0159720	0.0163217
10	0.0127518	0.0105702	0.0113408
11	0.0132615	0.0109702	0.0092923
12	0.0137004	0.0118564	0.0084345
13	0.0109242	0.0104634	0.0088872
14	0.0082050	0.0091414	0.0106781
15	0.0072201	0.0099402	0.0112286
16	0.0071036	0.0091937	0.0104898
17	0.0077907	0.0075868	0.0096135
18	0.0079097	0.0071149	0.0077422
19	0.0072643	0.0069518	0.0067644
20	0.0072725	0.0075226	0.0072907

YUMA 1

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 19 TO 21

	19	20	21
-20	0.0070607	0.0076281	0.
-19	0.0066442	0.0074532	0.
-18	0.0083231	0.0084512	0.
-17	0.0093300	0.0084041	0.
-16	0.0088397	0.0082133	0.
-15	0.0092234	0.0095544	0.
-14	0.0081172	0.0080301	0.
-13	0.0073829	0.0060897	0.
-12	0.0098392	0.0105293	0.
-11	0.0101927	0.0124605	0.
-10	0.0106918	0.0124290	0.
-9	0.0133970	0.0143007	0.
-8	0.0132424	0.0138669	0.
-7	0.0128200	0.0133641	0.
-6	0.0161009	0.0160364	0.
-5	0.0181710	0.0158327	0.
-4	0.0261558	0.0199267	0.
-3	0.0271478	0.0245819	0.
-2	0.0245603	0.0275837	0.
-1	0.1054496	0.1083446	0.
0	0.2190931	0.2156223	0.
1	0.1148584	0.1154192	0.
2	0.0238387	0.0263950	0.
3	0.0180655	0.0170791	0.
4	0.0201485	0.0164073	0.
5	0.0160017	0.0136827	0.
6	0.0142236	0.0159924	0.
7	0.0118471	0.0132135	0.
8	0.0119513	0.0109714	0.
9	0.0133024	0.0117355	0.
10	0.0113102	0.0112931	0.
11	0.0105157	0.0113597	0.
12	0.0087377	0.0098327	0.
13	0.0079376	0.0079981	0.
14	0.0089054	0.0073344	0.
15	0.0082574	0.0069286	0.
16	0.0085470	0.0084160	0.
17	0.0099584	0.0099334	0.
18	0.0082562	0.0085167	0.
19	0.0068888	0.0076252	0.
20	0.0075615	0.0087987	0.

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS -2 TO -0

	-2	-1	0
-20	0.0147366	0.0183268	0.0209916
-19	0.0182679	0.0224397	0.0251402
-18	0.0241137	0.0256593	0.0268164
-17	0.0219783	0.0210580	0.0213306
-16	0.0187748	0.0188691	0.0219886
-15	0.0219180	0.0197896	0.0205671
-14	0.0231250	0.0210783	0.0190432
-13	0.0314533	0.0278856	0.0248677
-12	0.0472032	0.0365187	0.0307545
-11	0.0468598	0.0388961	0.0279536
-10	0.0352893	0.0330884	0.0295558
-9	0.0376462	0.0416611	0.0371883
-8	0.0520555	0.0506486	0.0426580
-7	0.0750989	0.0647117	0.0522794
-6	0.1255604	0.0911355	0.0783859
-5	0.1735073	0.1323212	0.1321101
-4	0.1873067	0.1937058	0.2294413
-3	0.4659277	0.5369685	0.6918494
-2	3.2905561	5.2234664	5.6811014
-1	19.7790504	112.4179773	384.9695282
0	36.2784343	672.8579330	
1	12.9262917	89.1281948	384.9695320
2	1.9112820	4.2056748	5.6811018
3	0.5384576	0.7972379	0.6918495
4	0.2511723	0.2902168	0.2294414
5	0.1348946	0.1504073	0.1321101
6	0.0865057	0.0841018	0.0783859
7	0.0545854	0.0490964	0.0522794
8	0.0388512	0.0366511	0.0426580
9	0.0272338	0.0328362	0.0371883
10	0.0260933	0.0289589	0.0295558
11	0.0307038	0.0274463	0.0279536
12	0.0284259	0.0338867	0.0307545
13	0.0229693	0.0286406	0.0248677
14	0.0207981	0.0223772	0.0190432
15	0.0288332	0.0267861	0.0205671
16	0.0303044	0.0273596	0.0219886
17	0.0206754	0.0215512	0.0213306
18	0.0181283	0.0227287	0.0268164
19	0.0212593	0.0252637	0.0251402
20	0.0260068	0.0257581	0.0209916

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0257581	0.0260068	0.0224641
-19	0.0252637	0.0212593	0.0195531
-18	0.0227287	0.0181283	0.0211938
-17	0.0215511	0.0206754	0.0227575
-16	0.0273596	0.0303044	0.0263095
-15	0.0267861	0.0288332	0.0263944
-14	0.0223772	0.0207981	0.0223498
-13	0.0286406	0.0229693	0.0214359
-12	0.0338867	0.0284259	0.0300089
-11	0.0274463	0.0307038	0.0374736
-10	0.0289589	0.0260933	0.0250378
-9	0.0328362	0.0272338	0.0254685
-8	0.0366511	0.0388512	0.0426354
-7	0.0490964	0.0545854	0.0600724
-6	0.0841018	0.0865057	0.0909467
-5	0.1504073	0.1348946	0.1304313
-4	0.2902168	0.2511723	0.1993594
-3	0.7972376	0.5384576	0.3592684
-2	4.2056738	1.9112819	0.9261363
-1	89.1283188	12.9263000	5.2284830
0	672.8575592	36.2784133	11.2036422
1	112.4181328	19.7790630	6.3572212
2	5.2234659	3.2905563	1.5291963
3	0.5369686	0.4659279	0.3847577
4	0.1937058	0.1873067	0.1754918
5	0.1323212	0.1735073	0.1239280
6	0.0911355	0.1255604	0.1028350
7	0.0647117	0.0750989	0.0750960
8	0.0506486	0.0520555	0.0563139
9	0.0416611	0.0376462	0.0360827
10	0.0330884	0.0352893	0.0323983
11	0.0388961	0.0468598	0.0409988
12	0.0365187	0.0472032	0.0402153
13	0.0278856	0.0314533	0.0230988
14	0.0210783	0.0231250	0.0193881
15	0.0197896	0.0219180	0.0231767
16	0.0188691	0.0187748	0.0209426
17	0.0210580	0.0219783	0.0219651
18	0.0256593	0.0241137	0.0237234
19	0.0224397	0.0182680	0.0151090
20	0.0183268	0.0147366	0.0136286

YUMA 2

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0200626	0.0209604	0.0238335
-19	0.0220355	0.0228892	0.0215575
-18	0.0251552	0.0262584	0.0200327
-17	0.0211731	0.0218220	0.0204419
-16	0.0180966	0.0185838	0.0260739
-15	0.0226016	0.0218300	0.0278255
-14	0.0262830	0.0234162	0.0237929
-13	0.0262457	0.0240637	0.0248516
-12	0.0341404	0.0295940	0.0258222
-11	0.0370993	0.0329085	0.0283648
-10	0.0277282	0.0347900	0.0310639
-9	0.0343710	0.0463176	0.0372396
-8	0.0472195	0.0460210	0.0383938
-7	0.0613692	0.0432537	0.0307482
-6	0.0914288	0.0737568	0.0442424
-5	0.1378082	0.1210861	0.0852283
-4	0.1742014	0.1501186	0.1194893
-3	0.2513673	0.1926713	0.1398983
-2	0.4952187	0.3226853	0.2228771
-1	2.4322026	0.8887837	0.7172713
0	4.8605050	1.5137436	1.3309688
1	2.8594580	1.0130710	0.7539931
2	0.8062273	0.4022199	0.2416112
3	0.2668461	0.1915256	0.1520923
4	0.1416561	0.1342140	0.1203092
5	0.0769659	0.1043983	0.1103967
6	0.0703177	0.0687144	0.0638314
7	0.0608616	0.0462275	0.0400677
8	0.0439176	0.0303858	0.0373561
9	0.0352531	0.0349914	0.0352837
10	0.0331331	0.0414250	0.0379583
11	0.0321218	0.0311881	0.0332063
12	0.0295278	0.0242520	0.0231320
13	0.0226758	0.0278075	0.0222266
14	0.0227308	0.0282051	0.0248142
15	0.0289474	0.0314160	0.0251010
16	0.0238083	0.0232069	0.0181346
17	0.0216158	0.0193698	0.0155496
18	0.0238125	0.0217194	0.0177821
19	0.0179272	0.0237607	0.0226864
20	0.0185148	0.0243981	0.0241991

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 7 TO 9

	7	8	9
-20	0.0201180	0.0170275	0.0173386
-19	0.0177464	0.0169901	0.0179015
-18	0.0143925	0.0154312	0.0194253
-17	0.0172159	0.0198260	0.0246200
-16	0.0305068	0.0302955	0.0268143
-15	0.0343502	0.0343604	0.0308905
-14	0.0239273	0.0256495	0.0286379
-13	0.0225353	0.0264478	0.0287100
-12	0.0268753	0.0324391	0.0284628
-11	0.0279130	0.0299853	0.0283848
-10	0.0257172	0.0280962	0.0265689
-9	0.0285869	0.0342329	0.0343650
-8	0.0362125	0.0348543	0.0334425
-7	0.0405868	0.0472293	0.0479033
-6	0.0434576	0.0640208	0.0756311
-5	0.0691163	0.0736855	0.0716079
-4	0.1004144	0.0754015	0.0553456
-3	0.1026371	0.0854342	0.0838269
-2	0.1416024	0.1254722	0.1176069
-1	0.5468785	0.3988405	0.3809586
0	1.0664045	0.7017467	0.6656475
1	0.6408482	0.4557733	0.3905217
2	0.1985158	0.1991673	0.1521579
3	0.1268264	0.1261889	0.0942347
4	0.0904774	0.0774079	0.0665767
5	0.0644089	0.0462503	0.0386718
6	0.0511843	0.0438937	0.0341881
7	0.0455752	0.0376776	0.0344048
8	0.0520245	0.0489512	0.0407227
9	0.0445533	0.0487571	0.0370858
10	0.0323152	0.0302781	0.0278615
11	0.0328541	0.0306695	0.0245247
12	0.0304391	0.0321884	0.0244365
13	0.0224309	0.0232897	0.0214052
14	0.0194481	0.0212145	0.0285426
15	0.0181221	0.0203755	0.0290206
16	0.0142908	0.0154155	0.0233056
17	0.0154132	0.0158174	0.0187796
18	0.0201207	0.0229899	0.0198715
19	0.0196098	0.0183050	0.0159798
20	0.0184460	0.0142840	0.0147677

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

	10	11	12
-20	0.0206071	0.0188024	0.0131575
-19	0.0180445	0.0150503	0.0119217
-18	0.0183661	0.0155179	0.0144257
-17	0.0194320	0.0156817	0.0174479
-16	0.0200362	0.0185519	0.0182282
-15	0.0257934	0.0267643	0.0271174
-14	0.0255288	0.0278310	0.0319631
-13	0.0224729	0.0231386	0.0272709
-12	0.0234172	0.0271541	0.0285501
-11	0.0258223	0.0239992	0.0234075
-10	0.0224863	0.0237352	0.0225495
-9	0.0303731	0.0290386	0.0257430
-8	0.0310484	0.0311722	0.0305905
-7	0.0355716	0.0307854	0.0378331
-6	0.0590238	0.0411724	0.0402740
-5	0.0517438	0.0417285	0.0416417
-4	0.0488805	0.0565718	0.0579823
-3	0.0824568	0.0816876	0.0752420
-2	0.1112949	0.1057457	0.0905810
-1	0.3283863	0.3774868	0.3890289
0	0.5813122	0.7548890	0.7954129
1	0.3551823	0.4571938	0.4433824
2	0.1122926	0.1129276	0.0935344
3	0.0632148	0.0618346	0.0596695
4	0.0531363	0.0516830	0.0488938
5	0.0333731	0.0397350	0.0396755
6	0.0328568	0.0443564	0.0467589
7	0.0411947	0.0420652	0.0400434
8	0.0383495	0.0295526	0.0266644
9	0.0290209	0.0287541	0.0276356
10	0.0249386	0.0235412	0.0228713
11	0.0291489	0.0355882	0.0293368
12	0.0293531	0.0350980	0.0297541
13	0.0268433	0.0269587	0.0205626
14	0.0360714	0.0312276	0.0201815
15	0.0350412	0.0298222	0.0198373
16	0.0275324	0.0187184	0.0126664
17	0.0234295	0.0210709	0.0180953
18	0.0191902	0.0205205	0.0211826
19	0.0170342	0.0185976	0.0173416
20	0.0176464	0.0192131	0.0174161

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0138135	0.0187913	0.0212156
-19	0.0134232	0.0185610	0.0207277
-18	0.0152793	0.0187267	0.0196237
-17	0.0180948	0.0186202	0.0207598
-16	0.0181455	0.0186447	0.0220631
-15	0.0242389	0.0212137	0.0240542
-14	0.0297746	0.0239821	0.0239079
-13	0.0254224	0.0256801	0.0238894
-12	0.0259624	0.0290666	0.0273288
-11	0.0283969	0.0330108	0.0307678
-10	0.0264109	0.0310343	0.0292628
-9	0.0254200	0.0278980	0.0274118
-8	0.0333551	0.0346719	0.0314002
-7	0.0414462	0.0407331	0.0373847
-6	0.0427484	0.0390339	0.0372392
-5	0.0371350	0.0331216	0.0379808
-4	0.0494407	0.0460097	0.0410304
-3	0.0659439	0.0573596	0.0488996
-2	0.0919362	0.1062143	0.0958538
-1	0.3155221	0.3246462	0.3354494
0	0.5477226	0.4725607	0.5111475
1	0.3075510	0.2809582	0.2826260
2	0.0981707	0.1142454	0.0945172
3	0.0620384	0.0602905	0.0429307
4	0.0376946	0.0298909	0.0238513
5	0.0296627	0.0265874	0.0245691
6	0.0347422	0.0304845	0.0263233
7	0.0375168	0.0315281	0.0252664
8	0.0328973	0.0305252	0.0315638
9	0.0280882	0.0276388	0.0317478
10	0.0268868	0.0253586	0.0260205
11	0.0271181	0.0243949	0.0241802
12	0.0279903	0.0279021	0.0297137
13	0.0214373	0.0219197	0.0226373
14	0.0173777	0.0193397	0.0225023
15	0.0186926	0.0228544	0.0245694
16	0.0150734	0.0204429	0.0196998
17	0.0161044	0.0196422	0.0235398
18	0.0188831	0.0204996	0.0280960
19	0.0172860	0.0176335	0.0207658
20	0.0159938	0.0161634	0.0188156

THE CORRECTED SPECTRUM, (F-STAR)

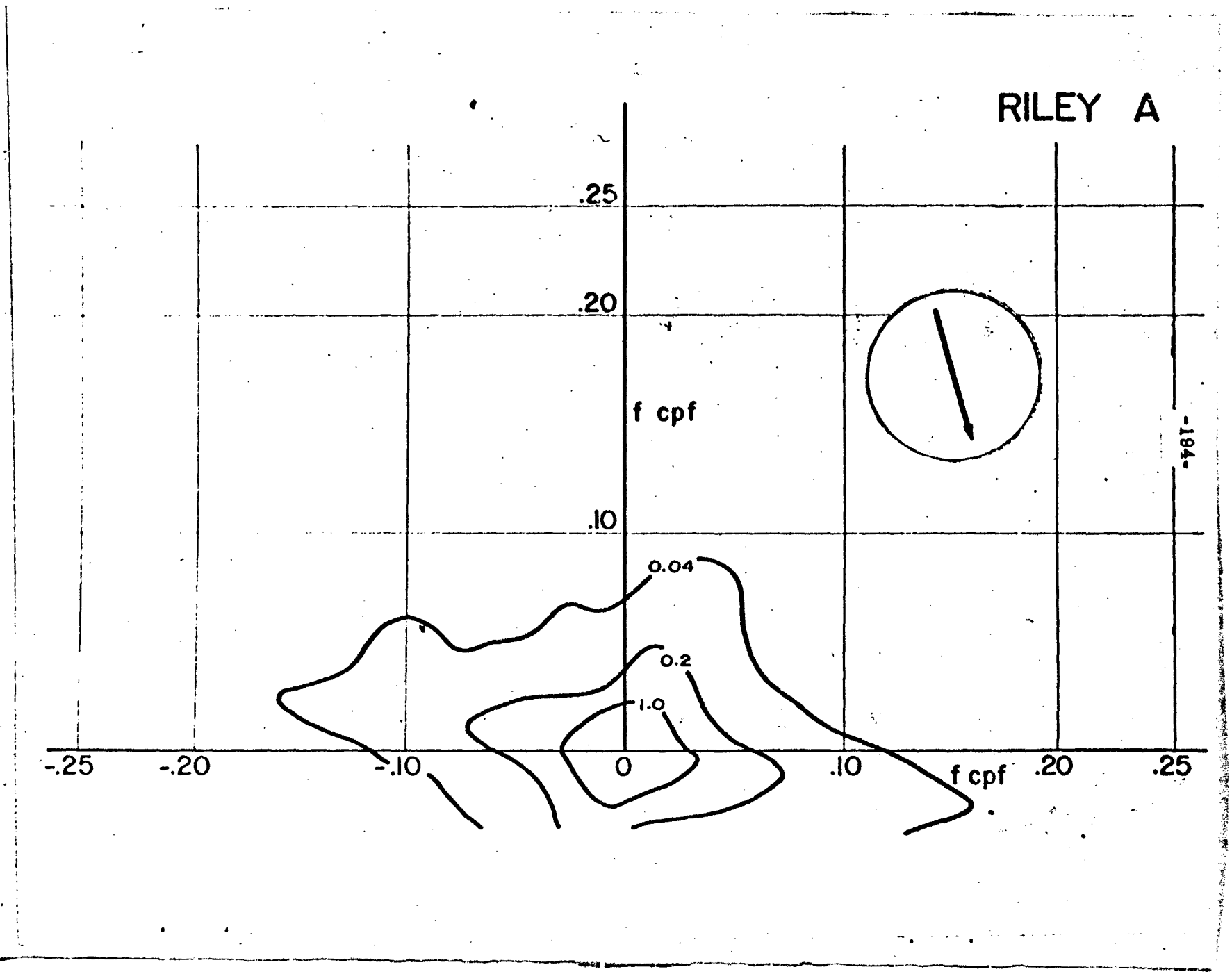
COLUMNS 16 TO 18

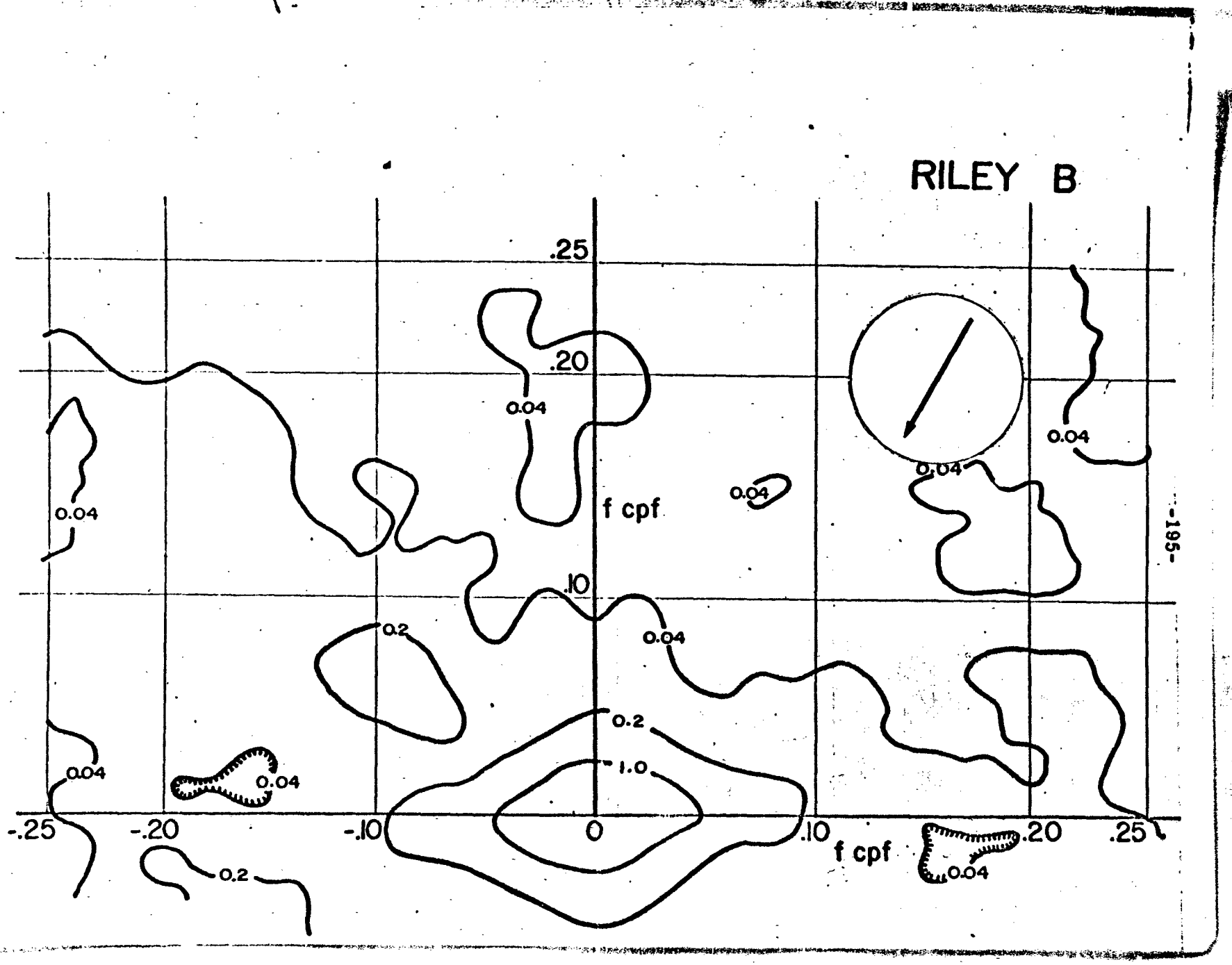
	16	17	18
-20	0.0175210	0.0141239	0.0150464
-19	0.0159988	0.0144360	0.0166053
-18	0.0167070	0.0159709	0.0194154
-17	0.0196668	0.0165106	0.0178439
-16	0.0209756	0.0172503	0.0186742
-15	0.0239890	0.0214877	0.0217651
-14	0.0247584	0.0208252	0.0186370
-13	0.0223732	0.0213959	0.0203281
-12	0.0209229	0.0226293	0.0261093
-11	0.0243640	0.0268335	0.0296806
-10	0.0294413	0.0278359	0.0260897
-9	0.0274384	0.0274405	0.0282074
-8	0.0270444	0.0259220	0.0289039
-7	0.0340487	0.0371019	0.0429154
-6	0.0383115	0.0449601	0.0498114
-5	0.0406082	0.0469148	0.0509506
-4	0.0407289	0.0396328	0.0433115
-3	0.0448129	0.0395367	0.0378795
-2	0.0831960	0.0868085	0.0733807
-1	0.3073666	0.3452572	0.3738297
0	0.4633564	0.4906546	0.6155693
1	0.2303791	0.2472107	0.3557941
2	0.0651278	0.0794220	0.1115352
3	0.0373373	0.0405098	0.0441264
4	0.0277572	0.0315612	0.0339950
5	0.0264499	0.0265586	0.0255295
6	0.0279019	0.0299479	0.0304182
7	0.0289191	0.0302710	0.0325101
8	0.0357182	0.0367567	0.0342234
9	0.0304774	0.0286684	0.0248205
10	0.0292091	0.0285102	0.0188145
11	0.0305088	0.0298469	0.0204559
12	0.0324184	0.0290934	0.0243034
13	0.0264600	0.0238542	0.0232352
14	0.0254737	0.0238434	0.0232587
15	0.0242747	0.0211017	0.0208917
16	0.0161775	0.0169190	0.0197144
17	0.0214768	0.0192246	0.0200203
18	0.0252437	0.0191662	0.0205691
19	0.0182629	0.0162892	0.0174786
20	0.0167277	0.0180698	0.0191875

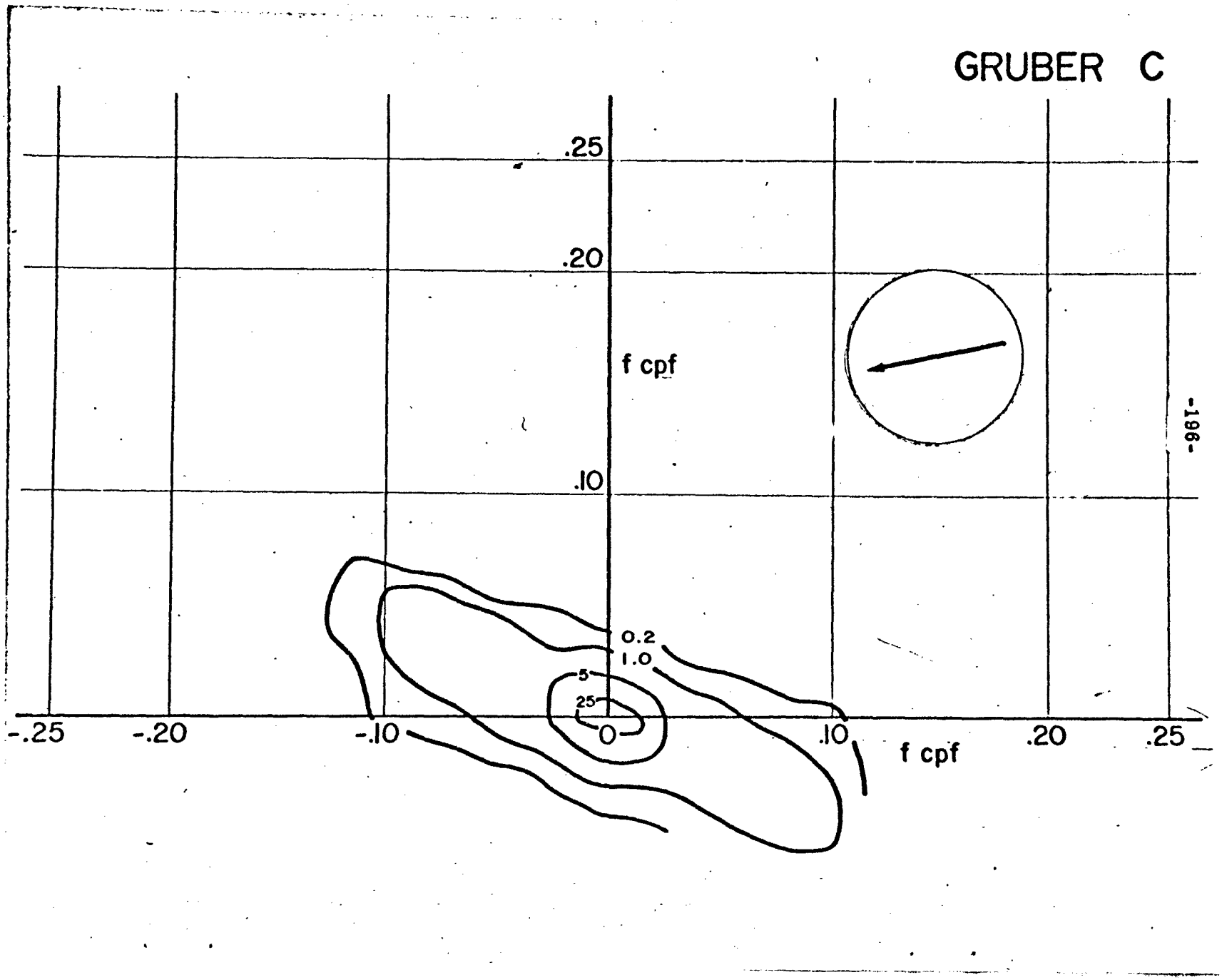
THE CORRECTED SPECTRUM, (F-STAR)

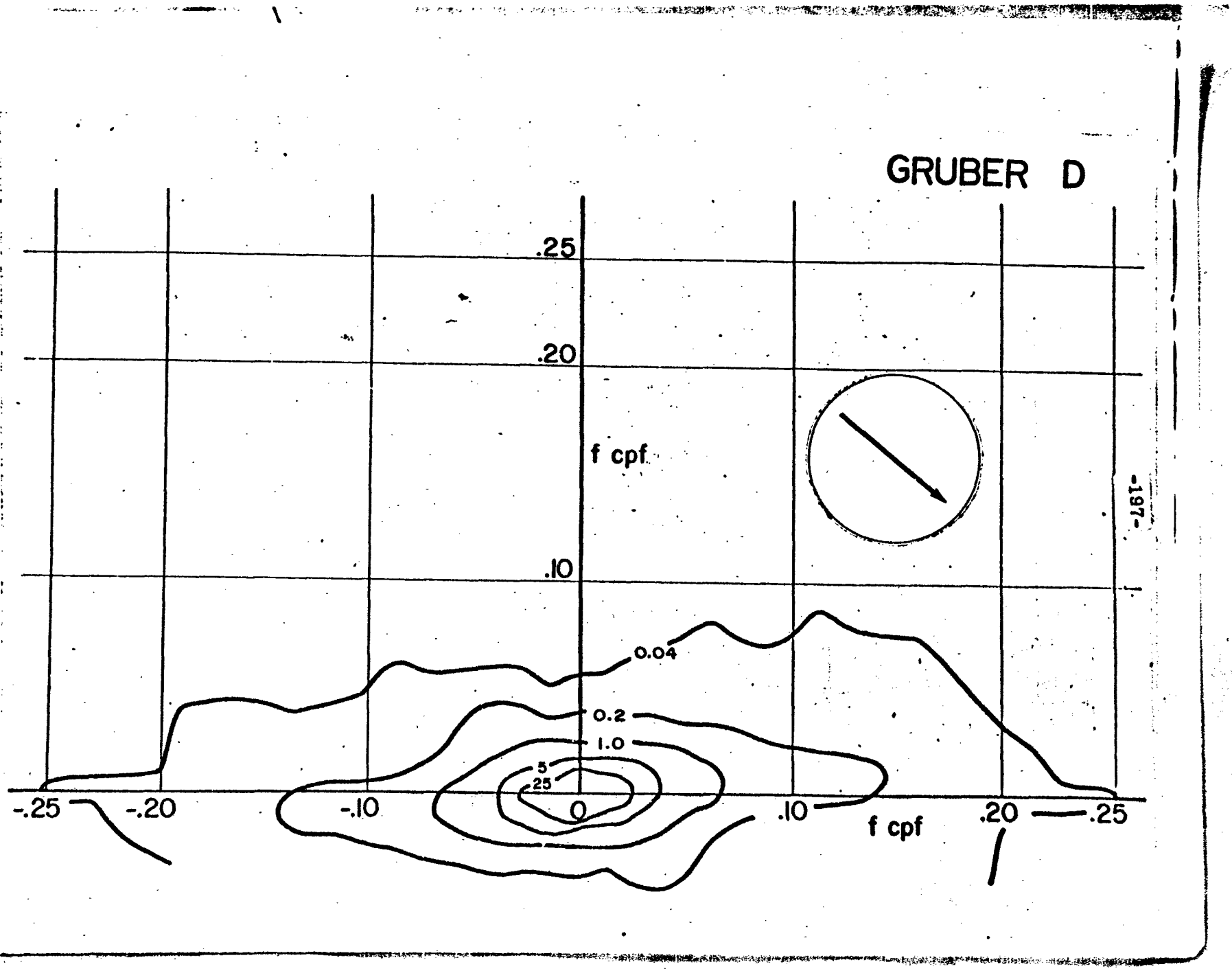
COLUMNS 19 TO 21

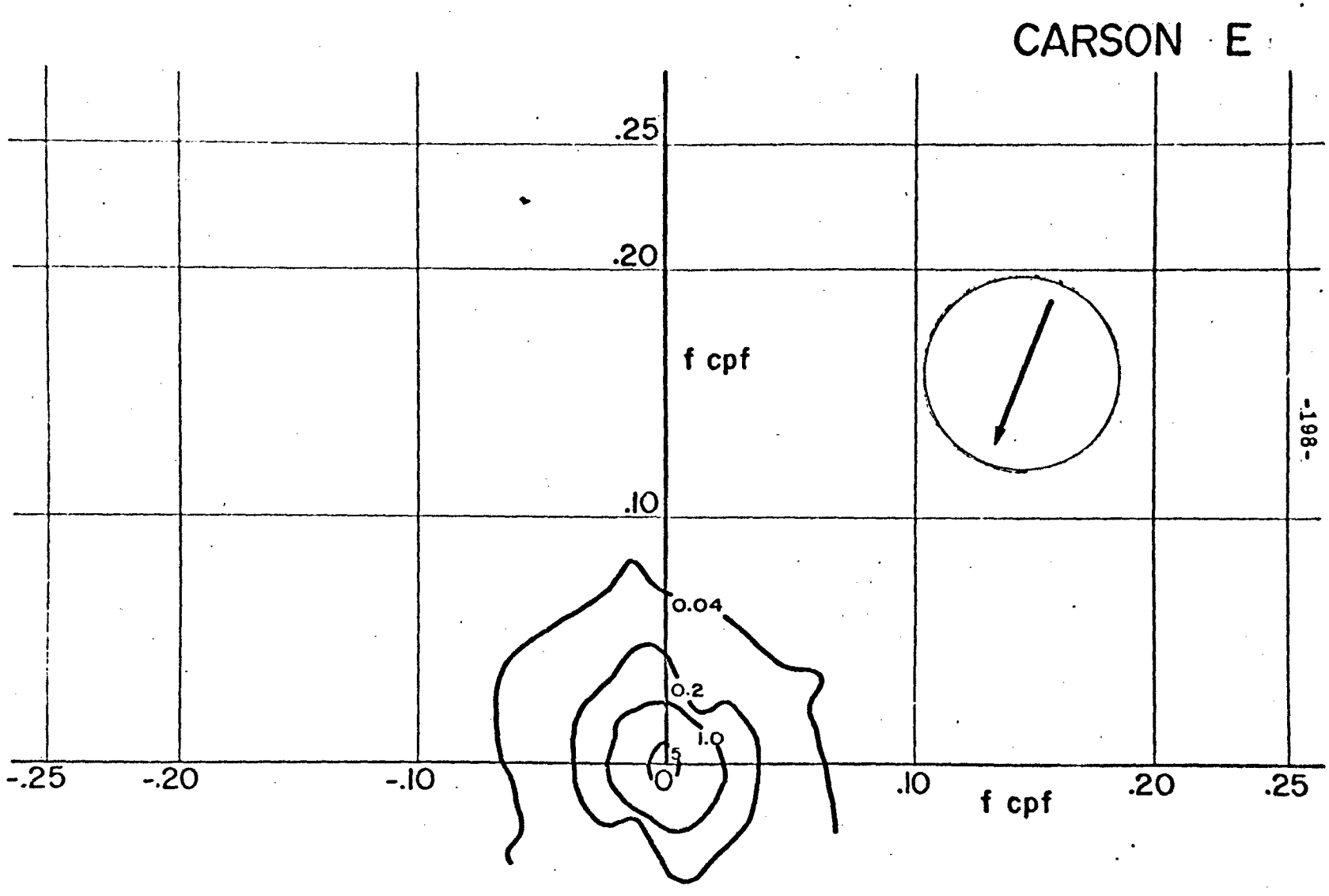
	19	20	21
-20	0.0179299	0.0205259	0.
-19	0.0181861	0.0191396	0.
-18	0.0207984	0.0206800	0.
-17	0.0198053	0.0204453	0.
-16	0.0191659	0.0175013	0.
-15	0.0230127	0.0227513	0.
-14	0.0236502	0.0269820	0.
-13	0.0235269	0.0250468	0.
-12	0.0267423	0.0264749	0.
-11	0.0235951	0.0220097	0.
-10	0.0236411	0.0229745	0.
-9	0.0317751	0.0328319	0.
-8	0.0336087	0.0369942	0.
-7	0.0466461	0.0502998	0.
-6	0.0514254	0.0548781	0.
-5	0.0500519	0.0506629	0.
-4	0.0480549	0.0467501	0.
-3	0.0456989	0.0463133	0.
-2	0.0734828	0.0861421	0.
-1	0.3448867	0.3465841	0.
0	0.6020262	0.5745192	0.
1	0.3502243	0.3133793	0.
2	0.1056994	0.0921583	0.
3	0.0575361	0.0667021	0.
4	0.0487693	0.0608772	0.
5	0.0298543	0.0380403	0.
6	0.0278987	0.0325060	0.
7	0.0270689	0.0262219	0.
8	0.0250262	0.0194951	0.
9	0.0194416	0.0150260	0.
10	0.0133875	0.0113230	0.
11	0.0159346	0.0132159	0.
12	0.0229044	0.0191673	0.
13	0.0235121	0.0207081	0.
14	0.0224214	0.0224060	0.
15	0.0250907	0.0301344	0.
16	0.0229132	0.0261236	0.
17	0.0206487	0.0204608	0.
18	0.0209942	0.0198516	0.
19	0.0164779	0.0164287	0.
20	0.0168672	0.0165761	0.


RILEY A
.25
.20
.10
f cpf
0.04
0.2
1.0
-.25
-.20
-.10
0
.10
f cpf
.20
.25
-184-

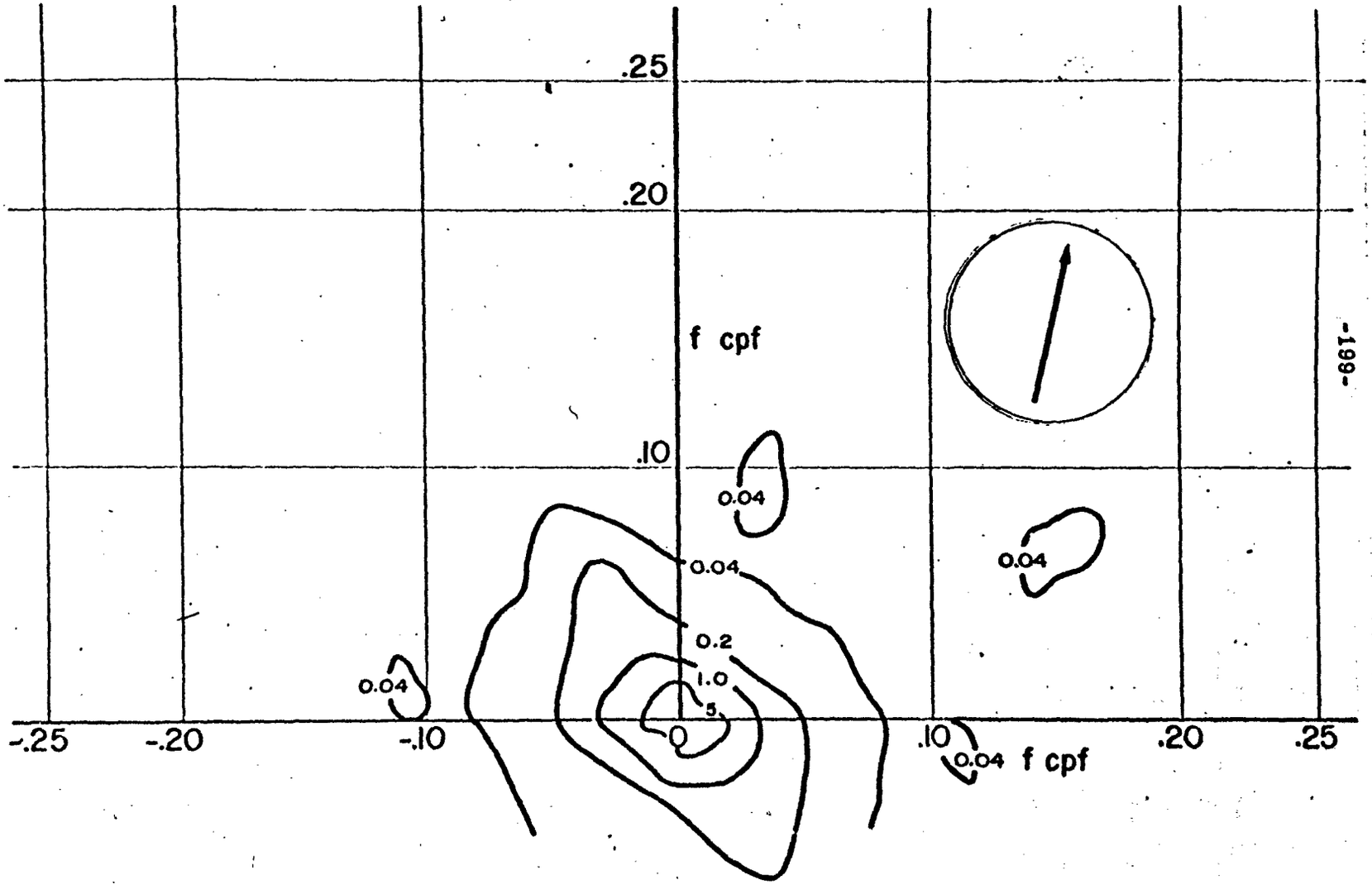

RILEY B
.25
.20
.10
f cpf
0.04
0.2
1.0
-.25
-.20
-.10
0
.10
.20
.25
f cpf

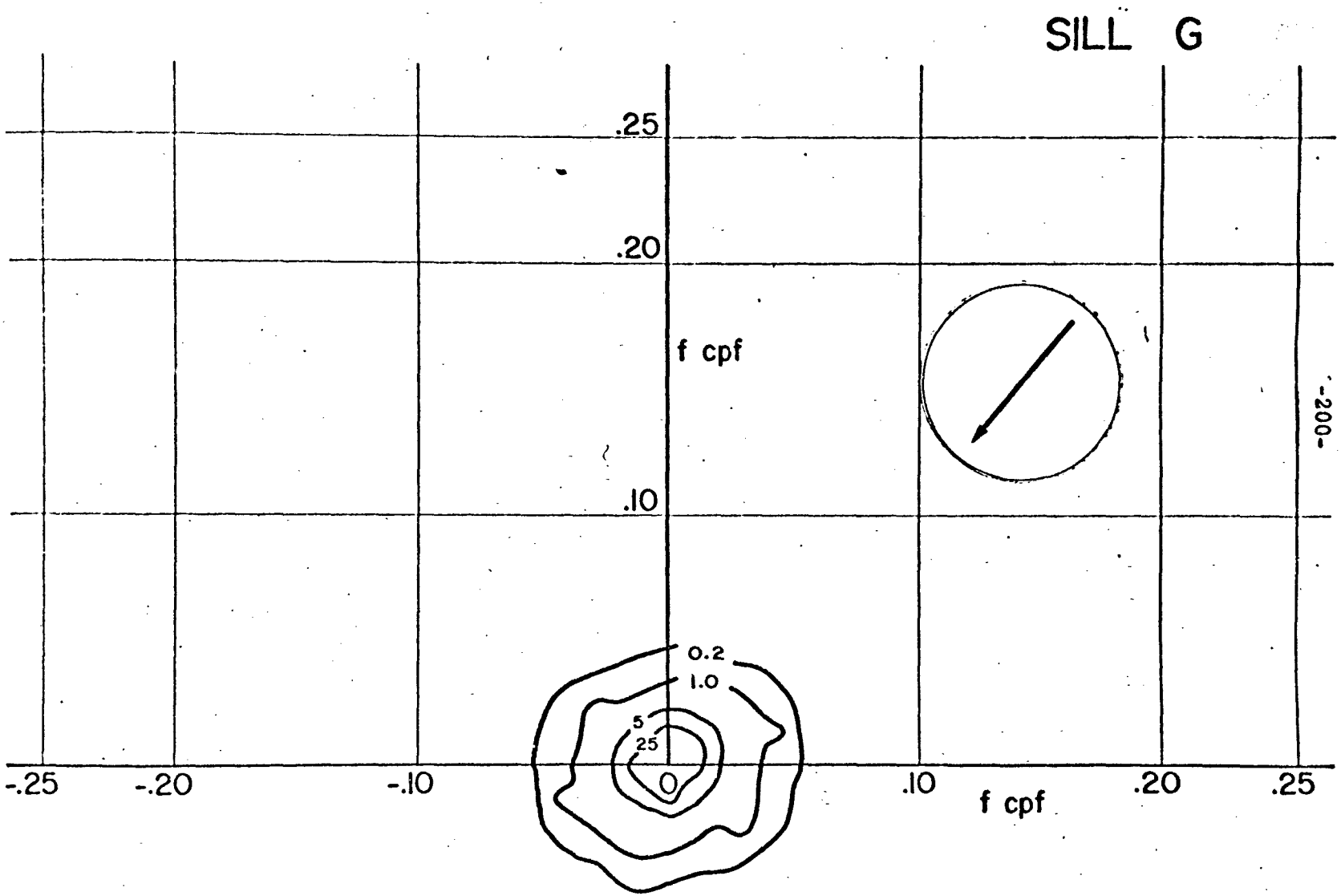

GRUBER C
.25
.20
.10
f cpf
0.2
1.0
5
25
0
-.25
-.20
-.10
.10
.20
.25
f cpf

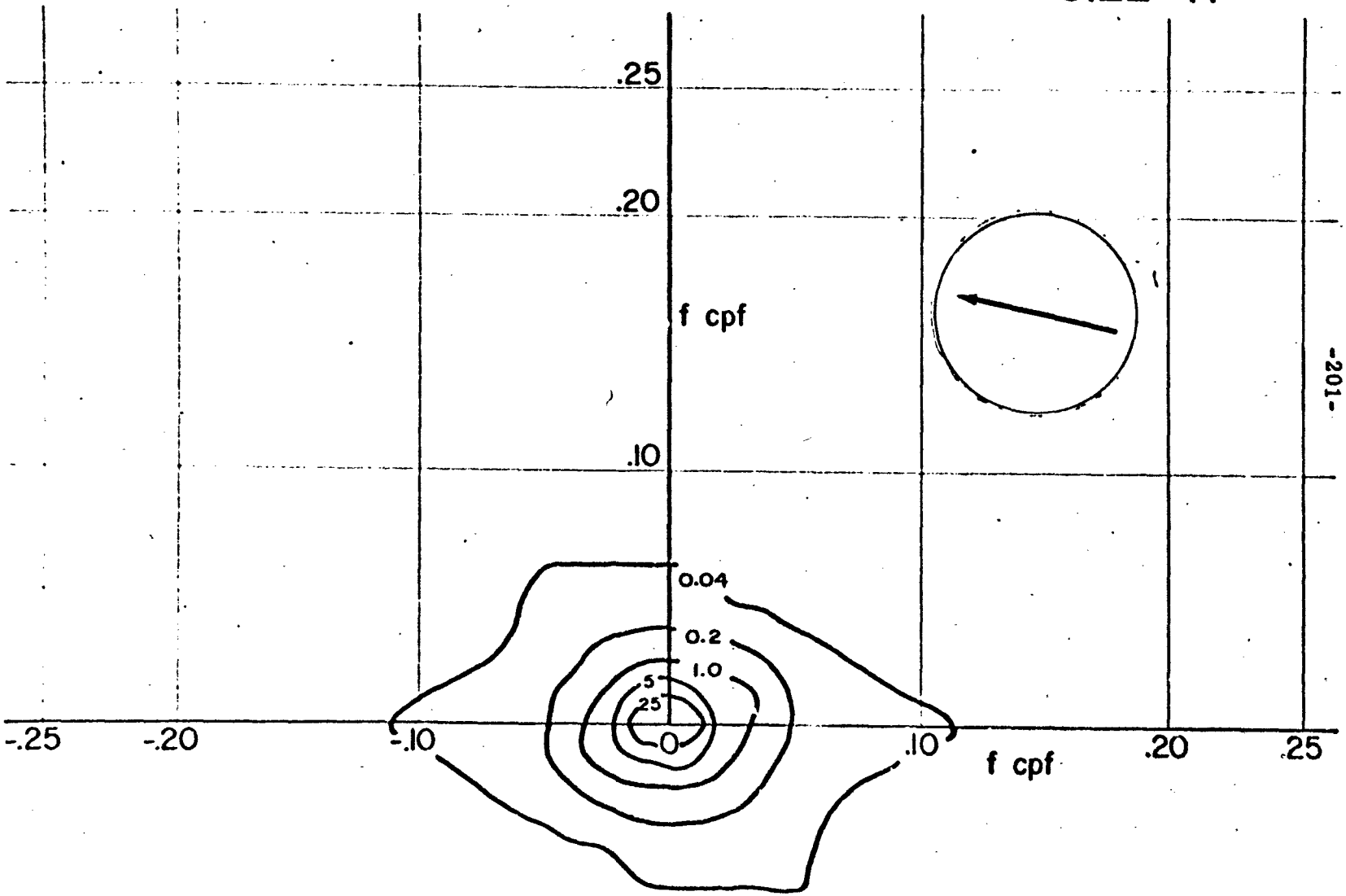

GRUBER D
.25
.20
.10
f cpf
0.04
0.2
1.0
5
25
-.25
-.20
-.10
0
.10
.20
.25
f cpf

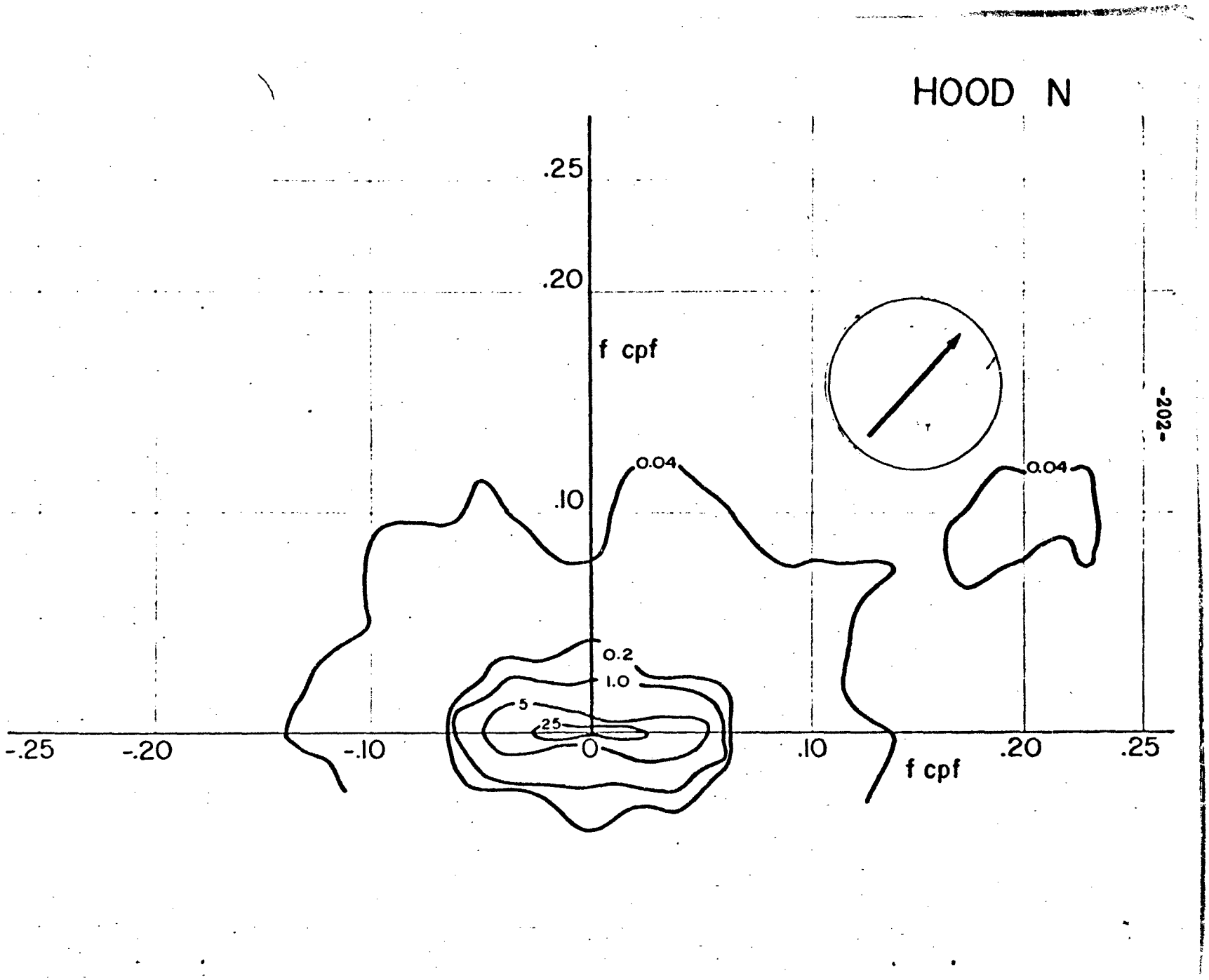

CARSON E
.25
.20
f cpf
.10
0.04
0.2
1.0
.5
0
-.25
-.20
-.10
.10
f cpf
.20
.25
-198-

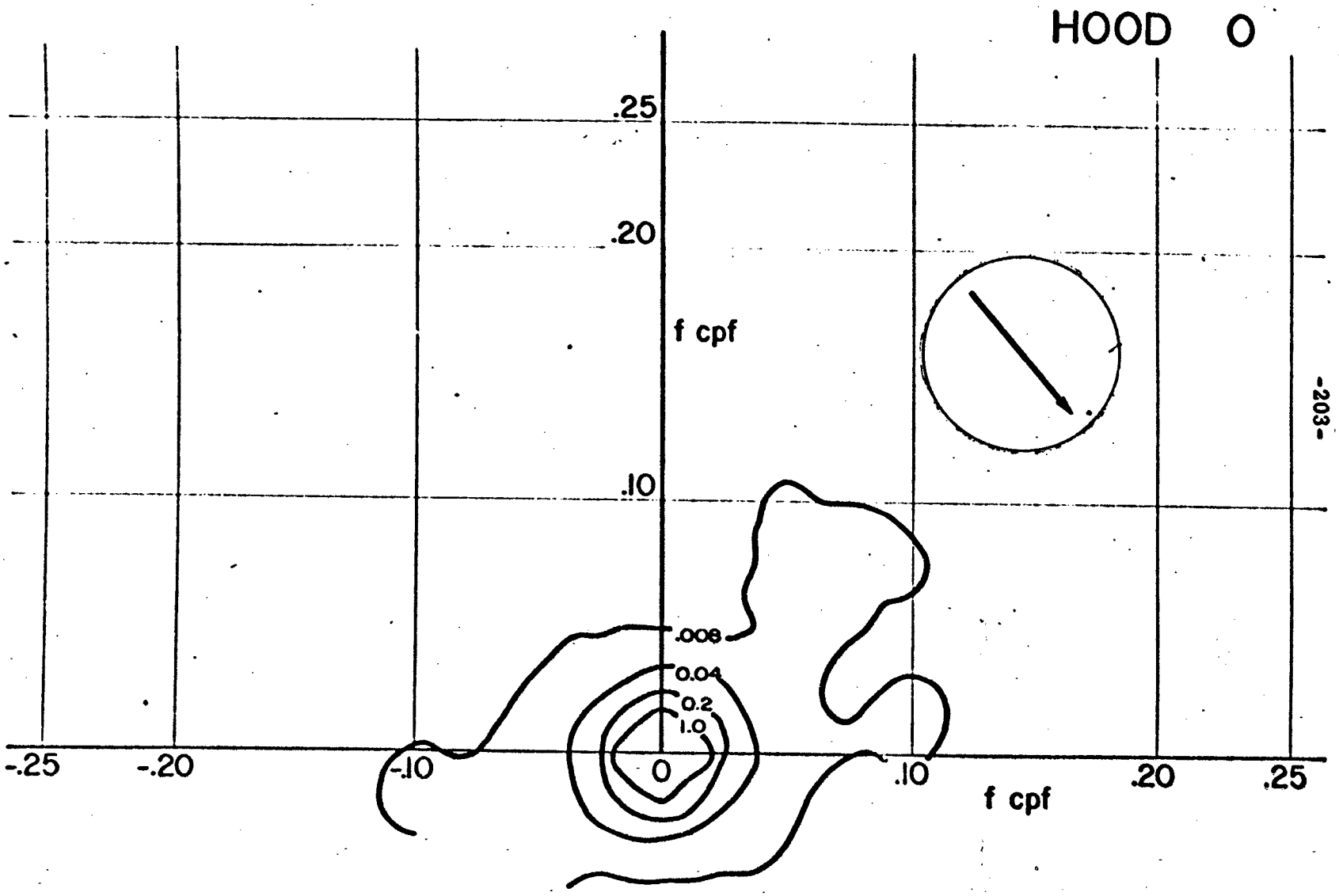
CARSON F

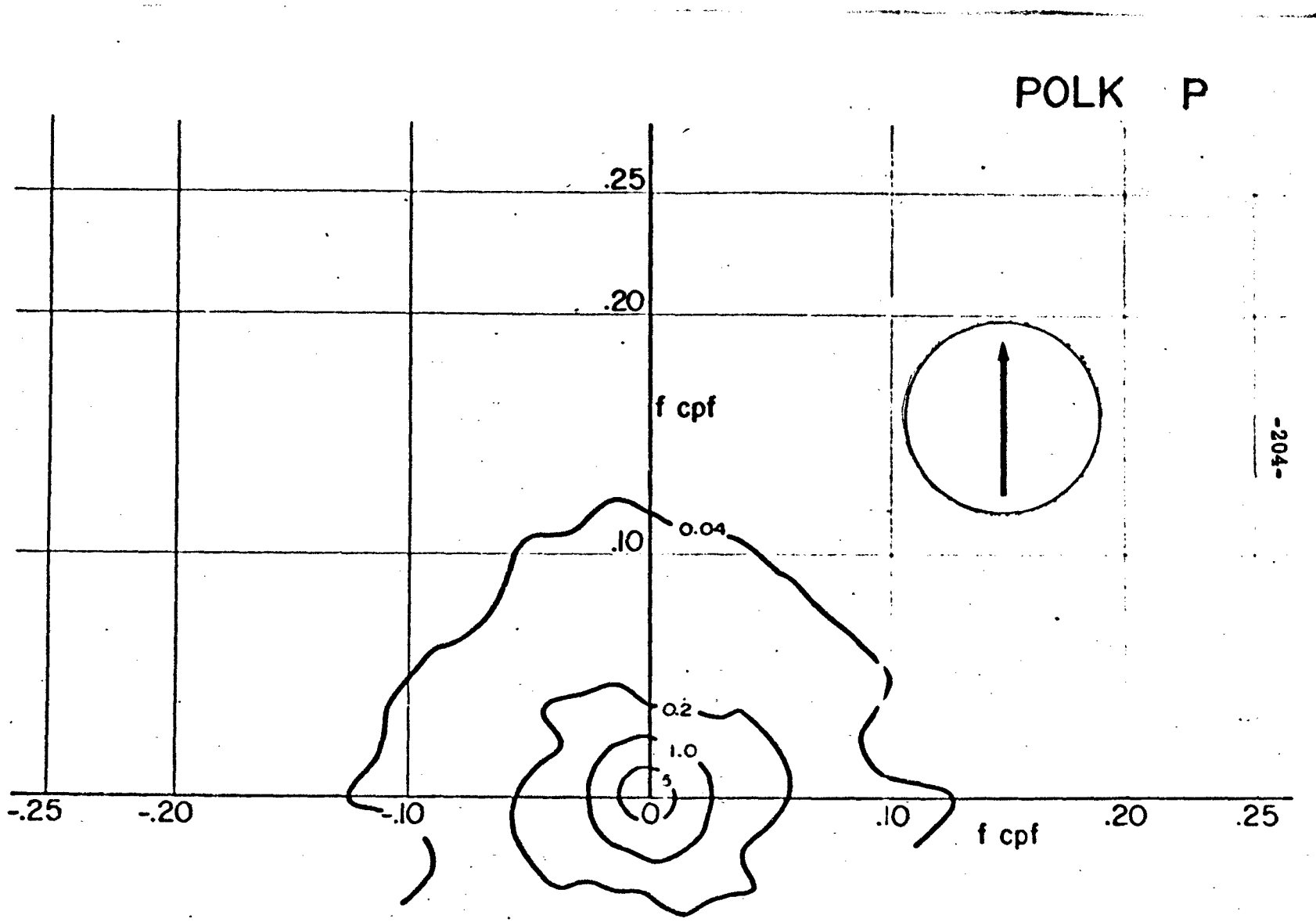


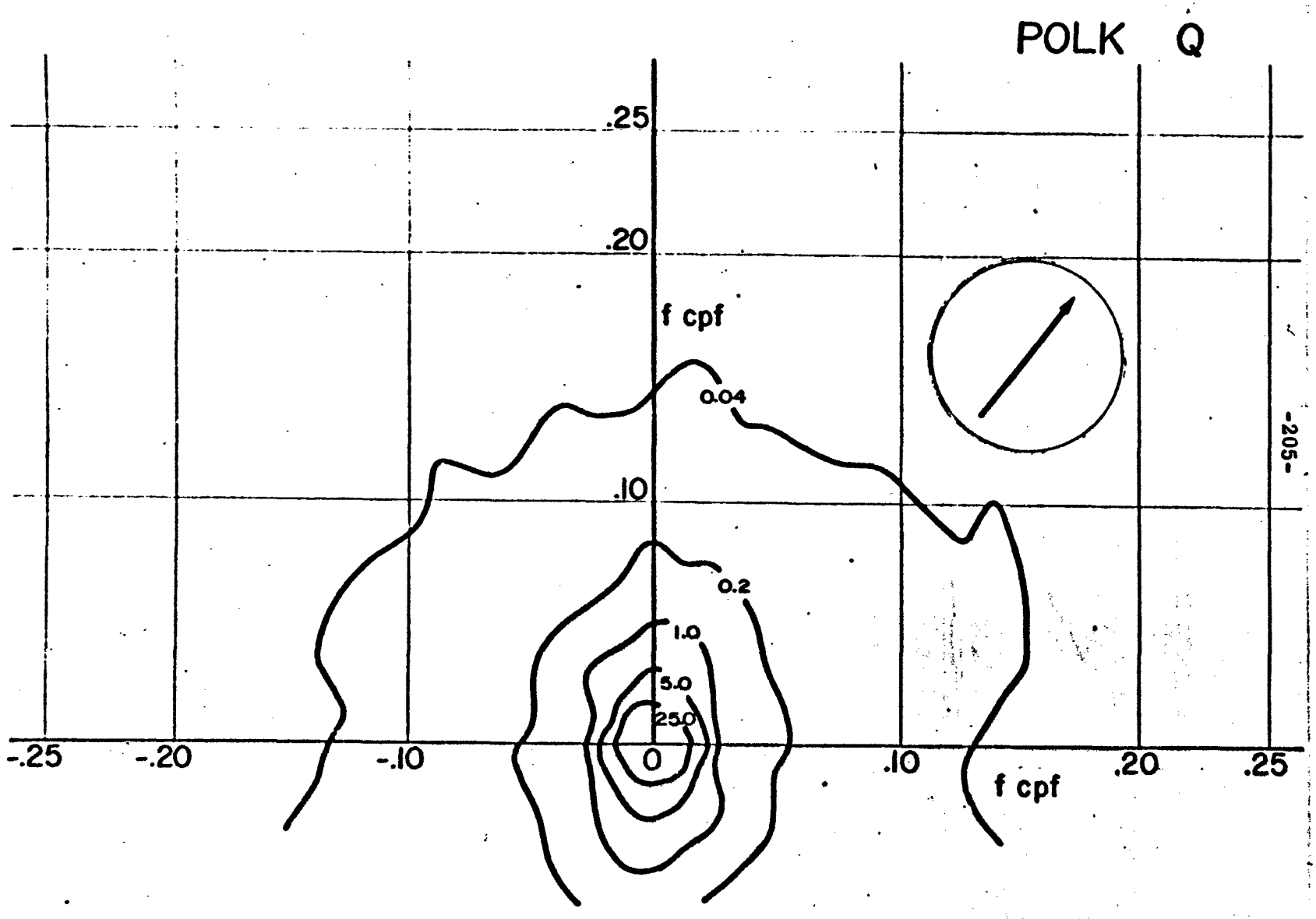

SILL G
.25
.20
.10
f cpf
-.200-
0.2
1.0
5
25
0
-.25
-.20
-.10
.10
.20
.25
f cpf

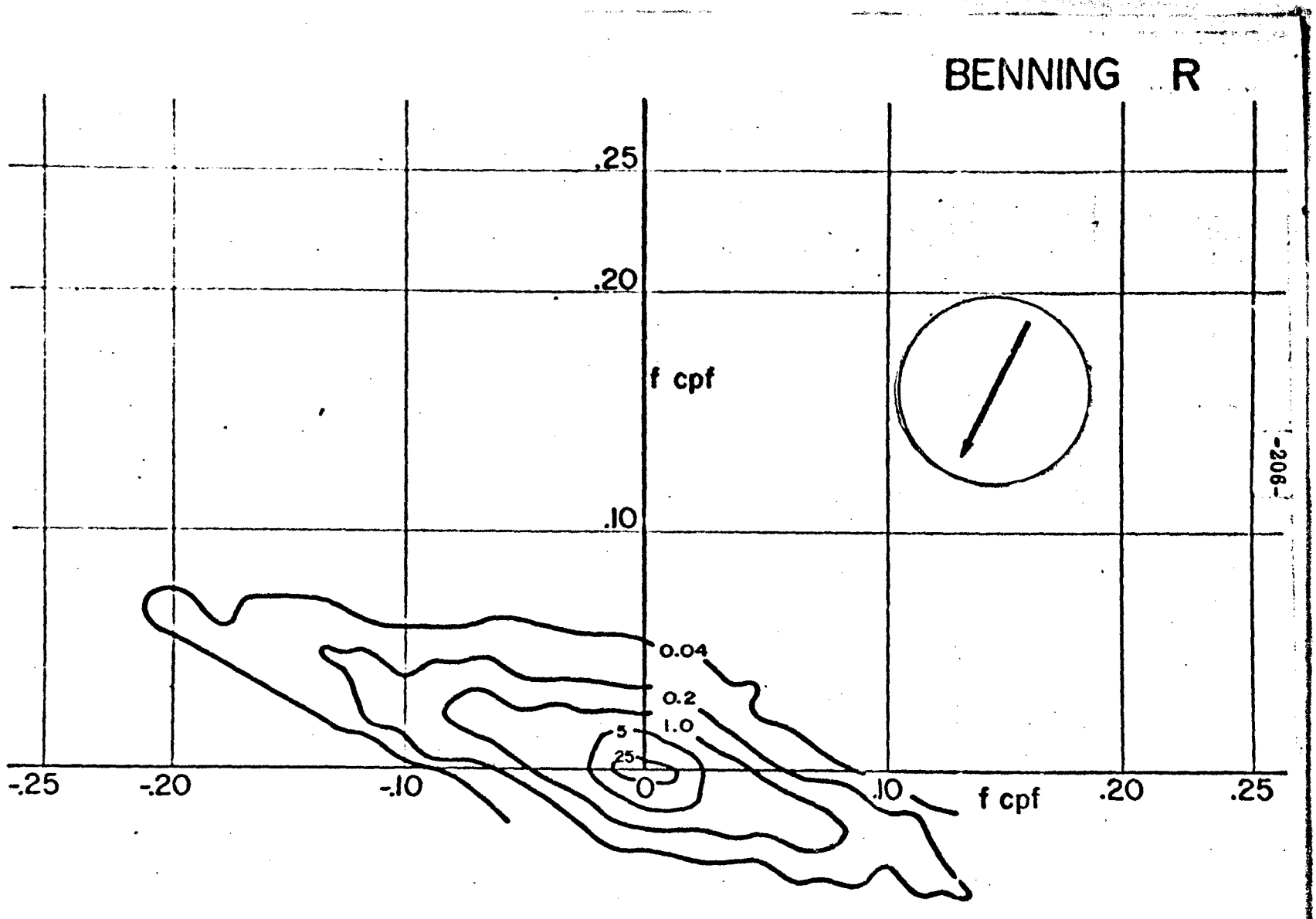

SILL H
.25
.20
.10
f cpf
0.04
0.2
1.0
5
25
0
-.25
-.20
-.10
.10
.20
.25
f cpf

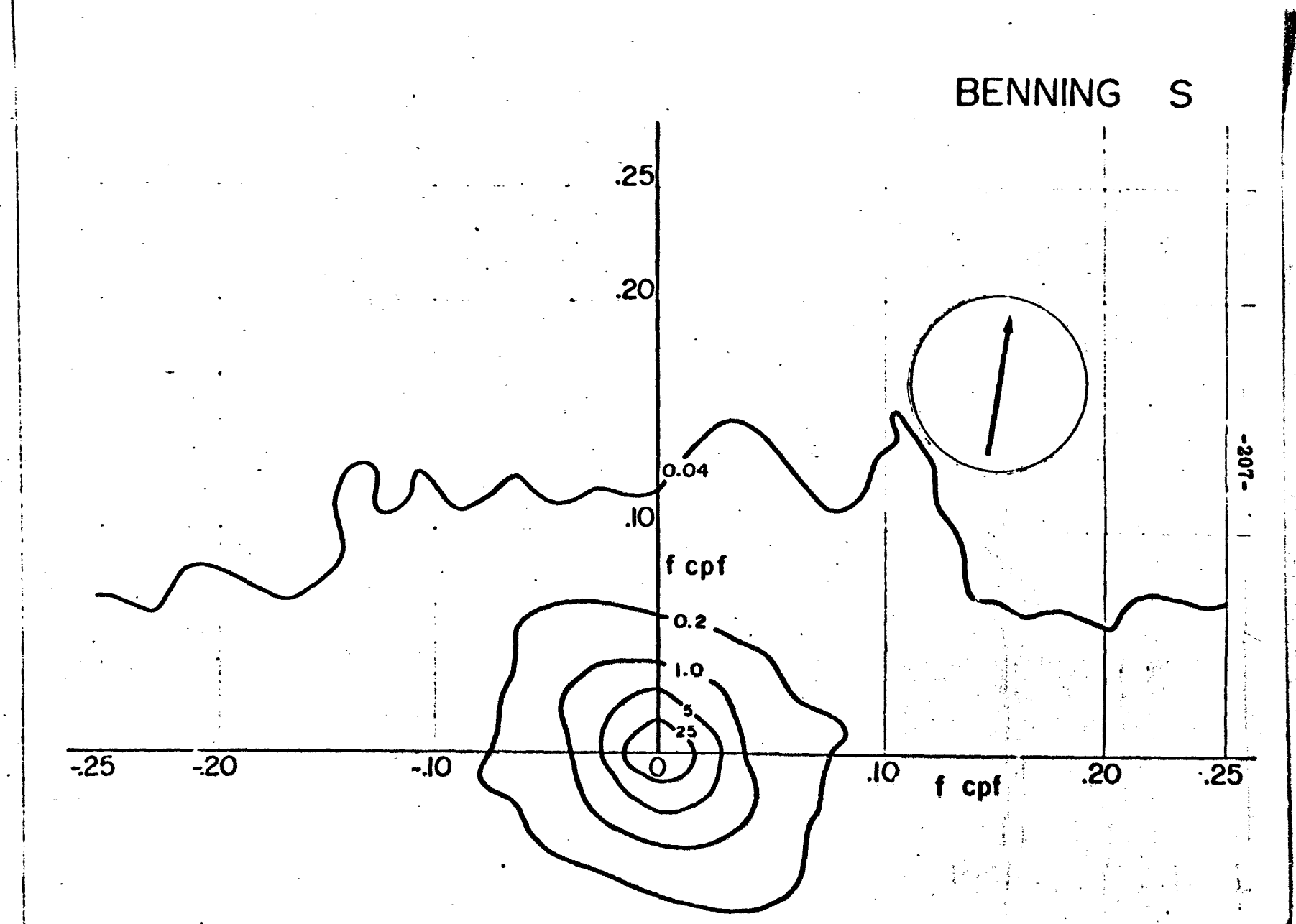

HOOD N
.25
.20
f cpf
.10
0.04
0.04
0.2
1.0
5
25
-.25
-.20
-.10
0
.10
.20
.25
f cpf
-202-

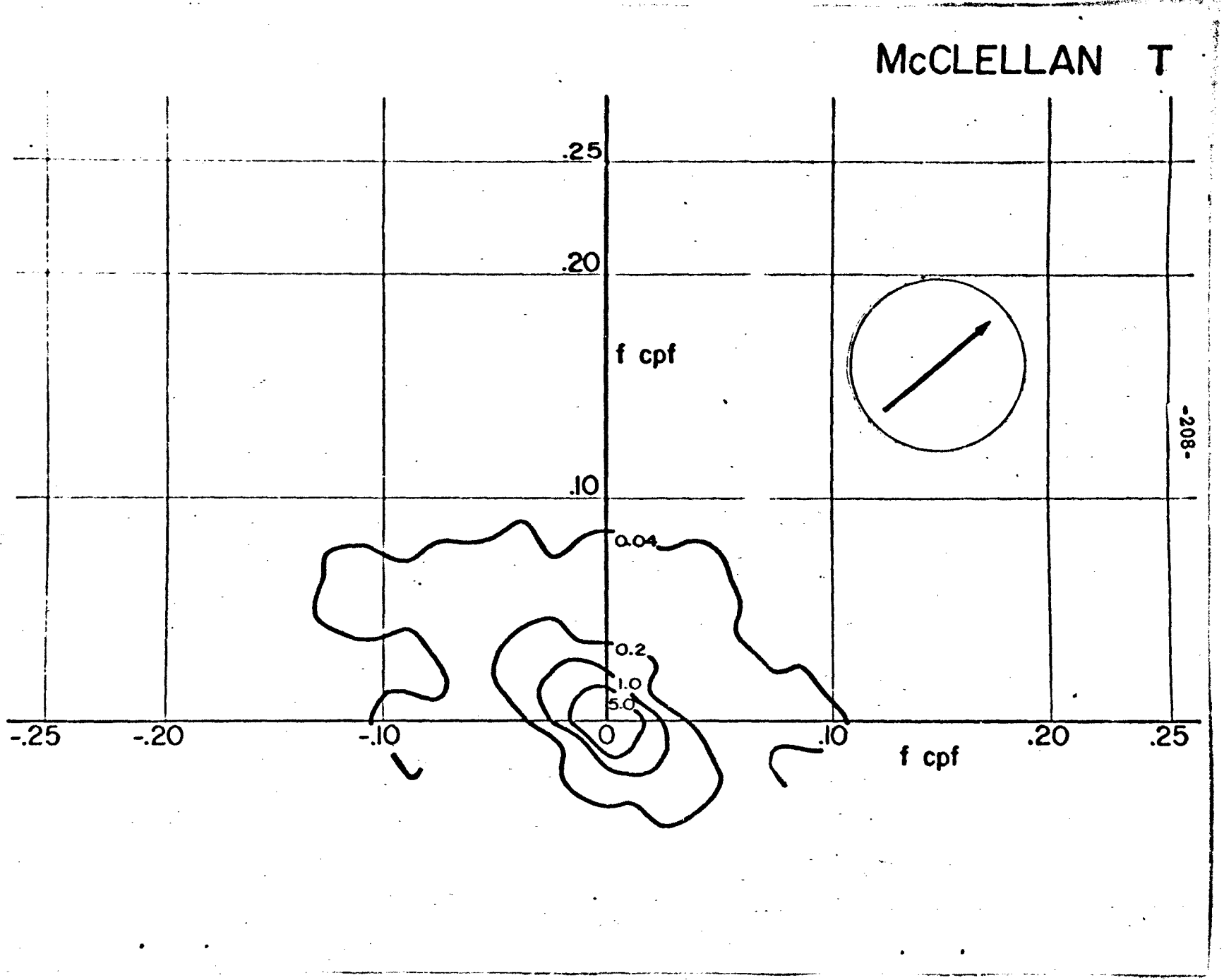

HOOD O
.25
.20
.10
f cpf
.008
0.04
0.2
1.0
-.25
-.20
-.10
0
.10
.20
.25
f cpf


POLK P
.25
.20
f cpf
.10
0.04
0.2
1.0
5
-.25
-.20
-.10
0
.10
.20
.25
f cpf


POLK Q
.25
.20
f cpf
0.04
.10
0.2
1.0
5.0
25.0
-.25
-.20
-.10
0
.10
.20
.25
f cpf
-205-


BENNING R
.25
.20
.10
f cpf
0.04
0.2
1.0
5
25
-.25
-.20
-.10
0
.10
f cpf
.20
.25


BENNING S
.25
.20
0.04
.10
f cpf
0.2
1.0
5
25
-.25
-.20
-.10
0
.10
f cpf
.20
.25
-207-


McCLELLAN T
.25
.20
f cpf
.10
0.04
0.2
1.0
5.0
-.25
-.20
-.10
0
.10
.20
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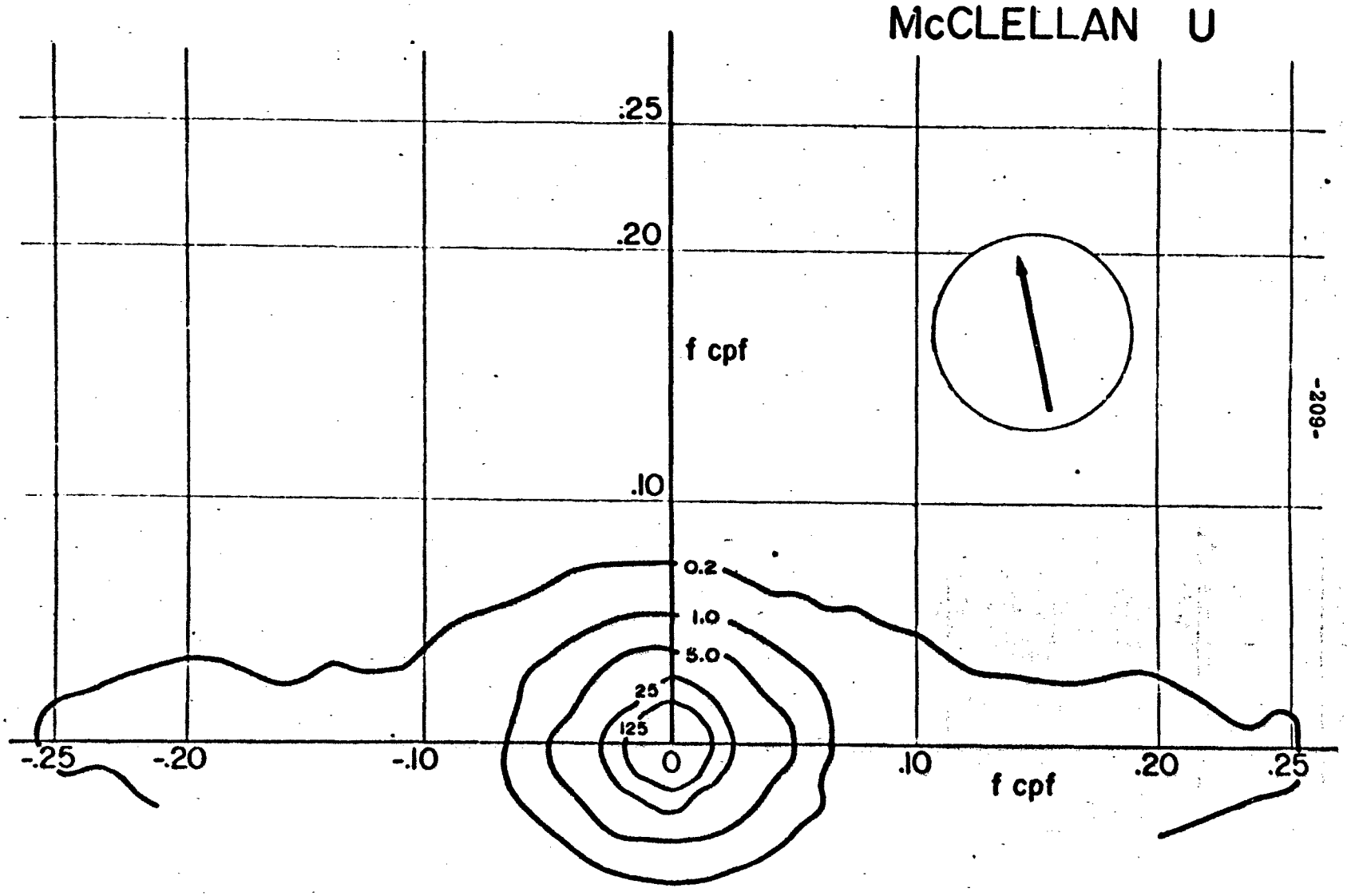
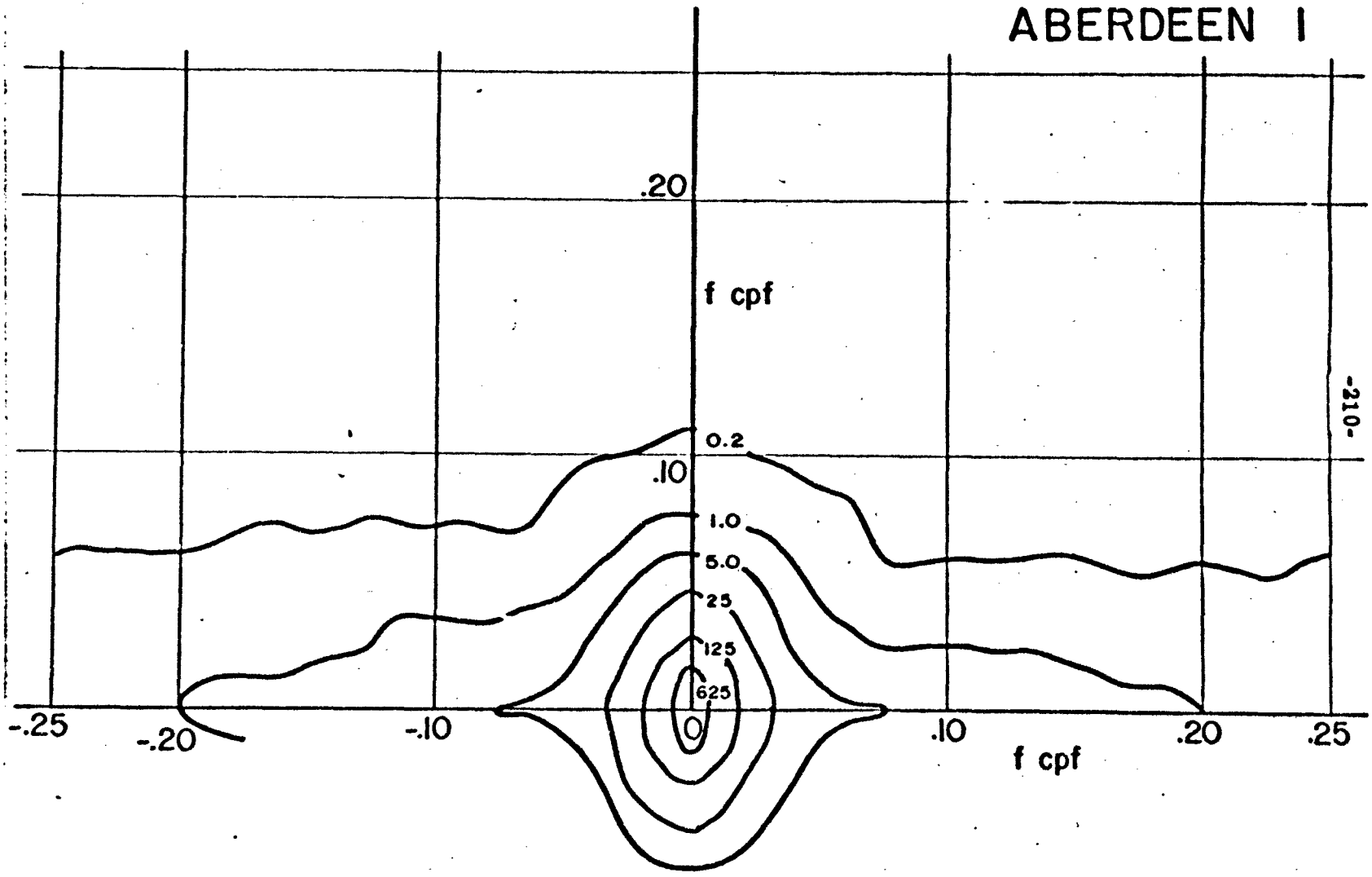
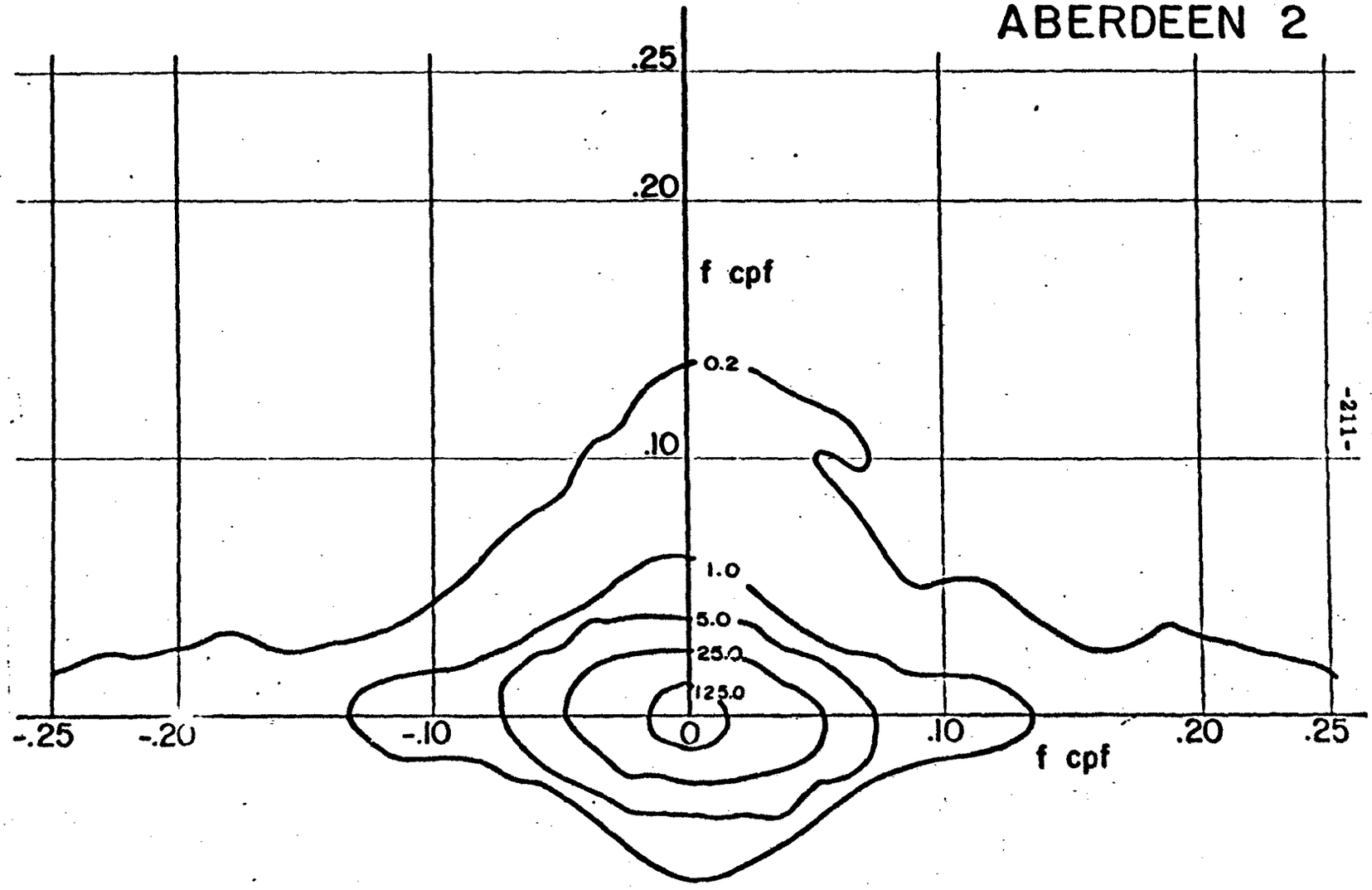
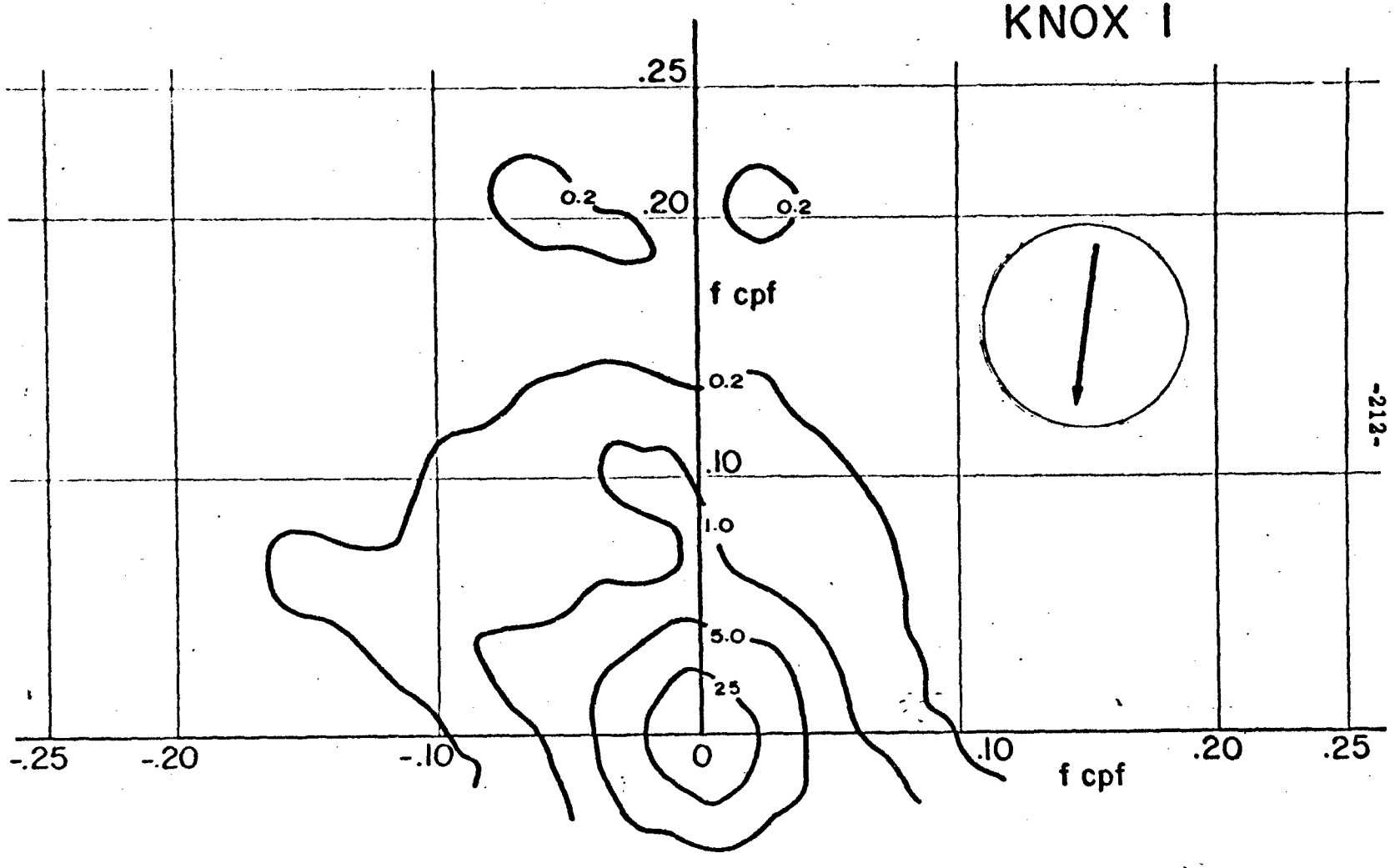
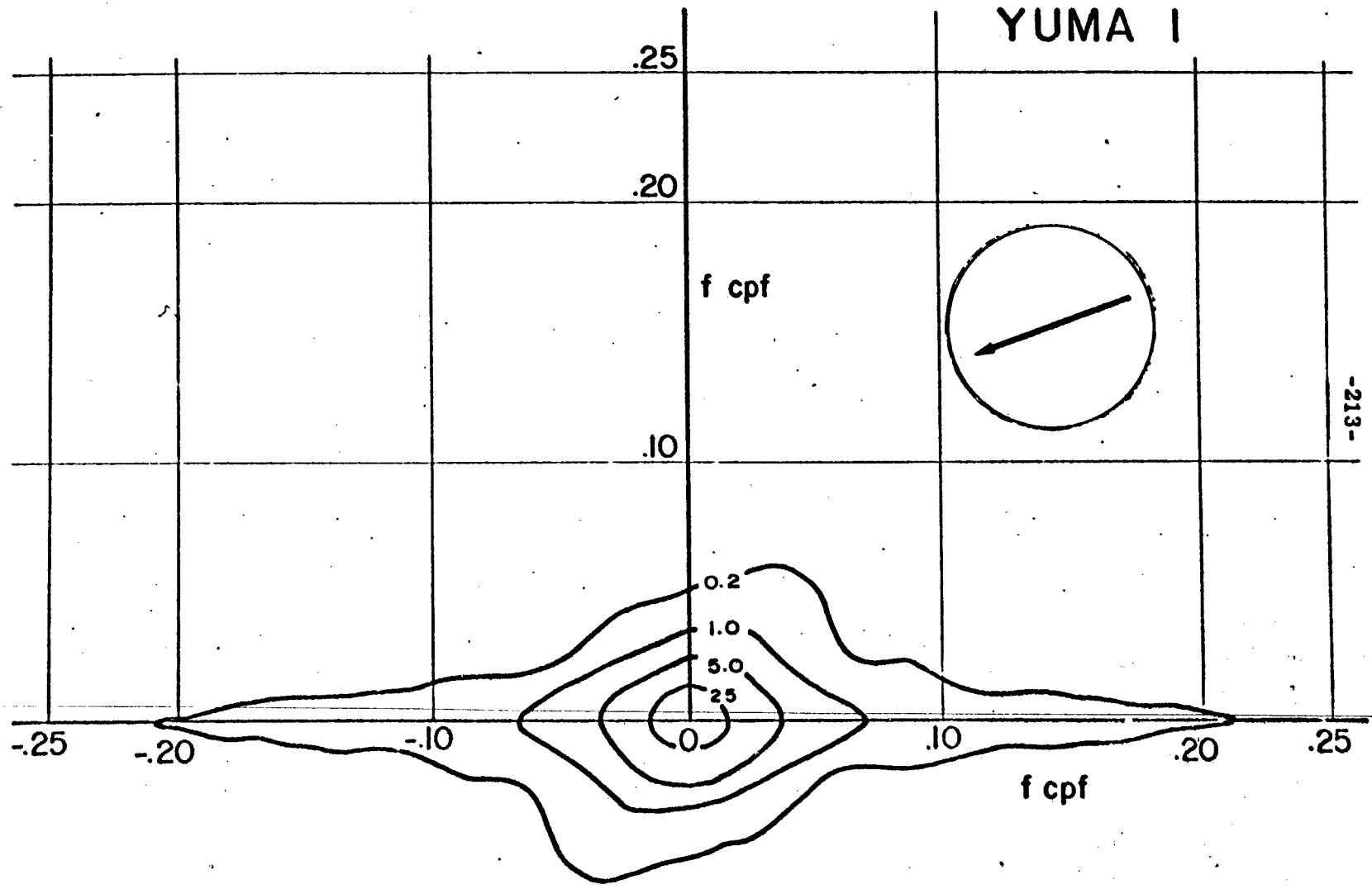
f cpf

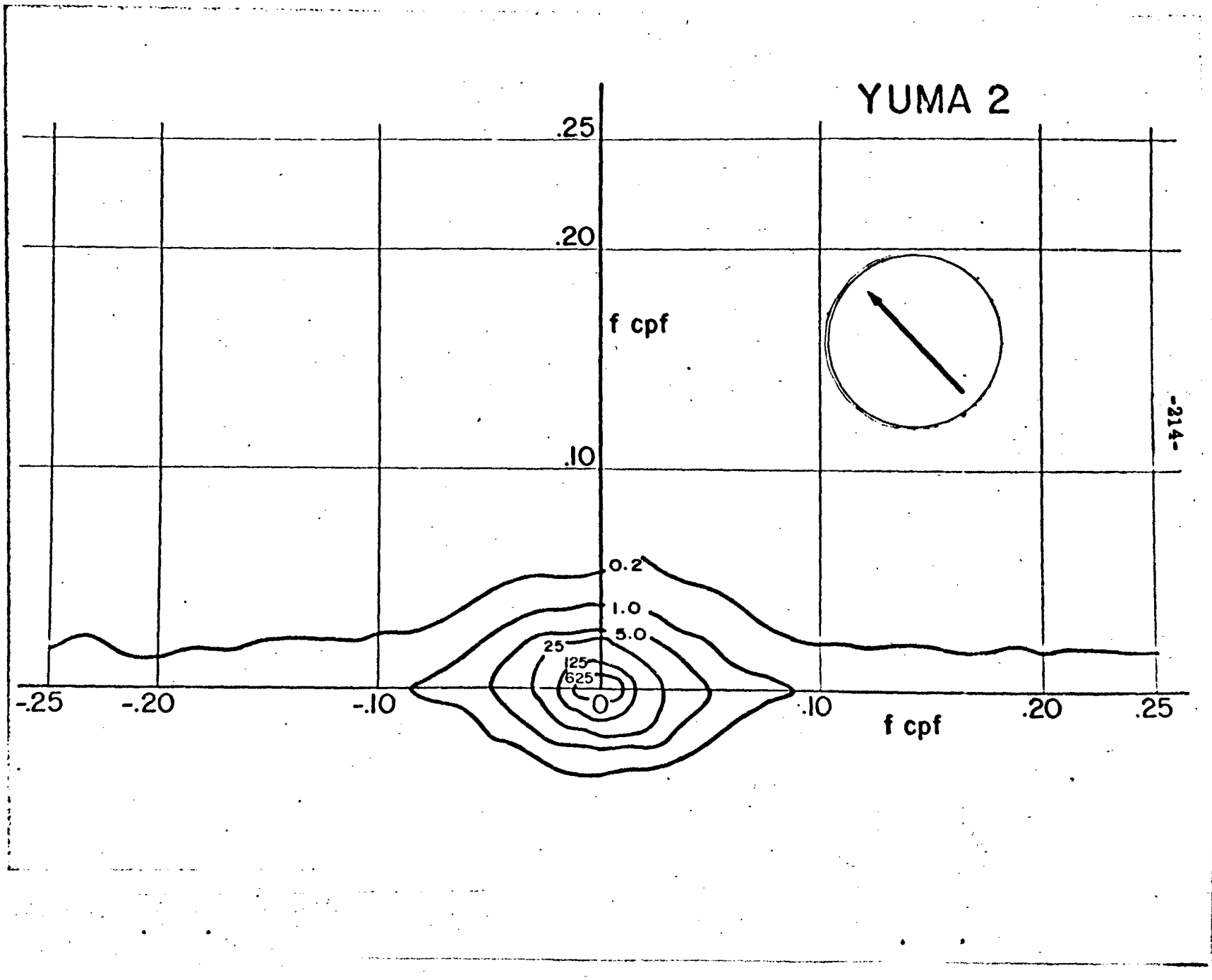

McCLELLAN U
.25
.20
.10
f cpf
0.2
1.0
5.0
25
125
-.25
-.20
-.10
0
.10
.20
.25
f cpf


ABERDEEN I
.20
f cpf
0.2
.10
1.0
5.0
25
125
625
-.25
-.20
-.10
0
.10
.20
.25
f cpf


ABERDEEN 2
.25
.20
f cpf
0.2
.10
1.0
5.0
25.0
125.0
-.25
-.20
-.10
0
.10
.20
.25
f cpf


KNOX 1
.25
.20
0.2
0.2
f cpf
0.2
.10
1.0
5.0
25
-.25
-.20
-.10
0
.10
.20
.25
f cpf


YUMA I
.25
.20
.10
f cpf
0.2
1.0
5.0
25
-.25
-.20
-.10
0
.10
.20
.25
f cpf


YUMA 2
.25
.20
f cpf
.10
0.2
1.0
5.0
25
125
625
0
-.25
-.20
-.10
.10
.20
.25
f cpf

COMPUTATIONS

The computations for this report are done on two programs for the IBM 7094 computer. These programs will be described in considerable detail in Appendices B and C.

In Appendix B, is the co-spectral program for processing data from one track or two parallel tracks. This program was modified from an existing program by adding to it a routine for smoothing the input data and correcting the resulting spectrum. Other changes of a minor nature were also made.

The program described in Appendix C was made especially for processing area data; it is new.

Both programs are available on IBM cards at Midwest Applied Science Corp. at cost.

CONCLUSIONS

There were no surprises in the new line data. Most of the features presented in the p.s.d.'s of our previous report [1] are again to be observed in the new p.s.d.'s. However, the bumps near the 28 ft. wave lengths noticeable in the Knox and Aberdeen p.s.d.'s are not observed again. We conjectured in [1] that these bumps were due to periodic components observable in the ground profile. These could have been caused by repeated use of the ground by vehicles.

The spectra trail off to levels associated with measurement error, as noted in [1]. Thus, power in the high frequency components was generally low. This suggests that a longer measurement interval could have been used. But we are constrained to note that in one vehicle test at Fort Sill high frequency vibration present in the steering system tended to limit speed, indicating that in certain situations closer spacing of data points may be required; this point will be commented upon again in our report on vehicle vibration tests.

Since interpretation is reserved for the second report, we shall now confine attention to conclusions concerning data acquisition and processing.

Surveying methods present a very simple technique for acquiring elevation data. Equipment is easy to rent and use. It is easy to train unskilled personnel in their use for this purpose. The data from Las Vegas were taken in one day by persons who had not previously made this type of measurement.

One is tempted to draw general conclusions from a visual inspection of the data presented. If, however, such remarks are to be meaningful, they must be made keeping in mind the purpose of the study. We cannot, for example, assert that the accuracy of our estimates is good until we know what accuracy is necessary. We cannot make up curves to fit the results unless we know what part of the results must require the closest fit. The internal consistency of the results--the comparison of the line data with the area data at each site, for example--requires some analytic work and perhaps more computation. We will delay such conclusions to the second report.

The spectral estimation procedure was designed with conventional vehicle sizes and speeds in mind. As mentioned elsewhere, it is conceivable that reprocessing of the data may be required for unconventional vehicle types. This point will be studied in due course.

RECOMMENDATIONS

1. For measurement of ground roughness, we recommend that the surveys be conducted with self-leveling levels and self-zeroing rods. Experienced personnel are not required.

2. The format on which the survey data is entered into books is, on the surface, a small matter. However, in recording it on IBM cards for program input, it may be a matter of considerable expense if the original data are not in a suitable format. Recommendations for recording data are presented with the program descriptions in this report.

3. A pre-program must be used to detect outlying data points. The anomalous points must be compared with original books and changed if there is sufficient reason. Unless errors of this type are eliminated, p.s.d. estimates will have peculiar features which are not easily explained. Consultation with survey personnel is usually desirable to check whether outlying values are errors.

4. An extended program to obtain a larger atlas of ground roughness measurements does not seem justified on the basis of the similarity between the results already obtained. Specific experiments or vehicle trials may, however, require surveys.

5. We recommend this atlas be used by those interested in aspects of ground roughness which can be measured by p.s.d.'s. These p.s.d.'s are from many different areas. They may be combined into an average for some purposes or their differences may be noted. In any case, a quantitative use of these results awaits further development.

REVIEWED: _____
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APPROVED: _____
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~~Lt Col~~, Ord
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REFERENCES

[1] Report 8391 LL95 of the Land Locomotion Laboratory, U. S. Army Tank-Automotive Center, Warren, Michigan. "Statistical Studies of Stable Ground Roughness" by Frank Kozin, Louis J. Cote, and John L. Bogdanoff (Nov. 1963).

[2] "Introduction to a Statistical Theory of Land Locomotion", by John L. Bogdanoff, Frank Kozin, and Louis J. Cote, in four parts. Jour. Terramechanics, Vol. 2, 3 (1965, 1966).

APPENDIX A

List of Equipment Used by Surveying Crew

1	dozen	Blue Crayons
2	lb.	Stake Tacks
2	rolls	Red Plastic Tape
2	rolls	Orange Plastic Tape
1	dozen	Pencils
2		Surveyor's Bags
4		100 ft. Engineer Tapes (Post Cat. No. 3141H)
2		100 ft. Lufkin 3/8" Steel Tapes (Post Cat. No. 3245K)
2		100 ft. Cloth Tapes (Post Cat. No. 3200K)
6		Range Poles
8	sets	14 in. Marking Pins
8		Marking Pin Rings
4		8 oz. Plumb Bobs
4		Plumb Bob Sheaths
2	skeins	Plumb Bob Cord
30	sets	Level Book Leaves
1	set	Cross Section Leaves
5		Binders
1		Prismatic Compass
2		Lenker Elevation Leveling Rods
2		Repeating Theodolites K&E Cat. No. 730050
2		Zeiss Self Leveling Levels K&E Cat. No. 750020
1		Auto Top Carrier and Cover
2		Shovels
2		Machettes
2		Thermos Jugs
2		Folding Stools
2		Canvas Bags
1		Hatchet
2		Snake Bite Kits
1		Auto First Aid Kit
1		Camera
1		Station Wagon
		Surveying Stakes and other expendible items purchased in field.

APPENDIX B

Linear Power Spectral Density Program

'PSLINE'

1. Purpose: 'PSLINE' is designed to accept one or more sets of data, each of which consists of one to five parallel tracks. The tracks are represented by as many as one thousand, equally spaced points. Control parameters have been provided to allow flexibility in specifying filtering values, output requirements and track selection.

   'PSLINE' provides the basic operation of computing the covariance functions, raw spectra and spectral estimates for one track or a pair of tracks.

2. Machine Requirements: The 'PSLINE' program exists as a (IBM) FORTRAN IV source program consisting of several subroutines. It is intended to be run on the IBM 7094 computer under the IBSYS operating system. Deviation from these conditions may involve slight modification of the source program. (See Supplement 1 for detailed description of program logic.)

3. Card Preparation:

   CONTROL CARD

COLS	1 - 6	$LINEP
	7 - 8	Input tape number. Ø5, blank - all input is taken from tape 05. XX - TITLE card, track data only are taken from tape XX, other information from tape 05.
	9	X - number of tracks. $1 \leq X \leq 5$
	10 - 12	XXX - number of lags.
	13	1
	14 - 15	XX - Number of filtering coefficients. $1 \leq XX \leq 20$

16 - 21	XXXXXX - distance between points within a track. Decimal point must be punched.
22	0, blank - do not print raw data. 1 - do print raw data.
23	0, blank - do not print smoothed data 1 - do print smoothed data.
24 - 25	XX - number of selection cards.
26 - 80	Blank

SELECTION CARDS

Type 1:

COLS 1 - 7	$SELECT
8	0 - Print covariance functions 1 - Do not print.
9	0 - Print raw spectrum. 1 - Do not print.
10	0 - Print spectral estimates. 1 - Do not print.
11 - 16	bbbbY - Track No. 1
17 - 22	bbbbb, bbbbY - Track No. 2 In both cases, if Y is present $1 \leq Y \leq X$, where X is the digit in Col. 9 of the CONTROL card. If Track No. 2 is present, then the pair of tracks (No. 2 and No. 1) will be processed. If Track No. 2 is not present, then only the single track specified by Track No. 1 will be processed.

Type 2:

COLS 1 - 7	$SELALP
8,9,10	As in Type 1. All possible pairs of tracks are processed.

Type 3:

COLS	1 - 7	$SELALS
	8,9,10	As in Type 1.

All tracks are processed individually.

KEY CARD

COLS	1 - 72	Blank
	73 - 80	An eight digit number which appears on the TITLE card of the particular track data which is to be processed.

This card is present to allow processing of arbitrarily positioned data sets on a tape other than Tape 5. However, regardless of whether the track data is on Tape 5 or on another tape, the KEY card number and the TITLE card number for the track data must be present. If more than one set of track data is to be processed, the sets must be in the same order as the KEY cards are encountered, i.e., PSLINE will not rewind the input tape if the correct TITLE card has not encountered when the end of the tape is reached.

TITLE CARD

COLS	1 - 6	Blank
	7 - 36	Any text which identified this track data set. This title will appear at the top of each page of output for this track data set.
	37 - 72	Blank
	73 - 80	Eight digit number which will identify this track data set given the number on the KEY card.

TRACK DATA

A set of track data consists of 1 or more tracks, all of which consist of the same number of points. Let T(I,J) denote the Ith point of the Jth track. Suppose there are n tracks, then

T(I,1), T(I,2), ··· T(I,n) is called the Ith cross-section for this set of track data. Track data is punched into cards by cross-sections and is read by 'PSLINE' by cross-sections. A FORMAT card must be constructed to indicate how the cross-section values have been punched on cards. In addition the FORMAT card must allow for a one character, alphameric field to be read after the last number of each cross-section. The use of this character will be discussed later.

Example Track 1 4.0, 4.2, 4.3
Track 2 3.1, 3.2, 3.3

This could be punched as follows:

Card 1	COLS	1-3	4.0
		4-6	3.1
Card 2	COLS	1-3	4.2
		4-6	3.2
Card 3	COLS	1-3	4.3
		4-6	3.3
Card 4	COLS	1-3	Blank
		4-6	Blank
		7	* or $ or /

And the associated FORMAT card would be

(2F3.0, A1)

NOTE: Columns 73-80 should not be used to contain track data or the one character field.

TERMINATION CARDS

In order to eliminate the necessity of counting the number of points/track in a track data set, PSLINE looks for a special cross-section in which the one-character field is not blank and is one of *, $ or /. When a cross-section of this type is found the following actions are taken:

1. The numeric values read are NOT included in the true track data.

2. It is assumed that the last cross-section read is the last cross-section for this track data set.

3. The particular character (*, $, or/) found determines how the NEXT input set is to be processed:

   * indicates that there are no more input sets.

   / indicates that the next input set consists of only

   KEY card
   TITLE card
   Track Data (including TERMINATION card)

   This allows one to process many track data sets with the parameters found on one CONTROL card. Note that this presupposes that filtering specifications, number of tracks, number of SELECTION cards and track data format are identical for the next data set.

   $ indicates that a new control card is to be read with the next input set. I.e., the next input set will consist of

   CONTROL Card
   Filtering Coefficient Format Card
   Filtering Coefficients
   Track Data Format Card
   KEY Card
   TITLE Card

Track Data (including TERM-
INATION Card)
SELECTION Card(s)

FORMAT CARD

The variable format technique is employed by PSLINE to allow flexible data card format. A FORMAT card for PSLINE consists of a standard FORTRAN FORMAT statement, with the word FORMAT deleted, punched free form, into columns 1-72 of a card.

Filtering coefficient format must contain only F or E-type conversions, track data formats must specify one more field than the number of tracks with the last of the fields A1.

Consult IBM FORTRAN IV programming (7090/94) manuals for detailed description of FORMAT statements.

4. Deck Preparation: The following is an example of a deck prepared using the various termination character options. Bracketed cards would appear on another tape (other than the system input tape) if the CONTROL card specified so.

```
$JOB card
     Installation $ID card
$EXECUTE IBJOB
$IBJOB
     Source Program Deck
               or
     Binary Object Deck
$DATA card
CONTROL card
Filtering Coefficient FORMAT Card
Filtering Coefficients
Track Data FORMAT Card
KEY Card
TITLE Card
Track Data (TERMINATION Card with /)
```

SELECTION Card(s)
KEY Card
Track Data (TERMINATION Card with $)
SELECTION Card(s)
CONTROL Card
Filtering Coefficient FORMAT Card
Filtering Coefficient
Track Data FORMAT Card
KEY Card
TITLE Card
Track Data (TERMINATION Card with $)
SELECTION Card(s)
END-OF-FILE Card

SUPPLEMENT 1

to

LINEAR POWER SPECTRAL DENSITY PROGRAM

A. General Program Logic

The PSLINE program consists of a main program (deck name RVR...) and five subroutines (entry points - INPUT, OUTPUT, FILDEC, COQUAD, and CORRET).

1. INPUT - The INPUT subroutine reads all input cards except selection cards and sets parameters to control the processing of the track data. Upon reading the filtering coefficients, it calls subroutine CORRET to compute the actual filtering values.

2. OUTPUT - The OUTPUT subroutine is called by the main program, RVR..., to print out raw and/or smoothed track data, one track per call.

3. FILDEC - The FILDEC subroutine is called by the main program, RVR..., to perform the filter transformation on the track data.

4. CORRET - The CORRET subroutine is called by the INPUT routine to compute the actual filtering values from the filtering coefficients read from cards.

5. COQUAD - The COQUAD subroutine is called by the main program, RVR..., and is supplied with two tracks as arguments. It does all computation for the spectral analysis of the filtered track data and all associated output (covariances, raw and smoothed spectra).

6. RVR... - The main program, RVR..., calls INPUT, OUTPUT, and FILDEC to prepare the filtered track data. It then reads SELECTION cards and calls COQUAD to perform the required spectral analysis.

B. Internal Data Organization

The following is a list of the various blocks of labeled COMMON and their associated variables. The table which follows indicates (via an X) which blocks are available to each routine.

Block Name

DLABEL

NDMT	-	Number of filtering coefficients.
D(20)	-	Filtering coefficients.
RAW	-	Switch (true or false) to control printing of raw data.
SMOOTH	-	Switch (true or false) to control printing of smoothed data.
NSEL	-	Number of SELECTION cards to be read.

DELTAX

DELTA	-	Distance between track points.
LAGS	-	Number of lags specified on CONTROL card.

LABEL

NAME(5)	-	COLS. 7-36 of TITLE card.

XXX

LA(501)	-	Actual filtering coefficients computed by CORRET and used by COQUAD.

LIST

IC	-	Switch (0 or 1) to control printing of covariance functions.
IR	-	Same as IC for raw spectrum.
IS	-	Same as IC for spectral estimates.
ITWO	-	Switch (true or false) set by RVR... to tell.

QSQ

CS(1002) - Computational constants produced
QA(501) - by CORRET for use in COQUAD.

	DLABEL	DELTAX	LABEL	XXX	LIST	QSQ
RVR...	X				X	
INPUT	X	X	X	X		
OUTER			X			
CORRET	X	X		X		X
FILDEC	X					
COQUAD		X	X	X	X	X

C. Detailed Description of Routines

Subroutine OUTER

ARGUMENTS:

ARRAY - Floating Pt. vector.
N - Number of elements in ARRAY.
XN - Track Code: Track No. 1-A,
Track No. 2-B, ···, Track No. S-E.
KK - 1 if raw track.
2 if smoothed track.

OPERATION:

Outputs ARRAY, ten numbers per line, with a double space every ten lines and a new page every fifty lines. Each page is headed by the information in Columns 7-37 of the TITLE card and the appropriate track code.

Subroutine CORRET

PARAMETERS: (Passed via labeled COMMON)

LAGS - Number of lags.
NF - Number of filtering coefficients.

FACTOR(NF) - Filtering coefficients.

OPERATION:

Computes the following:

For $i = 1,2, \cdots, NF$

$$QA_i = \sum_{j=1}^{NF-i+1} FACTOR_j \times FACTOR_{j+i-1}$$

For $i = 1,2, \cdots, 2 \times LAGS$

$$CS_i = \cos\left[(i-1) \times \frac{\pi}{LAGS}\right]$$

$$LA_1 = QA_1 + 2 \times \sum_{i=2}^{NF} QA_i$$

For $i = 2,3, \cdots, LAGS + 1$

$$LA_i = QA_1 + 2 \times \sum_{j=2}^{NF} PA_j \times CS_{[(i-1)\times(j-1) \text{ Modulo } 2 \times LAGS] + 1}$$

Subroutine FILDEC:

ARGUMENTS:

A	-	ARRAY containing raw track data.
NA	-	Number of points of raw track data.
NB	-	Set by FILDEC, number of points in smoothed track data.

OPERATION:

Smoothes the track data in A and returns smoothed track data to A.

PARAMETERS: (Via labeled COMMON)

F - ARRAY of filtering coefficients.
NF - Number of filtering coefficients.

For $i = 1,2, \cdots, NA-NF + 1$

$$A_i = \sum_{k=1}^{NF} F_k \times A_{k+i-1}$$

NB is set to NA-NF + 1

Subroutine INPUT:

ARGUMENTS:

A - A five column ARRAY with 1050 rows into which track data will be read.
I - INPUT will set this to number of points per track in the data read.
J - INPUT will set this to the number of tracks read.

Main Program RVR...

VARIABLES:

A - ARRAY of track data passed from INPUT routine.
NDATA - Number of points per track.
J - Number of tracks.

OPERATION:

See flow chart.

Subroutine COQUAD:

This was originally a routine for computing spectra, co-spectra and other related quantities. It was obtained from the University of California, Berkely, California. Its identification is G2 BC COQD. The program was written by Steward W. Smith, California Institute of Technology Seismological Laboratory, and was modified for BC Computer Center by Emily Harris in February 1963.

A flow chart for this program is not available and operating instructions are contained largely in the above. We present those quantities calculated by the program which are used by us.

The following two terms are computed for p=0 to m.

$$(\text{TERM 1})_p = \sum_{i=1}^{N-p} x_i\, y_{i+p} - \frac{1}{N-p} \sum_{i=1}^{N-p} y_{i+p} \sum_{i=1}^{N-p} x_i$$

$$(\text{TERM 2})_p = \sum_{i=1}^{N-p} y_i\, x_{i+p} - \frac{1}{N-p} \sum_{i=1}^{N-p} x_{i+p} \sum_{i=1}^{N-p} y_i$$

The following covariance estimates are computed for p=0 to m.

$(QX)_p = \frac{1}{N-p}$ X formula for TERM 1 with x replacing y so that products involve x's only.

$(QY)_p = \frac{1}{N-p}$ X formula for TERM 1 with y replacing x so that products involve y's only.

$$(QC)_p = \frac{1}{2(N-p)} \left[(\text{TERM 1})_p + (\text{TERM 2})_p\right]$$

$$(QQ)_p = \frac{1}{2(N-p)} [(\text{TERM } 1)_p - (\text{TERM } 2)_p]$$

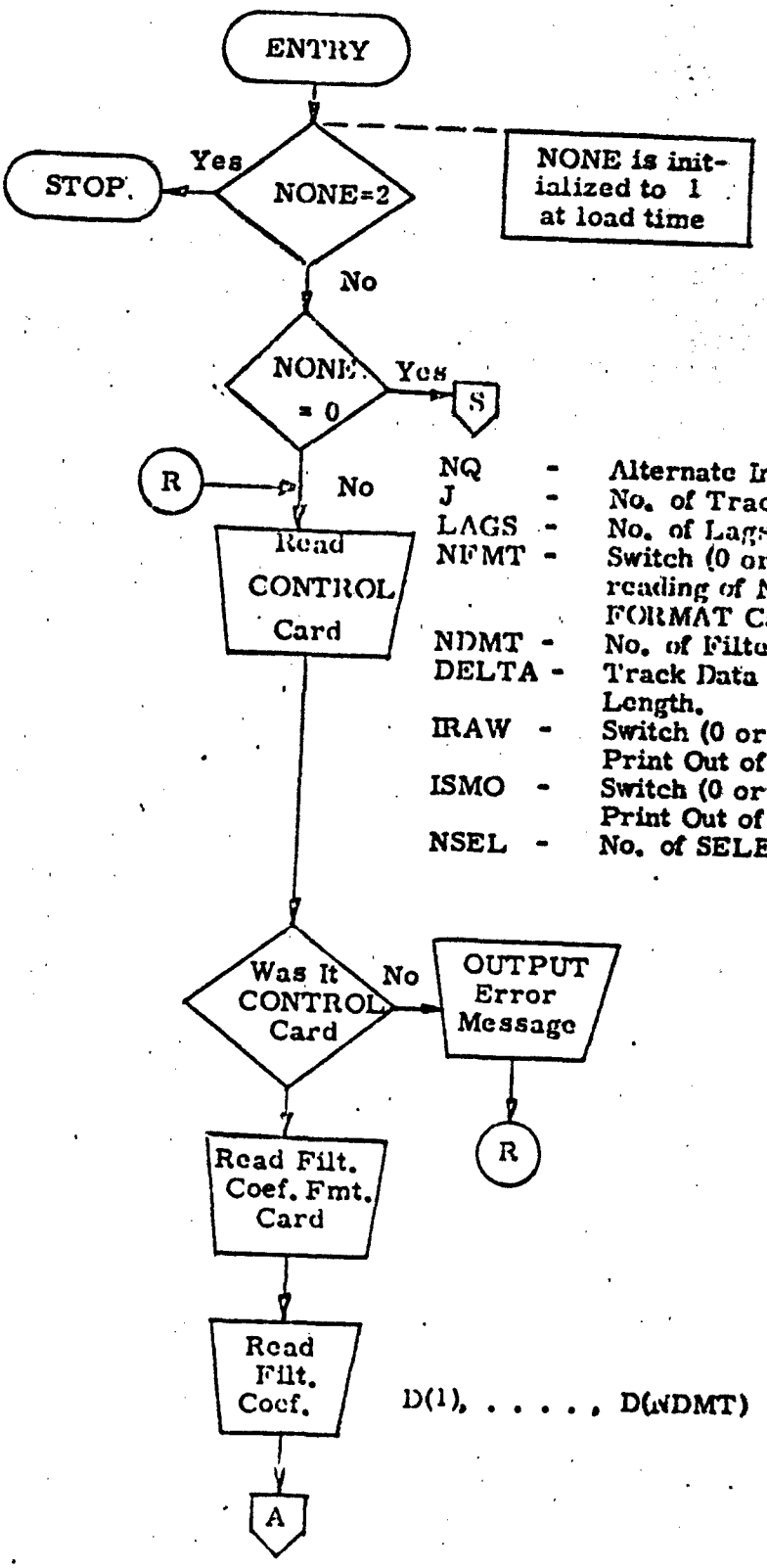
The raw spectral estimates are denoted (LZ) where Z may be X, Y, or C. (LQ) is computed by a separate formula. These are computed for h = 0 to m.

$$(LZ)_h = \frac{1}{m} (QZ)_o + \frac{2}{m} \sum_{1}^{m-1} (QZ)_p \cos \frac{\pi ph}{m} + \frac{1}{m} (QZ)_m (-1)^h$$

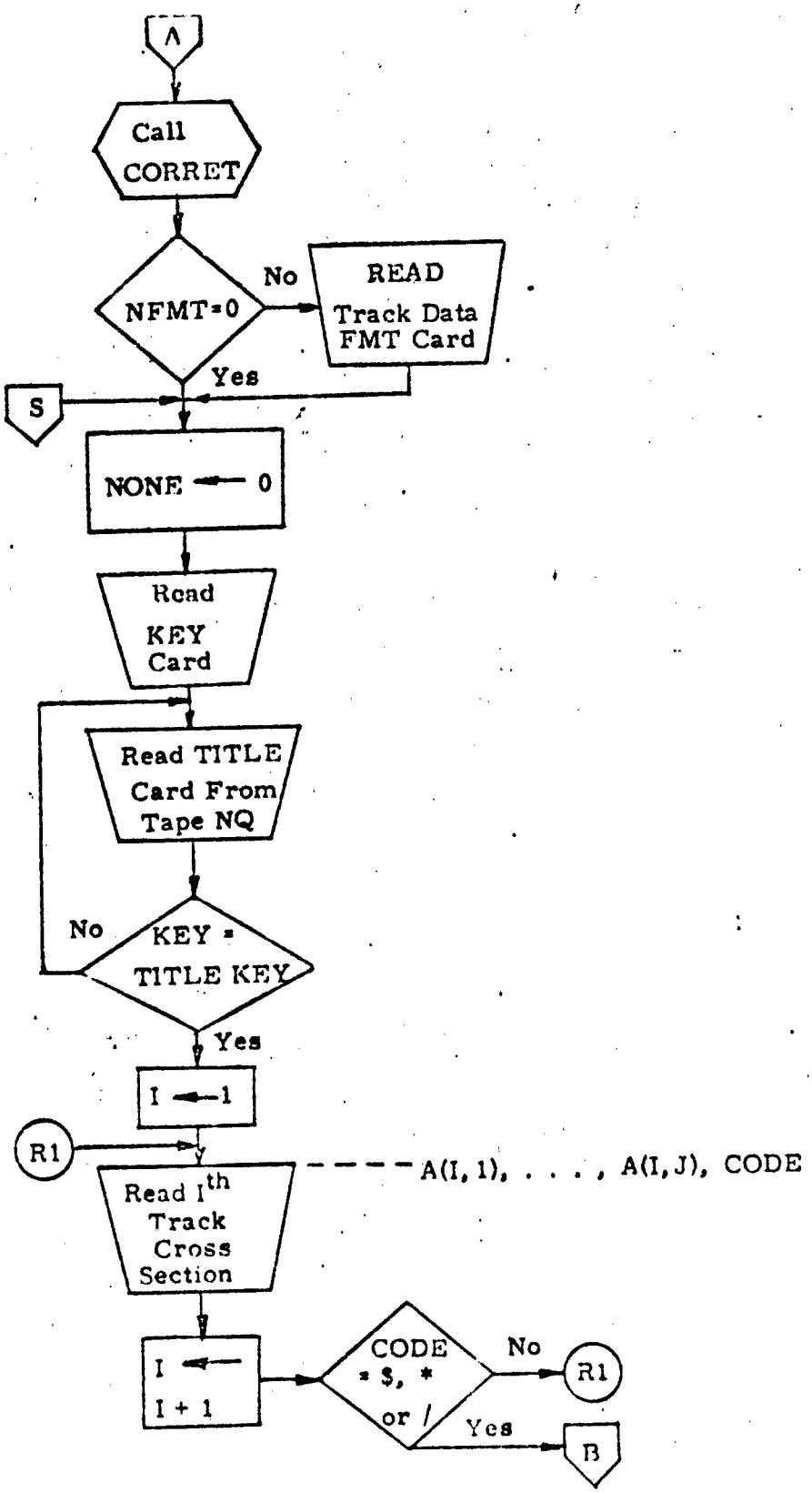
$$(LQ)_h = \frac{2}{m} \sum_{1}^{m-1} (QQ)_p \sin \frac{\pi ph}{m}$$

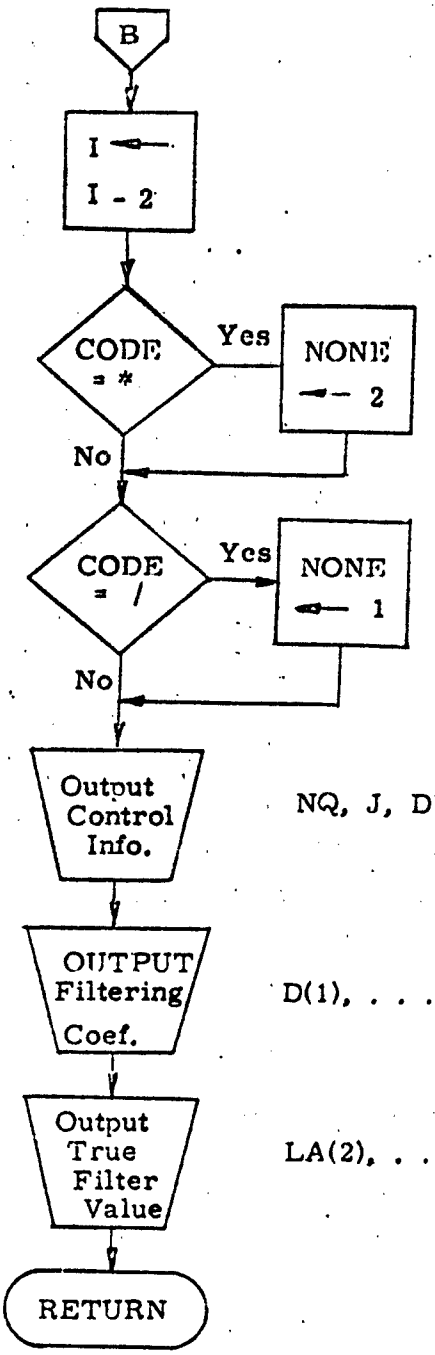
The raw spectral values are subjected to a running average smoothing using coefficients .25, .50, .25, to give the smoothed spectral values denoted $(WX)_h$, $(WY)_h$, $(WC)_h$, and $(WQ)_h$.

OPERATION:

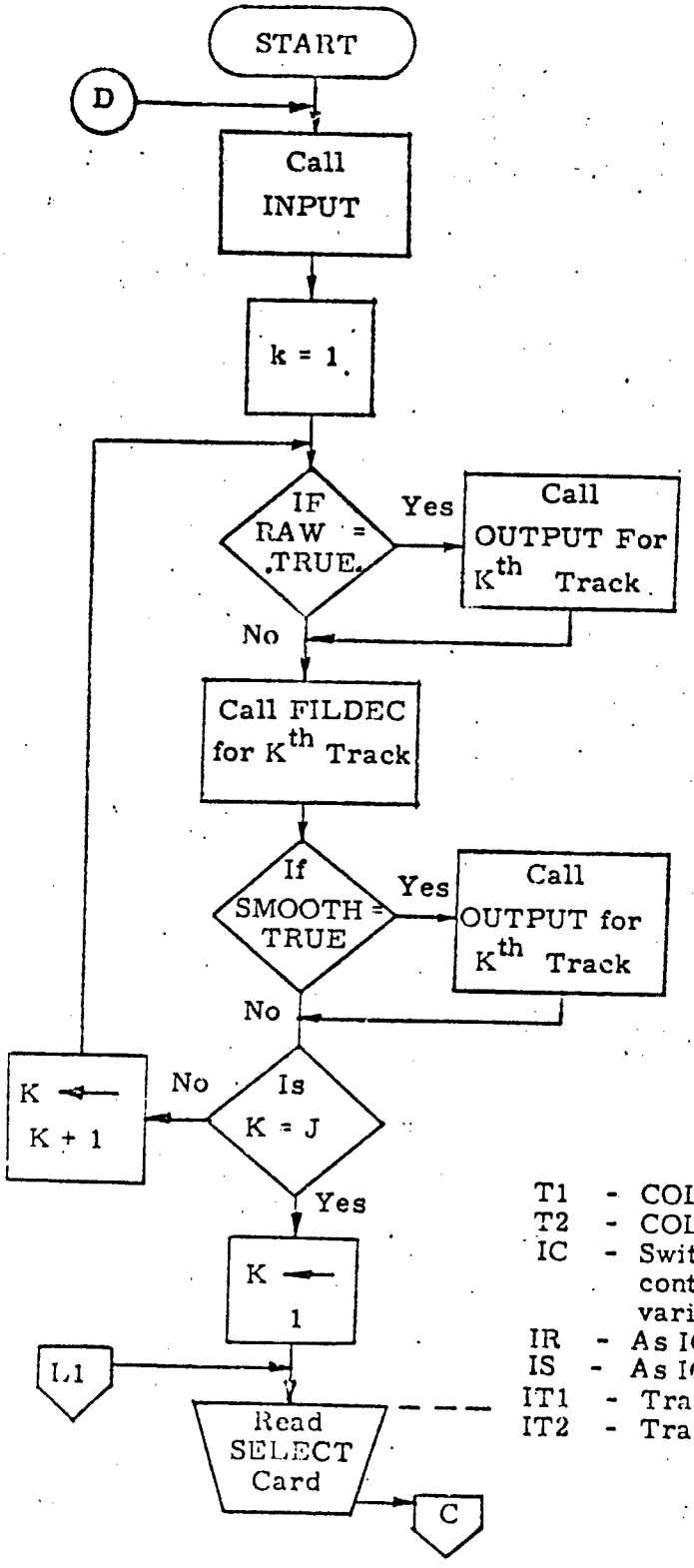


NQ - Alternate Input Tape No.
J - No. of Tracks
LAGS - No. of Lags
NFMT - Switch (0 or 1) to cause reading of New Track Data FORMAT Card.
NDMT - No. of Filtering Coefficients
DELTA - Track Data Point Interval Length.
IRAW - Switch (0 or 1) to Control Print Out of Raw Data.
ISMO - Switch (0 or 1) to Control Print Out of Smoothed Data.
NSEL - No. of SELECTION Cards

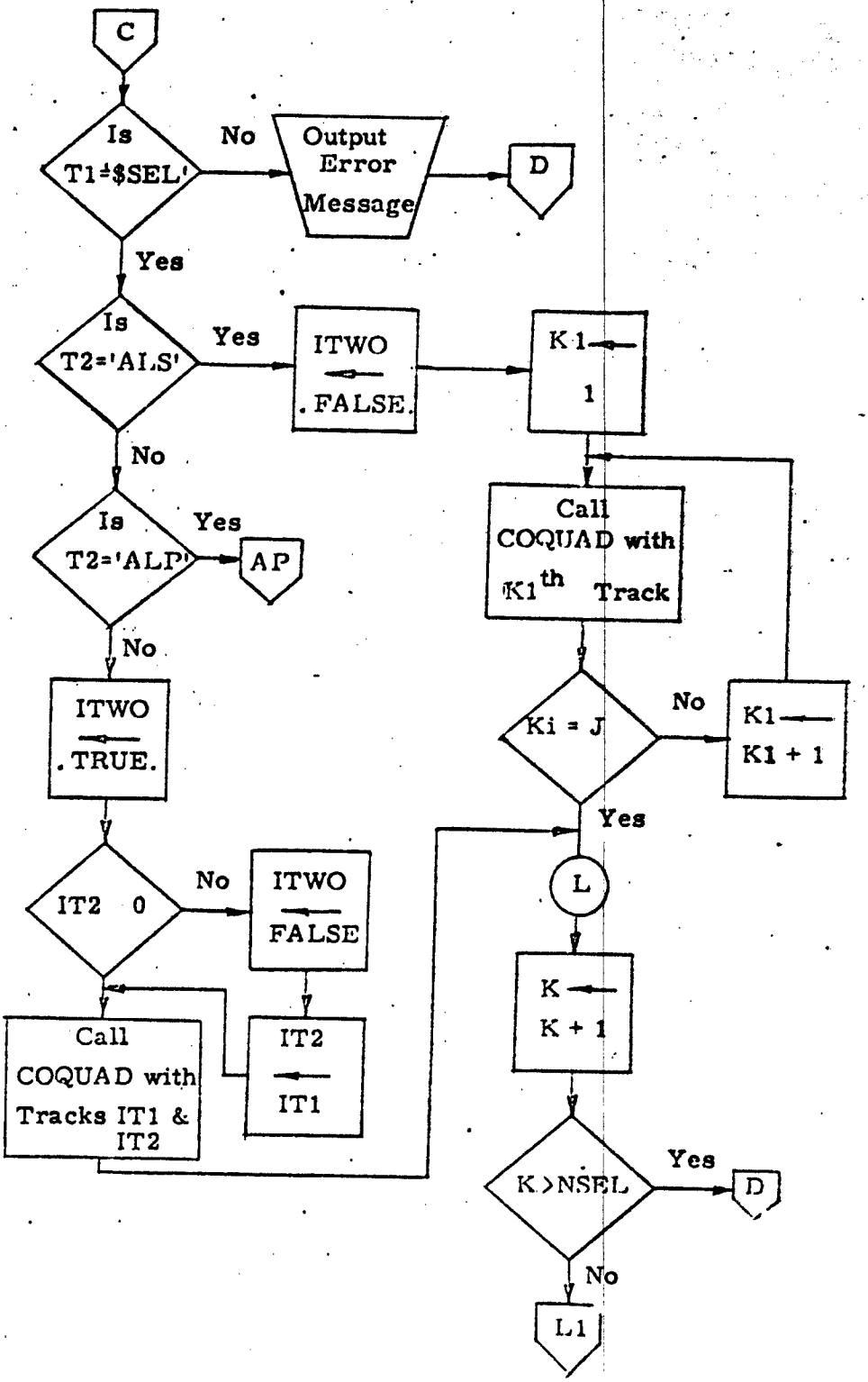

A
Call CORRET
NFMT=0
No
READ Track Data FMT Card
Yes
S
NONE ← 0
Read KEY Card
Read TITLE Card From Tape NQ
No
KEY = TITLE KEY
Yes
I ← 1
R1
Read I th Track Cross Section
A(I, 1), . . . , A(I, J), CODE
I ← I + 1
CODE = $, * or /
No
R1
Yes
B

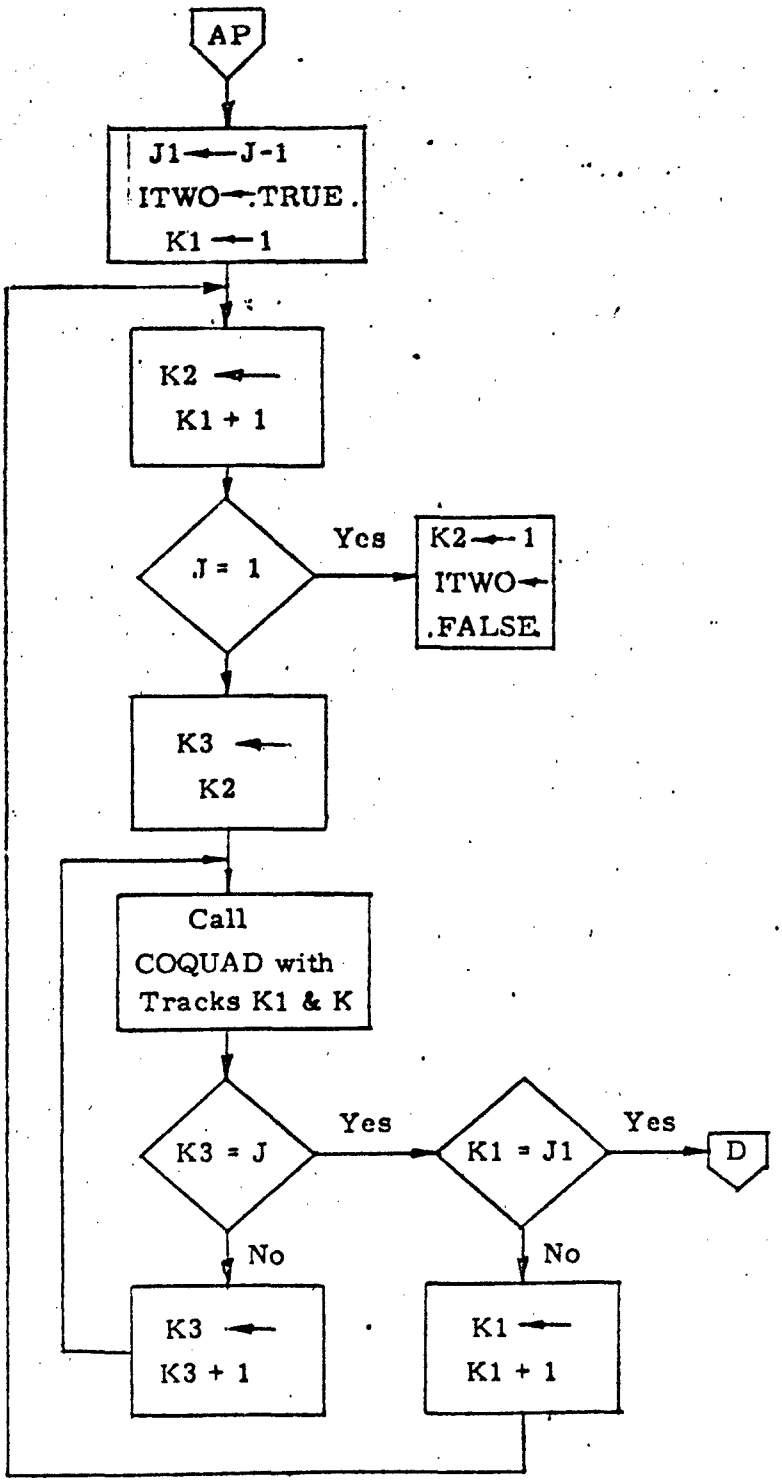

B
I ← I - 2
CODE = *
Yes
NONE ← 2
No
CODE = /
Yes
NONE ← 1
No
Output Control Info.
NQ, J, DELTA, L, NSEL, LAGS, NDMT
OUTPUT Filtering Coef.
D(1), . . . , D(NDMT)
Output True Filter Value
LA(2), ... , LA(LAGS + 1)
RETURN

MAIN PROGRAM RVR...



T1 - COLS 1-4
T2 - COLS 5-7
IC - Switch (0 or 1) to control printing of covariance functions by COQUAD
IR - As IC for raw spectrum
IS - As IC for smoothed spectrum
IT1 - Track No. 1
IT2 - Track No. 2


C
Is T1≠$SEL'
No
Output Error Message
D
Yes
Is T2='ALS'
Yes
ITWO ← .FALSE.
K1 ← 1
No
Is T2='ALP'
Yes
AP
No
ITWO ← .TRUE.
Call COQUAD with K1th Track
Ki = J
No
K1 ← K1 + 1
Yes
L
IT2 0
No
ITWO ← FALSE
K ← K + 1
Call COQUAD with Tracks IT1 & IT2
IT2 ← IT1
K>NSEL
Yes
D
No
L1


AP
J1←J-1
ITWO←.TRUE.
K1←1
K2←
K1 + 1
J = 1
Yes
K2←1
ITWO←
.FALSE.
K3←
K2
Call
COQUAD with
Tracks K1 & K
K3 = J
Yes
K1 = J1
Yes
D
No
No
K3←
K3 + 1
K1←
K1 + 1

```
C      TWO TRACK POWER SPECTRAL DENSITY PROGRAM
$EXECUTE        $IBJOB
$IBJOB          MAP
$IBFTC RVR...   DECK,FULIST,REF,DD                                          L!N00000
       LOGICAL  RAW, SMOOTH, !TWO                                           L!N00010
       DIMENSION  A(1050,5), AN(5)                                          L!N00020
       COMMON /DLABEL/ NDMT, D(20), RAW, SMOOTH, NSEL  /LIST/ IC, IR, IS,L!N00030
      1 !TWO                                                                L!N00040
       DATA ( AN(I), I = 1, 5 ) / 1HA, 1HB, 1HC, 1HD, 1HE /, SEL, ALS,     L!N00050
      !ALP / 4HSSEL, 3HALS, 3HALP /                                         L!N00060
100    CALL !NPUT( A, 1, J )                                                L!N00070
       NDATA  =  1                                                          L!N00080
       DO 200 K = 1, J                                                      L!N00090
       IF( RAW )  CALL OUTPUT( A(1,K), 1, AN(K), 1 )                        L!N00100
       IF( NDMT .LE. 0 )  GO TO 200                                         L!N00110
       CALL FILDEC( A(1,K), 1, NDATA )                                      L!N00120
200    IF( SMOOTH .AND. NDMT .GT. 0 )  CALL OUTPUT( A(1,K), NDATA, AN(K),L!N00130
      *2 )                                                                  L!N00140
                                                                            L!N00150
       DO 300 K = 1, NSEL                                                   L!N00160
       READ (5,1)  T1, T2, IC, IR, IS, !T1, !T2                             L!N00170
       IF( T1 .NE. SEL )  GO TO 900                                         L!N00180
                                                                            L!N00190
       IF( T2 .EQ. ALS )  GO TO 310                                         L!N00200
                                                                            L!N00210
       IF( T2 .EQ. ALP )  GO TO 320                                         L!N00220
       !TWO = .TRUE.                                                        L!N00230
       IF( !T2 .GT. 0 )  GO TO 305                                          L!N00240
       !TWO = .FALSE.                                                       L!N00250
       !T2 = !T1                                                            L!N00260
305    CALL COQUAD( NDATA, A(1,!T1), A(1,!T2), AN(!T1), AN(!T2) )           L!N00270
       GO TO 300                                                            L!N00280
                                                                            L!N00290
310    !TWO = .FALSE.                                                       L!N00300
       DO 311 K1 = 1, J                                                     L!N00310
311    CALL COQUAD( NDATA, A(1,K1), A(1,K1), AN(K1), AN(K1) )               L!N00320
       GO TO 300                                                            L!N00330
                                                                            L!N00340
320    J1 = J - 1                                                           L!N00350
       !TWO = .TRUE.                                                        L!N00360
       DO 321 K1 = 1, J1                                                    L!N00370
       K2 = K1 + 1                                                          L!N00380
       IF( J .NE. 1 )  GO TO 322                                            L!N00390
       K2 = 1                                                               L!N00400
       !TWO = .FALSE.                                                       L!N00410
322    DO 321 K3 = K2, J                                                    L!N00420
321    CALL COQUAD( NDATA, A(1,K1), A(1,K3), AN(K1), AN(K3) )               L!N00430
300    CONTINUE                                                             L!N00440
       GO TO 100                                                            L!N00450
                                                                            L!N00460
900    WRITE (6,2)  K                                                       L!N00470
       GO TO 100                                                            L!N00480
1      FORMAT(A4,A3,3I1,2I6)                                                L!N00490
2      FORMAT(23H1ON ATTEMPT TO READ THE14,7HTH SSEL CARD, NO SSEL CARD L!N00500
```

```
      END                                                                    L!N00520
$IBFTC !NPUT   DECK,FUL!ST,REF,DD                                            L!N00530
      SUBROUT!NE  !NPUT( A, !, J )                                           L!N00540
                                                                             L!N00550
      REAL  LA                                                               L!N00560
      LOG!CAL  RAW, SMOOTH                                                   L!N00570
      D!MENS!ON  A(1050,5), FMT(12), DFMT(12)                                L!N00580
      COMMON  /DLABEL/ NDMT, D(20), RAW, SMOOTH, NSEL  /DFLTAX/ DELTA,       L!N00590
     1 LAGS  /LABEL/ NAME(5)  / XXX /  LA(501)                               L!N00600
      DATA  ASTR!C, DOLLAR, SLASH, NONE /1H*, 1H$, 1H/, 1H /,                L!N00610
     1 FMT(1) / 13H(F10.0,81XA1) /,  !LIN, !FIN / 6H$L!NE, 6H$F!N!S /        L!N00620
                                                                             L!N00630
1     !F( NONE .EQ. 2 )  GO TO 6                                             L!N00640
      !F( NONE .EQ. 0 )  GO TO 3                                             L!N00650
                                                                             L!N00660
      !CTL = 1                                                               L!N00665
11    READ (5,100)  !TST, NQ, J, LAGS, NFMT, NDMT, DELTA, !RAW, !SMO,       L!N00670
     1              NSEL                                                    L!N00671
                                                                             L!N00672
      !F( !TST .EQ. !F!N )  GO TO 6                                          L!N00675
      !F( !TST .NE. !L!N )  GO TO 60                                         L!N00676
                                                                             L!N00679
      RAW = .TRUE.                                                           L!N00680
      SMOOTH = .TRUE.                                                        L!N00690
      !F( !RAW .EQ. 0 )  RAW = .FALSE.                                       L!N00700
      !F( !SMO .EQ. 0 )  SMOOTH = .FALSE.                                    L!N00710
      !F( NDMT .LE. 0 )  GO TO 2                                             L!N00720
      READ (5,101) DFMT                                                      L!N00730
      READ (5,DFMT)  ( D(M), M = 1, NDMT )                                   L!N00740
      CALL CORRET                                                            L!N00750
2     !F( NFMT .GE. 1 )  READ (5,101) FMT                                    L!N00760
                                                                             L!N00770
3     NONE = 0                                                               L!N00780
                                                                             L!N00790
4     READ (5,108)  KEY                                                      L!N00800
41    READ (NQ,102) NAME, KEYT                                               L!N00810
      !F( KEY .NE. KEYT )  GO TO 41                                          L!N00820
      ! = 1                                                                  L!N00830
5     READ (NQ,FMT)  ( A(!,N), N = 1, J ), CODE                              L!N00840
      ! = ! + 1                                                             L!N00850
      !F( CODE .NE. DOLLAR .AND. CODE .NE. ASTR!C .AND. CODE .NE. SLASH      L!N00860
     1)    GO TO 5                                                           L!N00870
                                                                             L!N00880
      ! = ! - 2                                                             L!N00890
      !F( CODE .EQ. ASTR!C )  NONE = 2                                       L!N00900
      !F( CODE .EQ. SLASH )  NONE = 1                                        L!N00910
                                                                             L!N00920
      WR!TE (6,103) NQ, J, DELTA, !, NSEL, LAGS, NDMT                        L!N00930
      !F( NDMT .LE. 0 )  GO TO 51                                            L!N00940
      WR!TE (6,104) ( D(M), M = 1, NDMT )                                    L!N00950
      LAGS1 = LAGS + 1                                                       L!N00960
      WR!TE (6,107)  ( LA(M), M = 2, LAGS1 )                                 L!N00970
51    !F( NQ * J * LAGS * NSEL * !F!X( DELTA + .9 ) .EQ. 0 )  WRITE (6,1L!N00980
```

```
      105)                                                                  L!N00990
                                                                            L!N01000
       RETURN                                                               L!N01010
                                                                            L!N01020
6      WRITE (6,106)                                                        L!N01030
       STOP                                                                 L!N01040
                                                                            L!N01041
60     WRITE (6,109)  ICTL, ITST, NQ, J, LAGS, NFMT, NOMT, DELTA, IRAW,     L!N01042
     1 ISMO, NSEL                                                           L!N01043
       ICTL = 0                                                             L!N01044
       GO TO 11                                                             L!N01045
                                                                            L!N01050
100    FORMAT(A6,I2,I1,I3,I1,I2,F6.0,2I1,I2)
101    FORMAT(12A6)                                                         L!N01070
102    FORMAT(6X,5A6,36X,I8)                                                L!N01080
103    FORMAT(49H1!NPUT PARAMETERS FOR THE FOLLOWING COMPUTATIONS,/,15HOELL!N01090
      1EVATION DATA//3X,12HLOGICAL TAPE,I3//3X,8HTRACKS,7X,I2//3X,8HDELTA F,I2.6L!N01100
      2//3X,10HNO. POINTS,I5/,21HONUMBER OF SSEL CARDS,I4/,15HONUMBER OF LAGS,I L!N01110
      34/,26HONUMBER OF FILTERING COEF.,I4)                                 L!N01120
104    FORMAT(/,19HOFILTERING COEF. --  3E17.8//(19X,3E17.8/,1X))           L!N01130
105    FORMAT(//,58HOERROR IN ABOVE INPUT. ATTEMPT AT PROCESSING WILL BE ML!N01140
      1ADE.)                                                                L!N01150
106    FORMAT(1H1/1H ,//,55X,10HTHESE THEN//,58X,3HARE//,53X,14HTHE ANSWERS,,L!N01160
      1,//,50X,20HNOW ALL THAT REMAINS//,55X,10HTO BE DONE//,49X,2HIS//,55X, L!N01170
      29HTO RECALL//,53X,14HTHE QUESTIONS,//,65X,6HRVR,,,    )              L!N01180
107    FORMAT(//,25X,19H ACT. FILTER VALUES//(F19.8,3E17.8/,1X))            L!N01190
108    FORMAT(72X,I8)                                                       L!N01200
109    FORMAT(I1,,50H'$LINEP' CARD EXPECTED BUT NOT FOUND. CARD AS READ/1HL!N01201
      1,6XA6,I2,I1,I3,2I1,F6.0,2I1,I2)                                      L!N01202
       END                                                                  L!N01210
$IBFTC CORRET  DECK,FULIST,REF,DD                                           L!N01390
       SUBROUTINE CORRET                                                    L!N01400
       REAL LA                                                              L!N01410
       COMMON /XXX/ LA(501)/DLABEL/NF,FACTOR(23)/DFLTAX/NULL,LAGS           L!N01420
       COMMON  /QSO/ CS(1002),QA(501)                                       L!N01430
       LAGS1=LAGS+1                                                         L!N01440
       NF1=NF+1                                                             L!N01450
       DO 51 I=1,NF                                                         L!N01460
       QA(I)=0.0                                                            L!N01470
       N=NF1-I                                                              L!N01480
       NJ=I                                                                 L!N01490
       DO 51 J=1,N                                                          L!N01500
       QA(I)=QA(I)+FACTOR(J)*FACTOR(NJ)                                     L!N01510
   51  NJ=NJ+1                                                              L!N01520
       QA1=QA(1)+0.5                                                        L!N01530
       DO 52     I=1,LAGS1                                                  L!N01540
   52  LA(I)=QA1                                                            L!N01550
       ANG=3.141592654/FLOAT(LAGS )                                         L!N01560
       LAGTWO=LAGS+LAGS                                                     L!N01570
       DO 53 I=1,LAGTWO                                                     L!N01580
       G=FLOAT(I-1)*ANG                                                     L!N01590
   53  CS(I)=COS(G)                                                         L!N01600
       DO 54 I=2,NF                                                         L!N01610
   54  LA(I) = LA(I)+QA(I)                                                  L!N01620
```

```
      DO 55 I=2,LAGS1                                                    LINO1630
      DO 55 J=2,NP                                                       LINO1640
      JR=(I-1)*(J-1)                                                     LINO1650
      JJ=MOD(JR,LAGTWO)+1                                                LINO1660
   55 LA(I)=LA(I)+CS(JJ)*QA(J)                                           LINO1670
      DO 56 I=1,LAGS1                                                    LINO1680
   56 LA(I)=2.0*LA(I)                                                    LINO1690
      RETURN                                                             LINO1700
      END                                                                LINO1710
$IBFTC FILDEC  DECK,FULIST,REF,DD                                        LINO1720
      SUBROUTINE FILDEC(A,NA,NB)                                         LINO1730
      DIMENSION A(1)                                                     LINO1740
      COMMON /DLABFL/ NP,F(23)                                           LINO1750
      NC=NA-NP+1                                                         LINO1760
      J=1                                                                LINO1770
      DO 11 I=1,NC                                                       LINO1780
      S=0.0                                                              LINO1790
      DO 10 K=1,NP                                                       LINO1800
      L=I+K-1                                                            LINO1810
   10 S=S+ F(K)*A(L)                                                     LINO1820
      A(J)=S                                                             LINO1830
   11 J=J+1                                                              LINO1840
      NB= J-1                                                            LINO1850
   50 RETURN                                                             LINO1860
      END                                                                LINO1870
$IBFTC COQUAD  DECK,FULIST,REF,DD                                        LINO1880
      SUBROUTINE COQUAD  (NDAT,X,Y,XN,YN)                                LINO1890
C*****************************************************************     LINO1900
C     SPECIFICATION STATEMENTS FOR COQUAD                                LINO1910
C                                                                        LINO1920
      LOGICAL  ITWO                                                      LINO1930
      COMMON /XXX/ ZA(501) /LABEL/ NAME(5) /DELTAX/ DELTA,LAGS           LINO1940
      COMMON /QSQ/ CS,UX/LIST/ IC, IR, IS, ITWO                          LINO1950
      DIMENSION X(6000),Y(6000),TERM1(501),TERM2(501),QX(501),QY(501),   LINO1960
     *SUMXL(501),SUMXU(501),SUMYL(501),SUMYU(501),PRODXX(501),PRODYY(501LINO1970
     *),PRODXY(501),PRODYX(501),QC(501),QQ(501),UX(501),UY(501),UC(501),LINO1980
     *UQ(501),WX(501),WY(501),WC(501),WQ(501),CS(1002),SN(1002),NFLAG(4)LINO1990
      EQUIVALENCE (PRODXX,QX,WX),(PRODYY,QY,WY),(PRODXY,TERM1,UC),       LINO2000
     *(PRODYX,TERM2,UQ),(SUMXL,UX),(SUMYL,UY),(SUMXU,QC,WC),            LINO2010
     * (SUMYU,QQ,WQ)                                                    LINO2020
      DATA  PW1, PW2, PW3 / 1HQ, 1HU, 1HW /, LAG /0/                     LINO2030
C*****************************************************************     LINO2040
C     INITIALIZATION OF CONSTANTS AND FACTORS FOR COQUAD                 LINO2050
C                                                                        LINO2060
      NDATA=NDAT                                                         LINO2070
      IF(LAG.EQ.LAGS) GO TO 500                                          LINO2080
      LAG=LAGS                                                           LINO2090
      NP=LAGS+1                                                          LINO2100
      FLAGS=LAGS                                                         LINO2110
      FLAGS2 = FLAGS + FLAGS                                             LINO2120
      FLT = 2.0 * DELTA                                                  LINO2130
      FX=(-1)**LAGS                                                      LINO2140
      PI=3.14159265                                                      LINO2150
      LAGTWO=LAGS+LAGS                                                   LINO2160
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      ANG=PI/PLAGS                                                    L!N02170
      DO 157 I=1,LAGTWO                                               L!N02180
      F!=I-1                                                          L!N02190
      G=F!*ANG                                                        L!N02200
      CS(I)=COS(G)                                                    L!N02210
  157 SN(I)=SIN(G)                                                    L!N02220
  500 NDAT!=NDATA+1                                                   L!N02230
      NDAT2 = NDAT! + NDAT!                                           L!N02240
      FDATA = N DATA                                                  L!N02250
      NU=NDATA-LAGS                                                   L!N02260
C*****************************************************************L!N02270
C     SUMMAT!ONS FOR CROSS PRODUCTS                                   L!N02280
C                                                                     L!N02290
      SUMX=0.                                                         L!N02300
      SUMY=0.                                                         L!N02310
      DO 12 J=NP,NU                                                   L!N02320
      SUMX=SUMX+X(J)                                                  L!N02330
   12 SUMY=SUMY+Y(J)                                                  L!N02340
      SUMXL(NP)=0.                                                    L!N02350
      SUMXU(NP)=0.                                                    L!N02360
      SUMYL(NP)=0.                                                    L!N02370
      SUMYU(NP)=0.                                                    L!N02380
      DO 13 J=1,LAGS                                                  L!N02390
      SUMXL(NP)=SUMXL(NP)+X(J)                                        L!N02400
      SUMYL(NP)=SUMYL(NP)+Y(J)                                        L!N02410
      JJ = NDAT! - J                                                  L!N02420
      SUMXU(NP)=SUMXU(NP)+X(JJ)                                       L!N02430
   13 SUMYU(NP)=SUMYU(NP)+Y(JJ)                                       L!N02440
      SUMXL(NP)=SUMX+SUMXL(NP)                                        L!N02450
      SUMXU(NP)=SUMX + SUMXU(NP)                                      L!N02460
      SUMYL(NP)=SUMY + SUMYL(NP)                                      L!N02470
      SUMYU(NP)=SUMY+SUMYU(NP)                                        L!N02480
      DO 14 J=1,LAGS                                                  L!N02490
      JJ=NP-J                                                         L!N02500
      JJJ= NDAT! - JJ                                                 L!N02510
      SUMXL(JJ)=SUMXL(JJ+1)+X(JJJ)                                    L!N02520
      SUMYL(JJ)=SUMYL(JJ+1)+Y(JJJ)                                    L!N02530
      SUMXU(JJ)=SUMXU(JJ+1)+X(JJ)                                     L!N02540
   14 SUMYU(JJ)=SUMYU(JJ+1)+Y(JJ)                                     L!N02550
      DO 15 J=1,NP                                                    L!N02560
      PRODXX(J)=0.                                                    L!N02570
      PRODYY(J)=0.                                                    L!N02580
      PRODXY(J)=0.                                                    L!N02590
      PRODYX(J)=0.                                                    L!N02600
      MN = NDAT! - J                                                  L!N02610
      JM=J                                                            L!N02620
      DO 15 I=1,MN                                                    L!N02630
      PRODXX(J)=PRODXX(J)+X(I)*X(JM)                                  L!N02640
      PRODYY(J)=PRODYY(J)+Y(I)*Y(JM)                                  L!N02650
      PRODXY(J)=PRODXY(J)+X(I)*Y(JM)                                  L!N02660
      PRODYX(J)=PRODYX(J)+Y(I)*X(JM)                                  L!N02670
   15 JM=JM+1                                                         L!N02680
C*****************************************************************L!N02690
C     THE CO-VARVAR!ANCE FUNCT!ONS                                    L!N02700
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C                                                                       L!N02710
      DO 18 I=1,NP                                                      L!N02720
      DENOM = NDAT1 - I                                                 L!N02730
      FDEN=1./DENOM                                                     L!N02740
      TERM1(I)=PRODXY(I)-FDEN*SUMYU(I)*SUMXL(I)                         L!N02750
      TERM2(I)=PRODYX(I)-FDEN*SUMXU(I)*SUMYL(I)                         L!N02760
      QX(I)=FDEN*(PRODXX(I)-FDEN*SUMXU(I)*SUMXL(I))                     L!N02770
 18   QY(I)=FDEN*(PRODYY(I)-FDEN*SUMYU(I)*SUMYL(I))                     L!N02780
      DO 17 I=1,NP                                                      L!N02790
      TDEN = NDAT2 - I - I                                              L!N02800
      FTDEN=1./TDEN                                                     L!N02810
      QC(I)=FTDEN*(TERM1(I)+TERM2(I))                                   L!N02820
17    QQ(I)=FTDEN*(TERM1(I)-TERM2(I))                                   L!N02830
      IF( IC .NE. 0 )  GO TO 200                                        L!N02840
      WRITE (6,35)  NAME                                                L!N02850
      IF( ITWO )  GO TO 201                                             L!N02860
      WRITE (6,331) XN                                                  L!N02870
      WRITE (6,361) PW1                                                 L!N02880
      GO TO 202                                                         L!N02890
201   WRITE (6,33)  XN, YN                                              L!N02900
      WRITE (6,36)  ( PW1, I = 1, 4 )                                   L!N02910
202   DO 204 I = 1, NP                                                  L!N02920
      MMP = I - 1                                                       L!N02930
      IF( ITWO )  GO TO 203                                             L!N02940
      WRITE (6,221)  MMP, QX(I)                                         L!N02950
      GO TO 204                                                         L!N02960
203   WRITE (6,22)  MMP, QX(I), QY(I), QC(I), QQ(I)                     L!N02970
204   CONTINUE                                                          L!N02980
C*****************************************************************    L!N02990
C     THE RAW SPECTRA                                                   L!N03000
C                                                                       L!N03010
200   QX(NP)=0.5*QX(NP)                                                 L!N03020
      QY(NP)=0.5*QY(NP)                                                 L!N03030
      QC(NP)=0.5*QC(NP)                                                 L!N03040
      QX1=0.5*QX(1)                                                     L!N03050
      QY1=0.5*QY(1)                                                     L!N03060
      QC1=0.5*QC(1)                                                     L!N03070
      DO 65 I=1,NP                                                      L!N03080
      UX(I)=QX1                                                         L!N03090
      UY(I)=QY1                                                         L!N03100
   65 UC(I)=QC1                                                         L!N03110
      DO 70 I=2,NP                                                      L!N03120
      UX(I)=UX(I)+QX(I)                                                 L!N03130
      UY(I)=UY(I)+QY(I)                                                 L!N03140
      UC(I)=UC(I)+QC(I)                                                 L!N03150
      UX(NP)=-UY(NP)+QX(I)                                              L!N03160
      UY(NP)=-UY(NP)+QY(I)                                              L!N03170
 70   UC(NP)=-UC(NP)+QC(I)                                              L!N03180
CNOTE EX=(-1)**LAGS                                                     L!N03190
      UX(NP)= EX*UX(NP)                                                 L!N03200
      UY(NP)= EX*UY(NP)                                                 L!N03210
      UC(NP)= EX*UC(NP)                                                 L!N03220
      UQ(1)=0.0                                                         L!N03230
      UQ(NP)=0.0                                                        L!N03240
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      GG(NP)=.5*GG(NP)                                                  L!N03250
      DO 80 I=2,LAGS                                                    L!N03260
   80 UG(I)=0.0                                                         L!N03270
      DO 90 I=2,LAGS                                                    L!N03280
      DO 90 J=2,NP                                                      L!N03290
  158 JREM=(I-1)*(J-1)                                                  L!N03300
      JJ=MOD(JREM,LAGTWO)+1                                             L!N03310
      UX(I)=UX(I)+CS(JJ)*GX(J)                                          L!N03320
      UY(I)=UY(I)+CS(JJ)*GY(J)                                          L!N03330
      UC(I)=UC(I)+CS(JJ)*GC(J)                                          L!N03340
   90 UG(I)=UG(I)+SN(JJ)*GG(J)                                          L!N03350
      DO 95 I=1,NP                                                      L!N03360
      UX(I)=FLT*UX(I)                                                   L!N03370
      UY(I)=FLT*UY(I)                                                   L!N03380
      UC(I)=FLT*UC(I)                                                   L!N03390
   95 UG(I)=FLT*UG(I)                                                   L!N03400
      IF( IR .NE. 0 )  GO TO 300                                        L!N03410
      WRITE (6,34)  NAME                                                L!N03420
      IF( ITWO )  GO TO 301                                             L!N03430
      WRITE (6,331) XN                                                  L!N03440
      WRITE (6,361) PW2                                                 L!N03450
      GO TO 302                                                         L!N03460
  301 WRITE (6,33)  XN, YN                                              L!N03470
      WRITE (6,36)  ( PW2, I = 1, 4 )                                   L!N03480
  302 DO 304 I = 1, NP                                                  L!N03490
      NNP = I - 1                                                       L!N03500
      IF( ITWO )  GO TO 303                                             L!N03510
      WRITE (6,221)  NNP, UX(I)                                         L!N03520
      GO TO 304                                                         L!N03530
  303 WRITE (6,22)  NNP, UX(I), UY(I), UC(I), UG(I)                     L!N03540
  304 CONTINUE                                                          L!N03550
C*****************************************************************    L!N03560
C     THE SMOOTHED AND CORRECTED SPECTRA                                L!N03570
C                                                                       L!N03580
  300 WX(1)=.5*(UX(1)+UX(2))  /ZA(1)                                    L!N03590
      WY(1)=.5*(UY(1)+UY(2))  /ZA(1)                                    L!N03600
      WC(1)=.5*(UC(1)+UC(2))   /ZA(1)                                   L!N03610
      WG(1)=.5*UG(1) /ZA(1)                                             L!N03620
      WX(NP)=.5*(UX(LAGS)+UX(NP)) /ZA(NP)                               L!N03630
      WY(NP)=.5*(UY(LAGS)+UY(NP)) /ZA(NP)                               L!N03640
      WC(NP)=.5*(UC(LAGS)+UC(NP)) /ZA(NP)                               L!N03650
      WG(NP)=.5*UG(NP)  /ZA(NP)                                         L!N03660
      DO 98 I=2,LAGS                                                    L!N03670
      WX(I)=(.25*(UX(I-1)+UX(I+1))+.5*UX(I))/ZA(I)                      L!N03680
      WY(I)=(.25*(UY(I-1)+UY(I+1))+.5*UY(I))/ZA(I)                      L!N03690
      WC(I)=(.25*(UC(I-1)+UC(I+1))+.5*UC(I))/ZA(I)                      L!N03700
   98 WG(I)=(.25*(UG(I-1)+UG(I+1))+.5*UG(I))/ZA(I)                      L!N03710
      IF( IS .NE. 0 )  GO TO 90                                         L!N03720
      WRITE (6,32)  NAME                                                L!N03730
      IF( ITWO )  GO TO 401                                             L!N03740
      WRITE (6,331) XN                                                  L!N03750
      WRITE (6,361) PW3                                                 L!N03760
      WRITE (6,211)                                                     L!N03770
      GO TO 402                                                         L!N03780
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401   WRITE (6,33)  XN, YN                                                  L1N03790
      WRITE (6,36)  ( PW3, I = 1, 4 )                                       L1N03800
      WRITE (6,21).                                                         L1N03810
402   DO 404 I = 2, NP                                                      L1N03820
      NMP = I - 1                                                           L1N03830
      IF( ITWO.)  GO TO 403                                                 L1N03840
      WRITE (6,221)  NMP, WX(I)                                             L1N03850
      GO TO 404                                                             L1N03860
403   WRITE (6,22)  NMP, WX(I), WY(I), WC(I), WQ(I)                         L1N03870
404   CONTINUE                                                              L1N03880
   50 RETURN                                                                L1N03890
C*************************************************************************L1N03900
C     FORMAT STATEMENTS                                                     L1N03910
C                                                                           L1N03920
21    FORMAT (6X,1H0,5X,4(4H----,10X))                                      L1N03930
211   FORMAT(9X,1H05X4H----)                                                L1N03940
22    FORMAT(X,I6,1P4E14.3)                                                 L1N03950
221   FORMAT(4X,I6,1P4F14.3)                                                L1N03960
33    FORMAT(11X5HITEM A1,11H WITH ITEM A1//)                               L1N03970
331   FORMAT(11X5HITEM A1//)                                                L1N03980
361   FORMAT(9X,1HP4XA1,4HX(P)/1X)                                          L1N03990
36    FORMAT(6X,1HP4XA1,4HX(P)9XA1,4HY(P)9XA1,4HC(P)9XA1,4HQ(P)/1X)         L1N04000
35    FORMAT(32H1     CO-VARIANCE FUNCTIONS FOR  5A6/1X)                    L1N04010
34    FORMAT(32H1     THE RAW SPECTRUM FOR       5A6/1X)                    L1N04020
32    FORMAT(32H1     SPECTRAL ESTIMATES FOR     5A6/1X)                    L1N04030
      END                                                                   L1N04040
$DATA
```

APPENDIX C

Two Dimensional Power Spectral Density Program

1. Field Recording of Data

The field recording of survey data should follow a pattern that simplifies transfer of the data to IBM cards. The following pattern is recommended.

The survey books should have, in addition to ruled horizontal lines, six vertical columns. The left column is for the x-coordinate numbers. The remaining columns are for elevation data in the order below.

H_{00}	H_{01}	H_{02}	H_{03}	H_{04}
H_{10}	H_{11}	H_{12}	H_{13}	H_{14}
H_{20}	H_{21}	H_{22}	H_{23}	H_{24}
		etc.		

On the next pages the first five lines of ground height should be completed. The x-axis heights then may be read in the left columns of the first several pages. The lines of y-coordinates 5 through 9 should be entered in the five columns of the next pages, etc.

Suppose the coordinate system on the ground were right hand one, i.e., standing at the (0,0) corner facing the y-axis side of the square, the x-axis side is to the right. The program prints out the raw data and the smoothed data in a right hand system also, but the y-axis heights are horizontally listed. The identification of the ground directions with the print-out is easily made with this in mind. The directional aspects of both the lagged products and spectral estimates outputs follow this pattern. They are in the same sense as the ground, but the positive y-axis is to the right, the positive x-axis is down.

2. Computer and Operating System

The program uses the IBM 7090 or 7094 computer. The standard IBSYS/IBJOB (version 12) operating system will operate the source deck if the 'TIME' subroutine is modified or dummied (see flow chart). Since different systems use different logical tape numbers, the standard input tape, 5, and output tape, 6, may be inconsistent. (See flow chart for appropriate modifications.)

3. General Purpose

(A) Processing of a raw elevation matrix.

Given as input a raw elevation matrix (adjusted for instrument height) the program computes the following matrices:

(a) Smoothed elevation matrix
(b) Mean lagged products
(c) Raw spectrum
(d) Smoothed spectrum
(e) Lagged products of smoothing coefficients
(f) Fourier transforms of L.P.S.C.
(g) Corrected spectrum

Any of these items may be written, optionally, on SYSOU1. In addition, items (a), (f), and (g) above are written on an alternate output tape.

(B) Processing a smoothed elevation matrix.

Using the alternate output tape produced by part (A), as input*, a subsequent run may be made which will produce items (b), (c), (d), and (g) for a selected submatrix of the smoothed matrix, with (g) for this submatrix saved on an alternate output tape.

---

*It is recommended that this facet of the PSD program be used only in conjunction with input tapes produced as alternate output tapes in part (A).

4. Input Data Format

In explanation of card preparation for all runs, the following terminology will be used.

All data will be positioned on a card by specifying column limits. 'COLS N - M' means that the data item involved must be punched in columns N through M, N and M included.

Numerical data will be of the type floating point (denoted by [F]) or integer (denoted by [I]). Floating point numbers must have the decimal point punched and lying within the column limits. Integer numbers must be right adjusted in the allotted columns, i.e., the units digit punched in column M; the decimal point is not punched.

5. Input Specifications

Due to the potentially large amount of data involved, both in size of input matrices and number of input matrices, a flexible and, hopefully, simple set of input options has been provided.

A raw elevation matrix is punched in the following manner, five numbers per card in (F) format. The elements of the first row and the first five columns are punched in the first card--

COLS	1 - 10	element of row 1, col 1
	11 - 20	element of row 1, col 2
	21 - 30	element of row 1, col 3
	31 - 40	element of row 1, col 4
	41 - 50	element of row 1, col 5

In the same manner, the elements of the first five columns and the second row are punched in the second card. This process is continued until the elements of the first five columns and the last row are punched. The second five columns are punched in exactly the same manner. Suppose the number of columns is not a multiple of five. In this case, the last few columns are punched in exactly the same manner as above; e.g. if the number of columns is 23, the last 3 columns are punched using only columns

1 - 10, 11 - 20, and 21 - 30.

Each input matrix has associated with it a matrix title card which contains a matrix number and identification information. The format for this card is:

COLS	1 - 72	any alphabetic text
	73 - 80	matrix number (I)

The alphabetic text in columns 1 - 72 will be printed at the top of each output page.

Each elevation matrix must be followed by a matrix termination card. The format for this card is

COLS	1 - 71	not read
	72 - 72	termination character
	73 - 80	not read

Each matrix which is to be processed requires a matrix control card which controls tape assignments, output options, etc. The format for this card is

COLS	1 - 6	$GRIDP
	7 - 8	=blank or 0, all input is on the system input tape. =n, matrix title card, elevation matrix and matrix termination card are on logical tape n, in that order.
	9 - 10	=m, logical tape m is alternate output tape.
	11 - 12	=0 or blank, this is a raw elevation matrix. =1, this is a smoothed elevation matrix.
	13 - 14	=0 or blank, continuous processing of all input. =1, after each matrix is processed the program pauses after printing on-line instructions to the operator to allow continuing or terminating the run.

15 - 16	=0 or blank, for all matrices in all runs, with the following exception: Suppose 3 matrices have been processed and their output written on an alternate output tape, The current run is to process several more matrices and it is desirable to write the alternate output from this run on the same tape reel, after the output from the first 3. In this situation, this field on the $GRIDP card for the first matrix only is punched 01.
17 - 18	≠0 or blank, the elapsed time is printed after each of the items (a) through (g) is computed. =0 or blank, no timing is done.

The following fields control the suppression of output on SYSOU1 of the indicated items. 0 or blank suppresses output of that particular item while 01 causes the item to be written.

COLS 19 - 20	elevation matrix as read.
21 - 22	smoothed elevation matrix.
23 - 24	mean lagged products.
25 - 26	raw spectrum.
27 - 28	smoothed spectrum.
29 - 30	lagged products of smoothing coefficients.
31 - 32	Fourier transforms of L.P.S.C.
33 - 34	corrected spectrum.
35 - 72	not read
73 - 80	matrix number (I). The program will search the tape which is specified as being the matrix tape (if cols 7-8 are 0 or blank, SYSIN1, if cols 7-8=n, logical tape n) for a matrix title card with this number in cols 73-80.

Data Interval Card

COLS	1 - 10	column interval (F)
	11 - 20	row interval (F)

Matrix Size Card

COLS	1 - 10	number of columns in the elevation matrix. (I)
	11 - 20	number of rows in the elevation matrix. (I)
	21 - 30	value of ρ. i.e. (the number of columns in the smoothing coefficient matrix - 1)/2. (I)
	31 - 40	value of σ. i.e. (the number of rows in the smoothing coefficient matrix - 1)/2. (I)
	41 - 50	value of MX. (I)
	51 - 60	value of MY. (I)

The corrected spectrum will be (2 * MX + 1) by (2 * MY + 1)

The G- matrix or spectral smoothing matrix (3 by 3) is presented on punched cards in the following format:

COLS	1 - 10	element in row 1, column 1 (F)
	11 - 20	element in row 1, column 2
	.	
	.	
	.	
	61 - 70	element in row 3, column 1

second card

COLS	1 - 10	element in row 3, column 2
	11 - 20	element in row 3, column 3

The B-matrix or matrix of smoothing coefficients has $2\rho + 1$ columns and $2\sigma + 1$ rows. As it is symmetrical about the origin, only the upper half of the plane ≥ 0 is specified in $(2\sigma + 1) * (\rho + 1)$ numbers. That is, columns ρ, $\rho + 1$, . . . $2\rho + 1$.

Punching by columns, 7, 10 column (F) fields per card, column ρ is punched, then column $\rho + 1$, etc.

Finish Card

The format for this card is:

COLS 1 - 6 $FINIS

6. Deck Set-up - Single Elevation Matrix

With the above mentioned cards, a complete deck, set up to process one raw elevation matrix consists of the following cards in the indicated order. This illustrates deck set-up if no alternate input tape is specified.

```
$JOB
    Installation identification card.
$EXECUTE      IBJOB
$IBJOB

      BINARY OR SOURCE DECK FOR PSGRID PROGRAM

$DATA
$GRIDP
    Matrix title card          *
    Data interval card         #
    Matrix size card           #
    G-matrix                   #
    B-matrix                   #
    Elevation matrix           *
    Matrix termination card    *
$FINIS
```

If an alternate input tape is specified, the *'ed items do not appear on the system input tape but are placed on the alternate unit in the following order.

Matrix title card
Elevation matrix
Matrix termination card

7. Deck Set-up - More Than One Elevation Matrix

To process more than one elevation matrix per run, the termination characters on the matrix termination cards control the input for the next matrix to be processed.

# in column 72	- This matrix is the last matrix to be processed in this run. Execution will be terminated after this matrix is processed.
/ in column 72	- In processing the next matrix, #'ed items are to be read in again.
$ in column 72	- In processing the next matrix, #'ed items will be the same as for this matrix, therefore these items are not included after the $GRIDP card for the following matrix.

The last card of every data deck must be a $FINIS card. There should be only one $FINIS card for each run.

8. Output Specifications - Alternate Output Tape

The information written on the alternate output tape during the processing of a raw elevation matrix is organized in the following manner:

Matrix Title Card (as read)
Data Interval Card (as read)
Matrix Size Card (as read)

except

COLS 1 - 10 number of columns in smoothed matrix

11 - 20 number of rows in smoothed matrix

G-matrix
Smoothed Matrix#
Fourier Transforms of L.P.S.C.##
Matrix Termination Card - Termination Character/
Matrix Title Card

COLS 1 - 72 (as read)
73 - 80 (as read) +5

Corrected Spectrum Dimensions

COLS 1 - 10 number of columns in corrected spectrum
11 - 20 number of rows in corrected spectrum

Corrected Spectrum##
Matrix Termination Card - Termination Character $ except for last matrix in run, in which case termination character is # and COLS 73-80 contain 99999999

Due to the problems created by the necessity of finite representation of numbers, the three #'ed items are written on the alternate output tape in a manner which will preserve the entire machine representation of their values. The format for all of these numbers if $\pm$ 0.zxxxxxxE$\pm$yy. This notation represents the number

$\pm$ 0.zxxxxxxx X 10 $\pm$ yy

Numbers written in this notation always require 15 columns and z is always non-zero, unless the number itself is zero.

* The smoothed matrix is written in a manner analogous to that of the raw matrix, i.e., 4 columns at a time, the values occupying COLS 1 - 15, 16 - 30, 31 - 45 and 46 - 60.

** The Fourier transforms of L.P.S.C. and the corrected spectrum are written in a slightly different manner, i.e., placing 4 numbers per card image the entire first row is written. Starting with the next field, the second row is written. This process continues until all rows have been written.

9. Deck Set-up - Processing a Submatrix of a Smoothed Matrix

Using the alternate output tape, described in 8., as the alternate input tape, any submatrix of a smoothed matrix may be processed as indicated in 3.(B). Deck set-up is as indicated in 6. and 7. with the following exceptions:

The matrix control card ($GRIDP card) must have '01' punched in columns 11 - 12.

All #'ed and *'ed items in 6. are removed and replaced by the following submatrix card.

COLS	1 - 10	lower column limit*
	11 - 20	upper column limit
	21 - 30	lower row limit
	31 - 40	upper row limit

*Both rows and columns are numbered starting at 1, even though the print-out in the raw matrix run begins numbering at 0.

SUPPLEMENT A
to
Two-Dimensional Power Spectral Density Program Notes

The PSD program is organized as a main program and four subroutines. Labeled common is used where appropriate and identical variable names are used when items are transmitted via labeled common. See Supplement B for a list of the important variable names and their usage.

The following is a brief description of each of the decks which comprise the PSD program. Flow charts are attached for the main program, deck name IN, and the major computational subroutine, deck name PSGRID. It is assumed that the source listings of the remaining decks are self-explanatory.

'CLOCK'	A machine language program which places the integer number representing the remaining execution time (in .6 seconds) in the AC each time it is called.
'TIME'	A FORTRAN subroutine which prints the total elapsed time (time since last call with zero argument) and the time elapsed since the last call, in minutes and seconds.
	NOTE: Both of these decks may be removed and a dummy 'TIME' deck substituted if the user so desires.
'WRITER'	A FORTRAN subroutine which writes the argument matrix on the output tape, 6, 5 columns at a time, indexing the rows and columns as specified by argument values.
'PSGRID'	A FORTRAN subroutine which computes and calls 'WRITER' to write items (b) through (g), given the smooth matrix.
'IN'	The FORTRAN main program which does all input for both raw and smoothed matrix runs, computes the smoothed matrix if necessary and calls 'PSGRID' for the remaining computations.

Included with the source deck of the PSD program are two file specification decks. These assume that FORTRAN logical tape 7 will be designated as the alternate input tape and FORTRAN logical tape 8 will be the alternate output tape. Both tapes are made up of 80 character logical and physical records, i.e. card images. This structure must be used to be consistent with READ and WRITE statements throughout the PSD program.

SUPPLEMENT B

to

Two-Dimensional Power Spectral Density Program Notes

Symbol Table

Equation Symbol	Name	Program Symbol	Max. Size
g_{ij}	The Spectral Smoothing Matrix	G	3x3
B_{rs}	The Smoothing Coefficients	B	25x25
H_{ij}	The Raw Elevation Matrix	H	105x101
h_{ij}	The Smoothed Matrix	SH	105x101
γ_{ab}	The Mean Lagged Products	GA	50x25
f_{ab}	The Raw Spectrum	F	50x50
T_{uv}	The Smoothed Spectrum	FB	50x50
W_{uv}	The Lagged Products of the Smoothing Coefficients	W	50x25
$\phi_{\psi\gamma}$	The Fourier Transforms of W_{uv}	PHI	50x50
$f^{*}_{\alpha\beta}$	The Corrected Spectrum	FS	50x50

Single Location Variables

NX = $N_x + 1$, the width of the H matrix.

NY = $N_y + 1$, the height of the H matrix.

NRHO = ρ, the horizontal limits of the B matrix.

NSIG = σ, the vertical limits of the B matrix.

NBR = $2\rho + 1$, the width of the B matrix.

NBS = $2\sigma + 1$, the height of the B matrix.

NHR = $\rho + 1$

NHS = $\sigma + 1$

NSHX = $N_x + 1 - 2\rho = n_x + 1$, the width of the h matrix.

NSHY = $N_y + 1 - 2\sigma = n_y + 1$, the height of the h matrix.

MX = m_x, the horizontal limits of the σ and f matrices.

MY = m_y, the vertical limits of the σ and f matrices.

NGX = $2m_x + 1$, the width of the matrix.

NFX = NGX

FX = NGX

NFY = $2m_y + 1$, the height of the f matrix.

FY = NFY

NGHX = $m_x + 1$

NGHY = $m_y + 1$

NFBX = $2m_x$

NFBY = $2m_y$

N2R = 2

NWX = 4 + 1, the width of the W matrix.

DX = x, the horizontal data interval.

DY = y, the vertical data interval.

INTAPE = the alternate input tape number.

OUTAPE = the alternate output tape number.

FLAG = 0 for raw run, $\neq$ 0 for smoothed run.

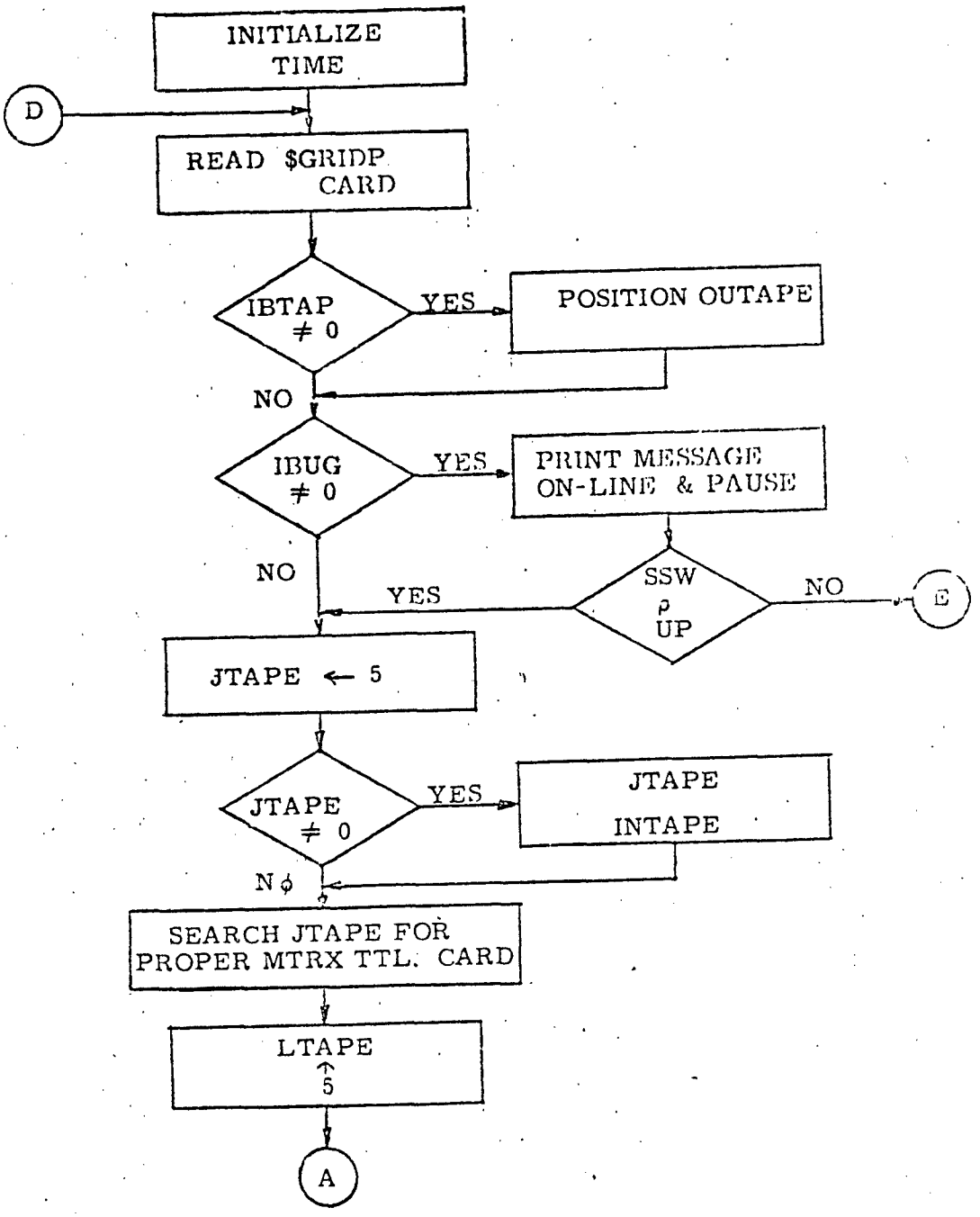
IBUG = switch for on-line messages.

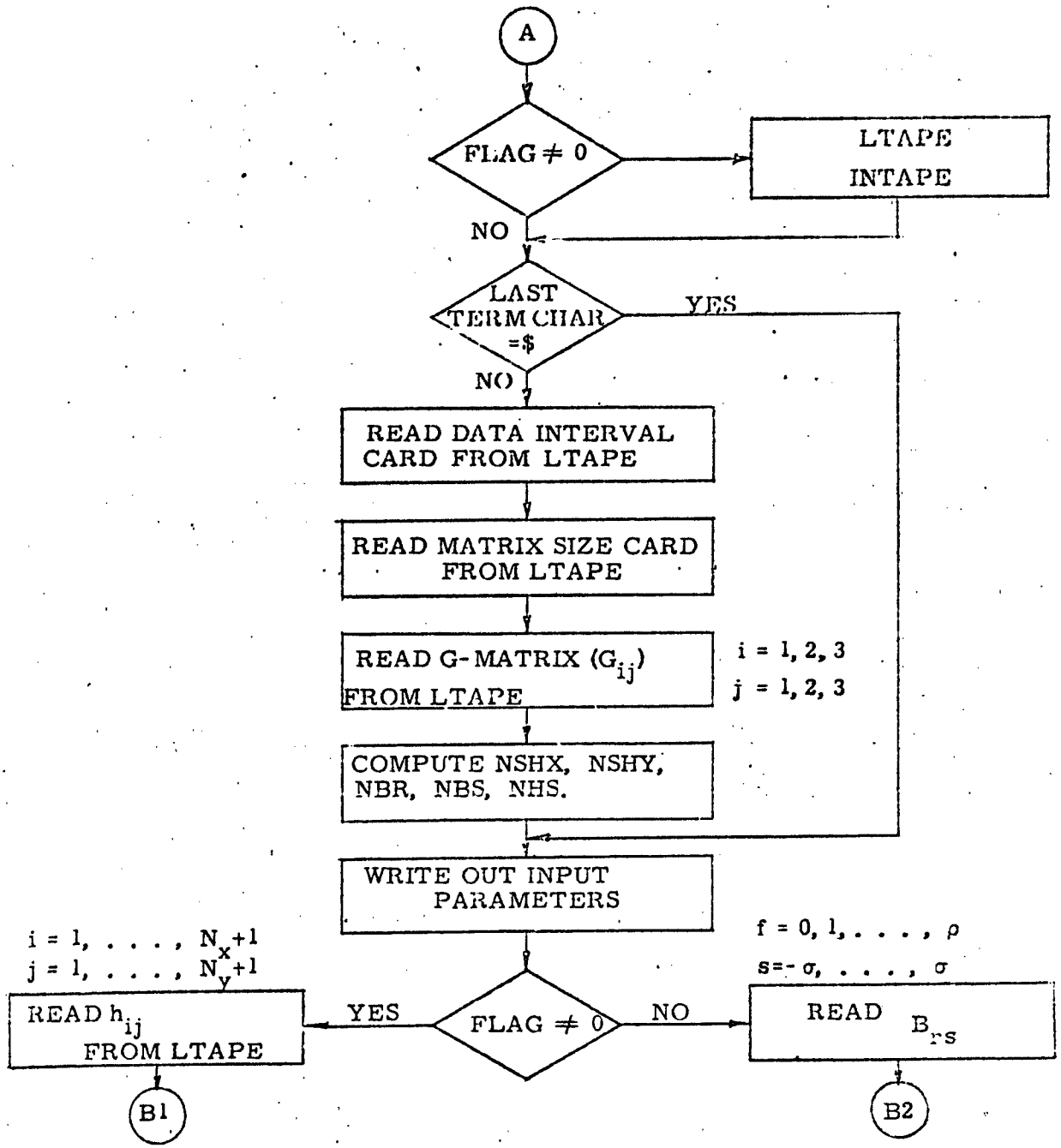
IBTAP = switch for previously-processed alternate output tape.

ITIME = switch for timing print-outs.

IPT(1) through IPT(8) = printing switches for raw elevation matrix and items (a) through (g) [listed under 3.(A) respectively.

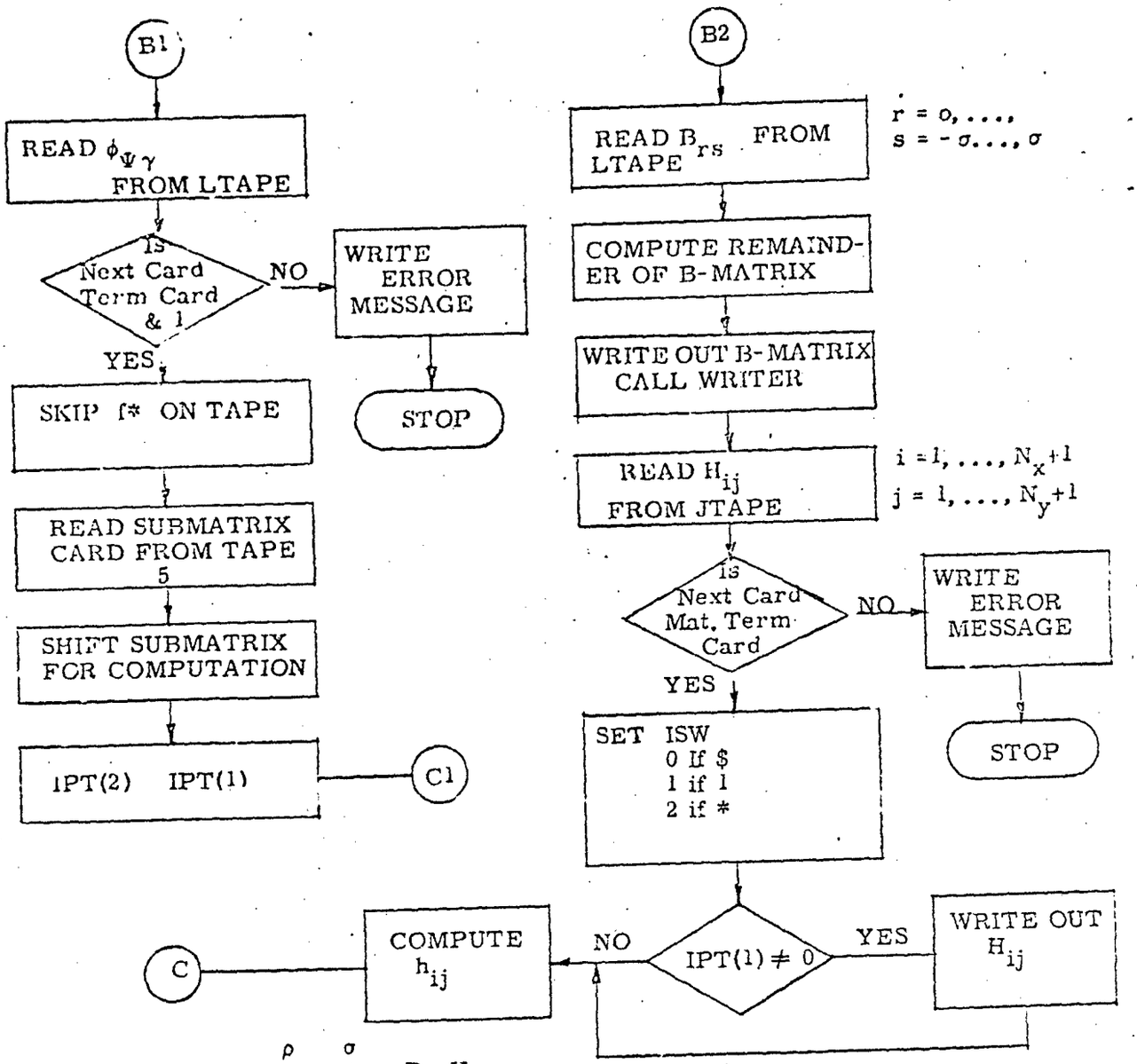
APPENDIX C - FLOW CHART
MAIN PROGRAM
'IN'




A
FLAG ≠ 0
LTAPE
INTAPE
NO
LAST TERM CHAR =$
YES
NO
READ DATA INTERVAL CARD FROM LTAPE
READ MATRIX SIZE CARD FROM LTAPE
READ G-MATRIX (G_{ij}) FROM LTAPE
i = 1, 2, 3
j = 1, 2, 3
COMPUTE NSHX, NSHY, NBR, NBS, NHS.
WRITE OUT INPUT PARAMETERS
i = 1, . . . , N_x+1
j = 1, . . . , N_y+1
f = 0, 1, . . . , ρ
s=- σ, . . . , σ
READ h_{ij} FROM LTAPE
YES
FLAG ≠ 0
NO
READ B_{rs}
B1
B2

MAIN PROGRAM

'IN'

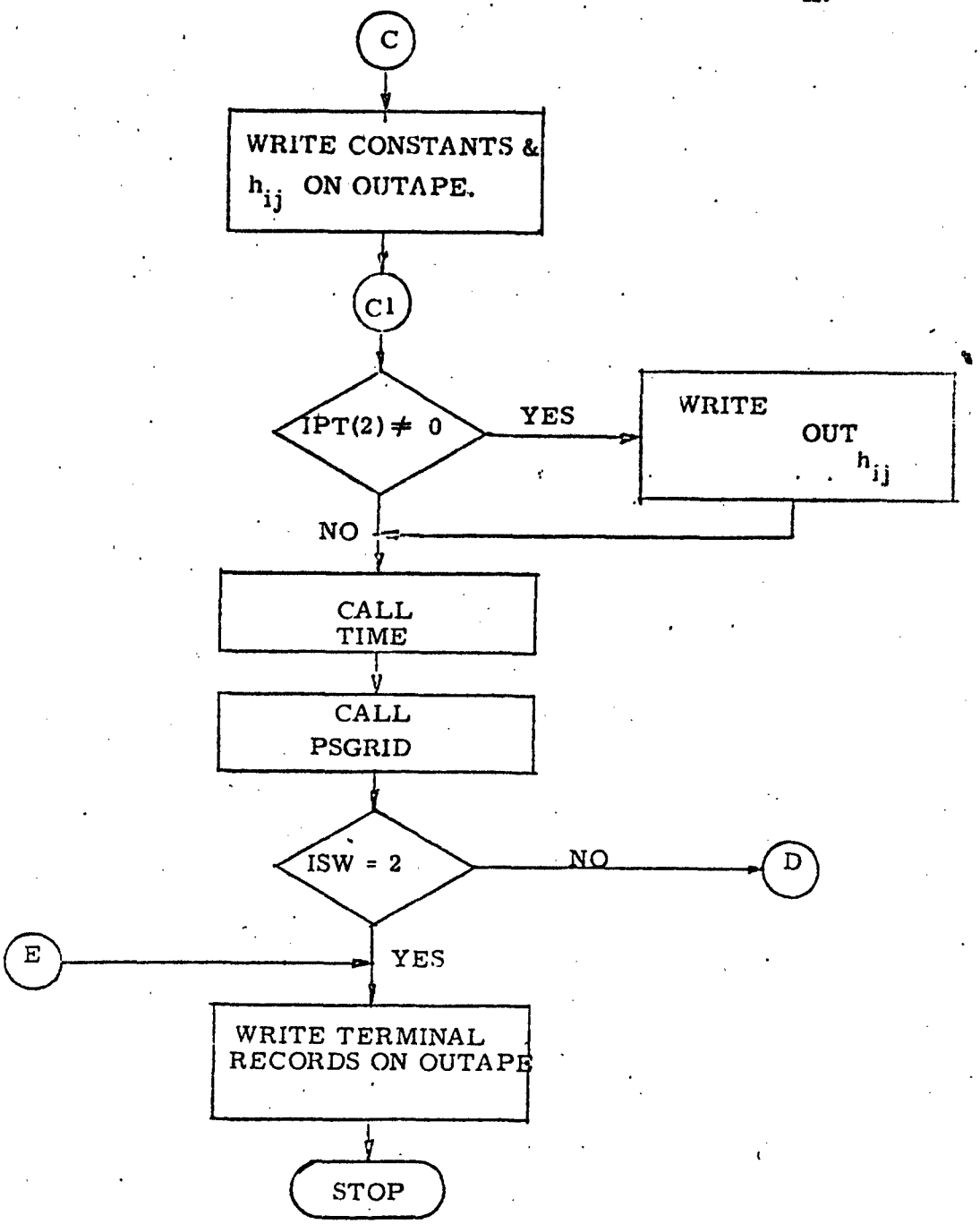


$$h_{ij} = \sum_{r=-\rho}^{\rho} \sum_{s=-\sigma}^{\sigma} B_{rs} H_{i+r+\rho,\, j+s+\sigma};$$

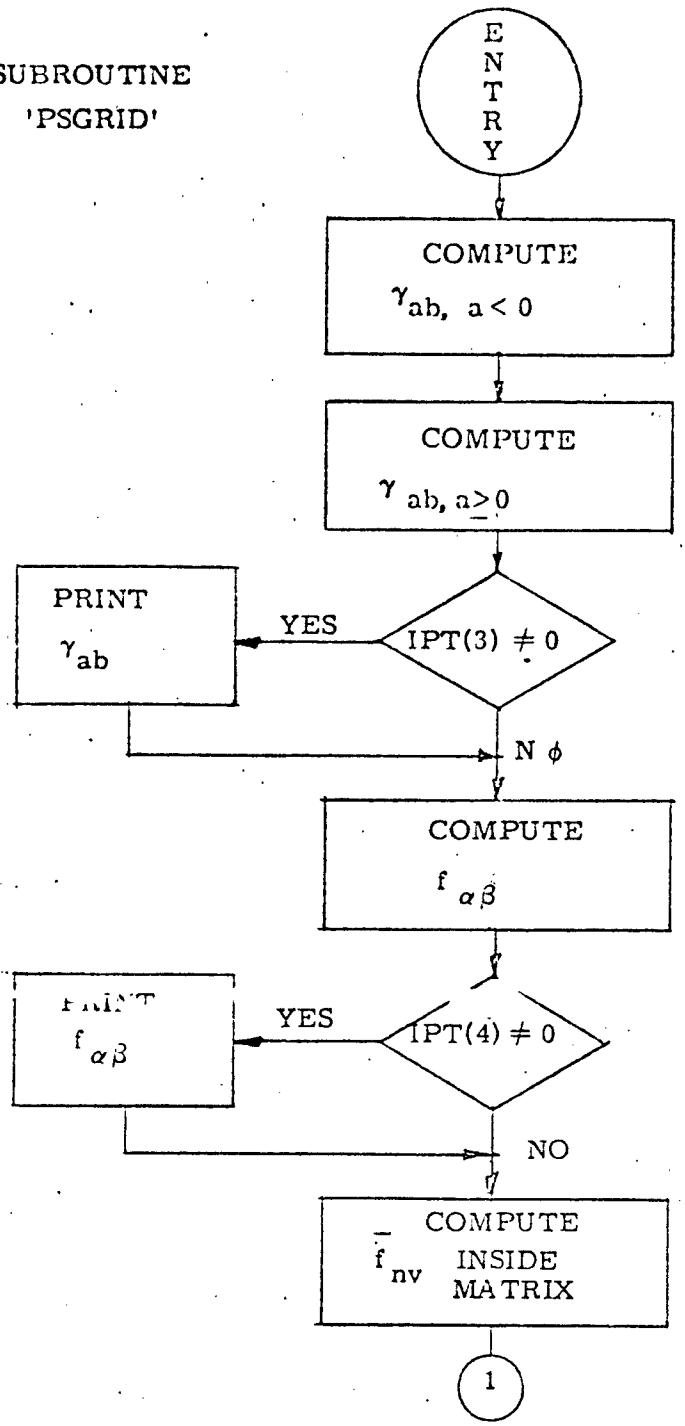
$i = 0, \ldots N_x - 2\rho$

$j = 0, \ldots N_y - 2\sigma$

MAIN PROGRAM
'IN'



SUBROUTINE 'PSGRID'



$$\gamma_{ab} = \frac{1}{(n_x - |a|)\,(n_y - |b|)}$$

$$\sum_{k=0}^{n_x} \sum_{j=0}^{n_y} h_{kj} h_{k+a,\, j+b}$$

where $n_x = N_x - 2\rho + 1$

$n_y = N_y - 2\sigma + 1$

and

$-m_x \leq a \leq m_x$

$-m_y \leq b \leq m_y$

$$f_{\alpha\beta} = \Delta x \Delta y \sum_{a=n_x}^{m_x} \sum_{b=m_y}^{m_y} \gamma_{2b} \cos\left[2\pi\left(\frac{a\alpha}{2m_x+1} + \frac{b\beta}{2m_y+1}\right)\right]$$

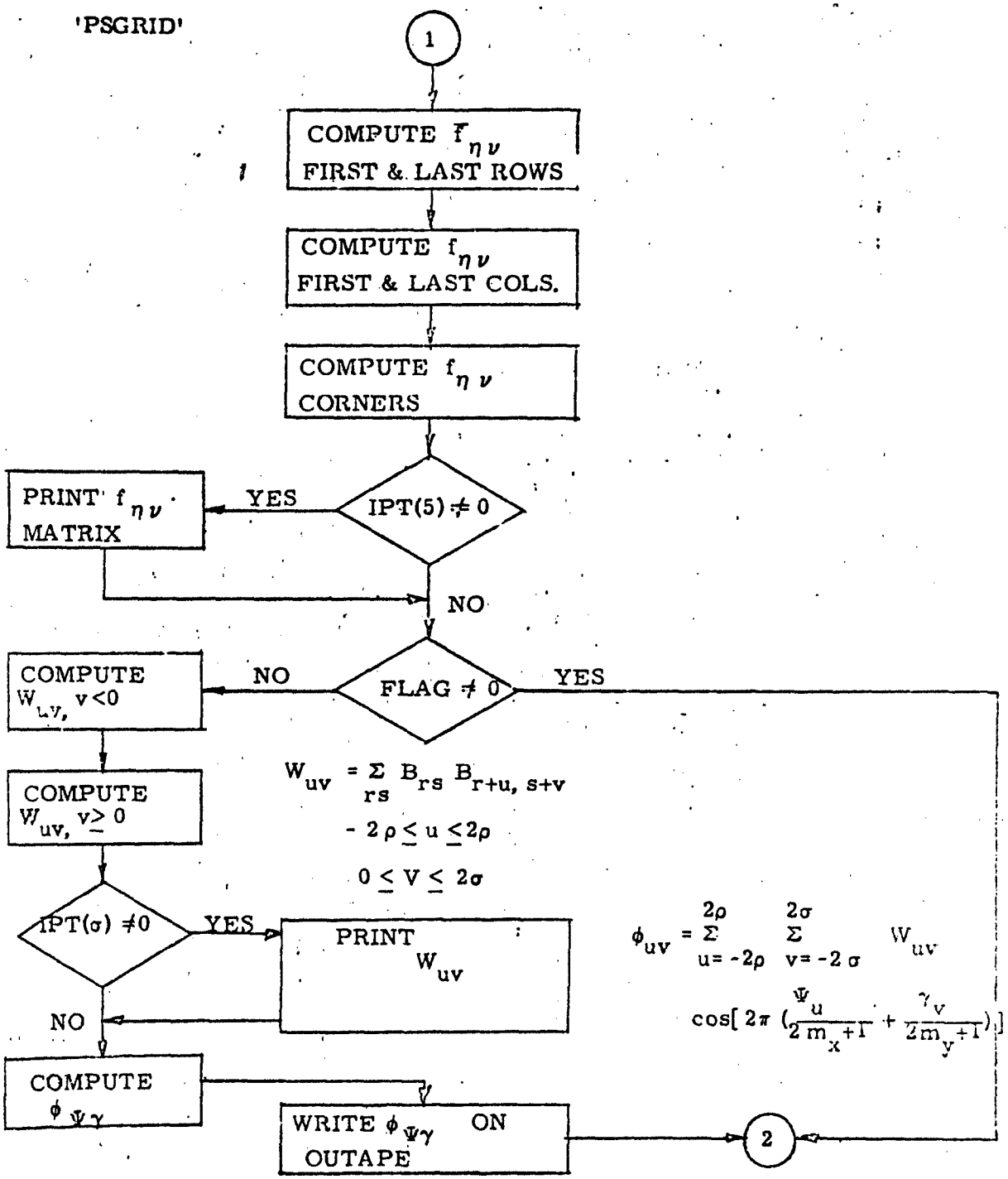
and $-m_x \leq \alpha \leq m_x$

$-m_y \leq \beta \leq m_y$

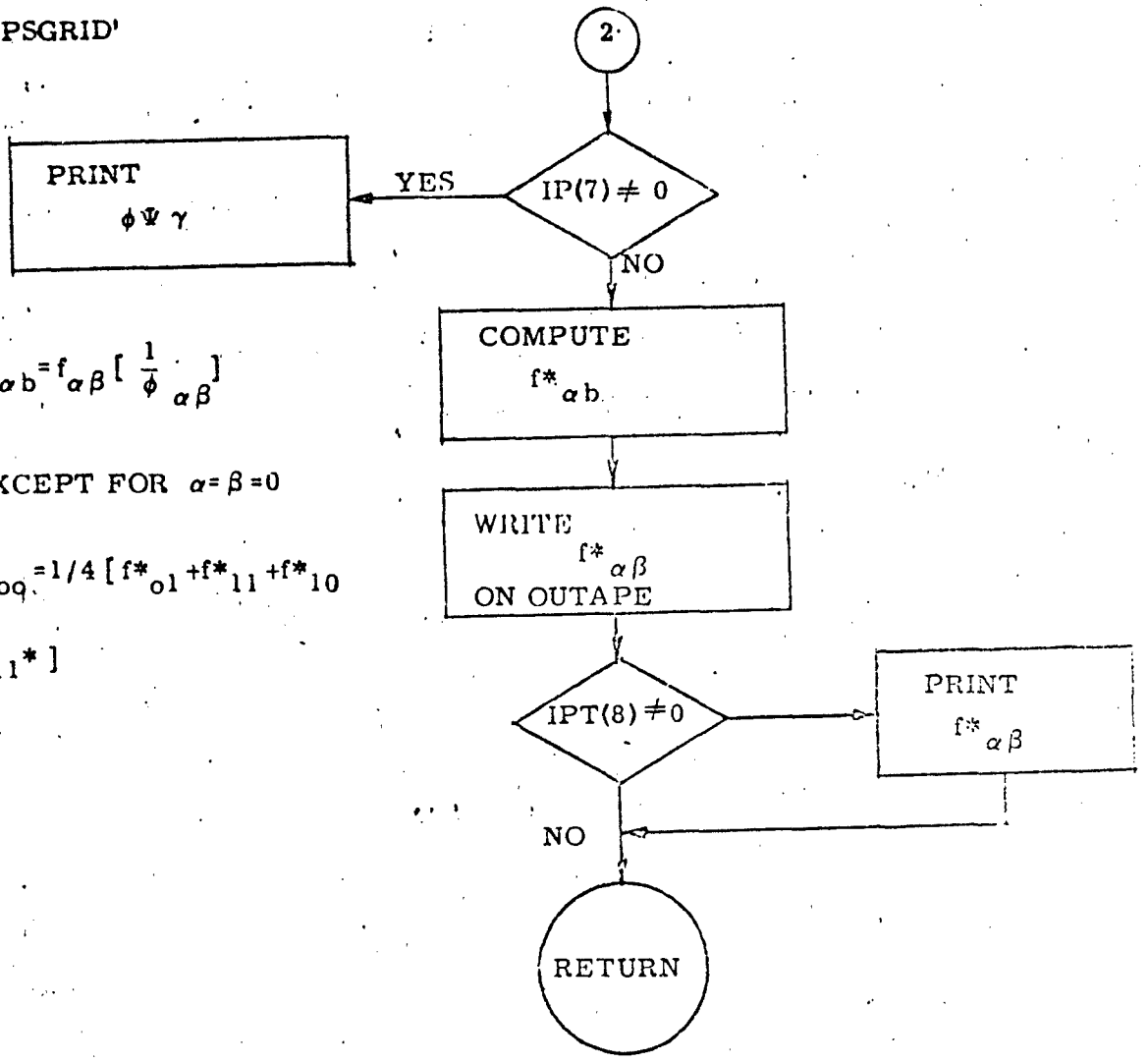
$$\bar{f}_{nv} = \sum_{2=-1}^{1} \sum_{j=-1}^{1} j_{2j}\, f_{\eta+2,\, \nu+j}$$

and if $\eta + 1$ or $\nu + j$ occurs outside the border, take the reflected index inside.

SUBROUTINE 'PSGRID'



SUBROUTINE
'PSGRID'



$f^*_{\alpha b} = f_{\alpha\beta} \left[\frac{1}{\phi} \right]_{\alpha\beta}$

EXCEPT FOR $\alpha = \beta = 0$

$f^*_{oo} = 1/4 \left[f^*_{o1} + f^*_{11} + f^*_{10} + f_{-11}{}^* \right]$

```
C      AREA SPECTRAL DENSITY PROGRAM
$EXECUTE        IRJOB
$IRJOB          MAP
$IBFTC PSGRID  DECK,DD,FULIST,REF                                       GRD00000
       SUBROUTINE PSGRID                                                GRD00010
C      MODIFIED SPECTRAL DENSITY PROG STARTED 10 SEPT 1964              GRD00020
                                                                        GRD00030
       INTEGER  OUTAPE, FLAG                                            GRD00040
                                                                        GRD00050
       COMMON /ARRAYS/ SH(105,100), PH1(50,25), R(25,25), G(3,3)        GRD00060
      1        /SIZES/  MX, MY, NBR, NBS, NSHX, NSHY, NFX, DX, DY, NRHO GRD00070
      2        /CONTRL/ IPT(8), FLAG, ITMP, OUTAPE                      GRD00080
      3    *   /LAB/ LABEL(12), NID                                     GRD00090
                                                                        GRD00100
       DIMENSION  GA(50,25), F(50,50), FB(50,50), W(50,25), FS(50,50),  GRD00110
      1 HEAD(6,6)                                                       GRD00120
                                                                        GRD00130
       DATA  HEAD(1,1) / 34HMEAN LAGGED PRODUCTS, (COVAR)        /,     GRD00140
      1      HEAD(1,2) / 34HRAW SPECTRUM, (F)                   /,     GRD00150
      2      HEAD(1,3) / 34HSMOOTHED SPECTRUM, (F-BAR)          /,     GRD00160
      3      HEAD(1,4) / 34HLAGGED PRODUCTS OF SMOOTHING COEF,  /,     GRD00170
      4      HEAD(1,5) / 34HFOURIER TRANSFORMS OF L,P,S,C,      /,     GRD00180
      5      HEAD(1,6) / 34HCORRECTED SPECTRUM, (F-STAR)        /      GRD00190
                                                                        GRD00200
       EQUIVALENCE  (FS,FB), (GA,W)                                     GRD00210
                                                                        GRD00220
C1                                                                      GRD00230
C      READ IN INPUT DATA                                               GRD00240
        P12  =  2.0*3.14159                                             GRD00250
C      COMPUTE THE MEAN LAGGED PRODUCTS (COVARIENCES)                   GRD00260
C      A LESS THAN ZERO                                                 GRD00270
  212 NGHX=MX+1                                                         GRD00280
      NGHY=MY+1                                                         GRD00290
      NGX=NGHX+MX                                                       GRD00300
      DO127I8=1,MX                                                      GRD00310
      K69=MX+1-I8                                                       GRD00320
      K67=NSHX-K69                                                      GRD00330
      DO127J8=1,NGHY                                                    GRD00340
      K70=J8-1                                                          GRD00350
      K68=NSHY-K70                                                      GRD00360
C13A                                                                    GRD00370
      SUM=0.0                                                           GRD00380
      DO128I6=1,K67                                                     GRD00390
      I7=K69+I6                                                         GRD00400
      DO128J7=1,K68                                                     GRD00410
      J6=K70+J7                                                         GRD00420
      TEMP=SH(I7,J7)*SH(I6,J6)                                          GRD00430
  128 SUM=SUM+TEMP                                                      GRD00440
      D=K67*K68                                                         GRD00450
  127 GA(I8,J8)=SUM/D                                                   GRD00460
C14                                                                     GRD00470
C      A EQUAL TO AND GREATER THAN ZERO                                 GRD00480
  213 DO177I8=NGHX,NGX                                                  GRD00490
      K69=I8-MX-1                                                       GRD00500
      K71=NSHY-K69
```

```
      DO177J8=1,NGHY                                                    GRD00510
      K70=J8-1                                                          GRD00520
      K72=NSHY-K70                                                      GRD00530
C14A                                                                    GRD00540
      SUM=0.0                                                           GRD00550
      DO178I7=1,K71                                                     GRD00560
      I6=I7+K69                                                         GRD00570
      DO178J7=1,K72                                                     GRD00580
      J6=J7+K70                                                         GRD00590
      TEMP=SH(I7,J7)*SH(I6,J6)                                          GRD00600
  178 SUM=SUM+TEMP                                                      GRD00610
      D=K71*K72                                                         GRD00620
  177 GA(I8,J8)=SUM/D                                                   GRD00630
C15                                                                     GRD00640
      IF( IPT(3) .NE. 0 )                                               GRD00650
     1   CALL WRITER( GA, 50, 0, MY, -MX, MX, HEAD(1,1) )               GRD00660
      IF( ITIME .NE. 0 )  CALL TIME(1)                                  GRD00670
C16                                                                     GRD00680
C     RAW SPECTRAL CALCULATIONS                                         GRD00690
  215 NFY=2*MY+1                                                        GRD00700
      NFX=2*MX+1                                                        GRD00710
      FY=NFY                                                            GRD00720
      FX=NFX                                                            GRD00730
      LPMX = MX + 1                                                     GRD00740
      LPMY = MY + 1                                                     GRD00750
      DO131I10=1,NFX                                                    GRD00760
      ALPHA = I10 - LPMX                                                GRD00770
      ALPHA = ALPHA / FX                                                GRD00780
      DO131J10=1,NFY                                                    GRD00790
      BETA = J10 - LPMY                                                 GRD00800
      BETA = BETA / FY                                                  GRD00810
      SUM=0.0                                                           GRD00820
C17                                                                     GRD00830
      DO136I9=1,NGX                                                     GRD00840
      A = I9 - LPMX                                                     GRD00850
      A = A * ALPHA                                                     GRD00860
      DO132J9=2,NGHY                                                    GRD00870
      BE= J9-1                                                          GRD00880
      ANG1 = PI2 * ( A + BE * BETA )                                    GRD00890
C17A                                                                    GRD00900
      TEMP= GA(I9,J9)*COS(ANG1)                                         GRD00910
  132 SUM=SUM+TEMP*2.0                                                  GRD00920
      ANG2 = PI2 * A                                                    GRD00930
  136 SUM=SUM+GA(I9,1)*COS(ANG2)                                        GRD00940
  131 F(I10,J10)=DX*DY*SUM                                              GRD00950
C18                                                                     GRD00960
      IF( IPT(4) .NE. 0 )                                               GRD00970
     1   CALL WRITER( F, 50, -MY, MY, -MX, MX, HEAD(1,2) )              GRD00980
      IF( ITIME .NE. 0 )  CALL TIME(1)                                  GRD00990
C19                                                                     GRD01000
C     SMOOTHED SPECTRUM                                                 GRD01010
C     INSIDE MATRIX                                                     GRD01020
  217 NFBX=NFX-1                                                        GRD01030
      NFBY=NFY-1                                                        GRD01040
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```
      DO140I13=2,NFBX                                                  GRD01050
      DO140J13=2,NFBY                                                  GRD01060
      SUM=0.0                                                          GRD01070
      DO141I11=1,3                                                     GRD01080
      I12=I13+I11-2                                                    GRD01090
      DO141J11=1,3                                                     GRD01100
      J12=J13+J11-2                                                    GRD01110
C20                                                                    GRD01120
      TEMP=G(I11,J11)*F(I12,J12)                                       GRD01130
  141 SUM=SUM+TEMP                                                     GRD01140
  140 FB(I13,J13)=SUM                                                  GRD01150
C21                                                                    GRD01160
  218 DO142I13=2,NFBX                                                  GRD01170
      SUM=0.0                                                          GRD01180
      SUMA=0.0                                                         GRD01190
      DO143I14=1,3                                                     GRD01200
      I15=I13+I14-2                                                    GRD01210
      TEMP=G(I14,1)*F(I15,2)+G(I14,2)*F(I15,1)+G(I14,3)*F(I15,2)       GRD01220
      TEMPA=G(I14,1)*F(I15,NFBY)+G(I14,2)*F(I15,NFY)+G(I14,3)          GRD01230
     X*F(I15,NFBY)                                                     GRD01240
      SUM=SUM+TEMP                                                     GRD01250
  143 SUMA=SUMA+TEMPA                                                  GRD01260
      FB(I13,1)=SUM                                                    GRD01270
  142 FB(I13,NFY)=SUMA                                                 GRD01280
C22                                                                    GRD01290
  219 DO144J13=2,NFBY                                                  GRD01300
      SUM=0.0                                                          GRD01310
      SUMA=0.0                                                         GRD01320
      DO145J14=1,3                                                     GRD01330
      J15=J14+J13-2                                                    GRD01340
      TEMP=G(1,J14)*F(2,J15)+G(2,J14)*F(1,J15)+G(3,J14)*F(2,J15)       GRD01350
      TEMPA=G(1,J14)*F(NFBX,J15)+G(2,J14)*F(NFX,J15)+G(3,J14)          GRD01360
     X*F(NFBX,J15)                                                     GRD01370
      SUM=SUM+TEMP                                                     GRD01380
  145 SUMA=SUMA+TEMPA                                                  GRD01390
      FB(1,J13)=SUM                                                    GRD01400
  144 FB(NFX,J13)=SUMA                                                 GRD01410
C23                                                                    GRD01420
  220 K27=2                                                            GRD01430
      K28=1                                                            GRD01440
      K29=2                                                            GRD01450
      K30=1                                                            GRD01460
      DO146L19=1,4                                                     GRD01470
      SUM=0.0                                                          GRD01480
      K26=K29                                                          GRD01490
      DO147L20=1,3                                                     GRD01500
      TEMP=G(L20,1)*F(K26,K27)+G(L20,2)*F(K28,K28)+G(L20,3)*F(K28,K27) GRD01510
C24                                                                    GRD01520
      IF(L20-2)148,149,147                                             GRD01530
  148 K26=K30                                                          GRD01540
      GOTO147                                                          GRD01550
  149 K26=K29                                                          GRD01560
      GOTO147                                                          GRD01570
  147 SUM=SUM+TEMP                                                     GRD01580
```

```
C25                                                                    GRD01590
      GOTO(150,151,152,154),L19                                        GRD01600
  150 FB(1,1)=SUM                                                      GRD01610
      K29=NFBX                                                         GRD01620
      K30=NFX                                                          GRD01630
      GOTO146                                                          GRD01640
  151 FB(NFX,1)=SUM                                                    GRD01650
      K29=2                                                            GRD01660
      K30=1                                                            GRD01670
      K27=NFBY                                                         GRD01680
      K28=NFY                                                          GRD01690
      GOTO146                                                          GRD01700
C26                                                                    GRD01710
  152 FB(1,NFY)=SUM                                                    GRD01720
      K29=NFBX                                                         GRD01730
      K30=NFX                                                          GRD01740
      GOTO146                                                          GRD01750
  154 FB(NFX,NFY)=SUM                                                  GRD01760
  146 CONTINUE                                                         GRD01770
C27                                                                    GRD01780
      IF( IPT(5) .NE. 0 )                                              GRD01790
     1   CALL WRITER( FB, 50, -MY, MY, -MX, MX, HEAD(1,3) )            GRD01800
      IF( ITIME .NE. 0 ) CALL TIME(1)                                  GRD01810
      IF (FLAG) 222, 222, 226                                          GRD01820
C28                                                                    GRD01830
C     COMPUTE CORRECTION COEFFICIENTS                                  GRD01840
C     U LESS THAN ZERO                                                 GRD01850
  222 N2R=NRHO+NRHO                                                    GRD01860
      DO157I18=1,N2R                                                   GRD01870
      K38=N2R+1-I18                                                    GRD01880
      K40=NBR-K38                                                      GRD01890
      DO157J18=1,NBS                                                   GRD01900
      K39=J18-1                                                        GRD01910
      K41=NBS-K39                                                      GRD01920
C29                                                                    GRD01930
      SUM=0.0                                                          GRD01940
      DO158I17=1,K40                                                   GRD01950
      I19=I17+K38                                                      GRD01960
      DO158J19=1,K41                                                   GRD01970
      J17=J19+K39                                                      GRD01980
      TEMP=B(I17,J17)*B(I19,J19)                                       GRD01990
  158 SUM=SUM+TEMP                                                     GRD02000
  157 W(I18,J18)=SUM                                                   GRD02010
C30                                                                    GRD02020
C     U EQUAL TO OR GREATER THAN ZERO                                  GRD02030
      NWX=NBR+N2R                                                      GRD02040
  223 DO159I18=NBR,NWX                                                 GRD02050
      K42=I18-NBR                                                      GRD02060
      K40=NBR-K42                                                      GRD02070
      DO159J18=1,NBS                                                   GRD02080
      K39=J18-1                                                        GRD02090
      K41=NBS-K39                                                      GRD02100
C30A                                                                   GRD02110
      SUM=0.0                                                          GRD02120
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      DO160I17=1,K40                                                    GRD02130
      I19=I17+K42                                                       GRD02140
      DO160J17=1,K41                                                    GRD02150
      J19=J17+K39                                                       GRD02160
      TEMP=B(I17,J17)*B(I19,J19)                                        GRD02170
  160 SUM=SUM+TEMP                                                      GRD02180
  159 W(I18,J18)=SUM                                                    GRD02190
C31                                                                     GRD02200
      IF( IPT(6) .NE. 0 )                                               GRD02210
     1   CALL WRITER( W, 50, 0, NRS-1, -NBR+1, NWX-NBR, HEAD(1,4) )     GRD02220
      IF( ITIME .NE. 0 )  CALL TIME(1)                                  GRD02230
C32                                                                     GRD02240
      LPMX = MX + 1                                                     GRD02250
  225 DO165I20=1,NFX                                                    GRD02260
      S = I20 - LPMX                                                    GRD02270
      S = S / FX                                                        GRD02280
      DO165J20=1,NGHY                                                   GRD02290
      T=J20-1                                                           GRD02300
      T = T / FY                                                        GRD02310
      SUM=0.0                                                           GRD02320
      DO167 I21=1,NWX                                                   GRD02330
      U=I21-NBR                                                         GRD02340
      U = U + S                                                         GRD02350
      DO166 J21=2,NBS                                                   GRD02360
      V=J21-1                                                           GRD02370
C33                                                                     GRD02380
      ANG1 = PI2 * ( U - V * T )                                        GRD02390
      TEMP=W(I21,J21)*COS (ANG1)                                        GRD02400
  166 SUM=SUM+TEMP*2.0                                                  GRD02410
      ANG2 = PI2 * U                                                    GRD02420
  167 SUM=SUM+W(I21,1)*COS (ANG2)                                       GRD02430
      IF(ABS(SUM).LT. 0.00001) SUM=SIGN(0.000001,SUM)                   GRD02440
  165 PHI(I20,J20)=SUM                                                  GRD02450
C34                                                                     GRD02460
      WRITE(OUTAPE,110)  ( ( PHI(I,J), I = 1, NFX ), J = 1, NGHY )     GRD02470
      WRITE (OUTAPE,103)                                                GRD02480
226   IF( IPT(7) .NE. 0 )                                               GRD02490
     1   CALL WRITER( PHI, 50, 0, NGHY-1, -MX, MX, HEAD(1,5) )          GRD02500
      IF( ITIME .NE. 0 )  CALL TIME(1)                                  GRD02510
C34A                                                                    GRD02520
C35                                                                     GRD02530
  227 DO169I22=1,NFX                                                    GRD02540
      DO169J22=1,NFY                                                    GRD02550
      I23=I22                                                           GRD02560
      J23=NGHY+1-J22                                                    GRD02570
      IF(J22.GT.MY) J23=J22-MY                                          GRD02580
  169 FS(I22,J22)=FB(I22,J22)/PHI(I23,J23)                              GRD02590
      K50=NGHX+1                                                        GRD02600
      K51=NGHY+1                                                        GRD02610
      FS(NGHX,NGHY)=(FS(MX,K51)+FS(NGHX,K51)+FS(K50,K51)+FS(K50,NGHY))/ GRD02620
     X4.0                                                               GRD02630
C36                                                                     GRD02640
      WRITE (OUTAPE,101)  LABEL, NID, MX, MY                            GRD02650
      WRITE (OUTAPE,110)  ( ( FS(I,J), I = 1, NFX ), J = 1, NFY )       GRD02660
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      IF( IPT(8) .NE. 0 )                                                GRD02670
     1   CALL WRITER( FS, 50, -MY, MY, -MX, MX, HEAD(1,6) )              GRD02680
      IF( ITIME .NE. 0 )  CALL TIME(1)                                   GRD02690
      RETURN                                                             GRD02700
                                                                         GRD02710
101   FORMAT(12A6,I8/2I10,60XA1)                                         GRD02720
102   FORMAT(7F10.3,10X)                                                 GRD02730
103   FORMAT(71X1H/8XA1)                                                 GRD02740
110   FORMAT(4E15.8,20X)                                                 GRD02750
      END                                                                GRD02760
$IBFTC IN       DECK,DD,FULIST,REF                                       GRD02770
      INTEGER   OUTAPE, FLAG                                             GRD02790
                                                                         GRD02800
      COMMON /ARRAYS/ SM(105,100), PHI(50,25), B(25,25), G(3,3)          GRD02810
     1        /SIZES/  MX, MY, NBR, NBS, NSMX, NSMY, NPX, DX, DY, NRHO   GRD02820
     2        /CONTRL/ IPT(8), FLAG, ITIME, OUTAPE                       GRD02830
     3        /LAB/ LABEL(12), NID                                       GRD02840
                                                                         GRD02850
      DIMENSION  M(105,100), HEAD(6,3), ELABEL(12)                       GRD02860
                                                                         GRD02870
      EQUIVALENCE (M,SM), (ID,NID)                                       GRD02880
                                                                         GRD02890
      DATA  ICTL, AST, SLASH, DOL, ISW1, JEC, IFIN / 6HSCRTOP, 1H*, 1H/,GRD02900
     1      1HS, 1, 1, 6HSFINIS /,                                       GRD02910
     2      HEAD(1,1) / 32HTHE SMOOTHING COEFFICIENTS        /,          GRD02920
     3      HEAD(1,2) / 32HTHE ELEVATION MATRIX              /,          GRD02930
     4      HEAD(1,3) / 32HTHE SMOOTHED MATRIX               /           GRD02940
                                                                         GRD02950
                                                                         GRD02960
      CALL TIME(0)                                                       GRD02970
                                                                         GRD02980
1000  READ (5,100)  I, INTAPE, OUTAPE, FLAG, IBUG, ISTAP, ITIME, IPT, IDGRD02990
      IF( I .EQ. IFIN )  GO TO 500                                       GRD03000
      IF( I .NE. ICTL )  GO TO 200                                       GRD03010
                                                                         GRD03020
      IF( ISTAP .EQ. 0 .OR. OUTAPE .EQ. 6 )  GO TO 1002                  GRD03030
1001     READ (OUTAPE,106)  ELABEL, CODE                                 GRD03040
         IF( CODE .NE. AST )  GO TO 1001                                 GRD03050
         BACKSPACE  OUTAPE                                               GRD03060
         WRITE (OUTAPE,306)                                              GRD03070
                                                                         GRD03080
                                                                         GRD03090
1002  JEC = 1                                                            GRD03100
                                                                         GRD03110
      IF( IBUG .EQ. 0 )  GO TO 1                                         GRD03120
         PRINT 108                                                       GRD03130
         PAUSE                                                           GRD03140
         CALL SSWTCH( 6,I)                                               GRD03150
         IF( I .EQ. 1 )  GO TO 501                                       GRD03160
                                                                         GRD03170
1     JTAPE = 5                                                          GRD03180
      IF( INTAPE .GT. 0 )  JTAPE = INTAPE                                GRD03190
                                                                         GRD03200
2     READ (JTAPE,101)  LABEL, IDT                                       GRD03210
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      IF( IDT .NE. ID )  GO TO 2                                          GRD03220
                                                                          GRD03230
      LTAPE = 5                                                           GRD03240
      IF( FLAG .NE. 0 )  LTAPE = INTAPE                                   GRD03250
      IF( ISW1 .EQ. 0 )  GO TO 21                                         GRD03260
                                                                          GRD03270
      READ (LTAPE,102)  DX, DY                                            GRD03280
      READ (LTAPE,103)  NX, NY, NRHO, NSIG, MX, MY                        GRD03290
      READ (LTAPE,102)  ( ( G(I,J), I = 1, 3 ), J = 1, 3 )               GRD03300
                                                                          GRD03310
      NSHX = NX - 2 * NRHO                                                GRD03320
      NSHY = NY - 2 * NSIG                                                GRD03330
      NBR = NRHO * 2 + 1                                                  GRD03340
      NBS = NSIG * 2 + 1                                                  GRD03350
      NHS = NSIG + 1                                                      GRD03360
                                                                          GRD03370
21    WRITE (6,104)  LABEL, NX, NY, NBR, NBS, MX, MY, DX, DY, ( I, I = 1GRD03380
     1               , 3 ), ( J, ( G(I,J), I = 1, 3 ), J = 1, 3 )       GRD03390
                                                                          GRD03400
      IF( FLAG .NE. 0 )  GO TO 8                                          GRD03410
                                                                          GRD03420
                                                                          GRD03430
      WRITE (6,109)  OUTAPE, NID                                          GRD03440
      IF( ISW1 .EQ. 0 )  GO TO 31                                         GRD03450
                                                                          GRD03460
      READ (LTAPE,102)  ( ( B(I,J), I = 1, NBR ), J = NHS, NBS )          GRD03470
                                                                          GRD03480
      DO 3 I = 1, NBR                                                     GRD03490
         II = NBR + 1 - I                                                 GRD03500
         DO 3 J = 1, NSIG                                                 GRD03510
            J1 = NBS + 1 - J                                              GRD03520
3           B(I,J) = B(II,J1)                                             GRD03530
                                                                          GRD03540
31    CALL WRITER( B, 25, -NSIG, NSIG, -NRHO, NRHO, HEAD(1,1) )           GRD03550
                                                                          GRD03560
      DO 4 I = 1, NX, 5                                                   GRD03570
         II = I + 4                                                       GRD03580
4        READ (JTAPE,105)  ( ( H(J1,J), J1 = I, II ), J = 1, NY )         GRD03590
                                                                          GRD03600
      READ (JTAPE,106)  ELABEL, CODE, IERR                                GRD03610
      ISW1 = 3                                                            GRD03620
      IF( CODE .EQ. AST )  ISW1 = 2                                       GRD03630
      IF( CODE .EQ. SLASH )  ISW1 = 1                                     GRD03640
      IF( CODE .EQ. DOL )  ISW1 = 0                                       GRD03650
                                                                          GRD03660
      IF( ISW1 .EQ. 3 )  GO TO 201                                        GRD03670
                                                                          GRD03680
      IF( IPT(1) .NE. 0 )                                                 GRD03690
     1    CALL WRITER( H, 105, 0, NY - 1, 0, NX - 1, HEAD(1,2) )          GRD03700
                                                                          GRD03710
      DO 6 I = 1, NSHX                                                    GRD03720
         DO 6 J = 1, NSHY                                                 GRD03730
            SUM = 0.0                                                     GRD03740
            DO 5 II = 1, NBR                                              GRD03750
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                I2 = I + I1 - 1                                          GRD03760
                DO 5 J1 = 1, NBS                                         GRD03770
                   J2 = J + J1 - 1                                       GRD03780
5                  SUM = SUM + B(I1,J1) * M(I2,J2)                       GRD03790
6           SH(I,J) = SUM                                                GRD03800
                                                                         GRD03810
      I1 = NSHX + 1                                                      GRD03820
      DO 7 I = I1, MX                                                    GRD03830
         DO 7 J = 1, NSHY                                                GRD03840
7           SH(I,J) = 0.0                                                GRD03850
                                                                         GRD03860
      WRITE (OUTAPE,101)  LABEL, NID                                     GRD03870
      WRITE (OUTAPE,112)  DX, DY                                         GRD03880
      WRITE (OUTAPE,113)  NSHX, NSHY, NRHO, NSIG, MX, MY                 GRD03890
      WRITE (OUTAPE,111)  ( ( G(I,J), I = 1, 3 ), J = 1, 3 )             GRD03900
      DO 71 I = 1, NSHX, 4                                               GRD03910
         I1 = I + 3                                                      GRD03920
71       WRITE (OUTAPE,110)  ( ( SH(J2,J), J2 = I, I1 ), J = 1, NSHY )   GRD03930
                                                                         GRD03940
      GO TO 11                                                           GRD03950
                                                                         GRD03960
                                                                         GRD03970
8     DO 9 I = 1, MX, 4                                                  GRD03980
         I1 = I + 3                                                      GRD03990
9        READ (LTAPE,110)  ( ( SH(I2,J), I2 = I, I1 ), J = 1, MY )      GRD04000
                                                                         GRD04010
      MPX = 2 * MX + 1                                                   GRD04020
      MGMY = MY + 1                                                      GRD04030
      READ (LTAPE,110)  ( ( PHI(I,J), I = 1, MPX ), J = 1, MGMY )       GRD04040
                                                                         GRD04050
      READ (LTAPE,106)  ELABEL, CODE                                     GRD04060
      IF( CODE .NE. SLASH )  GO TO 202                                   GRD04070
      ISW1 = 1                                                           GRD04080
                                                                         GRD04090
91    READ (LTAPE,106)  ELABEL, CODE                                     GRD04100
         IF( CODE .NE. DOL .AND. CODE .NE. AST )  GO TO 91               GRD04110
      IF( CODE .EQ. AST )  ISW1 = 2                                      GRD04120
                                                                         GRD04130
      READ (5,103)  MPX, MLX, MPY, MLY                                   GRD04140
      DO 10 I = MPX, MLX                                                 GRD04150
         I1 = I + 1 - MPX                                                GRD04160
         DO 10 J = MPY, MLY                                              GRD04170
            J1 = J + 1 - MPY                                             GRD04180
10          SH(I1,J1) = SH(I,J)                                          GRD04190
                                                                         GRD04200
      NSHX = MLX - MPX + 1                                               GRD04210
      NSHY = MLY - MPY + 1                                               GRD04220
      IPT(2) = IPT(1)                                                    GRD04230
                                                                         GRD04240
      WRITE (6,107)  MPX, MLX, MPY, MLY                                  GRD04250
                                                                         GRD04260
                                                                         GRD04270
11    IF( IPT(2) .NE. 0 )                                                GRD04280
     1    CALL WRITER( SH, 105, 0, NSHY - 1, 0, NSHX - 1, HEAD(1,3) )    GRD04290
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      IF( ITIME .NE. 0 )  CALL TIME(1)                                  GRD04300
                                                                        GRD04310
                                                                        GRD04320
      CALL PSGRID                                                       GRD04330
                                                                        GRD04340
      IF( ISW1 .EQ. 2 )  GO TO 500                                      GRD04350
      WRITE (OUTAPE,306)                                                GRD04360
      GO TO 1000                                                        GRD04370
                                                                        GRD04380
                                                                        GRD04390
  501 JEC = 4                                                           GRD04400
  500 WRITE (6,303)                                                     GRD04410
      DO 502 I = 1, 100                                                 GRD04420
  502    WRITE (OUTAPE,305)                                             GRD04430
      IF( JEC .EQ. 4 )  WRITE (6,304)                                   GRD04440
      STOP                                                              GRD04450
                                                                        GRD04460
  200 WRITE (6,300) JEC, I                                              GRD04470
      GO TO 1000                                                        GRD04480
                                                                        GRD04490
  201 WRITE (6,301)  ELABEL, CODE, IERR                                 GRD04500
      STOP                                                              GRD04510
                                                                        GRD04520
  202 WRITE (6,302)  ELABEL, CODE, IERR                                 GRD04530
      STOP                                                              GRD04540
                                                                        GRD04550
                                                                        GRD04560
  100 FORMAT(A6,I4I2,38X,I8)                                            GRD04570
  101 FORMAT(12A6,I8)                                                   GRD04580
  102 FORMAT(7F10.3)                                                    GRD04590
  103 FORMAT(7I10)                                                      GRD04600
  104 FORMAT(21H1INPUT PARAMETERS  --12A6///6X12HINPUT MATRIX4X,I4,3H X ,I GRD04610
     #4//6X16HSMOOTHING MATRIX,I4,3H X ,I4//6X14HNUMBER OF LAGS2X,I4,3H X ,I GRD04620
     #4//6X13HDATA INTERVAL3XF4.1,3H X F4.1////6X33HSPECTRAL SMOOTHING MGRD04630
     #ATRIX, 6(I,J)//7X3110///(6X,I3,3F10.3))                           GRD04640
  105 FORMAT(5F10.3)                                                    GRD04650
  106 FORMAT(11A6,A5,A1,I8)                                             GRD04660
  107 FORMAT(/1H0,5X31HTHIS IS A COMPUTATION INVOLVING,6X7HCOLUMNS,I4,3H TGRD04670
     1O,I4,10H AND ROWS ,I4,3H TO,I4/6X25HOF A PRE-SMOOTHED MATRIX.)       GRD04680
  108 FORMAT(46H0SENSE SWITCH 6 UP AND PRESS START TO CONTINUE/50H SENSEGRD04690
     1 SWITCH 6 DOWN AND PRESS START TO TERMINATE.)                     GRD04700
  109 FORMAT(//6X45HTHE ID. NUMBER FOR THE ALTERNATE OUTPUT TAPE I2,4H. GRD04710
     1,5I8,1H.)                                                         GRD04720
  110 FORMAT(4E15.8,20X)                                                GRD04730
  111 FORMAT(7F10.3,10X/2F10.3,60XA1)                                   GRD04740
  112 FORMAT(2F10.3,60XA1)                                              GRD04750
  113 FORMAT(6I10,20XA1)                                                GRD04760
                                                                        GRD04770
  300 FORMAT(1,61H*SGRIDP* CARD NOT ENCOUNTERED WHEN EXPECTED. SEARCH CGRD04780
     1ONTINUES/31H FIRST SIX CHARS. ON CARD READ A6,A1)                 GRD04790
  301 FORMAT(106H1*.  */ OR /* EXPECTED AT END OF ELEVATION MATRIX. INGRD04800
     1 COLUMN 72, NOT FOUND.  CARD AS READ APPEARS BELOW. /1H011A6,A5,A1GRD04810
     2,I8/72X1H*//69X7HCOL. 72//21H EXECUTION ABANDONED.)               GRD04820
  302 FORMAT(104H1*/* OR /** EXPECTED AT END OF FOURIER TRANFORMS IN COLGRD04830
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```
     1UMN 72, NOT FOUND.  CARD AS READ APPEARS BELOW. /1H011A6,A5,A1,I8/GRD04840
     272X1H*//69X7HCOL. 72//21H EXECUTION ABANDONED.)                   GRD04850
303   FORMAT(1H1/1H3//55X,10HTHESE THEN//58X,3HARE//53X,14HTHE ANSWERS,,GRD04860
     1,//50X,20HNOW ALL THAT REMAINS//55X,10HTO BE DONE//59X,2HIS//55X, GRD04870
     29HTO RECALL//53X,14HTHE QUESTIONS.//65X,6HRVR,,,    )             GRD04880
304   FORMAT(34H1EXECUTION TERMINATED BY OPERATOR.)                     GRD04890
305   FORMAT(71X1H*8H99999999)                                          GRD04900
306   FORMAT(71X1HS8XA1)                                                GRD04910
      END                                                               GRD04920
$IBFTC WRITE   DECK,DD,FUL,ST                                           GRD04930
      SUBROUTINE WRITER( OUT, ND1M, IRF, IRT, ICF, ICT, MHEAD )         GRD04940
                                                                        GRD04950
      COMMON  /LAB/ LABEL(12)                                           GRD04960
                                                                        GRD04970
      DIMENSION  OUT(ND1M,1), MHEAD(6)                                  GRD04980
      DIMENSION  NUMR(101), NUMC(5), FMT1(6), FMT2(4), FMCON(5)         GRD04990
                                                                        GRD05000
      DATA  FMCON / 6H     1, 6H     2, 6H     3, 6H     4, 6H     5 /, GRD05010
     1      FMT1(1) /35H(1H112A6//6X6A6//2X          I10/) /,           GRD05020
     2      FMT2(1) / 19H(/(14,      F10.3)) /                         GRD05030
                                                                        GRD05040
      NATC = ICT - ICF + 1                                              GRD05050
      NATR = IRT - IRF + 1                                              GRD05060
                                                                        GRD05070
      ICF1 = ICF - 1                                                    GRD05080
                                                                        GRD05090
      IRF1 = IRF - 1                                                    GRD05100
      DO 1 I = 1, NATR                                                  GRD05110
         NUMR(I) = IRF1 + I                                             GRD05120
1        IF( NUMR(I) .EQ. 0 )  NUMR(I) = 0                              GRD05130
                                                                        GRD05140
      FMT1(5) = FMCON(5)                                                GRD05150
      FMT2(2) = FMCON(5)                                                GRD05160
                                                                        GRD05170
      DO 4 I = 1, NATC, 5                                               GRD05180
         I1 = I + 4                                                     GRD05190
         IF( I1 .LE. NATC )  GO TO 2                                    GRD05200
            I1 = NATC                                                   GRD05210
            J = NATC - I + 1                                            GRD05220
            FMT1(5) = FMCON(J)                                          GRD05230
            FMT2(2) = FMCON(J)                                          GRD05240
2        DO 3 J = I, I1                                                 GRD05250
            J1 = J - I + 1                                              GRD05260
            NUMC(J1) = ICF1 + J                                         GRD05270
3        IF( NUMC(J1) .EQ. 0 )  NUMC(J1) = 0                            GRD05280
         K1 = I1 - I + 1                                                GRD05290
         DO 4 J = 1, NATR, 50                                           GRD05300
            WRITE (6,FMT1)  LABEL, MHEAD, ( NUMC(J1), J1 = 1, K1 )      GRD05310
            J1 = J + 49                                                 GRD05320
            IF( J1 .GT. NATR )  J1 = NATR                               GRD05330
            DO 4 L = J, J1, 10                                          GRD05340
               L2 = L + 9                                               GRD05350
               IF( L2 .GT. J1 )  L2 = J1                                GRD05360
4              WRITE(6,FMT2)  ( NUMR(L1), ( OUT(I3,L1), I3 = I, I1 ), L1GRD05370
```

```
     1                          = L, L2 )                                    GRD05380
                                                                             GRD05390
      RETURN                                                                 GRD05400
      END                                                                    GRD05410
$IBFTC TIME    DECK,DD,REF,FULIST                                           GRD05430
      SUBROUTINE TIME(IND)                                                   GRD05430
                                                                             GRD05440
      INTEGER  CLOCK, SEC, CURR, START                                       GRD05450
                                                                             GRD05460
      DATA  KOUNT / 0 /                                                      GRD05470
                                                                             GRD05480
      IF( IND .NE. 0 )  GO TO 2                                              GRD05490
      START = CLOCK(DUM)                                                     GRD05500
      RETURN                                                                 GRD05510
                                                                             GRD05520
2     CURR = CLOCK( DUM )                                                    GRD05530
      KOUNT = KOUNT + 1                                                      GRD05540
                                                                             GRD05550
      IT = FLOAT( START - CURR ) * .6                                        GRD05560
      MIN = IT / 60.                                                         GRD05570
      SEC = MOD( IT, 60 )                                                    GRD05580
      WRITE (6,10)  KOUNT, MIN, SEC                                          GRD05590
                                                                             GRD05600
      IF( KOUNT .EQ. 1 )  GO TO 3                                            GRD05610
         IT = FLOAT( LCURR - CURR ) * .6                                     GRD05620
         MIN = IT / 60                                                       GRD05630
         SEC = MOD( IT, 60.)                                                 GRD05640
         WRITE (6,11)  MIN, SEC                                              GRD05650
3     WRITE (6,12)                                                           GRD05660
      LCURR = CURR                                                           GRD05670
      RETURN                                                                 GRD05680
                                                                             GRD05690
10    FORMAT(1H1,5X,46(1H*)/,6X,1H*,46X,1H*/,6X,1H*,3X,I3,25HTH CALL TO TIMER ROUTGRD05700
     1,I5,15X,1H*/,6X,1H*,46X,1H*/,6X,1H*,3X,21HTOTAL TIME ELAPSED --,I4,6H MIN,I2,1GRD05710
     2(,I3,5H SEC, 4X,1H*) )                                                 GRD05720
11    FORMAT(6X,1H*,46X,1H*/,6X,1H*,3X,23HTIME SINCE LAST CALL --,I4,6H MIN,I2,1( GRD05730
     1I3,5H SEC,2X,1H*))                                                     GRD05740
12    FORMAT(6X,1H*,46X,1H*/,6X,46(1H*),/,1XA1)                              GRD05750
      END                                                                    GRD05760
$IBMAP CLOCK   DECK                                                          GRD05770
CELL   BOOL    77735
CLOCK  SAVE                                                                  GRD05790
       CAL     CELL                                                          GRD05800
       ANA     M2135                                                         GRD05810
       RETURN  CLOCK                                                         GRD05820
M2135  OCT     77777                                                         GRD05830
       END                                                                   GRD05840
UN07   FILE    ,UT2,,INOUT,BLK=14,BCD,HIGH,,MOUNT,,HOLD,,MULT,,REEL
UN,T08 FILE    ,UT,,MOUNT,,INPUT,BLK=14,BCD,HIGH,,HOLD                       GRD05880
$DATA
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13. ABSTRACT

Power spectral densities, in one (line) and two (area) dimensions, are presented for off-road ground in eleven sites in the United States. Methods of acquiring, recording, and processing the data are described in detail.

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	ROLE	WT	ROLE	WT	ROLE	WT
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