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June 9, 1981

S. E. Reynolds
State Engineer
State of New Mexico
Natural Resources Department
Water Resources Division
Bataan Memorial Building
Santa Fe, New Mexico 87503

Dear Mr. Reynolds:

QUARTERLY REPORT - UNC MINING & MILLING
Northeast Church Rock Tailings Facility
File No. 3346

In response to the April 2, 1981 letter from the NMSEO, and pursuant to Section 72-5-9 NMSA 1978, the following report is submitted to document the tailings disposal operations and condition of the tailings dam at the NE Church Rock site for the three month period of March, April, and May, 1981.

DETAILS OF MILL PRODUCTION AND TAILINGS DISPOSAL

Actual mill production for the last three months period, along with tonnages used for mine backfill and tailings solution from Borrow Pit No. 2 returned to the mill, are summarized below on Table 1:

TABLE 1

ITEM	MARCH	APRIL	MAY	TOTAL	% DIFF. FROM LAST QUARTER
Ore processed dry tons	51,021	42,811	32,147	125,979	-17.2%
Mine backfill tons of sand	2,995	0	0	2,995	-77.2%
Tailings solution returned to mill, gallons	10,970,000	9,471,000	8,269,000	28,710,000	- 6.2%

The tailings from the mill was conveyed as a slurry which averaged about 50 percent (50%) solids. Approximately 64 percent (64%) of time, the tailings were passed through the cyclone located on the south side of the central cell. The underflow from the cyclone was discharged in the vicinity of the crescent dike. The cyclone overflow was discharged in the southeast corner of the western part of the central cell. The remaining 36 percent (36%) of the time the tailings were spiggoted as whole tailings along the side of the main dam and south cross dike. Attached map shows the total hours tailings were discharged at various locations.

The tailings material being used for the mine backfill operation was obtained from the coarse cyclone underflow, being loaded into trucks from a staging area near the cyclone. Only 2,995 tons of sand were trucked during this quarter since the mine was using the stockpile made from the previously hauled sand.

As shown in the summary, the tailings solution returned to the mill decreased by 6.2% because the ore to process was considerably reduced as Kerr-McGee ore is not being toll milled since May, 1981. The proportion of tailings solution returned to the mill to the tonnage milled was increased by 13% as compared to the last quarter. This was necessary to maintain the liquid level in the Borrow Pit No. 2 in compliance with state approval. Recently, around 90 - 120,000 gallons per day of seepage water are being collected by ten seepage extraction pumps in Section 36 and being returned to Borrow Pit No. 2.

Tailings fluid which naturally separates from the tailings during deposition were contained within the Borrow Pits No. 1 and 2. Due to continued accumulation of tailings within Borrow Pit No. 1, the ability of this portion of the central area to store tailings liquid has continued to diminish to the point that hardly a couple of acre feed of free fluid is now ponded. The No. 2 Borrow Pit is also getting filled up very slowly with slime. There has been no change in the method of tailings disposal, direction of flow of tailings solution in the cell, location of the transfer pump or main pumps returning tailings liquid back to the mill. The mill was on for three to four days per week during March and the first half of April, 1981; now it is running on a weekly schedule of two and one-third days (2 1/3) on and the rest off.

RELATED ENGINEERING WORK

Since we are running out of room in the central cell for tailings deposition, two projects are under consideration to increase the tailings capacity. One is the proposal to stockpile dry coarse tailings sand in the north cell and it is already being reviewed by the SEO. The other project is being finalized for submittal to the state agencies and is related to raising the central cell dikes by about nine feet to create extra space for tailings.

Besides these, a study is very near its completion to determine the probable maximum flood potential of the southeast diversion and Section 1 watersheds and their impact on the existing drainage ditches. Another proposal already submitted to the NMEID relates to windblown sandy dust suppression by sprinkling the dry sand beaches of the south pond, the main dust source, with tailings water, at first at an experimental site. A seepage extraction system consisting of ten extraction wells was installed in Section 36, north of the present tailings area. This was required by the NMEID and is a part of the commitment by UNC to intercept the contaminated ground water seepage resulting from the tailings area. The water is being pumped back to the Borrow Pit No. 2.

The mill is operating on an extension without an approved discharge plan while the discharge plan submitted on November 30, 1980 is being reviewed by NMEID. During the last quarter, two extensions were granted; one on March 11, the other on May 26, 1981.

The stability analysis of the north and south cross dike and the main dam of the central cell was performed by Mr. John Raney, P.E., UNC's retained Geotechnical Consultant, and is presented herewith. Computed minimum factors of safety were found to be higher than the required minimum for both static and pseudostatic loading conditions. The field survey was performed by UNC personnel under my supervision. The locations of the cross sections, on the most critical slope configurations of the dike, are shown on the attached map.

The piezometer readings for the dikes around the central cell are summarized on Table 2. There has been a slight increase in the piezometric surface during the last three months, but that did not have any significant effect on the critical factor of safety.

The plots of the recorded settlement for some monuments along the north and south cross dikes and the main dam are presented in Figures 1 through 11. Though settlement is still in progress, it is my opinion that the primary settlement which was to occur has already taken place and the recent settlements are very slow and small.

TABLE 2

PIEZOMETRIC SURFACE ELEVATION

	March 2	April 1	May 1	May 29
NP-1	6954.92	6955.51	6955.99	6956.27
NP-2	6956.19	6956.56	6956.66	6956.77
SP-1A	6962.29	6962.95	6963.34	6963.84
SP-2A	6963.41	6963.97	6964.46	6964.82
SP-3A	6960.28	6960.67	6960.95	6961.26
SP-4A	Dry	Dry	Dry	Dry
HP-1841	6951.6	6951.6	6951.62	6951.78

A few soil samples were taken recently by borings on the dikes and tailings in the central cell and north cell area by Raney Geotechnical. The results of the soil properties determined have been or will be submitted to the SEO.

Another engineering study in progress relates to the evaluation of the present weekly reporting system of various monitoring data to determine whether a reduction in the amount of data and the frequency of reporting is justified.

GENERAL CONDITION OF THE TAILINGS IMPOUNDMENT AREA

On May 28, 1981, during inspection of the tailings area, minor cracking was observed in the downstream sandy zone in the breach repair section of the south tailings pond. SEO was advised of the cracks and Mr. Robert Booth, of Sergent, Hauskins and Beckwith, inspected the site the following day in order to determine the cause of the cracking. His report will be ready shortly and he has confirmed that the cracks are of minor nature and are not the result of structural deterioration of the breach repair portion of the dike. The cracks do not extend into the upstream clayey zone and do not jeopardize the safety of the dike in any way. Repair work will be done in accordance with Mr. Booth's suggestion. The settlement plate readings, survey monuments and Hall piezometers do not indicate any abnormal readings. No other unusual condition has been noticed during this quarter.

Some minor erosion marks were noticed on the downstream shell of the minor dikes, which were caused by rain. These are under repair and drainage provided so that rain water has been diverted so that it will not run down the slopes. The culvert near the toe dike was cleaned up and modified to prevent ponding of arroyo water against the toe dike. The maximum permissible liquid surface elevation in the borrow pits has been increased to 6,967' above MSL elevation by NMEID by their letter of March 23, 1981. Compliance has been maintained with all NMEID and State Engineer directives sent to UNC through letters at various times regarding tailings disposal methods, dam safety, ponding of water near the crest, freeboard, liquid level in the borrow pits, etc. A fair amount of vegetative cover has appeared lately in the tailings areas seeded last year. General maintenance of the dikes, diversion ditches and clay lining of the borrow pits were periodically done during this quarter.

DISPOSAL PLAN FOR NEXT QUARTER

Assuming that the mill will keep on operating on an extension until the discharge plan is approved by NMEID, there will be only four to five weeks of space for the tailings solid in the western part of the central cell. After that the Borrow Pit No. 1 will have to be utilized for solid tailings deposition, unless the 'north cell dry coarse tailings storage' and subsequently the 'central cell dikes raise' are approved. This will create an overall shortage of liquid storage place plus more slimes deposition in the Borrow Pit No. 2, resulting in rapid depletion of liquid storage space.

As the amount of seepage collection water will keep on coming to the Borrow Pit No. 2, and possibly in greater amount if more extraction wells are required, liquid level increase must be permitted to store that water. It is anticipated that the construction of southeast evaporation ponds may begin in the next quarter, if approval is obtained from the state agencies. Permission for the use of the north cell and to increase the liquid level in the borrow pits may be necessary to ensure continued operation of the mill in the next quarter. UNC is also considering using a low pressure dozer in the next quarter to level up the peaks of the deposited tailings in the western part of the central cell in order to create some amount of additional space.

This report has attempted to document the significant aspects of tailings disposal operations, engineering works and general conditions of the tailings impoundment area at the UNC Northeast Church Rock site during the spring quarter of 1981.

If you require any further documentation of these operations or have any comments, please do not hesistate to contact me.

Very truly yours,

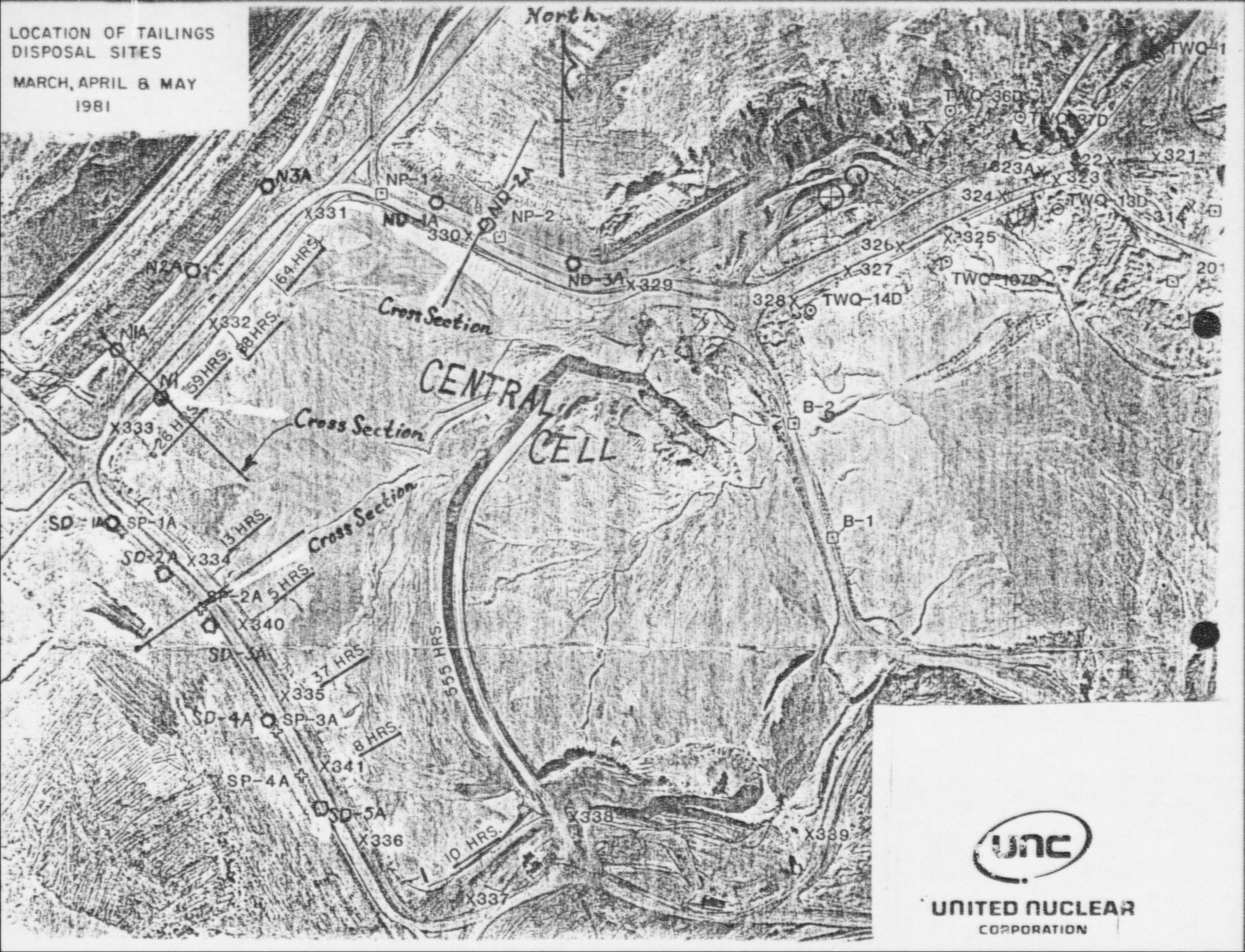
Satya Deb Misra

Satya Deb Misra, P.E.

SDM:jb

cc: Thomas M. Hill

Enclosures: Map of tailings disposal site, plot of recorded settlement, Figure 1 through 11, Stability Analysis Report from Raney Geotechnical


LOCATION OF TAILINGS DISPOSAL SITES
MARCH, APRIL & MAY 1981
North
N3A
NP-1
ND-2A
NP-2
ND-1A
ND-3A
N2A
N1A
N1
SD-1A
SP-1A
SD-2A
SP-2A
SD-3A
SD-4A
SP-3A
SP-4A
SD-5A
X331
X330
X329
X332
X333
X334
X340
X335
X341
X336
X338
X339
X337
64 HRS.
88 HRS.
59 HRS.
26 HRS.
13 HRS.
5 HRS.
37 HRS.
8 HRS.
10 HRS.
555 HRS.
Cross Section
Cross Section
Cross Section
CENTRAL CELL
B-1
B-2
TWO-36D
TWO-13D
TWO-14D
TWO-10ZD
TWO-1
X321
X323
X325
X326
X327
X328
X322
X324
UNC
UNITED NUCLEAR
CORPORATION

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DRP-08

PLATE NUMBER: 2 DRAWN BY: A.S./Gantous DATE: 6/1/91

PROJECT NUMBER: 253-001 CHECKED BY: [illegible] DATE: 6/5/91

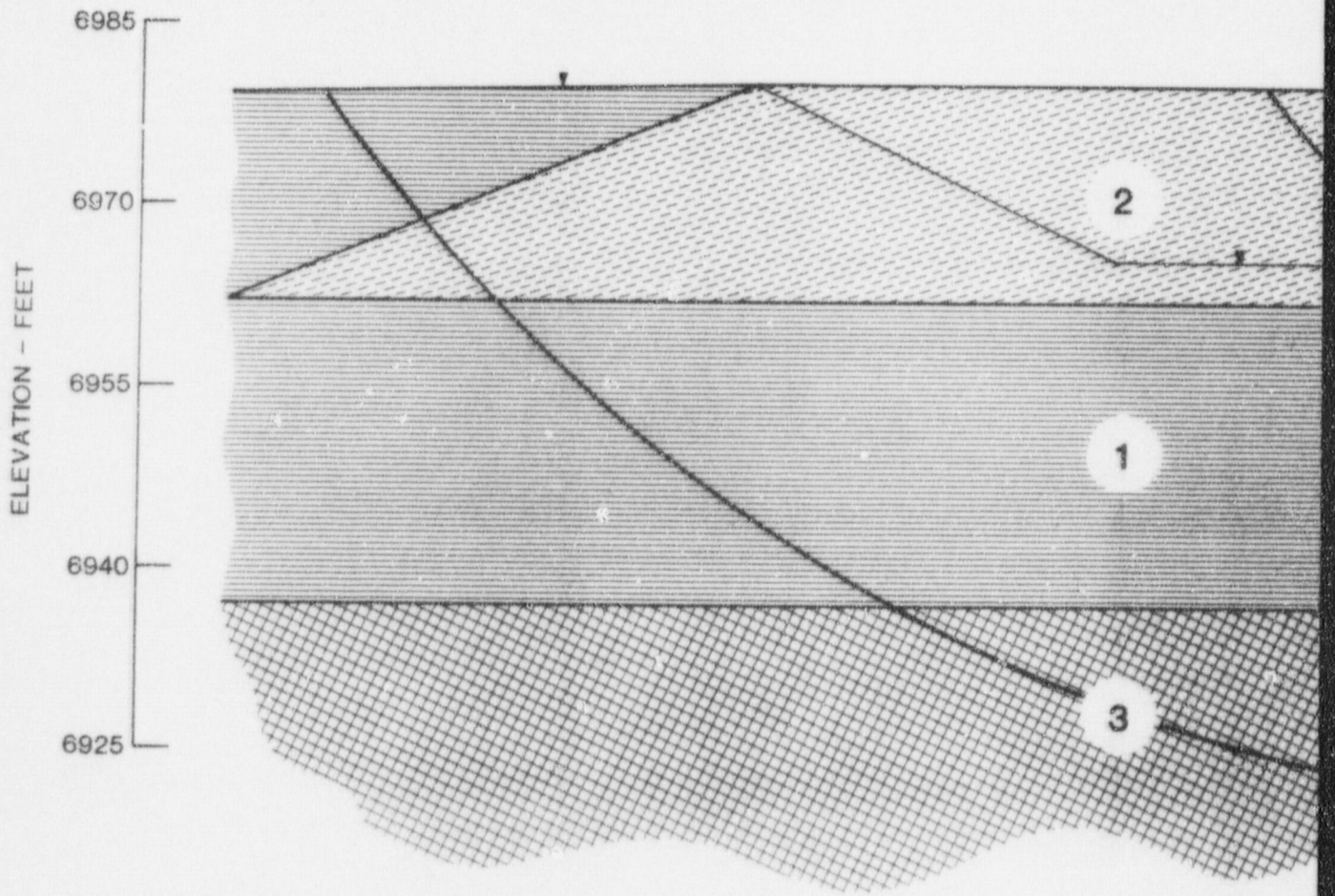
FACTOR OF SAFETY

CONDITION	COMPUTED	REQUIRED
FULL POOL	5.6	1.5
PSEUDOSTATIC (g = 0.1)	2.7	1.0

STRENGTH AND DENSITY DATA

ZONE	γ_t	c'	ϕ
1	120	0	34°
2	130	600	20°
3	125	400	21°

a/ NO STRENGTH PSEUDO-STATIC B
PHREATIC SURFACE WITH LESS
TEN FEET OF SURCHARGE



SECTION AT SP

NOTES:

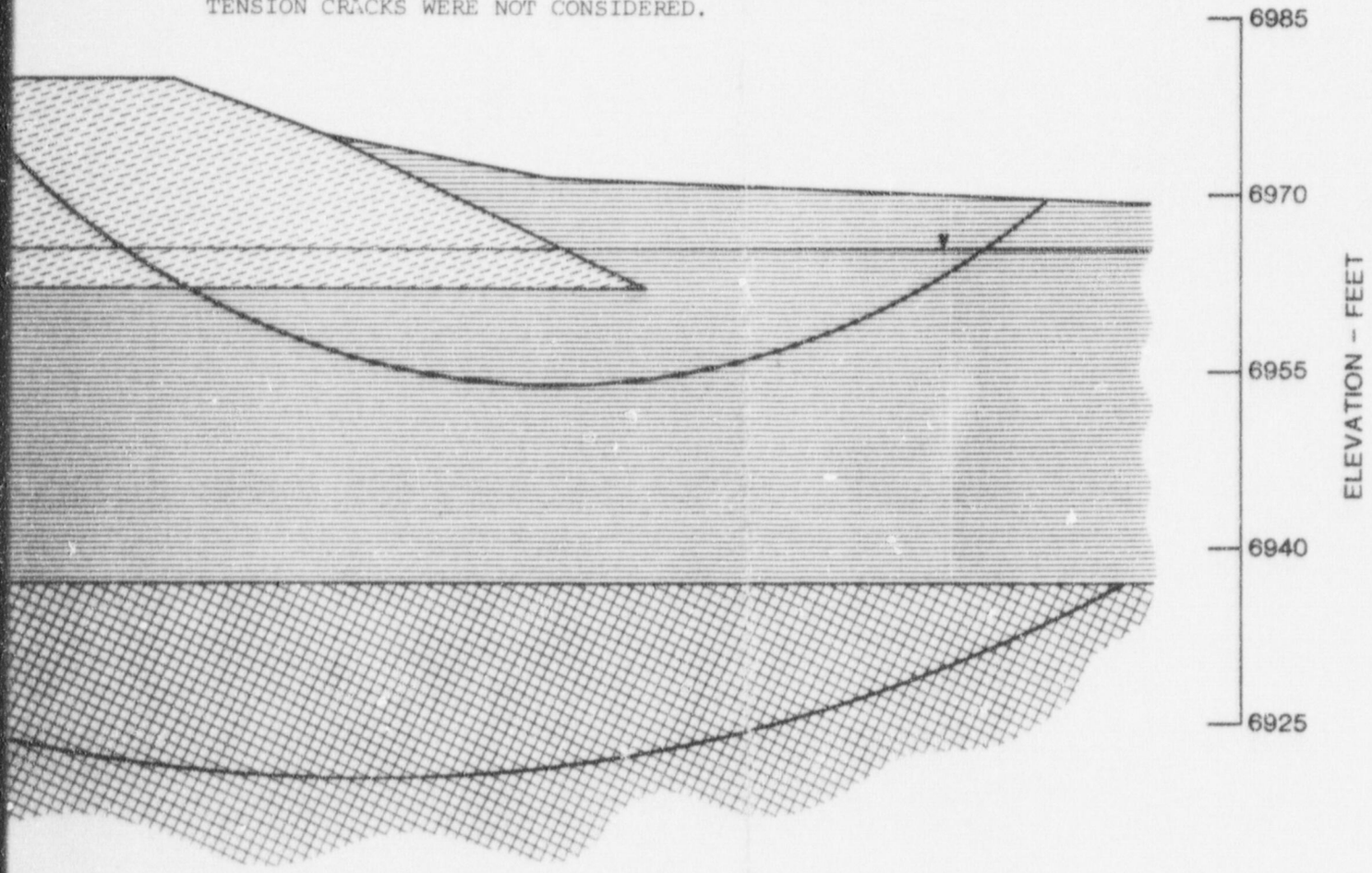
1. ANALYSIS PERFORMED BY THE SIMPLIFIED BISHOP METHOD UTILIZING THE SLOPE-II COMPUTER PROGRAM DEVELOPED BY GEO-SLOPE PROGRAMMING LTD.

2. SLOPE GEOMETRY DEVELOPED FROM THE FOLLOWING SOURCES: RECENT SURVEY DATA PROVIDED BY UNC; KAISER ENGINEERS' DESIGN REPORT, DATED FEBRUARY, 1976; SERGENT, HAUSKINS & BECKWITH'S "STABILITY & INTEGRITY ASSESSMENT" VOLUME 4, DATED SEPTEMBER 4, 1979 (SPECIFICALLY BORINGS 12, 13 AND 53); BORINGS R3 and R4 FROM AN ONGOING STUDY OF THE CENTRAL CELL BY RANEY GEOTECHNICAL.

3. SOIL PROPERTIES DEVELOPED FROM THE FOLLOWING SOURCES: SAI'S "GROUNDWATER DISCHARGE PLAN FOR UNC NORTHEAST CHURCH ROCK MILL", DATED DECEMBER, 1980; AND, RANEY GEOTECHNICAL'S "GEOTECHNICAL CONSULTING NORTH CELL TAILINGS STORAGE", DATED MAY 21, 1981.

4. PHREATIC SURFACE SHOWN BASED UPON A MAY 22, 1981, MEASUREMENT OF OPEN WELL NUMBER SP 2A. PORTIONS OF THE PHREATIC SURFACE BOTH UPSTREAM AND DOWNSTREAM OF THE OPEN WELL VERY CONSERVATIVELY APPROXIMATED.

5. SINCE THE ANALYSIS WAS PERFORMED TO DEFINE EXISTING STABILITY, TENSION CRACKS WERE NOT CONSIDERED.



SLOPE STABILITY ANALYSIS
SOUTH CROSS DIKE

2A

9804200340-02

Raney Geotechnical

PLATE NUMBER: 3 DRAWN BY: R.A. Gaston DATE: 6/1/81

PROJECT NUMBER: 053-001 CHECKED BY: [illegible] DATE: 6/5/81

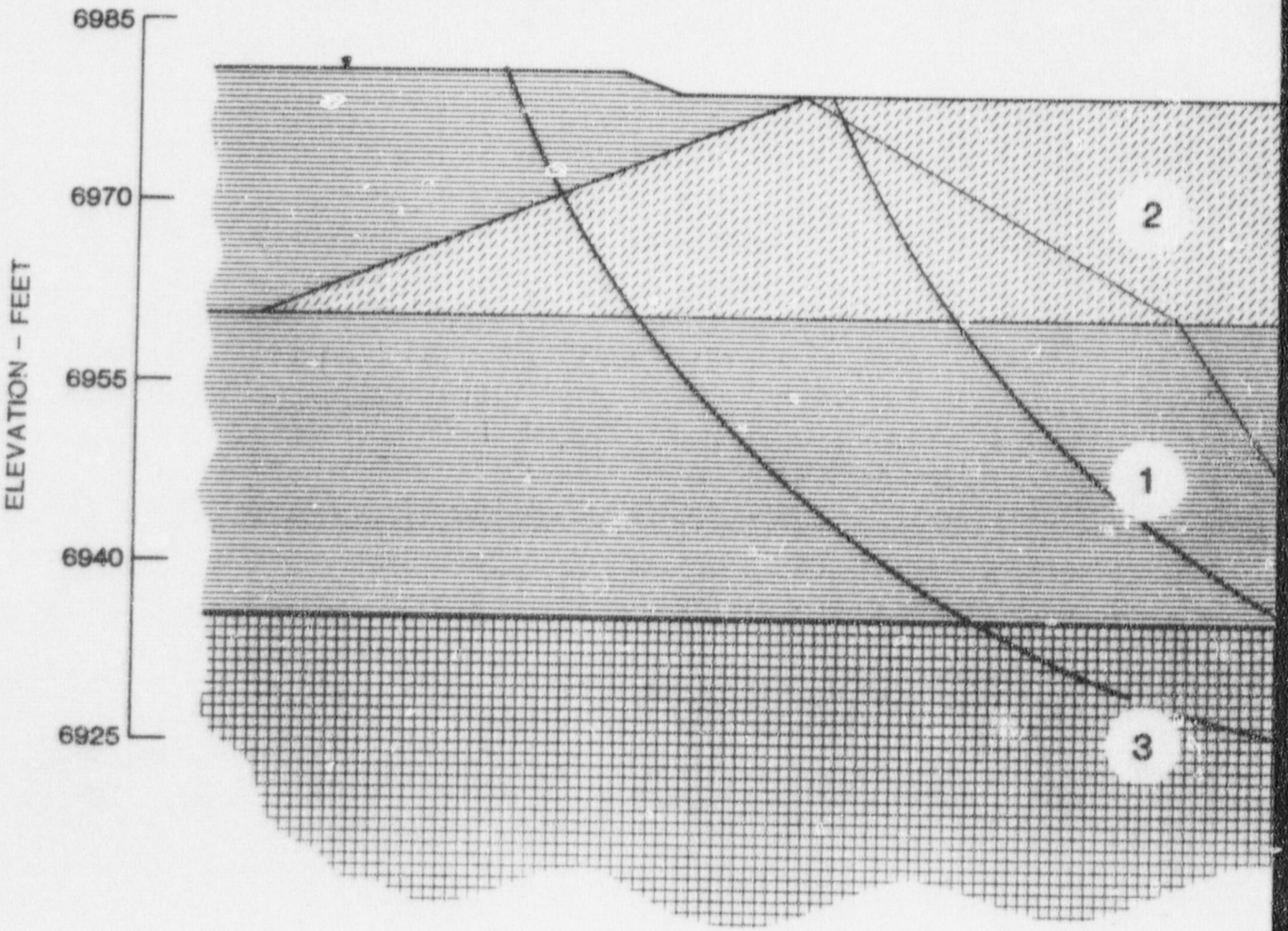
FACTOR OF SAFETY

CONDITION	COMPUTED	REQUIRED
FULL POOL	3.3	1.5
PSEUDOSTATIC (g = 0.1)	2.2	1.0

STRENGTH AND DENSITY

ZONE	γ_t	c'
1	120	0
2	130	600
3	125	400

a/ NO STRENGTH PSEUDO-ST
PHREATIC SURFACE WITH
TEN FEET OF SURCHARGE



SECTION AT N

NOTES:

1. ANALYSIS PERFORMED BY THE SIMPLIFIED BISHOP METHOD UTILIZING THE SLOPE-II COMPUTER PROGRAM DEVELOPED BY GEO-SLOPE PROGRAMMING LTD.

2. SLOPE GEOMETRY DEVELOPED FROM THE FOLLOWING SOURCES: RECENT SURVEY DATA PROVIDED BY UNC; KAISER ENGINEERS' DESIGN REPORT DATED FEBRUARY 1976; SERGENT, HAUSKINS & BECKWITH'S "STABILITY & INTEGRITY ASSESSMENT" VOLUME 4, DATED SEPTEMBER 4, 1979 (SPECIFICALLY BORINGS 15, 16 AND 57); BORING R5 FROM AN ONGOING STUDY OF THE CENTRAL CELL BY RANEY GEOTECHNICAL.

3. SOIL PROPERTIES DEVELOPED FROM THE FOLLOWING SOURCES: SAI'S "GROUNDWATER DISCHARGE PLAN FOR UNC NORTHEAST CHURCH ROCK MILL", DATED DECEMBER, 1980; AND, RANEY GEOTECHNICAL'S "GEOTECHNICAL CONSULTING NORTH CELL TAILINGS STORAGE", DATED MAY 21, 1981.

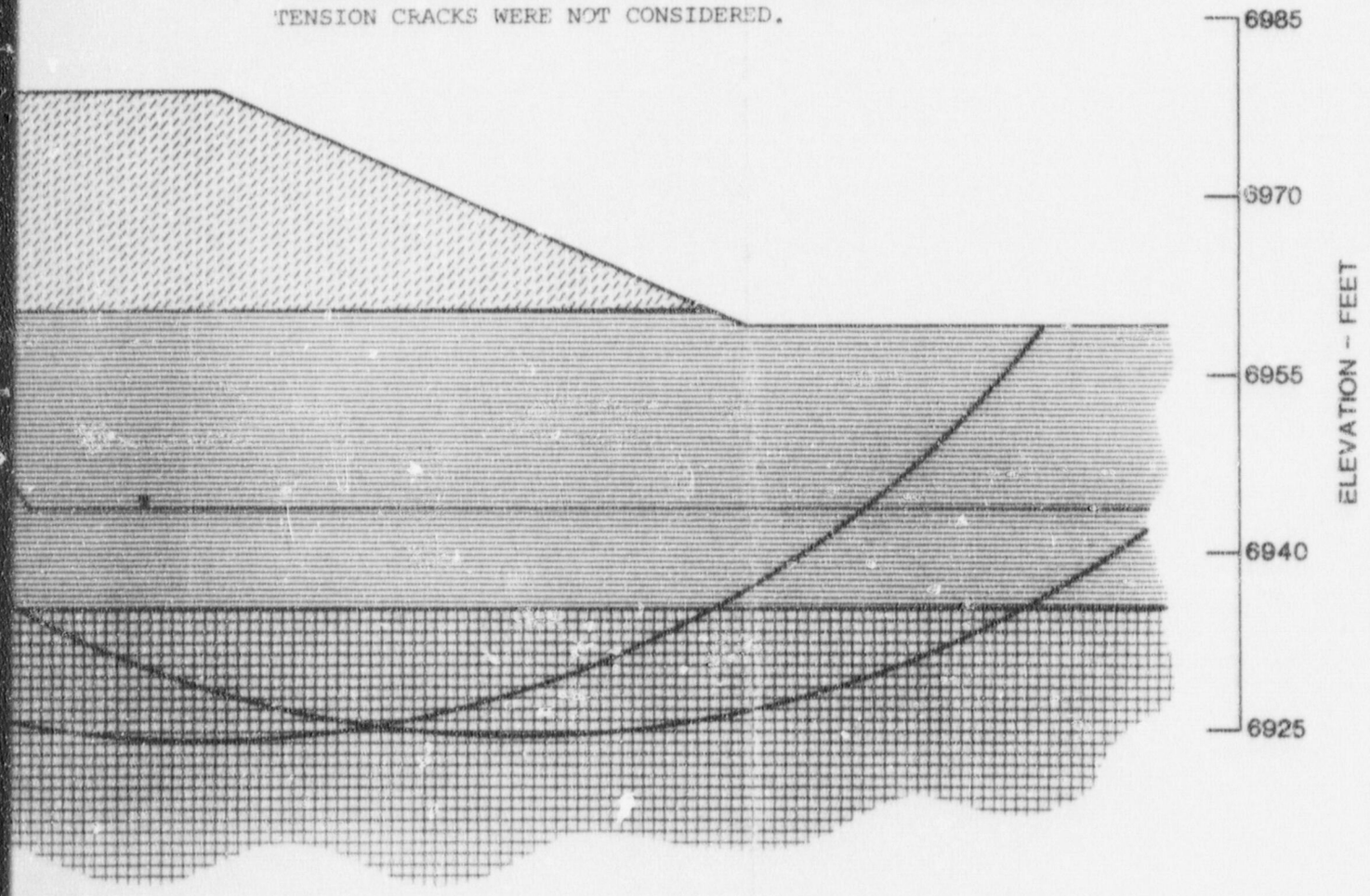
4. PHREATIC SURFACE SHOWN BASED UPON A MAY 22, 1981, MEASUREMENT OF OPEN WELL NUMBER NP 2. PORTIONS OF THE PHREATIC SURFACE BOTH UPSTREAM AND DOWNSTREAM OF THE OPEN WELL VERY CONSERVATIVELY APPROXIMATED.

5. SINCE THE ANALYSIS WAS PERFORMED TO DEFINE EXISTING STABILITY, TENSION CRACKS WERE NOT CONSIDERED.

TA

ϕ'
34° a/
20°
21°

IC BELOW
LESS THAN



SLOPE STABILITY ANALYSIS
NORTH CROSS DIKE

D 2A

9804200340-03

Raney Geotechnical

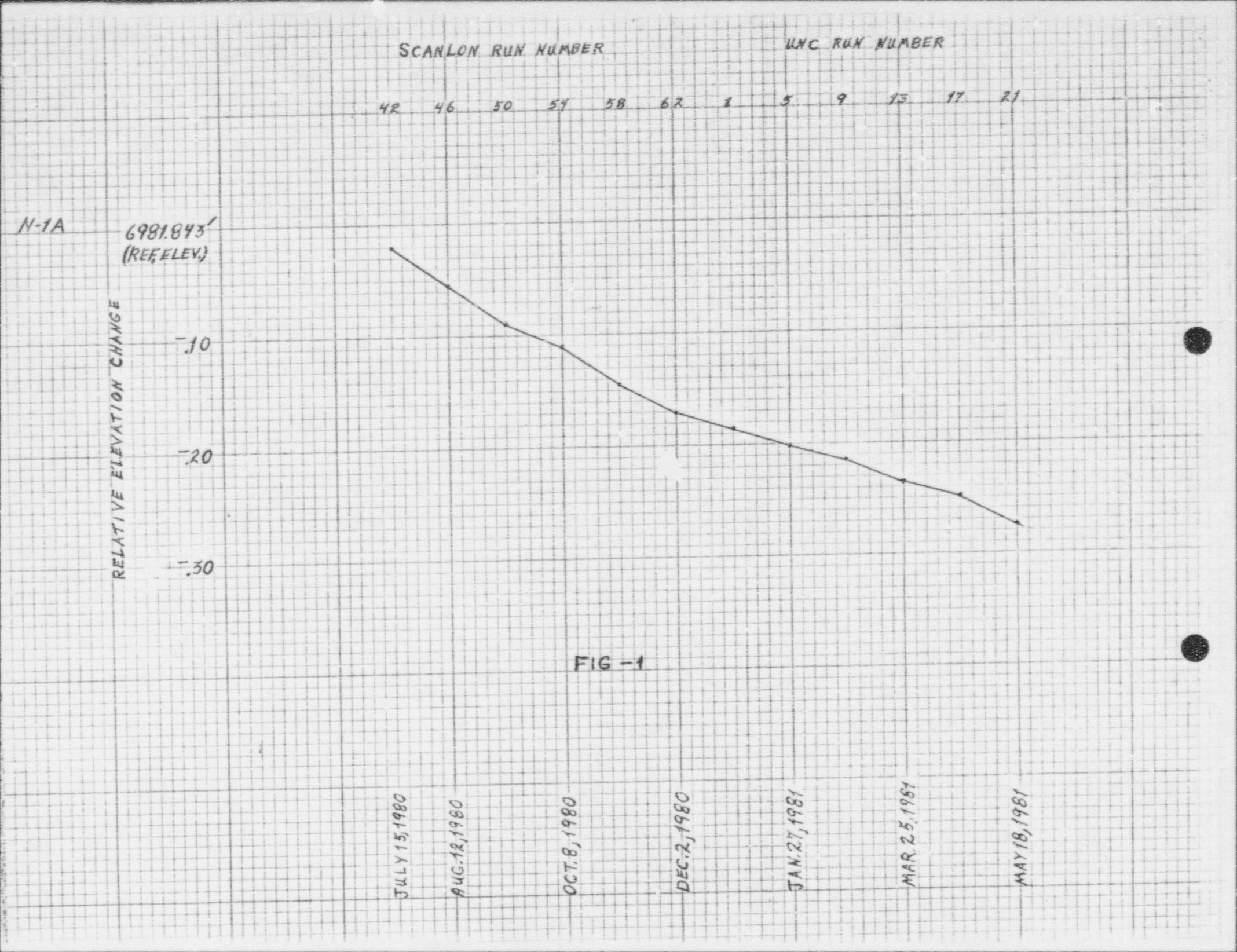

SCANLON RUN NUMBER
UNC RUN NUMBER
42
46
50
54
58
62
1
5
9
13
17
21
N-1A
6981.843'
(REF. ELEV.)
RELATIVE ELEVATION CHANGE
-.10
-.20
-.30
JULY 15, 1980
AUG. 12, 1980
OCT. 8, 1980
DEC. 2, 1980
JAN. 27, 1981
MAR. 25, 1981
MAY 18, 1981

FIG -1

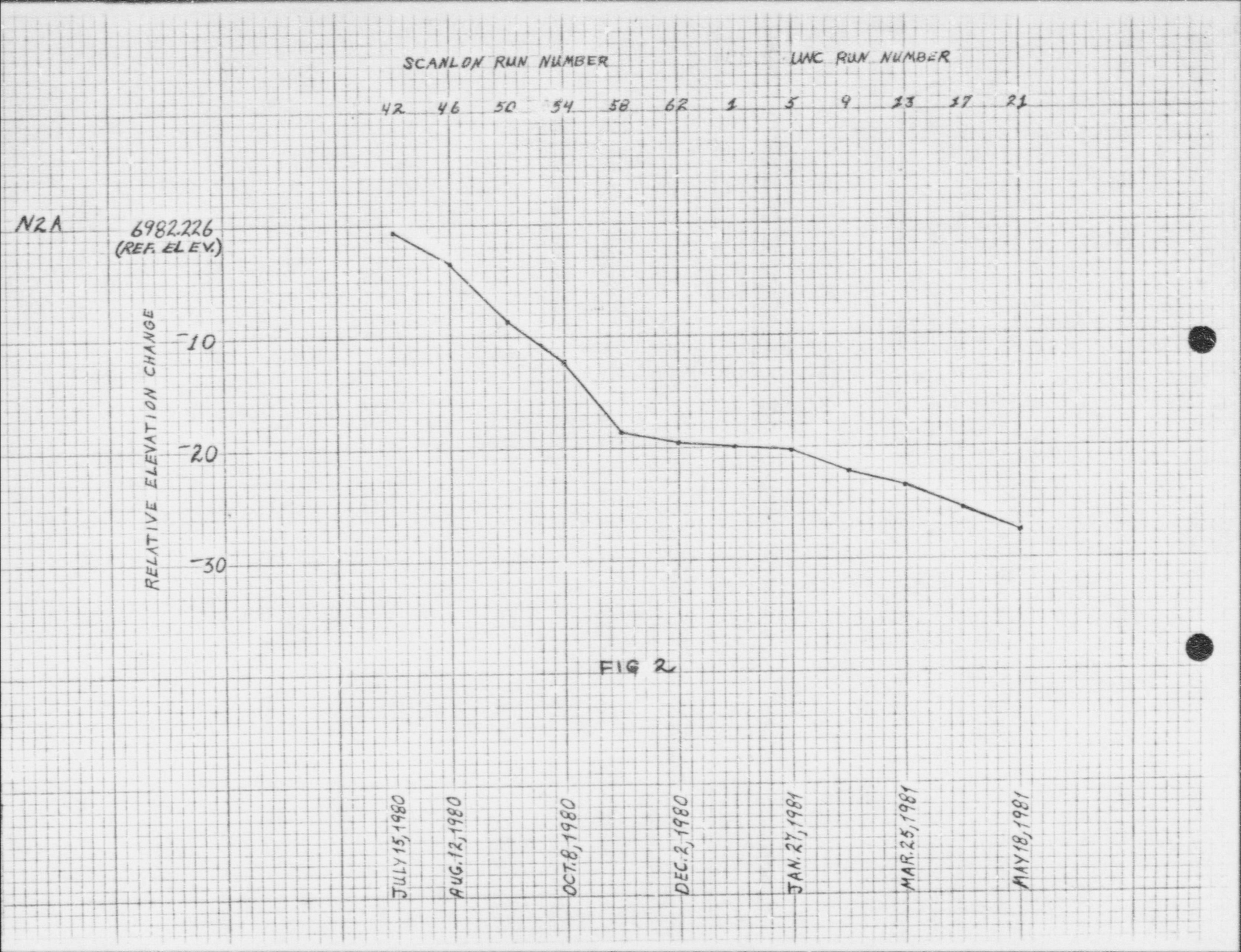

SCANLON RUN NUMBER
UNC RUN NUMBER
42 46 50 54 58 62 1 5 9 13 17 21
N2A
6982.226
(REF. ELEV.)
RELATIVE ELEVATION CHANGE
-10
-20
-30
JULY 15, 1980
AUG. 12, 1980
OCT. 8, 1980
DEC. 2, 1980
JAN. 27, 1981
MAR. 25, 1981
MAY 18, 1981

FIG 2

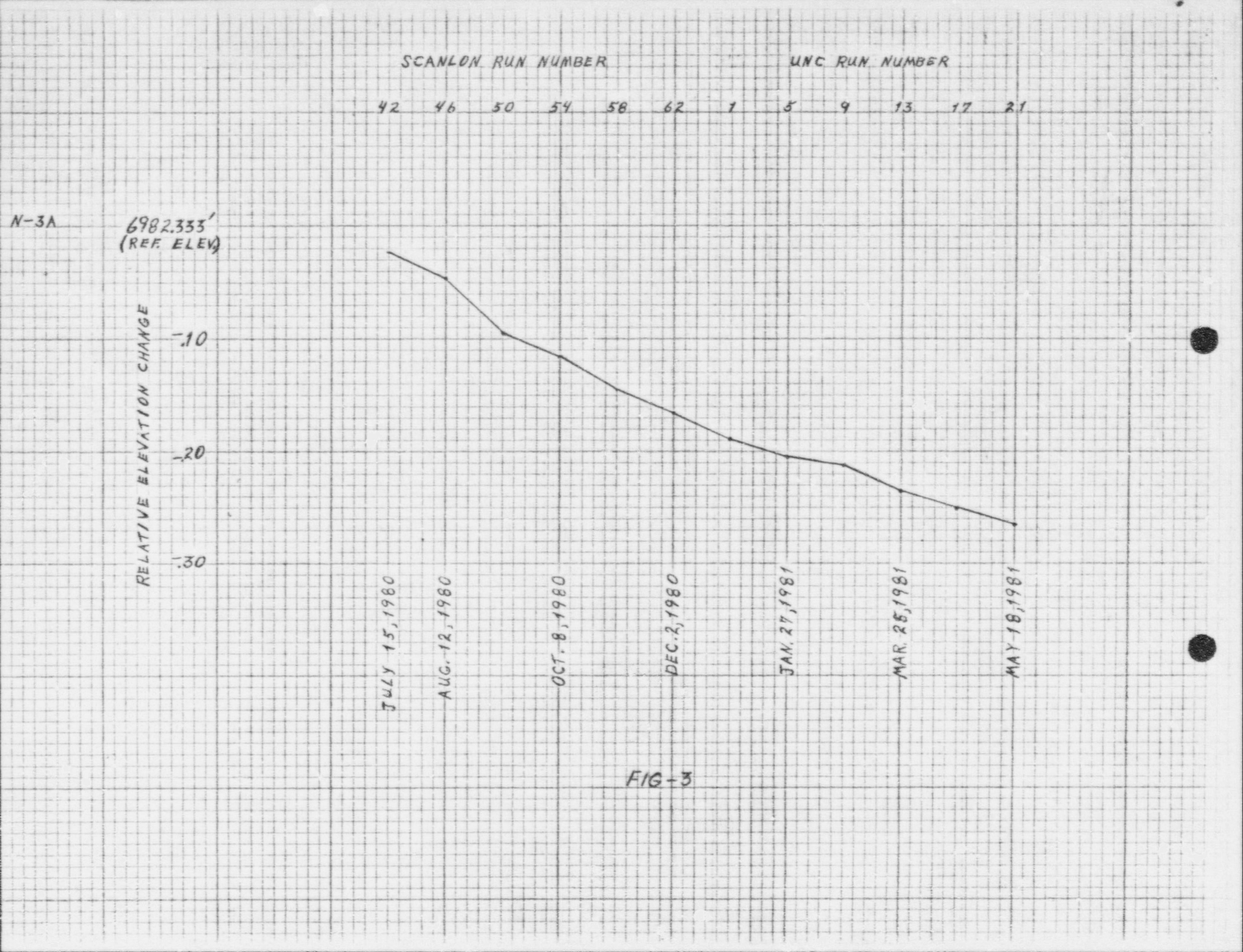

SCANLON RUN NUMBER
UNC RUN NUMBER
42 46 50 54 58 62 1 5 9 13 17 21
N-3A
6982.333'
(REF. ELEV.)
RELATIVE ELEVATION CHANGE
-.10
-.20
-.30
JULY 15, 1980
AUG. 12, 1980
OCT. 8, 1980
DEC. 2, 1980
JAN. 27, 1981
MAR. 25, 1981
MAY 18, 1981

FIG-3

SCANLON RUN NUMBER

UNC RUN NUMBER

42 46 50 54 58 62 1 5 9 13 17 21

ND-1A

6961.987'
(REF. ELEV.)

RELATIVE ELEVATION CHANGE

-.10

-.20

+.10

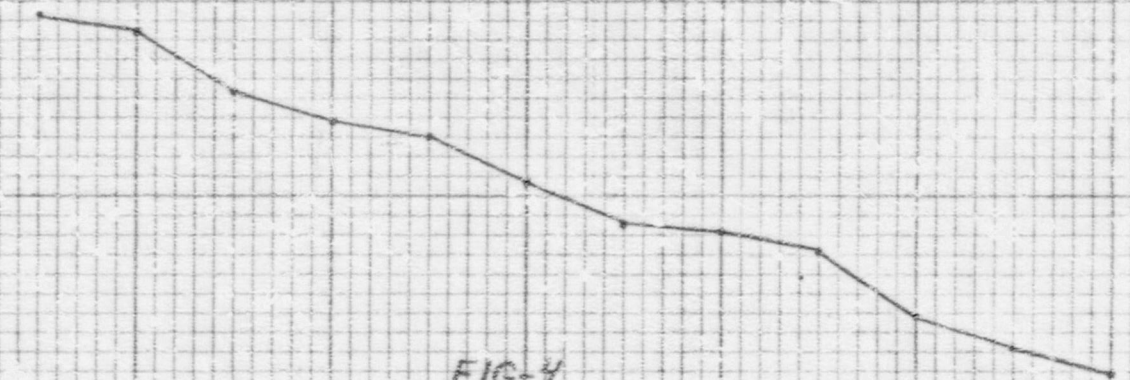


FIG-4

ND-2A

6931.658
(REF. ELEV.)

RELATIVE ELEVATION CHANGE

-.10

-.20

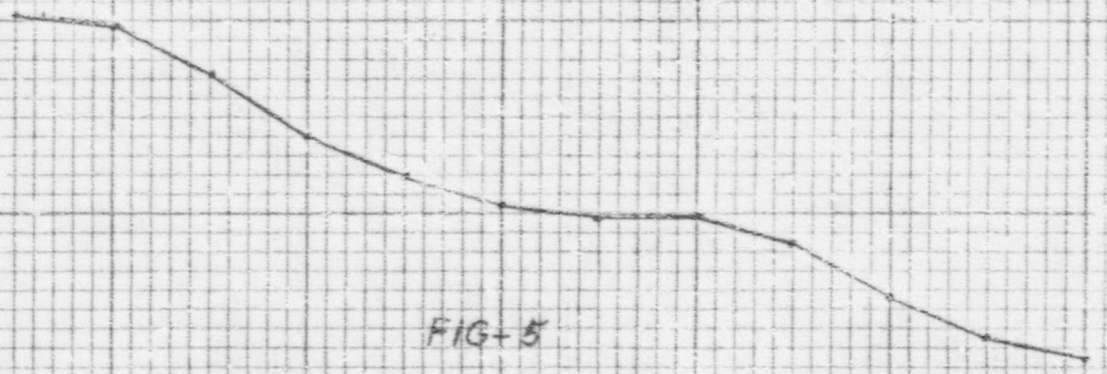


FIG-5

1980 1980 1980 1980 1981 1981

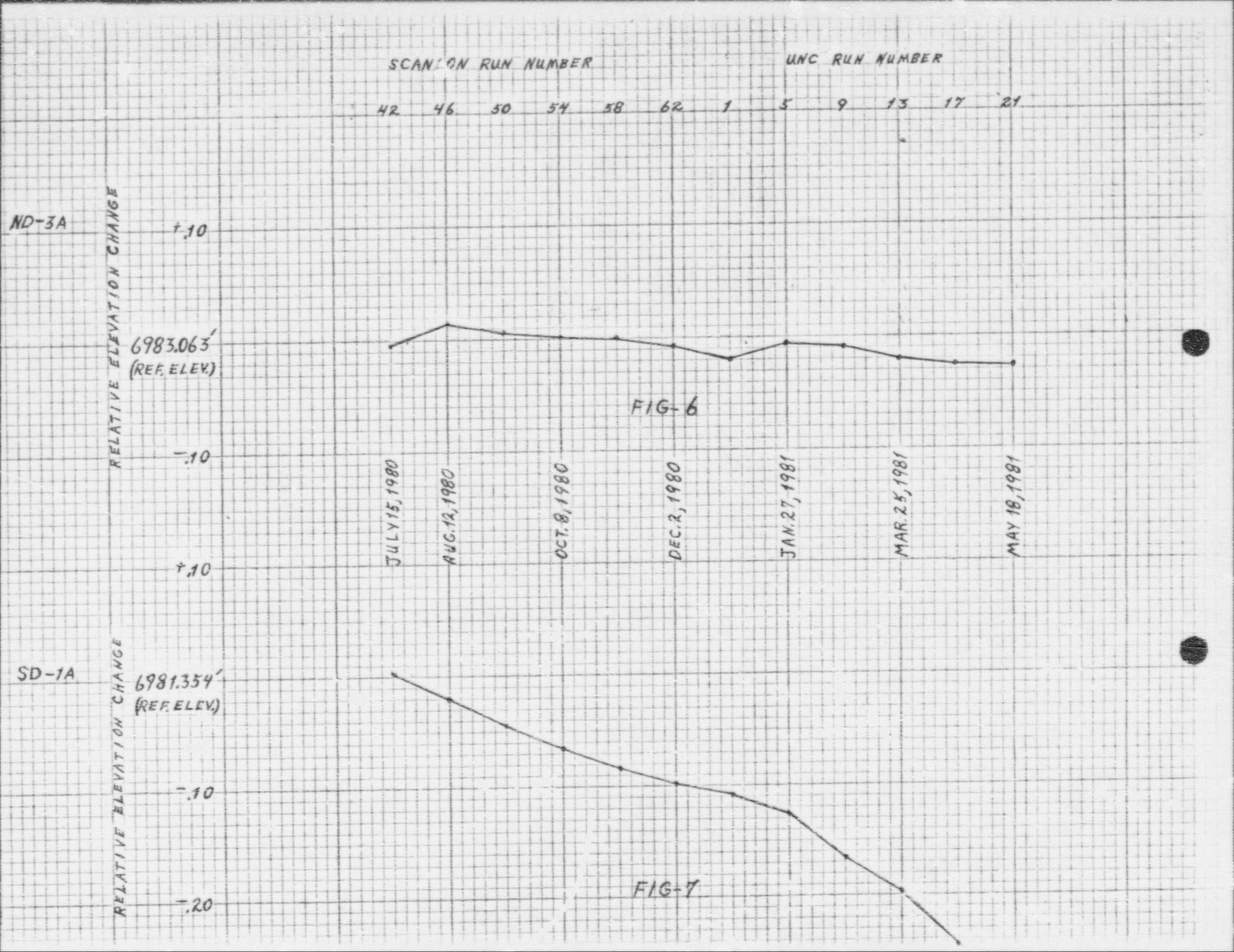

SCANION RUN NUMBER
UNC RUN NUMBER
42 46 50 54 58 62 1 5 9 13 17 21
ND-3A
RELATIVE ELEVATION CHANGE
+.10
6983.063'
(REF. ELEV.)
-.10
JULY 15, 1980
AUG. 12, 1980
OCT. 8, 1980
DEC. 2, 1980
JAN. 27, 1981
MAR. 25, 1981
MAY 18, 1981

FIG-6

SD-1A
RELATIVE ELEVATION CHANGE
6981.354'
(REF. ELEV.)
-.10
-.20

FIG-7

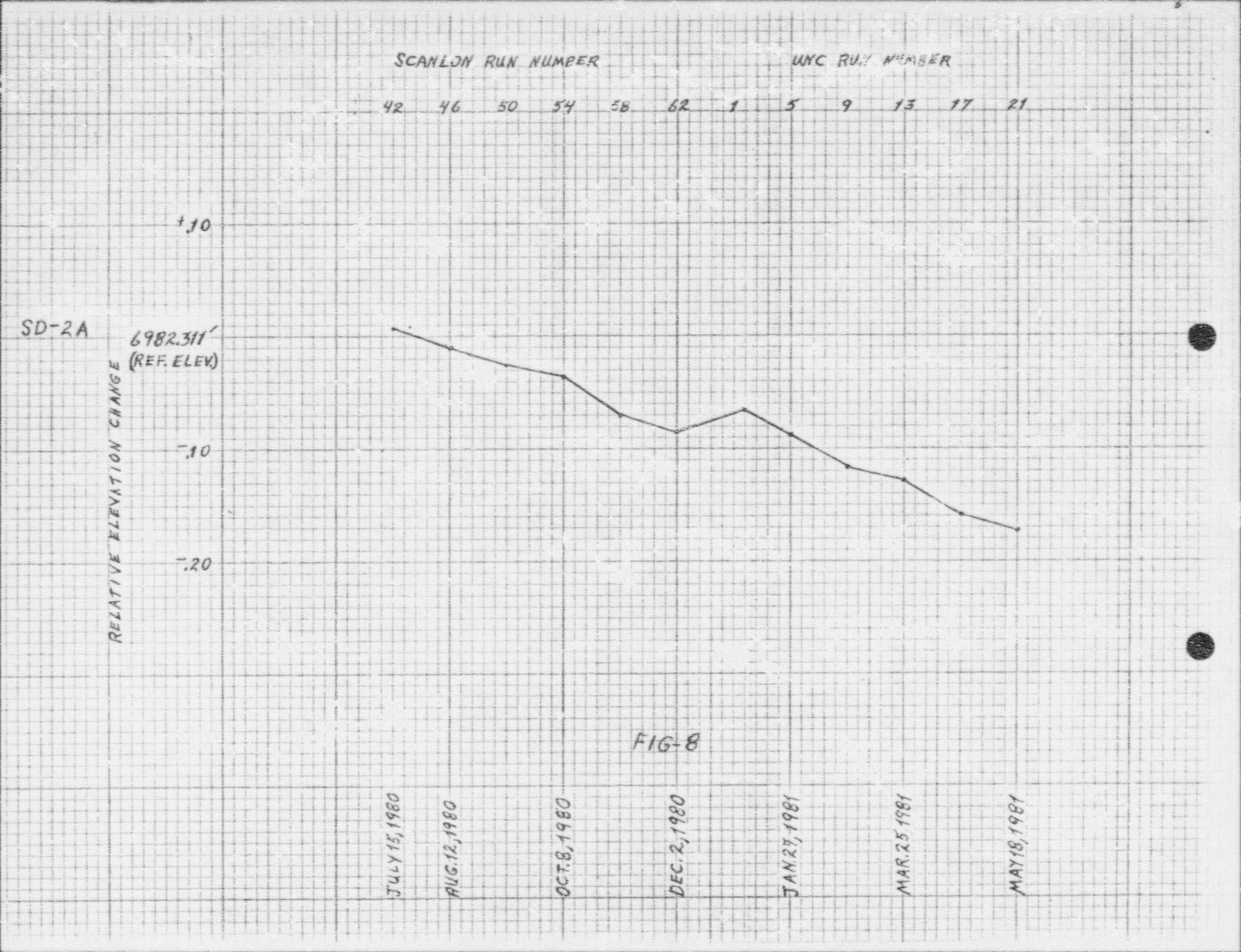

SCANLON RUN NUMBER
UNC RUN NUMBER
42 46 50 54 58 62 1 5 9 13 17 21
+.10
-.10
-.20
SD-2A
6982.311'
(REF. ELEV.)
RELATIVE ELEVATION CHANGE
JULY 15, 1980
AUG. 12, 1980
OCT. 8, 1980
DEC. 2, 1980
JAN. 27, 1981
MAR. 25 1981
MAY 18, 1981

FIG-8

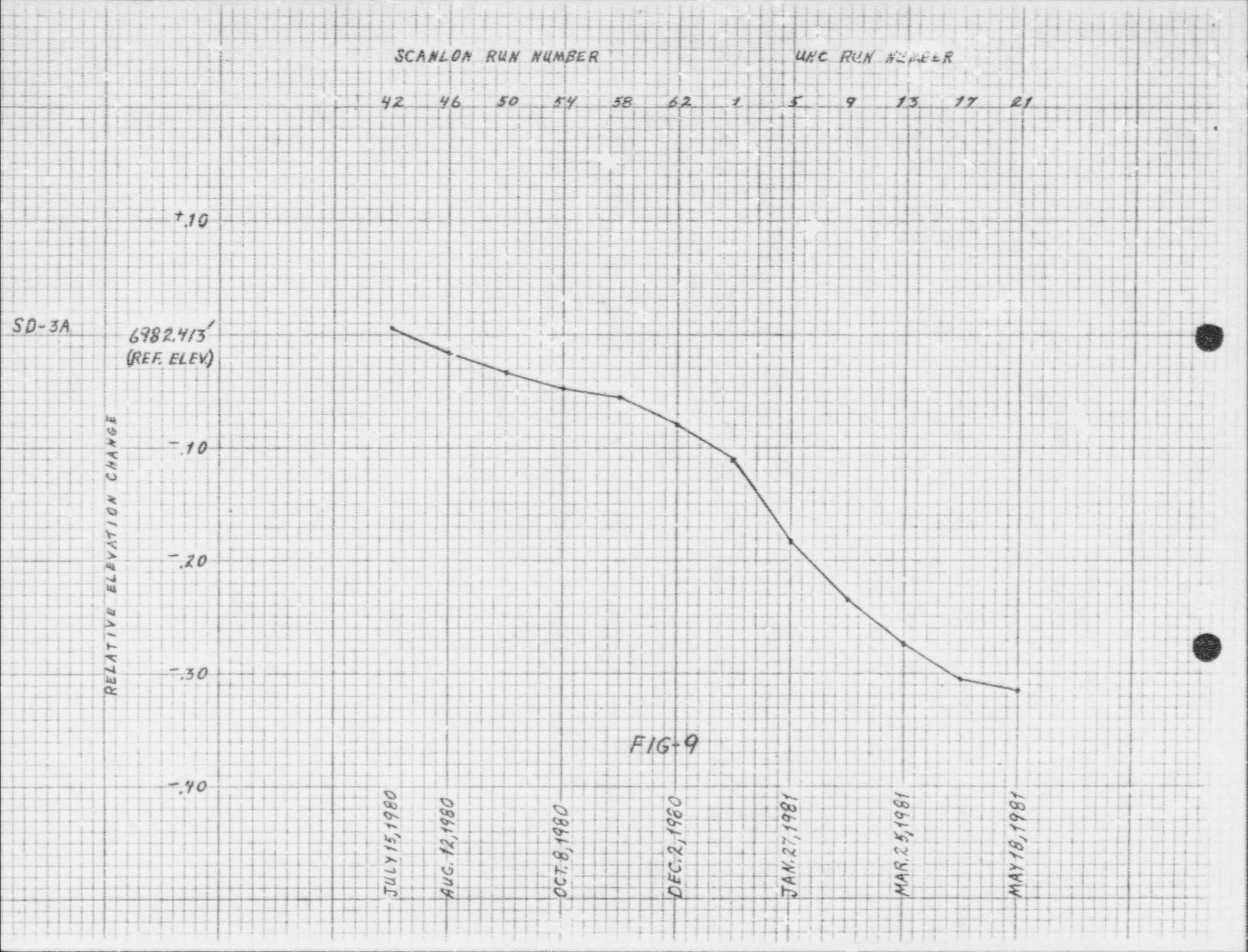

SCANLON RUN NUMBER
UHC RUN NUMBER
42 46 50 54 58 62 1 5 9 13 17 21
+.10
SD-3A
6982.413'
(REF. ELEV.)
-.10
-.20
-.30
-.40
RELATIVE ELEVATION CHANGE
JULY 15, 1980
AUG. 12, 1980
OCT. 8, 1980
DEC. 2, 1960
JAN. 27, 1981
MAR. 25, 1981
MAY 18, 1981

FIG-9

SCANLON RUN NUMBER

UNC RUN NUMBER

42 46 50 54 58 62 1 5 9 13 17 21

SD-4A

RELATIVE ELEVATION CHANGE

+.10

6982.1[illegible]'
(REF. ELEV.)

-.10

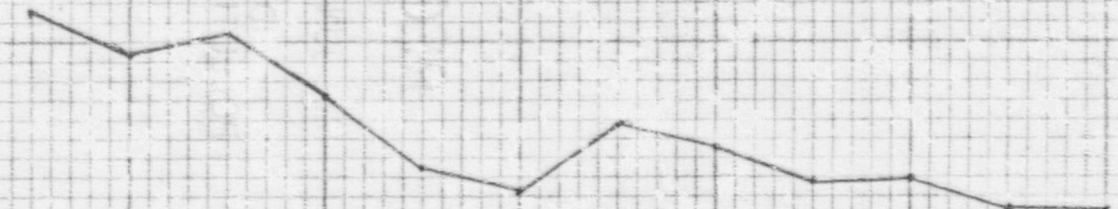


FIG-10

SD-5A

RELATIVE ELEVATION CHANGE

6982.244'
(REF. ELEV.)

-.10

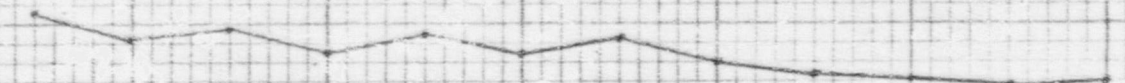


FIG-11

1980 1981 1980 1981 1981 1981