APPENDIX E:

HISTORICAL ENVIRONMENTAL ACTION SYNPOSIS

August 1978	In response to the draft EPA regulation on RCRA, Avtex reviews its waste sources to see if any could be considered "hazardous" under RCRA. Environmental Resources Management (ERM) retained as consultant on this matter.
August 1980	Avtex files EPA form "Notification of Hazardous Waste Activity". Only raw chemicals listed in Section 261.33 are reported.
November 1980	Avtex files Part A of a permit application pursuant to Section 3005 of the RCRA Act. Waste viscose disposed in impoundments was the waste source identified as being a corrosive waste.
February 1981	ERM proposes monitoring wells to comply with the requirements under RCRA. Five wells proposed. State Water Control Board (SWCB) requests additional wells.
June 1981	Six well locations and the monitoring parameters agreed upon. SWCB presents data from wells across the South Fork of the Shenandoah River from Avtex site.
August 1981	Wells 1-6 are installed.
September 1981	SWCB representatives tour basin area. Present data on CS2 found in wells across the river.
November 1981	Since pH of viscose basins appears to be less than the definition of corrosive waste (12.5) the pH is monitored routinely. Avtex prepares a Policy and Procedures Manual concerning the RCRA interim permit requirements.

February 1982	Wells 1-6 sampled; data presented to th SWCB as requested. Ground-water contamination found. Additional monitoring and parameters discussed.
May 1982	Meeting held with SWCB and Department of Health to discuss solid waste disposal at Avtex.
June 1982	Monitoring of contents of visco basins show pH below 12.5. Application filed to have viscose basins delisted. All monitoring under SWCB requirements.
August 1982	SWCB sent more data on wells across the river. CS2 found two times in Well 137 (Smith).
September 1982	While investigating the site for a new permitted landfill, ERM stated that ground-water contamination cannot go under a ground-water divide (Shenandoah River) to the west bank wells.
October 1982	A local firm, Foundation Engineering, Inc., which was hired to finish site evaluation for a new landfill design doubted the reliability of ERM's statement.
January 1983	R. Brad Chewning, Regional Director, SWCB, met personally with E.E. Campbell, then plant manager, and presented findings in an Executive Summary.
February 1983	Meeting with SWCB representatives where executive summary was presented with requirements for our compli .
March 1983	G&M selected as new ground-water consultants, prepared a proposal and schedule to address the Executive Summary requirements. The SWCB reviews the proposal and generally agrees.

	Geraghty & Miller, Inc., begin Phase I.
	Ground-water pollution - Front Royal discussed at SWCB meeting in Richmond. Concern for safe water supply emphasized.
June 1983	Status report given at Board Meeting.
	Avtex corresponds with Burton, Director, SWCB, suggesting that the potable water request be tied into the results of the G&M study. Burton requests that the Board continues to work with Avtex to provide potable water.
	Phase I report completed by G&M. Sampling of selected wells was spread out over west bank.
July 1983	Avtex starts using new landfill with liner and leachate collection system, Permit No. 357.
	SWCB reviews Phase I and requests more sampling of wells, specifically Well 177, which had not been previously sampled.
August 1983	Phase IIA started which included a resampling and split sampling of wells on the west bank. Sampling located a narrow zone of degraded wells. Four have CS2 detected. SWCB differs on which four have CS2 detected and, therefore, concludes that contamination may include northern wells.
September 1983	At SWCB meeting in Richmond, Regional Office presents new water-quality data. SWCB requests that Avtex submi a schedule for providing potable water to the SWCB by October 15.

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October 1983	Avtex submits a schedule with two options. The option of providing town water was eliminated because of cost ($387,000 minimum). Meeting with Fiddler's Green/Rivermont Acres Property Owners Association, the president states preference for town water but also likes option to sell property to Avtex and relocate. Providing new community wells was discussed. The two options submitted includes the buy-out option and the community well. Anticipated schedule for Phase IIB also submitted to SWCB. After a two-year effort to develop a method to treat the waste viscose impounded in the basins and the source of the waste viscose itself, a method that did not cause problems at the Avtex waste treatment facility was found. After initial trials, treatment of waste viscose became continous.
November 1983	All lots in both subdivision appraised for buy-out option. Superfund Branch-EPA Region III reviewing situation. G&M starts Phase IIB by performing packer tests and by drilling a well cluster on the Avtex site and one on the west bank. Monthly progress reports on Phase IIB are submitted to SWCB.
December 1983	Ron Nagi, President of Property Owners Association, requests interim water for property owners using water. Avtex replies that potable water will be provided for property owners using water. Avtex requests that G&M expand the number of wells to be drilled on the site. Four lots have been purchased.

February 1984	G&M's Phase IIB study has been completed and was presented to the SWCB; 30-day trial period of counter pumping is proposed.
	Potable water is provided to those west bank residents who request it.
	A meeting is set with the SWCB to discuss the Phase IIB report. G&M reports that counter pumping system should halt the migration of contaminants off the Avtex site.
March 1984	Avtex has started to drain and treat the liquid contents of viscose basins 9 and 11. No. 10 basin had been drained previously.
	The 30-day counter-pumping trial started; however, in April, it was expanded to continue an additional six weeks at a deeper depth.
May 1984	Fifteen property owners have agreed to sell their property to Avtex.
June 1984	Counter pumping was stopped on wells PW1 and PW2 so that well recoveries could be determined. A second counter pumping test was scheduled in Well GM 8 which is further north. A short pump test was repeated on Wells PW1 and PW2.
	The ground water from these two wells was analyzed.
	Environmental Laboratories sampled the South Fork of the Shenandoah River above the fault from the Avtex property west to the opposite bank.
	Three new pumping wells were proposed by G&M during a meeting where they presented up-dated findings to Avtex.

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July 1984	A precipitate has been forming in the pumping wells that make changes in the pumping system necessary. The air compressor used in the air lift pump must be repaired. Due to the precipitat , submersible pumps cannot be used.
August 1984	Both pumping wells must be cleaned prior to returning to use due to the precipitate problem.
September 1984	The consultants report on river water contamination is completed and sent to the SWCB. G&M prepares answers to questions from the SWCB on the status of certain items.
October 1984	Wells PW1 and PW2 have been refurbished. The drilling of three new wells has been started.
November 1984	Avtex met with the SWCB and G&M to discuss the study and the closure of the viscose basins. Additional ground-water analysis was agreed upon as well as additional river sampling. The three wells have been completed. PW3 and PW1 and PW2 have been returned to the counter-pumping system.
January 1985	The counter-pumping system is operating satisfactorily. By the end of the month, 5.01 million gallons have been removed and treated through the waste treatment facility. The total volume removed and treated, including the amount removed during the development period in the sp ng of 1984, was 10.01 million gallons. The latest ground-water analyses showed improvement in all wells sampled. These results will be discussed in the interim report being prepared by G&M for submission to the SWCB in Mar .

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February 1985	The Phase III report was completed by G&M and was submitted to the SWCB. An additional 1.6 million gallons were removed by the counter-pumping system. The total removed and treated through February was 11.61 million gallons.
March 1985	Virginia Polytechnic Institute has submitted the report on the bottom fauna study which included the area of ground-water/surface-water interaction. During March, an estimated 2 million gallons will be removed by the counter-pumping system and treated. The liquid portion of Viscose Basins 9 and 11 will be analyzed, and portions removed and treated through the Avtex waste treatment facility.
April 1985	Ground-water removed and treated totalled 2.4 million gallons, bringing the total handled by the pumping wells to 15.5 million gallons. Another 1.05 million gallons of viscose basin leachate was pumped and treated.
May 1985	Inspection of the river seeps with State Water Control Board personnel showed no evidence of white "growth". Pumping well activity totalled 2.4 million gallons. Viscose basin leachate treated totalled .84 million gallons.
June 1985	Pumping wells handled 2.3 million gallons. Viscose basin leachate totalling .58 million gallons was treated. Four additional pits were installed in Viscose Basin #11, with four more in Basin #9.

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July 1985	A check of river seeps again showed no evidence of activity. Pumping wells totalled 1.8 million gallons and viscose basin leachate contributed .89 million gallons to the waste water treatment plant. April '85 ground-water analytical results continued to show improvement in water quality.
August 1985	Ground-water pumping yielded only .9 million gallons because of compressor problems, while viscose basin leachate totalled .89 million gallons. The laundry sewer was run into a contained line directed to the waste treatment facility.
September 1985	Compressor problems continued, with .9 million gallons from the pumping wells. Viscose basin leachate totalled .86 million gallons.
October 1985	With the compressor operating normally, ground-water pumping totalled 2.1 million gallons, bringing the total handled to date to 25.8 million gallons. Viscose basin leachate was .89 million gallons, with the pits deepened in both #9 and #11 basins. Some evidence of white "growth" was seen in the river seeps. VPI study of bottom fauna in the vicinity of the Front Royal plant was received: the principal conclusion is that "the AVTEX plant has little effect on the water quality of the Shenandoah River."
November 1985	Despite a major flood, 1.7 million gallons was pumped from wells, along with .86 million gallons from the viscose basins. A trench was dug along the entire perimeter of #11 Basin to improve leachate back-pumping.

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December 1985	Counter pumping dropped to .9 million gallons because of well-plugging. Viscose basin leachate totalled .89 million gallons.
January 1986	Pumping well revitalization was authorized. VPI's report on fish toxicity tests from effluents obtained 12/19/84 was received: no fathead minnow deaths occurred in either the Final Effluent or the Storm Water.
April 1987	All submitted RI/FS workplans are approved by Agency.
May 1987	Avtex initiates RI field work.
January 1988	RI field work completed.

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GERAGHTY & MILLER, INC.

PRELIMINARY REPORT OF FINDINGS

FROM ELECTRICAL RESISTIVITY SURVI

AVTEX FIBERS, INC.

FRONT ROYAL, VIRGINIA

JULY, 1987

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APPENDIX A: DIPOLE-DIPOLE RESISTIVITY FIELD DATA SHEETS

APPENDIX B: RESISTIVITY PSEUDOSECTIONS

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1.0 INTRODUCTION

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PRELIMINARY REPORT OF FINDINGS
FROM ELECTRICAL RESISTIVITY SURVEYS
AVTEX FIBERS, INC.
FRONT ROYAL, VIRGINIA

1.0 INTRODUCTION

As a preliminary phase of the current Remedial Investigation/Feasibility Study being conducted at the Avtex Fibers facility in Front Royal, Virginia, surface geophysical surveys were performed between May 22 and June 4, 1987. Electrical resistivity traverses utilizing the dipole-dipole array were conducted over six transects. The purpose of the surveys was to delineate the major bedrock fracture features that appear to be transporting highly mineralized fluids from beneath the site toward the Rivermont Acres properties which are located west-southwest of the plant, across the Shenandoah River. The results of these surveys are intended to guide subsequent activities of this Remedial Investigation.

2.0 PLANT SETTING

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2.0 PLANT SETTING

The Avtex Fibers facility is situated in Front Royal, Virginia, which is located along the boundary of the Valley and Ridge and the Blue Ridge physiographic provinces. The Blue Ridge Province is situated to the southeast and encompasses the Shenandoah National Park and Skyline Drive. The Valley and Ridge Province exists at the facility and to the west, characterized by parallel to subparallel ridges and structurally controlled surface drainage patterns.

The area in which the geophysical surveys were performed is bisected by the South Fork of the Shenandoah River. The river borders the Avtex facility on the west-southwest and seperates the plant site from the Rivermont Acres properties (see Figure 1).

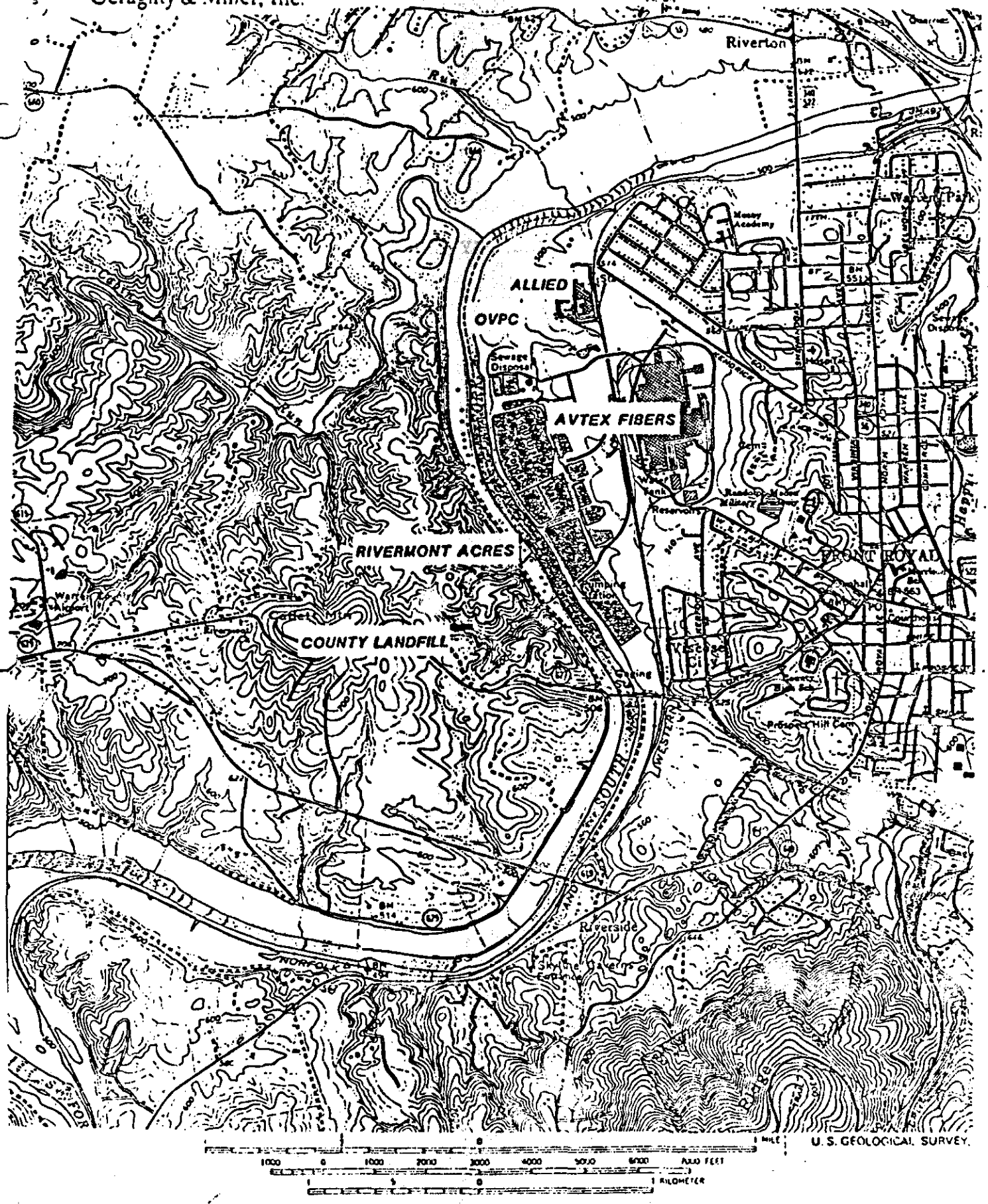

FIGURE 1. Generalized Setting of the Avtex Fibers Facility

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3.0 LOCAL GEOLOGY AND HYDROGEOLOGY

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3.0 LOCAL GEOLOGY AND HYDROGEOLOGY

Much of the area addressed by the geophysical surveys is underlain by river alluvial deposits of sand, silt, clay, and meta-igneous cobbles. These overburden deposits are approximately 20- to 30-feet thick, as determined from the installation of on-site ground-water monitoring wells. The river deposits are underlain by the Martinsburg Formation. Locally, this formation consists of massive and fractured greenish-grey shale with occasional void spaces and stringers of silty sandstone. In general, the dip of the formation beds is nearly vertical, with strike trending approximately northeast-southwest.

The local ground-water flow system is complicated by the presence of major fracture zones within the Martinsburg Formation. Based on aquifer tests performed during January, 1984 and January, 1985, ground water flow within the Martinsburg Formation is controlled by major fracture zones which appear to parallel structural strike of the bedrock. The pumping tests suggested the presence of three fracture zones which are permitting fluids to migrate to the southwest (i.e., from beneath the facility toward Rivermont Acres). Figure 2 summarizes the results of these pumping tests.

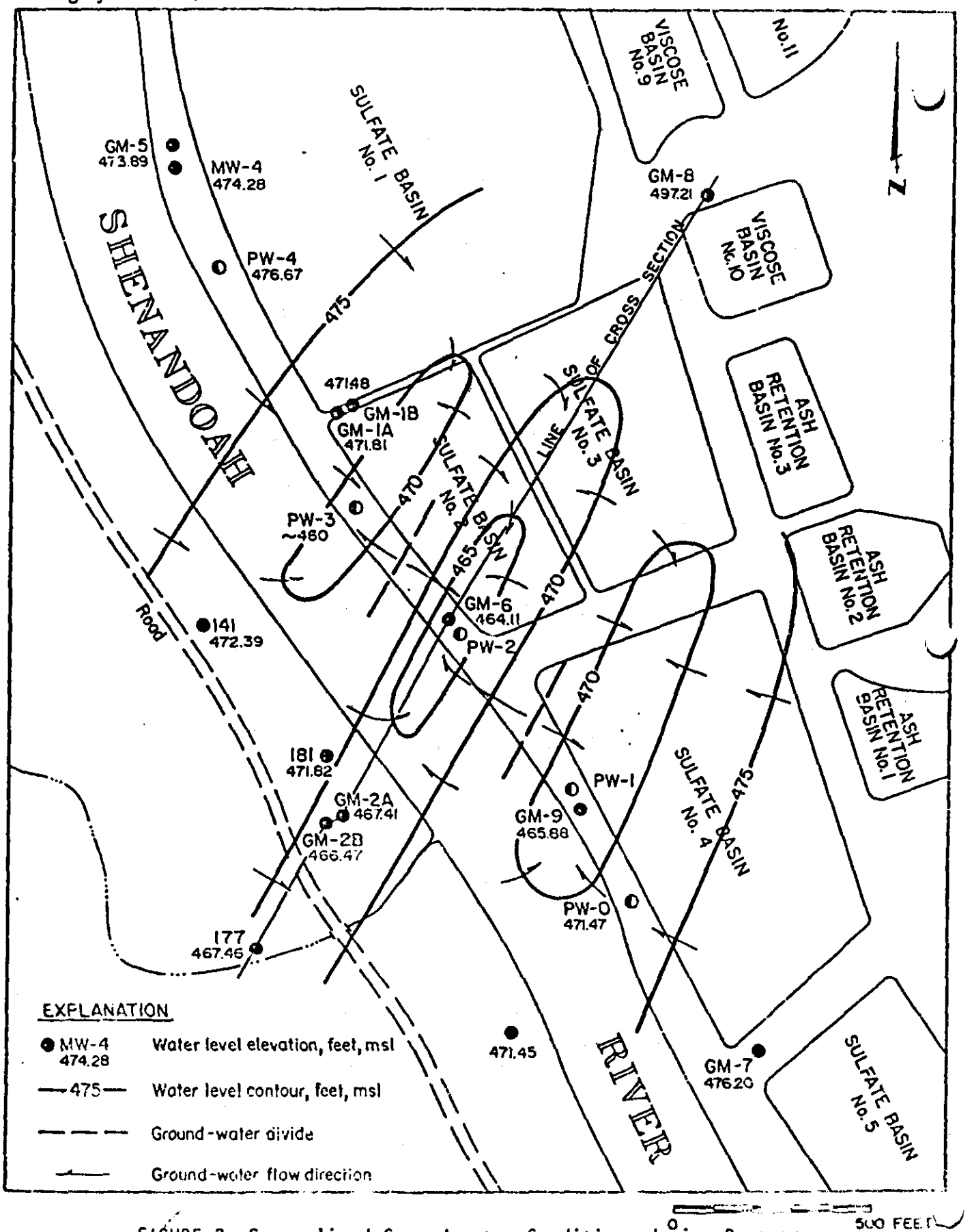

FIGURE 2. Generalized Ground-water Conditions during Recovery

4.0 SURVEY OBJECTIVES

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4.0 SURVEY OBJECTIVES

The objective of these geophysical surveys was to determine the location and attitude (i.e., strike and dip) of major fracture features that are permitting the migration of fluids from beneath the various facility basins. These surveys were intended to confirm the presence and locations of the fracture zones which are transmitting fluids toward Rivermont Acres and to establish whether migration beyond Rivermont Acres to the southwest may be occurring. Also, it was proposed that data from the dipole-dipole profiles may indicate the vertical extent of the fluid migration. The resulting interpretations may also be used to more effi ently locate sites for additional monitoring wells that are to be installed in subsequent p ses of this Remedial Investigation.

5.0 SURVEY METHODOLOGY

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5.0 SURVEY METHODOLOGY

Based on previous environmental assessments performed at Avtex, zones of ground-water degradation can be characterized by high specific conductance or low resistivity. Ground-water sample analyses have characterized degraded ground water as containing elevated levels of sodium, chloride, and sulphate. The electrical resistivity method was selected as the appropriate geophysical survey technique for this investigation based upon its ability to detect contrasts in the resistivity of subsurface materials, such as that which would occur between relatively resistive competent bedrock and a porous fracture zone containing highly mineralized fluid.

More specifically, the co-linear dipole-dipole array was chosen for its two-dimensional resolution of the subsurface. This array combines horizontal profiling and vertical sounding to produce a geoelectric cross-section, or pseudosection, from which geologic structure and plume configuration may be inferred.

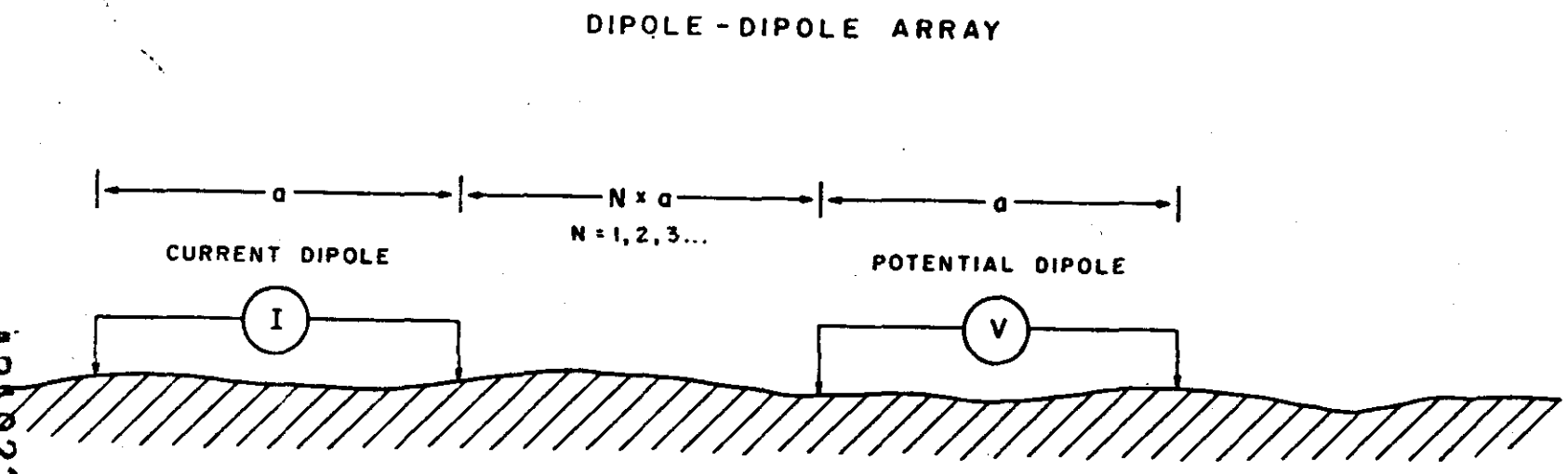
5.1 Resistivity Technique

In general, the electrical resistivity method involves inducing an electric current into the ground through a pair

of electrodes at the surface. A second pair of surface electrodes is used to measure the resulting potential field. The apparent resistivity of the subsurface material is then calculated by knowing the geometry of the electrode array, electrode seperation, measured voltage, and applied current.

At the Avtex facility, resistivity data was collected using the co-liner dipole-dipole array (see Figure 3). This method utilized a pair of current electrodes (current dipole) separated by a given distance (a) and a pair of potential measuring electrodes (potential dipole) also separated by the distance 'a'. The current dipole remains stationary while the potential dipole is moved along the traverse line at increments (N) of the dipole spacing (a). Current and potential measurements are taken at each successive station. The potential dipole is moved until the potential field is no longer able to be measured, or until the desired depth of investigation is obtained. The current dipole is then moved one N-spacing (e.g., from stations 1 and 2 to stations 2 and 3) and the procedure is repeated.

The effective probing depth of the array increases with increased distance between the dipoles. Commonly, the dipole-dipole array is expanded until N is equal to six. At this dipole seperation, the approximate depth of inves-



In the co-linear dipole-dipole array, the current dipole electrodes and the potential dipole electrodes are located along the same traverse line. Several variations of this configuration are sometimes applied.

Figure 3. General arrangement of the dipole-dipole resistivity array.

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tigation is on the order of two times the a-spacing. In the case of this survey, 'a' was chosen to be 50 feet, so as to provide adequate resolution to identify the anticipated targets (i.e. major fluid-filled fracture zones) while not requiring extensive field time. With 'a' equal to 50 feet, the depth of investigation is about 100 feet. In areas of very high conductivity, the probing depth is reduced and may be more on the order of 80 feet for this investigation.

For the dipole-dipole array, the apparent resistivity is calculated by the equation:

$$p_a = \pi N(N+1)(N+2)a\,\Delta V/I$$

where: p_a = apparent resistivity

π = 3.14

N = the number of 'a' increments separating the dipoles

a = the distance between the dipole electrodes

ΔV = the voltage drop between the dipoles

I = the transmitted current

5.2 Equipment

Resistivity data was collected using the ABEM Terrameter SAS 300. This system consists of a transmitter/receiver unit that is capable of outputting up to 160 volts (320 volts peak

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to peak), 20 milliamps, and receiving and averaging 1, 4, 16, or 64 successive readings. This signal averaging capability helps to improve the signal to noise ratio. In performing resistivity soundings, this unit is normally used alone. However, in conducting the dipole-dipole surveys, where the current and potential electrode pairs may be separated by a considerable distance, the ABEM Terrameter SAS 2000 Booster was coupled with the SAS 2300 Governor and used as a separate transmitter. In this mode, the transmitter is capable of outputting up to 400V (800 volts peak to peak) and 500 mA.

The current electrodes were stainless steel and were linked to the transmitter with insulated multi-strand copper wire. The potential measuring electrodes were non-polarizable electrodes consisting of a copper rod immersed in saturated copper sulfate solution contained in a plastic housing. The copper sulfate was permitted to seep through a porous wooden plug in the end of the housing, providing contact with the ground. The potential electrodes were linked to the receiver by insulated multi-strand copper wire. All connections were made with plug-in connectors.

5.3 Field Methods

A Brunton compass and 300-foot nylon tape were used to lay out the resistivity traverse lines. Stations were spaced

50 feet apart (i.e., a=50') and were marked with surveyor's pin flags. Waterproof markers were used to designate each flag with the appropriate station number. Following completion of the surveys, the first station in each line was surveyed so that its location could be accurately plotted on a site base map. Knowing the station spacing and the orientations of the lines, and using the appropriate scale, each survey line was then reconstructed on the base map.

In setting up the current dipole, the ground around each of the electrodes was soaked with a saltwater solution to reduce the contact resistance, allowing higher current ranges to be used. A multi-meter was used to routinely monitor the resistance inherent in the transmitting system. To reduce the effect of inductive coupling caused by current leakage through long lengths of cable, only the amount of cable need to span the dipole electrodes (i.e., 50 feet) was used.

At each potential measuring station, a small area of the uppermost layer of dry soil and vegetation was removed so that the copper sulfate solution seeping from the non-polarizable electrodes could contact with moist soil.

At each survey station, the resistivity measuring procedure involved several steps. With no signal being

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transmitted from the current dipole, the receiver operator took a self-potential (SP) reading. This is a measurement of the ambient voltage in the ground and is normally measured in millivolts (mV). This value was relayed to the transmitter operator via walkie-talkie and recorded as V_0. A signal of known current was immediately induced into the ground by the transmitter and a second voltage reading was taken by the receiver operator. This value was then relayed to the transmitter operator and recorded as V_1, along with the transmitted current (I).

At the outset of each dipole-dipole traverse, the receiver unit was set to average four successive SP readings. If the four consecutive readings were found to be nearly equal, the survey was then conducted by taking single readings. Otherwise, the signal averaging system was utilized until the traverse moved out of the high noise area.

The value of ΔV, used in the equation for determining apparent resistivity (provided in the section describing Resistivity Technique), was calculated by:

$$\Delta V = V_1 - V_0$$

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For any given value of N and a, that portion of the equation excluding $^{\Delta}V/I$ (i.e., $\pi N(N=1)(N=2)$ a)was converted into a geometric factor with units in meters. To calculate the apparent resistivity in ohn-m, the value of $^{\Delta}V/I$ was then simply multiplied by the geometric factor.

Data were recorded on field data sheets as shown in Appendix A. To check data reproducibility, one of the shorter dipole-dipole traverse lines (Line B) was performed twice, a period of one week apart.

6.0 DATA INTERPRETATION

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6.0 DATA INTERPRETATION

Interpretation of dipole-dipole data involves the construction of a resistivity pseudosection by plotting the apparent resistivities obtained from each station at the point where lines drawn at 45 degree angles from the centers of the dipoles intersect (see Figure 4). The data is then contoured so that variations in resistivity may be observed. Due to the nature of this plotting routine, vertical planar features, as might be produced by steeply dipping fluid-filled fracture zones, exhibit a 45 degree dip in the pseudosection.

Six dipole-dipole traverses, ranging in length from 500 to 4200 feet, were performed over the survey area. The locations of these traverses, designate Line A through Line F, are shown in Figure 5. Since the anticipated major fracture systems were presumed to be oriented parallel to bedrock strike, the survey traverse lines were layed out at as high an angle to this trend as was possible, considering the topographic and cultural restrictions (i.e., the presence of power lines, pipelines, buildings, etc.). Such an orientation was desired, as it would provide improved resolution of the expected anomalous features.

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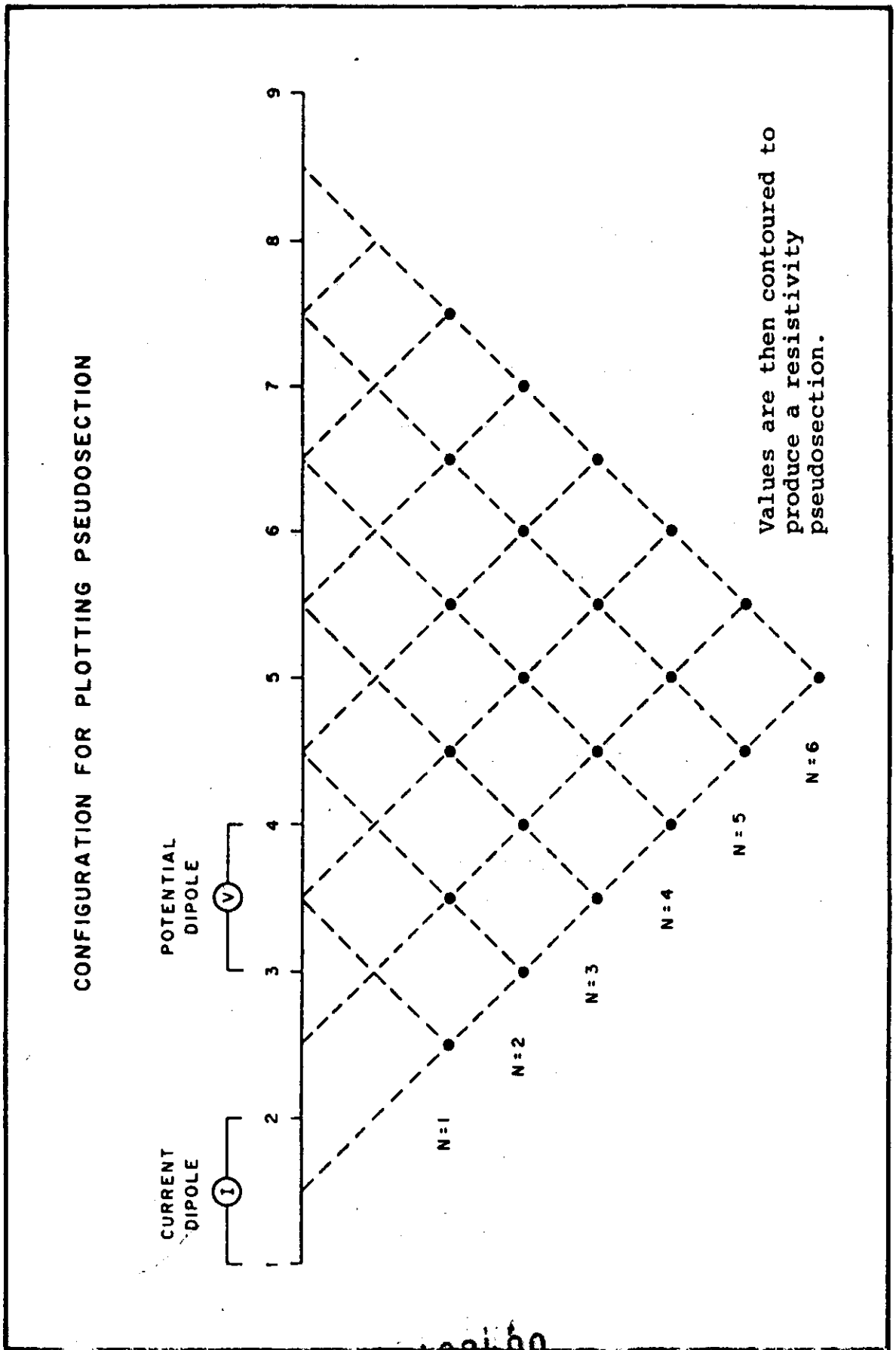

Figure 4. Standard method for plotting dipole-dipole resistivity data.

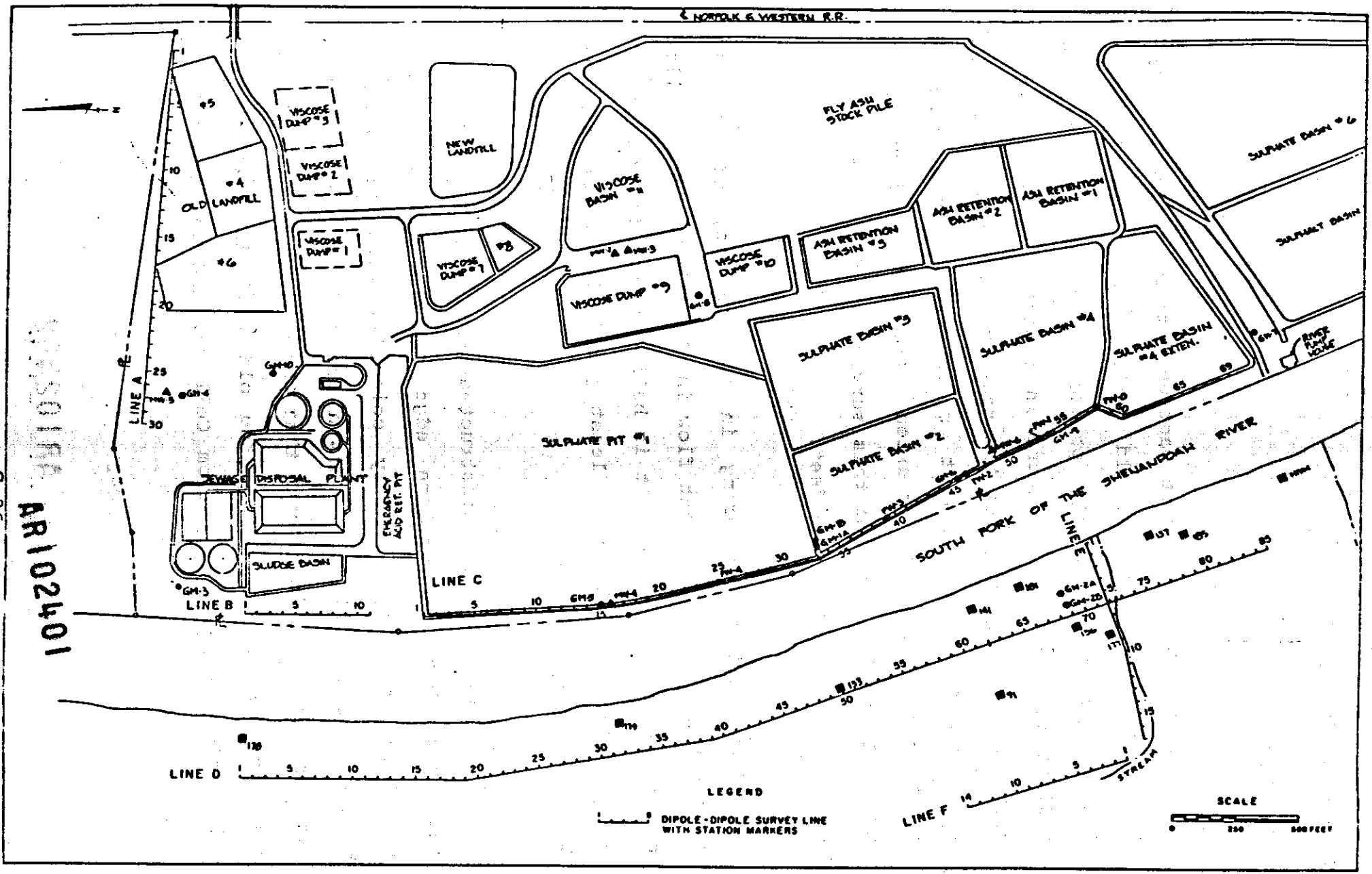

Figure 5. Generalized locations of dipole-dipole resistivity traverse lines.

Geraghty & Miller, Inc.

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6.1 Line A

Line A is a 1450-foot east-west transect located along the northern edge of the old landfill area (see Figure 5). The resulting resistivity pseudosection (see Appendix B) indicates a distinct increase in resistance from east to west, with that portion of the section east of about station 11 exhibiting the lowest resistivity. This zone of relatively low resistivity extends from near land surface to the full probing depth of this survey, which is estimated to be on the order of 80-100 feet.

Ground-water monitoring in the vicinity of the old landfill has indicated that flow in the alluvium and shallow bedrock is to the north. It is believed that fluid built up within the landfill is at least partially contributing to this northerly gradient.

The pseudosection constructed from the Line A data indicates that the western edge of the relatively low resistive zone approximately coincides with the western boundary of the #5 Cell. Given the inferred ground-water flow in this area, it appears that the majority of the fluids migrating to the north from the old landfill area may be originating predominantly from Cell #5, and to some extent from Cell #4.

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Also contributing to the change in resistivity observed along Line A may be a change in the bedrock lithology. It is possible to infer a lithologic contact at two locations along Line A, approximately below stations 14 and/or 19.

6.2 Line B

Beginning near the treatment plant outfall to the Shenandoah River, Line B is a 500-foot long north-south transect (see Figure 5). As a check of data reproducibility, the dipole-dipole survey was conducted twice over this traverse a period of one week apart.

The Line B pseudosections provided in Appendix B indicate good agreement between the two sets of data. In both cases, there is a gradual increase in resistivity from north to south and also with depth. The rise in resistance with depth can be attributed to two factors. With increased depth, bedrock normally becomes less weathered and fractured and, therefore, less permeable. This tends to increase the resistivity. Also, with increased depth, a greater volume of relatively resistive bedrock is being factored into the value obtained by the survey, causing the apparent resistivity value to rise.

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Although general agreement between the two data sets is good, two subtle differences can be recognized. In the replicate pseudosection, a zone of relatively low resistance appears at intermediate depth below stations 5 and 6, and an area of high resistivity is observed at depth below station 5. Though neither of these features are found in the initial Line B pseudosection, they are not considered to represent major deviations in the reproducibility of the data.

6.3 Line C

The dipole-dipole traverse designated as Line C was conducted along the western berm of the sulfate basins (see Figure 5). This survey line parallels the eastern bank of the Shenandoah River along a generally north-south orientation and is 3400 feet long. The resistivity pseudosection constructed from the Line C data is provided in Appendix B.

The resistivity values observed along Line C were generally lower than those recorded over the other traverses. This is probably due to the composition of the berm along which the survey was run. Reportedly, the berm is comprised of fly ash and/or clay. The relatively low resistance characteristic of these materials probably acts to

reduce the apparent resistivity values recorded along this particular traverse.

Several zones of anomalously low resistivity are apparent on the Line C pseudosection. Near the south end of the traverse, a zone of very low resistivity is located at depth below stations 59 through 61. This anomaly extends on to the south (i.e., between stations 61 and 66), where it exists at a somewhat shallower depth. Another region of very low resistivity is observed at intermediate depth between stations 51 and 56. Resistivity values calculated for this area are as low as 2 ohm-meters. Possibly associated with this anomaly is another, smaller zone of low resistance situated approximately below station 50.

Less well defined, is an area of low resistivity that appears to exist near the maximum probing depth of the array beneath stations 44 through 47. The boundaries of this anomaly have been inferred based upon the behavior of the instrumentation in this area. When trying to obtain readings at several of the stations associated with the data points in this portion of the pseudosection, the current being induced into ground by the transmitter dipole was not detectable at the receiver dipole. This is sometimes caused by the presence of very conductive material, such as highly

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mineralized ground water, which dissipates the electrical signal before it can reach the receiver.

Another anomaly is observed as a planar feature dipping at approximately 45 degrees between stations 16 and 18. As discussed earlier, the presence of this type of anomaly in a pseudosection is representative of a near vertical planar feature in the subsurface, such as a vertical fluid-filled fracture zone.

6.4 Line D

Nearly parallel to Lines B and C, dipole-dipole Line D was performed along the roadway through the Rivermont Acres properties (see Figure 5). The traverse was 4200 feet long and was situated next to the base of the southwestern valley wall. In this area, the alluvial deposits are believed to be relatively thin. As a result, the resistivity pseudosection constructed from data collected along Line D (see Appendix B) represents primarily bedrock conditions.

Along Line D, five anomalous zone have been identified; directly beneath station 30, below stations 34 to 36, 63 to 65, 67 to 70, and stations 73 to 75. All of these anomalies exhibit a dip of some 45°, indicating that they are the result of near vertical planar features in the bedrock

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strata. The two southernmost of these anomalies generally coincide with the mouth of a west-trending ravine which is thought to be fracture controlled. Also, these anomalies appear to correlate well with several zones of low resistivity observed near the south end of Line C.

6.5 Line E

Dipole-dipole Line E is a east-west traverse which begins near the Shenandoah River, crosses Line D at approximately station 72, and continues into a ravine to the west (see Figure 5). The resistivity pseudosection for Line E (Appendix B) indicates that a lithologic contact exists, approximately between stations 11 and 12. In the pseudosection, this feature appears to dip at about 45 degrees, indicating a near vertical contact. A second, less well define contact may be present near the eastern end of this traverse at about station 6. These contacts probably repr ent changes in lithology (i.e., shale grading to limestone or sandstone) which are common within the Martinsburg Formation.

6.6 Line F

In an effort to better define the western extent of the inferred fracture system(s) detected beneath the Rivermont

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Acres floodplain (i.e., along Line D), dipole-dipole Line F was performed in a narrow ravine just to the west of Line D (see Figure 5). Line F is a 650-foot north-south transect.

The Line F pseudosection (see Appendix B) shows a distinct increase in resistivity toward the south which is probably the result of a change in lithology at about station 6. An area of relatively low resistivity is also present on the pseudosection below stations 7 through 10. This anomaly exhibits no distinctive shape or orientation; but, due to its extent (i.e., it is not defined by one or two anomalous readings as might be the result of noise or error) and correlation with anomalies observed on Lines C and D (which will be discussed further in the following section), it is considered to represent some type of geologic occurrence.

6.7 Correlation of Low Resistivity Anomalies

The primary objective of this investigation was to delineate major fracture lineaments that may be transporting highly conductive plant-related fluids to the southwest from beneath the various basins on the Avtex facility. Because these fracture systems are believed to be oriented parallel to bedrock strike, which is generally northest-southest, Line B, C, D, and F were situated so as the optimize resolution of these features. Also, Line E was located in a narrow ravine

which is thought to represent a fracture trace. The general locations of these survey lines have been provided in Figure 5.

Figure 6 provides the approximate locations of those anomalies that were observed across each traverse. Good correlation is evident between the anomalies identified on Line C with those on Lines D and F. The resulting trends suggest that the major fracture system is approximately parallel to bedrock strike. For example, the anomaly identified below stations 16 through 18 on Line C correlates well, both in depth and attitude, with the low resistivity zones observed beneath stations 30 and 35 on Line D. Additional evidence of this fracture trace is the presence of a small ravine in the western valley wall which falls in line with the trend established by the correlation of these two anomalies.

This trend is repeated when correlating the anomalies below stations 44 through 47, 51 through 56, and 59 through 66 on Line C with those observed below stations 63 through 65, 58 through 70 and 73 through 75 on Line D. By extrapolating the orientation established by the correlation between these two groups of anomalies, the inferred anomaly identified on Line F is intersected, suggesting that fluids have migrated to the west, beyond Rivermont Acres.

AR102409

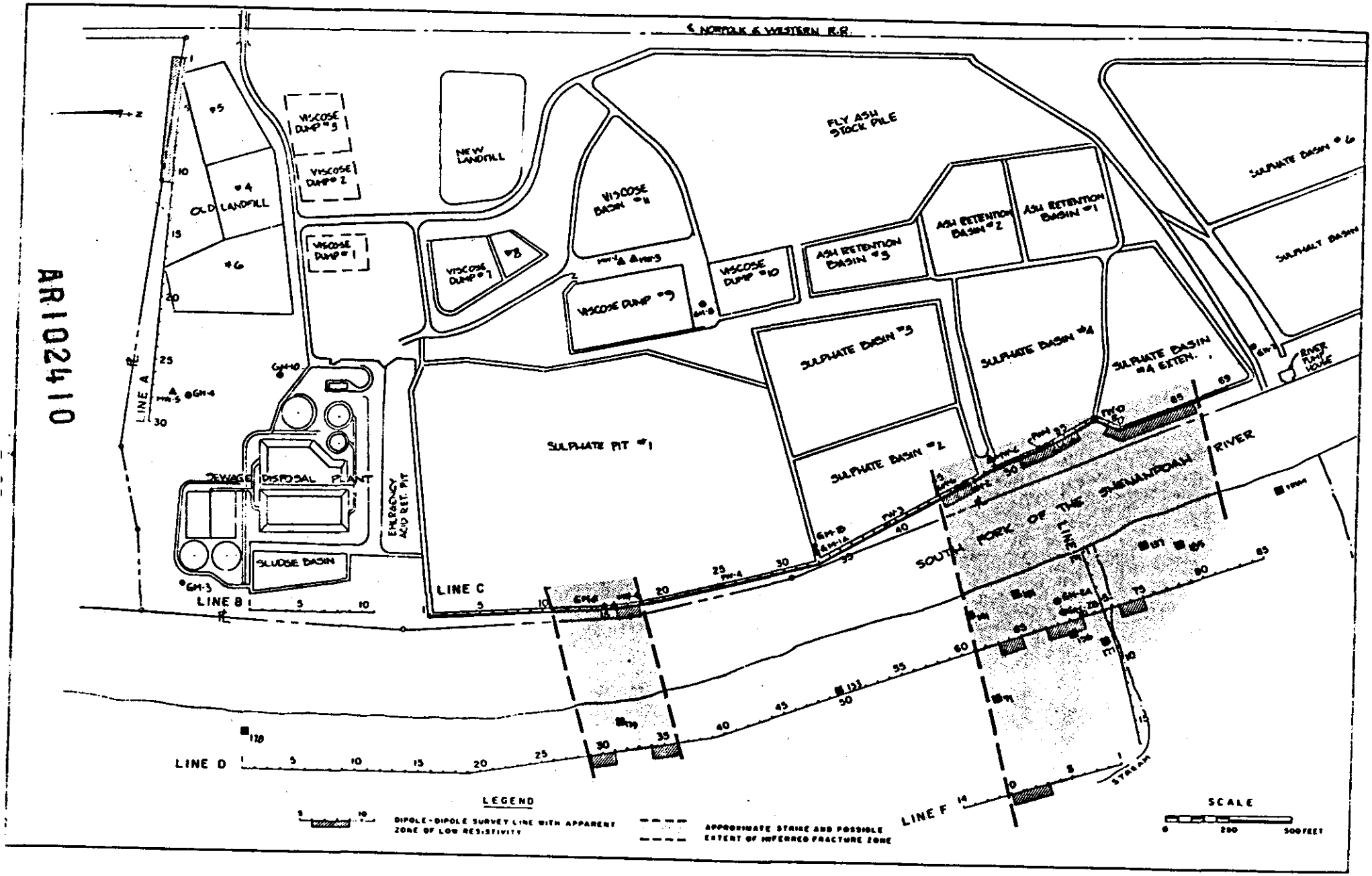

Figure 6. General locations of resistivity anomalies identified from dipole-dipole pseudosections.

AR102410

The dipole-dipole traverse performed along Line E did not identify any obvious low resistivity anomalies that could be correlated with other identified features, but did detect two apparent lithologic contacts. If the ravine in which Line E is located is fracture controlled, it does not appear as though this specific fracture trace is transporting large quantities of plant-related fluids.

Though the major fracture systems appear to be nearly parallel to bedrock strike, correlation between specific anomalies could yield an orientation that varies from this trend. Such an orientation could reflect the presence of a secondary fracture system, as commonly forms at angles of 30 to 45 degrees to the primary stress direction in deformational environments

7.0 SUMMARY

AR102412

7.0 SUMMARY

Generally, the the dipole-dipole resistivity surveys that were performed in the vicinity of the Avtex facility were successful in identifying the major fracture features in the Martinsburg Formation that are responsible for the migration of fluids from beneath the site. Correlation between low resistivity anomalies that were observed along Lines C and D suggest the presence of a major northeast-southwest trending fracture zone that nearly parallels bedrock strike and passes predominantly beneath the #4 Sulphate Basin. A less distinctive anomaly located near the center of Line F suggests that fluid originating beneath the basins ha migrated beyond Rivermont Acres to the west along this trend. Due to topographic and cultural restrictions, optimal coverage could not be obtained in this area.

Further to the north, similar anomalies on Lines C and D indicate the presence of a second fracture zone. This lineament appears to be less extensive, but is sharply defined. It passes directly beneath the #1 Sulphate Basin and also exhibits a general northeast-southwest orientation that is parallel to the major fracture system to the south.

The results of a dipole-dipole traverse conducted along the north edge of the old landfill area (Line A) suggest that the degraded ground water in the vicinity of the traverse line may be originating predominantly from the #5 Cell, and to some extent from the #4 Cell. Also observed along Line A is an apparent lithologic contact. The precise location of the contact is uncertain, but is believed to be between about stations 14 and 19.

Dipole-dipole Line E was performed in a narrow ravine that was believed to be fracture controlled. Though no distinct anomalies were observed that could clearly be attributed to major fluid-filled fracture zones, two changes in lithology appear to occur over the length of this transect.

Where anomalous areas were identified by these surveys, the resistivity contrast was not as great as was anticipated, given the extremely high specific conductance of the fluids retained in the various basins at the facility. Resistivity values within the anomalous areas were generally two to five times lower than surrounding values. This relatively subtle contrast is attributed to several factors. As degraded fluids move in the subsurface they become mixed with unaffected ground-water, resulting in a lowering of the overall conductivity with distance from the source area.

AR102414

overall conductivity with distance from the source area. Also, since the porosity of a bedrock fracture would generally be small compared to the total volume of material contributing to any given resistivity value, the resulting apparent resistivity value may tend to be greater than expected.

In addition, the dip of the bedrock strata in the survey area is nearly vertical. Because the dipole-dipole traverse lines were oriented at a very high angle to bedrock strike, the apparent resistivity values obtained may represent the transverse resistance of the bedrock strata, rather than the longitudinal resistance, which is commonly obtained by surface resistivity surveys. Since the transverse resistance is normally greater than the longitudinal resistance, this may contribute to the reduced resistivity contrast between anomalous zones and background areas.

Given the a-spacing that was required to provide adequate anomaly resolution (i.e., 50 feet), the depth of investigation of these surveys was on the order of 80-100 feet. Many of the anomalous features identified in the pseudosections appeared to extend beyond this depth.

AR102415

APPENDIX A

DIPOLE-DIPOLE RESISTIVITY FIELD DATA SHEETS

AR102416

FARGO, BALDWIN, CARRIENTES — LINE A — 5-29-7?

$\Delta V = V_1^+ - V_0$ $\quad \Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a$ $\quad \Delta V/I$ $\quad a = 50'$ $\quad N=$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2 I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
1 2	34		-6.03	-5.02	20		1.01	.0505	287.25	14.
	4-5		3.22	3.40	20		.18	.009	1149.01	10.
	5-6		3.38	3.87	50		.49	.0098	2872.53	28.
	6-7		3.57	3.93	100		.36	.0036	5745.06	20.
	7-8		~~-.377~~ -.411	-.278	200		.133	.000665	10053.86	6.
	8-9		9.38	9.52	200		.14	.0007	16086.18	11.
2-3	4-5		3.45	4.99	20		1.54	.077		22
	5-6		4.09	4.48	50		.39	.0078		8.
	6-7		3.95	4.62	100		.67	.0067		19.
	7-8		-.431	~~.43~~ 1.308	200		1.439	.007195		44
	8-9		9.50	9.57	200		.07	.00035		3.
	9-10		-4.20	-4.06	200		.14	.0007		11
3-4	5-6		3.99	5.50	20		1.51	.0755		21
	6-7		5.39	6.69	50		1.30	.0026		29.
	7-8		0.554	0.831	50		.277	.00554		15.
	8-9		9.00	9.22	100		.22	.0022		12.
	9-10		-3.31	-2.77	200		.54	.0027		27.
	10-11		-2.09	-.889	200		1.201	.00605		97.
4-5	6-7		5.08	7.07	20		1.99	.0995		28.
	7-8		0.505	1.558	50		1.053	.02106		24.
	8-9		8.47	9.35	100		.88	.0088		25.
	9-10		-3.30	-2.46	200		.84	.0042		24.
	10-11		-1.256	-.788	200		.468	.00234		23.
	11-12		6.47	6.73	200		.26	.0013		20.

AR102417

5-29-87

LINE A

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ a = 50' N=6

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
5-6	7-8		1.148	2.350	20		1.202	.0601		17.2
	8-9		8.72	9.70	50		.98	.0196		22.5
	9-10		-3.62	-2.75	100		.87	.0087		24.9
	10-11		-1.198	-.285	200		.913	.004565		26.2
	11-12		4.79	5.12	200		.33	.00165		16.5
	12-13		-4.58	-4.92	200		—	—		—
6-7	8-9		8.03	9.54	20		1.51	.0755		21.6
	9-10		-4.19	-3.21	50		.98	.0196		22.5
	10-11		-1.823	-0.573	100		.750	.0075		21.5
	11-12		2.50	3.07	200		.57	.00285		16.3
	12-13		-2.71	-2.60	200		.11	.00055		3.5
	13-14		2.25	2.63	200		.38	.0019		30.5
7-8	9-10		-4.17	+3.27	100 ~~20~~		7.44	.0744		3
	10-11		-1.308	.518	100		1.826	.01826		20.98
	11-12		2.55	3.04	100		.49	.0049		14.08
	12-13		-8.84	-8.33	200		.51	.00255		14.65
	13-14		0.159	0.991	200		.832	.00416		41.82
	14-15		5.60	4.96	200		—	—		—
8-9	10-11		-0.940	5.54	50 ~~20~~		6.48	.1296		37.2
	11-12		1.429	3.690	50		2.261	.04522		51.9
	12-13		-8.96	-8.20	100		.76	.0076		21.85
	13-14		0.124	1.095	200		.981	.004905		28.18
	14-15		-.871	5.85	2		—	—		
	15-16		2.59	3.42	200		.83	.00415		66.76

AR102418

5-29-87

LINE A

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ a = 501 N =

C_1C_2	P_1P_2	N	V_0	V_1^+	$V_2^- I$	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
9-10	11-12		3.29	6.12	20		2.83	.1415		40.
	12-13		-9.22	-7.63	50		1.59	.0318		36.
	13-14		0.005	2.110	100		2.105	.02105		60.
	14-15		5.37	6.25	100		.88	.0088		50.
	15-16		3.07	3.92	200		.85	.00425		42.
	16-17		~~-27.2~~ -19.23	~~-22.0~~ -17.67	200		1.56	.0078		125.
10-11	12-13		-10.89	-7.98	20		2.91	.1455		41.7
	13-14		0.327	3.060	50		2.733	.05466		62.8
	14-15		-4.85	-6.90	100		2.05	.0205		58.8
	15-16		2.07	2.97	100		.9	.009		51.
	16-17		-16.33	-15.22	200		1.11	.00555		65.
	17-18		18.87	13.45	200		.91	.00455		72.
11-12	13-14		-1.41	3.100	20		2.659	.13295		38.
	14-15		5.79	6.26	50		1.47	.0294		33.
	15-16		2.10	4.05	100		1.95	.0195		56.0
	16-17		-13.72	-13.32	100		.4	.004		22.9
	17-18		10.86	12.40	500		1.54	.0077		77.4
	18-19		-14.41	-13.45	200		.96	.0048		77.
12-13	14-15		5.80	9.24	20		3.44	.172		49.4
	15-16		3.03	4.16	20		1.13	.0565		64.9
	16-17		-12.60	-12.68	20		—	—		—
	17-18		10.53	11.75	50		1.22	.0244		140.1
	18-19		-12.47	-11.22	100		1.25	.0125		125.6
	19-20		21.8	22.7	200		.9	.0045		72.3

AR102419

LINE A

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	ΔV/I	G.F.	ρ_a
13-14	15-16		3.41	5.84	20		2.43	.1215		34.
	16-17		-12.86	-10.68	50		2.18	.0436		50.
	17-18		10.77	12.75	50		1.98	.00396		113.
	18-19		-12.25	-10.54	100		1.71	.0171		98.
	19-20		21.4	22.3	100		.9	.009		90.
	20-21		4.22	4.91	200		.69	.00345		55.
14-15	16-17		-13.88	-12.05	20		1.83	~~1.83~~ .0915		26.
	17-18		9.55	12.27	50		2.72	.0544		62.
	18-19		-13.70	-12.38	50		1.32	.0264		75.
	19-20		19.8	20.9	100		1.1	.011		63.
	20-21		1.819	2.090	100		.221	.00221		22.
	21-22		-15.59	-14.10	200		1.49	.00745		129.
15-16	17-18		11.18	14.13	20		2.95	.1475		2.
	18-19		-12.79	-10.80	50		1.99	.0398		45.
	19-20		21.1	22.1	50		1.00	.02		57.4
	20-21		2.57	3.64	100		1.07	.0107		61.4
	21-22		-12.33	-11.99	100		.34	.0034		34.1
	22-23		-6.35	-4.00	200		2.35	.01175		189.
16-17	18-19		-12.75	-9.46	20		3.29	.1645		47.
	19-20		21.00	23.9	50		2.90	.058		66.6
	20-21		2.48	3.64	50		1.18	.02[illegible]		67.7
	21-22		-12.42	-11.40	100		1.02	.0102		58.
	22-23		-6.83	-5.98	100		.85	.0085		85.4
	23-24		13.79	-9.66	~~200~~ 100		—	—		—

AR102420

LINE A

5-29-87

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' N=6

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
17-18	19-20		21.0	40.9	~~50~~ 100		19.9	.199		57.
	20-21		2.16	5.25	50		3.09	.0618		71.0
	21-22		-14.12	-12.70	50		1.42	.0284		81.5
	22-23		-6.53	-4.56	100		1.97	.0197		113.1
	23-24		6.90	7.59	100		.69	.0069		69.3
	24-25		-27.4	-25.5	200		1.9	.0095		152.
18-19	20-21		3.14	8.46	20		4.32	.216		62.0
	21-22		-13.37	-8.10	50		5.27	.1054		121.1
	22-23		-3.850	1.064	100		4.914	.04914		141.1
	23-24		14.14	10.34	200		—	—		—
	24-25		-23.7	-22.7	100		1.0	.010		100.
	25-26		12.18	13.17	200		.99	.00495		99.6
19-20	21-22		-13.67	-7.07	20		6.60	.330		94.7
	22-23		-5.01	-2.98	20		2.03	.1015		116.6
	23-24		6.86	9.13	50		2.27	.0454		130.
	24-25		-19.74	-18.38	50		1.36	.0272		156.
	25-26		-7.92	-8.28	100		.36	.0036		36.
	26-27		-4.56	-5.18	~~200~~ 100		—	—		—
20-21	22-23		-4.80	~~-1~~ 6.23	~~20~~ 50		11.03	.2206		63.
	23-24		5.52	8.68	~~50~~		3.16	.0632		72.0
	24-25		-21.10	-18.14	100		2.96	.0296		85.0
	25-26		7.56	8.01	100		.45	.0045		25.8
	26-27		-9.42	-8.90	100		.52	.0052		52.
	27-28		-7.21	-6.13	200		1.08	.0054		86.

AR102421

5-29-77

LINE A

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N=6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
				17.67	20		11.77	.5885		
21-22	23-24		5.90	34.80	50		28.90	.578		166.0
	24-25		-21.90	-18.76	20		3.14	.157		180.[illegible]
	25-26		9.89	11.59	50		1.70	.034		97.0
	26-27		-8.27	-7.48	50		.79	.0158		90.7
	27-28		-5.16	-4.03	100		1.13	.0113		113.0
	28-29		-.339	1.274	200		1.613	.008065		129.[illegible]
22-23	24-25		-23.40	-10.05	20		13.35	.6675		191.7
	25-26		9.52	11.40	20		1.88	.094		108.0
	26-27		-10.18	-7.96	50		2.22	.0444		72.[illegible]
	27-28		-6.23	-3.91	100		2.32	.0232		133.
	28-29		-3.366	-1.894	100		1.466	.01466		147.
	29-30		-15.92	-11.45	200		4.47	.02235		369.[illegible]
23-24	25-26		-10.41	-1.33	20		8.92	.446		[illegible]
	26-27		-9.10	-6.52	20		2.58	.129		148.[illegible]
	27-28		-4.77	-3.68	20 / ~~50~~		1.09	.0545 / ~~.0218~~		156.5
	28-29		-2.880	-.686	100		3.566	.03566		204.8
	29-30		-11.39	-8.96	100		2.43	.0243		244.3
24-25	26-27		-8.670	-.881	20		7.989	.39945		114.7[illegible]
	27-28		-4.92	-2.50	20		2.42	.121		131.0
	28-29		-2.76	0.501	50		3.261	.06522		187.[illegible]
	29-30		-11.50	-7.29	100		4.21	.0421		241.8
25-26	27-28		-5.22	-1.161	20		4.059	.20295		58.3
	28-29		-3.49	-2.16	20		1.33	.0665		76.41
	29-30		-11.08	-9.50	50		1.58	.0316		90.7[illegible]
26-27	28-29		-3.37	1.409	20		4.779	.23895		68.64
	29-30		-11.26	-9.44	20		1.82	.091		104.5[illegible]
27-28	29-30		-9.70	-6.34	20		3.36	.168		46.2[illegible]

AR102422

PARDEE, GOLDSMITH, DALRYMPLE

LINE B

1.914 / 1.026

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$ $P_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a = 50$ $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^+ I	V_3^+	ΔV	ΔV/I	G.F.	P_a
1-2	3-4		-0.166	15.68	100		15.846	.15846	287.25	45.5
	4-5		+3.39	+2.05	100				1149.01	—
	5-6		1.602	+1.623	100		.021	.00021	2972.53	66
	6-7		3.99	+5.35	100		1.36	.0136	5745.06	78.13
	7-8		1.914	3.04	100		1.026	.01026	10053.86	103.1
	8-9		5.52	5.29	100				16086.18	—
2-3	4-5		1.732	36.200	200		34.468	.17234		49.5
	5-6		0.584	13.880	200		13.296	.06648		76.3
	6-7		2.390	9.890	200		07.500	.0375		107.
	7-8		1.425	5.730	200		04.305	.021575		123.9
	8-9		3.02	5.58	200					
	9-10		-2.280	8.03	200		13.47	.007385		118.8
3-4	5-6		0.666	43.400	200		42.734	.21367		62.3
	6-7		2.68	20.10	200		17.420	.0871		100.0
	7-8		0.873	10.10	200		9.227	.046135		132.5
	8-9		3.28	8.80	200		5.52	.0276		158.5
	9-10		-2.35	1.035	200		3.385	.016925		170.1
	10-11		3.70	6.29	200		2.59	.01295		208.
4-5	6-7		3.44	50.30	200		46.86	.2343		67.3
	7-8		1.45	19.98	200		18.53	.09265		106.4
	8-9		3.59	13.51	200		9.92	.0496		142.
	9-10		-2.06	3.83	200		5.89	.02945		169.1
	10-11		3.34	7.32	200		3.98	.0199		200.
5-6	7-8		1.909	28.400	100		26.491	.26491		76.1
	8-9		4.54	14.45	100		9.91	.0991		113.8
	9-10		0.746	5.380	100		4.634	.04634		133.1
	10-11		2.74	5.75	100		3.01	.0301		172.9

AR102423

5-22-87

LINE B

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ a = 50' N = 6

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
6-7	8-9		3.810	35.300	100		31.490	.31490		90.4
	9-10		-0.319	10.58	100		10.899	.10899		125.2
	10-11		2.62	7.92	100		5.30	.0530		152.2
7-8	9-10		0.622	29.80	100		29.178	.29178		83.8
	10-11		2.190	12.42	100		10.23	.1023		117.5
8-9	10-11		7.70	33.00	100		25.30	.2530		72.6

AR102424

FARGO, BALDWIN, BARRIENTES LINE B REP 5-21-87

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a = .501$ N.

$C_1 C_2$	$P_1 P_2$	N	V_0	V_1^+	V_2^-	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
1-2	3-4		[illegible]	[illegible]	[illegible]			.150	[illegible]	[illegible]
	4-5		[illegible]	[illegible]	[illegible]		[illegible]	.06765	[illegible]	[illegible]
	5-6		[illegible]	[illegible]			[illegible]	.0226	[illegible]	[illegible]
	6-7		[illegible]	[illegible]	[illegible]		[illegible]	.02924	[illegible]	[illegible]
	7-8		2.32	[illegible]	[illegible]		[illegible]	.0106	[illegible]	[illegible]
	8-9		[illegible]	[illegible]	[illegible]		[illegible]	.01335	[illegible]	[illegible]
2-3	4-5		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
	5-6		[illegible]	[illegible]	[illegible]		[illegible]	.0642		[illegible]
	6-7		[illegible]	[illegible]	[illegible]		[illegible]	.14405		[illegible]
	7-8		[illegible]	[illegible]	[illegible]		[illegible]	.01558		[illegible]
	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
3-4	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
	7-8		[illegible]	[illegible]	[illegible]		[illegible]	.046		132.[illegible]
	8-9		[illegible]	[illegible]	[illegible]		[illegible]	.0156		[illegible]
	9-10		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		208.[illegible]
	10-11		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
4-5	6-7		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		61.[illegible]
	7-8		[illegible]	[illegible]	[illegible]		[illegible]	.09535		[illegible]
	8-9		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
	9-10		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		186.[illegible]
	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		193.[illegible]
5-6	7-8		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		79.[illegible]
	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
	9-10		[illegible]	[illegible]	[illegible]		[illegible]	.0492		141.[illegible]
	10-11		2.39	[illegible]	[illegible]		[illegible]	.0336		193.[illegible]

AR102425

LINE B

5-29-87
REP.

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = .501$ $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
6-7	8-9		3.20	9.96	20		6.76	.338		97.0
	9-10		-2.360	0.057	20		2.417	.12085		138.8
	10-11		3.24	6.65	50		3.41	.0682		195.9
7-8	9-10		-2.30	3.97	20		6.27	.3135		90.0
	10-11		3.85	6.00	20		2.15	.1075		123.5
8-9	10-11		3.90	9.51	20		5.61	.2805		80.5

AR102426

FARGO, BALDWIN, CARPIENTES

LINE C

5·27·87

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ $N =$

C_1C_2	P_1P_2	N	V_0	V_1^+	~~V_2^-~~ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
				8.[illegible]		50	.73	.0546		
1-2	3-4		5.92	6.80		20	.87	.044[illegible]		15.6
				7.97		50	.76	.013[illegible]		
	4-5		3.22	2.55		20	.33	.016		15.
				1.9[illegible]		100	.287	.028[illegible]		
	5-6		2.11	1.604		50	.6[illegible]	.012		34.
	6-7		.105	0.496		100	.391	.00391		22.4
				4.94		200	.42	.00[illegible]		
	7-8		4.52	4.66		100	.14	.0014		21.1
				6.01		200	.39	.00195		
	8-9		5.62	5.77		100	.15	.0015		24.1
2-3	4-5		3.32	6.05		50	2.73	.0546		15.6
	5-6		1.277	1.866		50	.589	.01178		13.5
	6-7		2.06	2.25		50	.19	.0038		10.
	7-8		3.66	4.25		100	.59	.0059		33.
	8-9		4.88	5.08		100	.20	.002		20.
				-4.16		200	.11	.00055		
	9-10		-4.27	-4.39		100				8.
3-4	5-6		0.836	2.02		20	1.184	.0592		17.
	6-7		2.01	2.21		20	.20	.010		11.4
	7-8		3.58	4.02		50	.44	.0088		25.
	8-9		5.29	5.56		100	.27	.0027		15.
	9-10		-3.89	-3.68		100	.22	.0022		22.
	10-11		11.97	6.70		200	—	—		—
4-5	6-7		2.60	3.82	20		1.22	.061		17.
	7-8		3.67	3.91	20		.24	.012		13.7
	8-9		5.72	5.88	50		.16	.0032		9.
	9-10		-3.75	-3.45	100		.30	.003		17.
	10-11		5.05	5.35	100		.30	.003		30.
	11-12		2.98	2.64	200		—	—		—

AR102427

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N =$ 6

C_1C_2	P_1P_2	N	V_0	V_1^+	~~V_2^-~~ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
5-6	7-8		0.599	2.000	20		1.401	.0705		20.2
	8-9		1.148	1.425	20		.277	.01385		15.9
	9-10		-5.43	-5.01	50		.42	.0084		24.1
	10-11		0.509	0.938	100		.429	.00429		24.6
	11-12		-0.401	0.049	100		.450	.00450		45.2
	12-13		-2.72	-2.73	200		—	—		—
6-7	8-9		3.05	4.42	20		1.37	.0685		19.68
	9-10		-4.97	-4.69	20		.280	.014		16.0
	10-11		1.155	1.533	50		.378	.00756		21.7
	11-12		0.212	0.587	100		.375	.00375		21.5
	12-13		-2.80	-2.72	100		.08	.0008*		8.0
	13-14		1.189	1.657	200		.468	.00234		37.6
7-8	9-10		-5.11	-3.93	20		1.18	.059		95
	10-11		1.281	1.605	20		.324	.0162		18.61
	11-12		0.255	0.893	50		.638	.01276		36.6
	12-13		-2.53	-2.13	100		.40	.004		22.9
	13-14		1.728	1.925	100		.197	.00197		19.8
	14-15		5.27	6.24	200		.97	.00485		76.0
8-9	10-11		1.070	2.100	20		1.03	.0515		14.7
	11-12		0.290	0.633	20		.343	.01715		19.71
	12-13		-3.33	-3.15	50		.18	.0036		10.3
	13-14		1.159	1.441	100		.282	.00282		16.2
	14-15		3.12	3.35	100		.23	.0023		23.1
	15-16		-2.56	-2.41	200		.15	.00075		12.0

AR102428

LINE C

5-28-87

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ a = 50' N =

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^+ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
9-10	11-12		2.42	3.51	20		1.09	.0545		15.
	12-13		-1.858	-1.589	20		.269	.01345		15.
	13-14		2.83	2.95	50		.12	.0024		6.
	14-15		5.11	5.27	100		.16	.0016		9.
	15-16		-2.140	-1.943	100		.197	.00197		19.
	16-17		3.32	3.45	200		.13	.00065		10.
10-11	12-13		-2.790	-1.714	20		1.076	.0538		15.
	13-14		2.22	2.41	20		.19	.0095		10.
	14-15		4.25	4.53	50		.28	.0056		16.
	15-16		-1.958	-1.655	100		.303	.00303		17.
	16-17		4.64	5.46	200		.82	.0041		41
	17-18		0.789	1.334	200		.544	.00272		43
11-12	13-14		2.86	3.83	20		.97	.0485		13.
	14-15		3.88	4.14	20		.26	.013		14
			-1.185	-0.512	100					
	15-16		~~0.060~~	~~-0.878~~	~~50~~		.673	.00673		19
	16-17		3.67	4.15	100		.48	.0048		27
	17-18		0.840	1.236	100		.396	.00396		39
	18-19		-0.522	0.836	200		1.358	.00679		10
12-13	14-15		4.23	5.10	20		.87	.0435		12
	15-16		-0.518	-0.377	20		.141	.00705		8
	16-17		4.37	4.49	50		.12	.0024		6.
	17-18		1.645	2.010	100		.365	.00365		20
	18-19		1.080	1.438	100		.358	.00358		35
	19-20		3.18	5.48	100		—	—		-

AR102429

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a =$ 50' $N = 6$

$C_1 C_2$	$P_1 P_2$	N	V_0	V_1^+	$V_2^- I$	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
13-14	15-16		-1.087	-0.361	20		.726	.0363		10.4
	16-17		4.45	4.57	20		.12	.006		6.8
	17-18		1.188	1.547	50		.359	.00718		20.
	18-19		0.290	0.629	100		.349	.00349		20.
	19-20		3.04	3.01	100		—	—		—
	20-21		0.014	0.316	~~200~~ 100		.302	.00302		48.
14-15	16-17		4.53	5.63	20		1.10	.055		15.
	17-18		1.282	1.496	20		.214	.0107		12.
	18-19		0.339	0.674	50		.335	.0067		19.
	19-20		2.76	2.92	100		.160	.0016		9.
	20-21		-0.986	-0.791	100		.195	.00195		19.
	21-22		-1.097	-1.432	100		—	—		—
15-16	17-18		.759	2.110	20		1.351	.0675		9.
	18-19		0.063	0.270	20		.207	.01035		11.8
	19-20		2.37	2.53	50		.16	.0032		9.7
	20-21		-0.974	-0.025	100		.949	.00949		54.
	21-22		-3.24	-2.79	100		.45	.0045		45.
	22-23		7.32	7.69	200		.37	.00185		29.
16-17	18-19		-0.70	1.511	20		2.211	.1105		31.
	19-20		2.36	2.49	20		.13	.0065		7.
	20-21		0.120	0.546	50		.426	.00852		24.
	21-22		-1.538	-1.026	100		.512	.00512		29.
	22-23		8.63	8.73	100		.10	.0010		10.
	23-24		-2.26	-2.92	200		—	—		—

BR102430

5-28-8[illegible]

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N =$ [illegible]

C_1C_2	P_1P_2	N	V_0	V_1^+	~~V_2^-~~ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
17-18	19-20		2.22	3.14	20		.92	.046		13.[illegible]
	20-21		-0.400	-0.111	20		.289	.01445		16.[illegible]
	21-22		-1.542	-0.897	50		.645	.0129		37.[illegible]
[illegible]	22-23		7.18	~~15.88~~ 7.68	100		.50	.0050		28.[illegible]
	23-24		-3.59	-3.23	100		.36	.0036		36.[illegible]
	24-25		3.97	4.34	200		.37	.00185		29.[illegible]
18-19	20-21		-0.674	0.382	20		1.056	.0528		15.[illegible]
	21-22		-0.810	-0.321	20		.489	.02445		28.[illegible]
	22-23		7.44	7.77	50		.33	.0066		18.[illegible]
	23-24		-3.51	-3.15	100		.36	.0036		20.[illegible]
	24-25		4.34	4.46	100		.12	.0012		12.[illegible]
	25-26		-0.692	0.489	200		1.181	.005905		94.[illegible]
19-20	21-22		-.335	.873	20		1.208	.0604		17.[illegible]
	22-23		7.19	7.38	20		.19	.0095		10.[illegible]
	23-24		-3.58	-3.35	50		.23	.0046		13.[illegible]
	24-25		3.15	3.35	100		.20	.002		11.[illegible]
	25-26		0.662	1.238	200		.576	.00288		28.[illegible]
	26-27		3.82	3.90	200		.08	.0004		6.[illegible]
20-21	22-23		7.35	8.36	20		1.01	.0505		14.[illegible]
	23-24		-3.06	-2.82	20		.24	.0120		13.[illegible]
	24-25		3.36	3.69	50		.33	.0066		18.[illegible]
	25-26		2.15	2.47	100		.32	.0032		18.[illegible]
	26-27		4.76	5.20	200		.44	.0022		22.[illegible]
	27-28		1.721	1.984	200		.263	.001315		21.[illegible]

AR102431

5-22-82

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ N=6

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
21-22	23-24		-3.49	2.30	20		1.19	.0595		17.0
	24-25		2.82	3.04	20		.22	.011		12.6
	25-26		1.834	2.060	50		.226	.00452		12.9
	26-27		3.54	3.82	100		.33	.0033		18.96
	27-28		1.277	1.550	100		.273	.00273		27.4
	28-29		1.219	1.279	200		.060	.0003		4.8
22-23	24-25		2.76	3.78	20		1.02	.051		16.65
	25-26		2.06	2.35	20		.29	.0145		16.67
	26-27		3.80	4.04	50		.24	.0048		13.7
	27-28		1.552	1.945	100		.393	.00393		22.5
	28-29		1.269	1.610	100		.341	.00341		34.2
	29-30		3.67	4.08	200		.41	.00205		32.91
23-24	25-26		1.724	3.050	20		1.326	.0661		10.99
	26-27		2.87	3.14	20		.27	.0135		15.51
	27-28		1.084	1.186	~~50~~ 20		.102	.0051		14.65
	28-29		-.001	0.344	100		.345	.00345		19.82
	29-30		4.07	4.26	100		.190	.0019		19.10
	30-31		-1.620	-1.475	~~100~~ 100		.145	.00145		23.3
24-25	26-27		4.58	5.76	20		1.18	.059		16.95
	27-28		2.93	3.12	20		.19	.0095		10.92
	28-29		1.653	1.721	~~50~~ 100		.068	.0068		19.53
	29-30		4.99	5.15	200		.16	.0008		4.60
	30-31		0.069	~~[illegible]~~ 0.345	200		.276	.00138		13.87
	31-32		4.33	5.49	200		1.16	.0058		93.29

AR102432

5-28-87

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $P_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a =$ 50 $N =$

C_1C_2	P_1P_2	N	V_0	V_1^+	$V_2^- I$	V_3^+	ΔV	$\Delta V/I$	G.F.	P_a
25-26	27-28		2.58	3.47	20	.89	.0445 →			12.
	28-29		0.518	0.699	20	.181		.00905		10.
	29-30		4.77	5.02	50		.25	.005		14.
	30-31		-0.071	0.289	100		.360	.0036		20.
	31-32		1.909	2.190	100		.281	.00281		28
	32-33		-1.652	-1.226	200		.426	.00213		34
26-27	28-29		-1.945	-1.012	20		.934	.0467		13.
	29-30		-0.576	3.11	20		3.626	.1813		20
	30-31		-1.984	-1.666	50		.318	.00636		18
	31-32		-0.753	-0.416	100		.337	.00337		19
	32-33		-3.51	-2.87	100		.64	.0064		6
	33-34		-5.09	-4.69	200		.40	.0020		32
27-28	29-30		3.04	4.23	20		1.19	.0595		17.
	30-31		-1.932	-1.498	20		.434	.0217		498
	31-32		-1.174	-0.815	50		.359	.00718		20
	32-33		-1.427	-0.734	100		.693	.00693		39
	33-34		-4.92	-4.71	100		.21	.0021		21.
	34-35		-0.516	-0.120	200		.396	.00199		31.
28-29	30-31		-2.83	-1.761	20		1.069	.05345		15.
	31-32		-3.36	-2.87	20		.49	.0245		61
	32-33		-2.230	-1.712	50		.518	.01036		70
	33-34		-6.85	-6.31	100		.54	.0054		59
	34-35		0.108	1.252	100		1.144	.01144		115
	35-36		0.969	2.050	200		1.081	.005405		86

AR102433

5-28-87

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$ $P_a = \pi N(N+1)(N+2)\, a^{\Delta V/I}$ a = 50' ν = (

$C_1 C_2$	$P_1 P_2$	N	V_0	V_1^+	$V_2^+ I$	V_3^+	ΔV	ΔV/I	G.F.	P_a
29-30	31-32		-2.72	-1.50	20		1.22	.061		17..
	32-33		-1.017	-0.577	20		.440	.022		25.
	33-34		-5.89	-5.53	50		.36	.0072		20.(
	34-35		2.75	2.92	100		.17	.0017		9.
	35-36		0.679	1.282	200		.603	.003015		30.
	36-37		-7.44	-7.19	200		.25	.00125		20.1
30-31	32-33		1.580	3.080	20		1.500	.0750		21.3
	33-34		-4.80	-4.40	20		.40	.02		22.9
	34-35		3.58	4.19	50		.61	.0102		29.3
	35-36		2.28	2.73	100		.45	.0045		25.3
	36-37		-5.93	-5.15	200		.78	.0039		39.
	37-38		.036	-0.493	200		—	—		—
31-32	33-34		-1.922	-0.473	20		1.449	.07245		20.8
CM-1A&B STA. 32	34-35		6.25	6.57	20		.32	.016		18.3
	35-36		4.88	5.38	50		.50	.010		28.7
	36-37		-3.77	-3.02	100		.75	.0075		43.0
	37-38		-0.123	0.443	100		.566	.00566		56.9
	38-39		6.87	7.65	200		.78	.0039		62.
32-33	34-35		3.96	5.11	20		1.15	.0575		16.5
	35-36		3.40	3.78	20		.38	.0190		21.8
	36-37		-5.07	-4.68	50		.39	.0078		22.4
	37-38		-1.714	-1.284	100		.430	.0043		24.7
	38-39		8.98	9.67	100		.69	.0069		69.3
	39-40		-3.55	-2.61	200		.94	.0047		75.(

AR102434

LINE C

5-28-87

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N =$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
33-34	35-36		3.10	4.23	20		1.13	.0565		16..
	36-37		-5.27	-4.89	20		.38	.019		21..
	37-38		-0.502	-0.709	50			—		—
	38-39		8.27	8.71	100		.44	.0044		25.
	39-40		-3.12	-2.62	200		.50	.0025		25.
	40-41		-1.444	-0.958	200		.486	.00243		39.
34-35	36-37		-5.89	-4.99	20		.90	.045		12.
	37-38		-2.29	-1.99	20		.30	.015		17.
	38-39		7.89	8.21	50		.32	.0064		18.
	39-40		-3.27	-2.74	100		.53	.0053		30.
	40-41		-1.221	-0.960	100		.261	.00261		26.
	41-42		~~-3.71~~ 0.448	0	200		.440	.0022		35.
35-36	37-38		-3.54	-2.48	20		1.06	.053		15.
	38-39		7.13	7.31	20		.18	.009		10.3
	39-40		-2.29	-3.37	~~50~~ 100		—	—		—
	40-41		-4.25	-3.13	~~100~~ 200		1.12	.0056		32.
	41-42		~~-1.386~~ -1.684	-1.015	~~100~~ 200		.669	.003345		33.
	42-43		-2.69	-2.74	200		—	—		—
36-37	38-39		6.28	7.36	20		1.08	.054		15.
T 1-3 38/39	39-40		-4.48	-4.10	20		.38	.0190		21.
	40-41		-3.18	-2.66	50		.52	.0104		29.
	41-42		-0.964	-0.421	100		.543	.00543		31.
	42-43		-2.330	-1.817	100		.513	.00513		51.
	43-44		~~-24.9~~ -2.81	-2.42	200		.39	.00195		31.

5-28-87

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ $N=6$

C_1C_2	P_1P_2	N	V_0	V_1^+	~~V_2^-~~ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
37-38	39-40		-4.06	-2.75	20		1.31	.0655		18.
	40-41		-2.46	-2.10	20		.36	.018		20.
	41-42		-6.42	-6.94	50		—	—		—
	42-43		-1.869	-1.370	100		.499	.00499		28.
	43-44		-1.813	-1.572	100		.241	00241		24.
	44-45		1.377	2.280	200		1.097	.005485		88.
38-39	40-41		-2.030	-0.884	20		1.146	.0573		16.
	41-42		-0.710	-0.255	20		.455	.02275		26.
	42-43		-1.924	-1.517	50		.407	.00814		23.
	43-44		-2.410	-1.821	100		.589	.00589		33.
	44-45		0.717	1.112	100		.395	.00395		39.
	45-46		0.517 ~~[illegible]~~	.931	200		.414	.00207		33.
39-40	41-42		-.055	.805	20		.860	.043		2.
	42-43		-2.00	-1.586	20		.414	.0207		23.
	43-44		-2.350	-1.767	50		.583	.01166		33.
	44-45		-5.930	0.455	100		1.042 6.385	.01042 .06385		60.
	45-46		0.199	0.497	100		.298	.00298		29.
	46-47		24.50	24.70	200		.20	.001		16.
40-41	42-43		-2.22	-1.179	20		1.041	.05205		14.9
	43-44		-2.050	-1.714	20		.336	.0168		19.
	44-45		0.017	0.481	50		.465	.0093		26.
	45-46		0.467	0.820	100		.353	.00353		20.
	46-47		24.50	24.80	100		.3	.003		30.
	47-48		-39.1	-39.2	200		—	—		—

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5-28-87

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50 $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^-/I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
41-42	43-44		-1.630	-.684	20		.946	.0473		13.
	44-45		0.626	1.034	20		.408	.0204		23.
	45-46		-0.086	0.066	50		.152	.00304		8.
	46-47		22.7	23.4	100		.7	.007		40.
	47-48		-40.7	-40.4	100		.3	.003		30.
	48-49		0.220	.319	200		.099	.000495		7.
42-43	44-45		1.805	2.780	20		.975	.04875		14.
	45-46		0.790	1.183	20		.393	.01965		22.
	46-47		24.7	25.3	100 ~~50~~		.6	.006		17.
	47-48		-38.9	-39.1	100		—	—		—
	48-49		-.714	-.666	100		.048	.00048		4.
	49-50		-1.993	-2.15	200		—	—		—
43-44	45-46		1.297	2.170	20		.873	.04365		12.
	46-47		24.4	24.8	20		.4	.02		22.
	47-48		-39.2	-38.9	50		.3	.006		17.
	48-49		-2.65	-2.38	100		.27	.0027		15.
	49-50		-.238	0.071	200		.309	.001545		15.
B THERY FADING	50-51		11.87	11.71	200		—	—		—
44-45	46-47		25.0	26.3	20		1.30	.065		18.
	47-48		-39.7	-39.7	20		—	—		—
	48-49		-3.16	-2.79	50		.37	.0074		21.
	49-50		.082	.101	100		.183	.00183		10.
	50-51		10.8	10.65	100		—	—		—
Pin-1 52	51-52		6.55	6.76	200		.21	.00105		16.
GM-9 153										

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3-28-87

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N =$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
45-46	47-48		-41.4	-40.6	20		.8	.040		11.
	48-49		-3.98	-3.14	50		.84	.0168		19.
	49-50		-1.107	-.928	50		.179	.00358		10.
	50-51		9.08	9.36	100		.28	.0028		16.
	51-52		8.01	8.36	100		.35	.0035		35
	52-53		-9.73	-8.??	200		1.4 ?	.007		112
46-47	48-49		-3.69	-2.21	20		1.48	.074		21.7
	49-50		-.141	.258	50		.399	.00798		9.
	50-51		9.92	9.91	50		—	—	INSUFFICIENT CURRENT	
	51-52		7.17	7.46	100		.29	.0029		29.
	52-53		-8.39	-8.17	100		.22	.0022		35.
	53-54		-1.073	—	—		—	—	INSUFFICIENT CURRENT	
47-48	49-50		-.219	.718	20		.937	.0467		3.
	50-51		9.36	9.61	20		.25	.0125		14.
	51-52		6.93	7.24	~~50~~ 100		.31	.0031		8.
	52-53	-	9.04	-9.02	100		.02	.0002*		—
	53-54		-2.76	-2.52	200		.24	.0012		12.
	54-55		.10	1.14	200		1.04	.0052		83.
48-49	50-51		10.23	11.40	20		1.17	.0585		16.8
	51-52		7.76	7.81	20		.05*	.0025		2.8
	52-53		-8.74	-8.51	50		.23	.0046		13.
	53-54		-1.234	-.940	100		.294	.00294		16.8
T P-0 AT C-57	54-55		3.18	3.23	~~.05~~ 100		.05*	.0005		5.0
	55-56		-1.726	-1.218	200		.508	.00254		40.

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5-27-87

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 60' $N=6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
49-50	51-52		10.06	10.73	20		.67	.0335		9.6
	52-53		-7.40	-7.50	50		—	—	I.C.	—
	53-54		.306	.551	100		.245	.00245		7.0
	54-55		2.17	2.07	~~200~~ 100		—	—	INSUFFICIENT CURRENT	
	55		-.760	-.636	~~200~~ 100		.124	.00124		12.4
	56-57		19.22	19.02	~~200~~ 100		.2	.002		32.
50-51	52-53		-9.29	-6.46	50		2.83	.0566		16.2
	53-54		-.922	.876	200		1.798	.00899		10.3
	54-55		1.380	1.612	200		.232	.00116		3.3
	55-56		-1.069	-1.012	200		.057	.000285		1.6
	56-57		17.55	17.68	200		.13	.00065		6.5
	57-58		-2.41	-3.33	200		—	—	INSUFFICIENT CURRENT	
51-52	53-54		-.413	2.26	50		2.673	.05346		15.
	54-55		.389	.810	100		.421	.00421		4.8
	55-56		-2.60	-2.41	200		.19	.00095		2.7
	56-57		16.15	16.31	200		.16	.0008		4.
	57-58		-6.13	-6.67	200		—	—	I.C.	—
	58-59		-16.54	-15.18	200		1.36	.0068		109.
52-53	54-55		-.257	2.030	50		2.287	.04574		13.14
	55-56		-2.640	-1.932	100		.708	.00708		8.1
	56-57		16.15	16.60	200		.45	.00225		6.4
	57-58		-7.33	-7.01	200		.31	.0015		8.6
	58-59		-4.15	-4.26	200		—	—	I.C.	—
	59-60		-.135	-1.063	200		—	—	I.C.	—

AR102439

5-28-87

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' N=6

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^+ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
53-54	55-56		-2.950	-.751	50		2.199	.04398		12.
	56-57		16.91	17.14	50		.23	.0046		5.
	57-58		-6.59	-6.35	100		.24	.0024		6.8
	58-59		-6.57	-6.22	200		.34	.0017		9.7
	59-60		.189	.409	200		.220	.0011		11.0
	60-61		-.470	-.339	200		.131	.000655		10.9
54-55	56-57		16.80	19.13	50		2.33	.0466		13.3
	57-58		-6.68	-6.01	50		.67	.0134		15.
	58-59		-6.57	-5.85	100		.72	.0072		20.6
	59-60		1.062	1.664	200		.602	.00301		17.2
	60-61		-.144	.077	200		.221	.001105		11.1
	61-62		3.890	4.176	200		.286	.00143		23.
55-56	57-58		-7.20	-2.64	50		4.56	.091		6.1
	58-59		-6.92	-5.98	50		.94	.0188		21.6
	59-60		.472	.821	50		.349	.00698		20.1
	60-61		.228	.390	100		.162	.00162		9.3
	61-62		1.058	1.167	100		.109			10.
	62-63		19.59	18.64	200		—	—	I.C.	—
56-57	58-59		-8.07	-6.68	20		1.39	.0695		19.9
	59-60		.442	1.072	50		.630	.0126		14.1
	60-61		.552	.822	100		.270	.00270		7.7
	61-62		1.862	2.280	200		.418	.00209		12.
	62-63		19.03	19.01	200		—	—	I.C	—
	63-64		-8.37	-8.81	200		—	—	I.C.	—

AR102440

AR102440

5-28-87

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' N =

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	
57-58	59-60		1.367	2.650	20		1.283	.06415		18
	60-61		.670	.947	20		.277	.01385		1
	61-62		.967	1.112	50		.145	.0029		8
	62-63		17.65	17.75	100		.10	.0010		5
	63-64		-12.29	-12.17	200		.12	.0006		6.
	64-65		7.04	6.95	200		—	—		-
58-59	60-61		0.823	2.090	20		1.267	.06335		18
	61-62		1.012	1.971	100		.959	.00959		11.
	62-63		17.75	18.42	200		.67	.00335		9.
	63-64		-12.44	-12.22	200		.22	.0011		6
	64-65		6.66	6.73	200		.07	.00035		3.
	65-66		3.17	3.67	200		.50	.0025		40
59-60	61-62		1.643	2.640	20		.997	.04985		14
	62-63		18.18	18.57	50		.39	.0078		8
	63-64		-12.49	-12.21	100		.28	.0028		8.
	64-65		5.12	5.45	200		.33	.00165		9.
	65-66		4.49	4.82	200		.33	.00165		16
	66-67		6.92	7.35	200		.43	.00215		3'
60-61	62-63		~~[illegible]~~ 17.05	18.27	20		1.22	.061		17
	63-64		-13.41	-12.95	50		.46	.0092		10
	64-65		4.13	4.49	100		.36	.0036		10
	65-66		4.33	4.47	~~200~~ 100		.14	.0014		8
	66-67		6.46	6.77	200		.31	.00155		15
	67-68		-9.71	2.16	200	?	11.87	[illegible]	?	[illegible]

AR102441

3-28-87

LINE C

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a =$ 50' $N=6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
61-62	63-64		-14.10	-12.93	20		1.17	.0585		16.
	64-65		3.88	4.27	50		.39	.0078		8.
	65-66		3.63	3.91	100		.28	.0028		8.
	66-67		6.77	7.32	200		.55	.00275		15.
	67-68		1.504	2.220	200		.716	.00358		35.
	68-69		2.51	3.67	200		1.16	.0058		93.
62-63	64-65		4.49	5.45	20		.96	.048		13.
	65-66		3.35	3.64	50		.29	.0058		6.
	66-67		7.27	7.53	100		.26	.0026		7.4
	67-68		2.53	2.77	200		.24	.0012		6.
	68-69		5.10	5.74	200		.64	.0031		31.
63-64	65-66		3.19	4.10	20		.91	.0455		13.
	66-67		7.65	7.92	50		.27	.0054		5.
	67-68		2.31	2.46	~~100~~ 50		.15	~~.0015~~ .003		8.6
	68-69		4.86	6.19	200		1.33	.00665		38.
64-65	66-67		7.83	10.98	50		3.15	.063		18.
	67-68		2.38	2.68	50		.30	.006		6.
	68-69		6.39	6.86	200		.47	.00235		6.
65-66	67-68		2.47	5.24	50		2.77	.0554		15.
	68-69		6.46	7.10	50		.64	.0128		14.
66-67	68-69		6.17	9.01	50		2.84	.0568		16.

AR102442

TARGO, BALDWIN, BARRIENTES 5-26-77

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ $N=6$

C_1C_2	P_1P_2	N	V_0	V_1^+	~~V_2^-~~ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
1-2	3-4		+2.63	81.70	200	~~79.0~~	79.07	.39535	287.25	113.
	4-5		3.46	36.20	200		32.74	.1637	1149.01	188
	5-6		2.89	21.20	200		18.31	.09155	2872.53	262
	6-7		6.19	19.04	200		12.85	.06425	5745.06	369
	7-8		-4.14	4.79	200		8.93	.04465	10053.86	448
	8-9		-0.040	6.49	200		6.53	.03265	16086.18	52
2-3	4-5		4.12	72.60	200		68.48	.3424		98
	5-6		3.05	34.00	200		30.95	.15475		177
	6-7		7.81	26.10	200		18.29	.09145		262
	7-8		-3.91	5.85	200		9.76	.0488		280
	8-9		0.585	9.510	200		8.925	.044625		44
	9-10		4.85	12.52	200		7.67	.03835		616
3-4	5-6		3.01	68.30	200		65.29	.32645		93
	6-7		7.49	38.60	200		31.11	.15555		178
	7-8		-3.92	13.63	200		17.55	.08775		25
	8-9		0.750	13.030	200		12.28	.0614		35.
	9-10		5.62	13.09	200		7.47	.03735		37
	10-11		-0.188	5.46	200		5.648	.02824		45
4-5	6-7		7.30	74.50	200		67.20	.3360		96
	7-8		-4.03	27.20	200		31.23	.15615		17
	8-9		1.028	20.600	200		19.572	.09786		28
	9-10		2.49	14.24	200		11.75	.05875		33
	10-11		1.163	10.130	200		8.967	.044835		45
	11-12		5.47	10.07	200		4.60	.0230		36

AR102443

LINE D

5-26-83

$\Delta V = V_1^+ - V_0$ or $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N =$ 6

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
5-6	7-8		-0.760	67.600	200		68.36	.3468		99
	8-9		2.26	37.30	200		35.04	.1752		201
	9-10		3.20	22.00	200		18.80	.0940		270
	10-11		2.41	12.28	200		9.87	.04935		283
	11-12		6.93	13.38	200		6.45	.03225		324.
	12-13		0.420	5.410	200		4.99	.02495		401.
6-7	8-9		0.522	40.80	100		39.278	.39278		112.
	9-10		3.41	38.20	200		34.79	.17395		199.
	10-11		2.24	19.40	200		17.16	.0858		246.
	11-12		6.27	16.96	200		10.69	.05345		307.
	12-13		1.426	8.830	200		7.404	.03702		372.
	13-14		0.226	6.630	200		6.404	.03202		515.
7-8	9-10		3.13	39.20	100		36.07	.3607		0.3
	10-11		2.42	10.15	50		7.73	.1546		177.
	11-12		7.06	11.28	50		4.22	.0844		242.
	12-13		1.503	4.500	50		2.997	.05994		344.
	13-14		0.394	2.010	50		1.616	.03232		324.
	14-15		2.920	4.670	50		1.750	.0350		563.
8-9	10-11		2.48	19.47	50		16.99	.3398		97.6
	11-12		7.06	14.54	50		7.48	.1696		194.8
	12-13		1.54	5.720	50		4.18	.0836		240.
TO. SINGLE READINGS	13-14		0.315	2.910	50		2.595	.0519		278.
	14-15		4.43	5.72	50		1.29	.0258		259.
	15-16		0.660	2.620	50		1.96	.0392		630.

AR 102444

5-16-17

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N=6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
9-10	11-12		7.00	23.10	50		16.10	.322		92
	12-13		1.460	8.06	50		6.60	.132		151.
	13-14		-0.046	3.63	50		3.676	.07352		211.
	14-15		7.37	9.17	50		1.80	.036		206
	15-16		-0.603	0.933	50		1.536	.03072		308
	16-17		4.71	5.01	50		0.30	.0060		96
10-11	12-13		1.446	20.80	50		19.354	.38708		111.
	13-14		0.140	8.99	50		8.85	.1770		203
	14-15		7.12	11.94	50		4.82	.0964		276
	15-16		1.304	4.460	50		3.156	.06312		362
	16-17		4.40	6.02	50		1.62	.0324		325
	17-18		-0.189	1.008	50		1.197	.02394		385
11-12	13-14		0.127	22.30	50		22.173	.44346		127
	14-15		7.45	16.70	50		9.25	.1850		212
	15-16		1.141	3.030	20		1.889	.09445		271
	16-17		2.37	3.72	20		1.35	.0675		387
	17-18		0.874	1.515*	20		.641	.03205		322
	18-19		6.320	1.988*	20					—
12-13	14-15		6.96	16.10	20		9.86	.4930		141
	15-16		0.949	4.660	20		3.711	.1855		213
	16-17		2.07	3.83	20		1.76	.088		257
	17-18		0.830	1.904	20		1.074	.0537		30[illegible]
	18-19		1.922	2.900	20		0.978	.0489		280
	19-20		2.84	2.60*	20					—

AR102445

LINE D

$\Delta V = V_1^+ - V_0$ $\quad \Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $\quad a = 50'$ N=4

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
13-14	15-16		0.807	9.370	20		8.563	.42815		122.
	16-17		1.857	5.220	20		3.363	.16815		193.
	17-18		1.172	2.800	20		1.628	.0814		233.8
	18-19		2.270	3.07	20		0.800	.0400		229.
	19-20		2.80	3.39	20		0.59	.0295		296.
	20-21		4.20	5.34	50		1.14	.0228		
14-15	16-17		1.153	29.100	10		27.947*			—
	17-18		0.937	3.800	20		2.863	.14315		164.
	18-19		1.723	3.100	20		1.377	.06885		197.
	19-20		2.46	3.23	20		0.77	.0385		221.
	20-21		3.63	4.25	20		0.62	.0310		311.
	21-22		4.02	5.07	50		1.05	.0201		323.3
15-16	17-18		0.45 ~~0.48~~	8.310	20		7.856	.3928		2.
	18-19		2.25	5.310	20		3.06	.153		175.
	19-20		2.79	4.45	20		1.66	.083		238.
	20-21		3.51	4.44	20		0.93	.0465		267.
	21-22		3.59	4.13	20		0.54	.0270		271.
	22-23		4.65	5.44	50		0.79	.0178		256.
16-17	18-19		1.578	8.810	20		7.232	.3616		103.
	19-20		2.87	5.99	20		3.12	.1560		179.
	20-21		2.96	4.56	20		1.60	.080		229.
	21-22		3.16	4.04	20		0.88	.044		252.
	22-23		3.89	4.28	20		0.39	.0195		196.
	23-24		6.04	7.18	50		1.14	.0228		366.

AR102446

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' N=6

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
17-18	19-20		3.40	10.41	20		7.01	.3005		86.
	20-21		2.77	5.76	20		2.99	.1495		171.
	21-22		3.51	4.62	20		1.11	.0555		159.
	22-23		3.30	4.02	20		0.72	.0360		206.
	23-24		2.75	4.26	20		1.51	.0755		759
	24-25		-3.030	-1.807	50		1.223	.02446		393
18-19	20-21		2.63	10.46	20		7.83	.3915		112.
	21-22		3.11	5.89	20		2.78	.1390		159.
	22-23		3.22	4.66	20		1.44	.072		206
	23-24		3.72	4.37	20		0.65	.0325		186.
	24-25		-2.54	-2.04	20		0.50	.0250		251
	25-26		8.69	9.77	50		1.08	.02016		324
19-20	21-22		4.06	11.16	20		7.10	.355		101
	22-23		3.28	5.85	20		3.57	.1785		205
	23-24		4.48	5.93	20		1.45	.0725		208
	24-25		-1.725	-0.934	20		0.791	.03955		227
	25-26		9.49	10.06	20		0.57	.0285		286
	26-27		1.244	2.650	50		1.406	.028012		452
20-21	22-23		2.35	8.43	20		6.08	.3040		87.
	23-24		4.08	6.45	20		2.37	.1185		136
	24-25		-2.20	-0.876	20		1.324	.0662		190
	25-26		9.06	9.92	20		0.860	.0430		247
	26-27		1.763	2.650	20		0.887	.04435		445
	27-28		-0.750	0.325	50		1.075	.0215		345

AR102447

5-26-[illegible]

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $P_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ $N=6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	P_a
21-22	23-24		3.79	8.70	20		4.91	.2455		70.
	24-25		-2.170	0.153	20		2.323	.11615		133.
	25-26		8.81	9.97	20		1.16	.058		166.
	26-27		1.513	2.320	20		0.807	.04035		231.
	27-28		0.061	0.342	20		0.281	.01405		141.
	28-29		1.400	2.16	50		0.760	.0152		244.
22-23	24-25		-2.21	3.63	20		5.84	.2910		83.
	25-26		7.76	10.31	20		2.55	.1275		146.
	26-27		1.241	2.700	20		1.459	.07295		209.
	27-28		-0.216	0.646	20		0.862	.0431		247.
	28-29		0.880	1.428	20		0.548	.0274		275.
	29-30		1.203	2.640	50		1.437	.02874		462.
23-24	25-26		7.39	13.36	20		5.97	.2985		35.
	26-27		1.822	4.469	20		2.638	.1319		151.
	27-28		0.394	1.746	20		1.352	.0676		194.
	28-29		0.132	0.861	20		0.729	.03645		209
	29-30		3.870	4.340	20		0.47	.0235		236
	30-31		-0.313	-0.576*	50*					—
24-25	26-27		1.659	9.180	20		7.521	.37605		108
	27-28		2.09	4.73	20		2.64	.1320		151.
	28-29		-1.662	-0.426	20		1.236	.0618		177
	29-30		3.810	4.450	20		0.64	.0320		183
	30-31		-0.999	-0.293	20		0.706	.0353		354.
	31-32		-0.871	0.063	50		.934	.01868		300.

AR102448

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ $N=6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
25-26	27-28		2.35	10.47	20		8.13			116.7
	28-29		-0.868	2.00	20		2.868			164.
	29-30		4.37	7.92	50		3.55	.071		203
	30-31		-1.990	0.387	50		2.377	.04754		273.
	31-32		1.178	3.030	50		1.852	.03704		372.
	32-33		-7.13	-6.27	200		.86	.0043		69.
26-27	28-29		0.680	10.250	20		9.57	.4785		137.
	29-30		4.13	7.53	20		3.40	.170		195.
	30-31		-2.250	-0.448	20		1.802	.0901		258.
	31-32		1.352	2.180	20		.828	.0414		237.
	32-33		-9.40	-9.03	20		.370 *	.0185		186.
	33-34		8.72	10.08	50		1.36	.0272		437.
27-28	29-30		3.46	12.45	20		8.99			129.
	30-31		-2.410	0.969	20		3.379	.16895		194.
	31-32		1.161	2.600	20		1.439	.07195		206.
	32-33		-9.27	-8.77	20		.500	.0250		143.
	33-34		11.23	12.39	50		1.160	.0232		233.
	34-35		0.999	2.250	50		1.251	.02502		402.
28-29	30-31		-3.83	6.43	20		10.26	.513		147.
	31-32		1.316	4.660	20		3.344	.1672		191.
	32-33		-9.67	-8.38	2		1.29	.0645		185
	33-34		10.15	11.14	20		.99	.0495		281.
	34-35		1.999	3.550	50		1.551	.03102		311.8
	35-36		3.49	4.82	50		1.33	.0266		427.

AR102449

LINE I

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a = 50'$ $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
29-30	31-32		1.617	10.800	20		9.183	.45915		131.
	32-33		-9.28	-6.65	20		2.63	.1315		151.
	33-34		10.37	12.05	20		1.68	.084		241.
	34-35		2.58	5.08	50		2.50	.050		287.
	35-36		3.52	5.79	50		2.27	.0454		456.
	36-37		1.506	5.750	50		4.244	.0804		1293.
30-31	32-33		-9.33	-2.48	20		6.85	.3425		98.
	33-34		10.43	13.53	20		3.10	.1550		178.
	34-35		3.31	5.10	20		1.79	.0895		257.
	35-36		3.33	4.79	20		1.46	.0730		419.
	36-37		3.11	4.00	20		0.89	.0445		447.
	37-38		2.07	4.21	50		2.14	.04028		647.
31-32	33-34		10.37	18.21	20		7.84	.3920		2.
	34-35		3.29	5.69	20		2.40	.120		137.
	35-36		2.87	4.51	20		1.64	.0820		235.
	36-37		2.76	3.73	20		.97	.0485		278.
	37-38		2.81	4.64	50		1.83	.0365		366.
	38-39		5.05	5.58	100		.53*	.0053		85.
32-33	34-35		3.27	7.48	20		4.21	.2105		60.
	35-36		3.20	4.68	20		1.48	.074		85.
	36-37		3.35	4.10	20		.75	.0375		107.
	37-38		3.57	4.07	20		.50	.0250		143.
	38-39		4.48	5.42	50		.94	.0188		189.
	39-40		3.38	4.73	50		1.35	.027		431.

AR102450

LINE I

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N =$

C_1C_2	P_1P_2	N	V_0	V_1^+	~~V_2^-~~ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
33-34	35-36		3.18	9.14	20		5.96	.2980		85.
	36-37		2.90	5.20	20		2.30	.115		131.
	37-38		3.39	4.39	20		1.00	.050		142.
	38-39		3.97	4.64	20		.67	.0335		192.
	39-40		3.43	4.34	50		.91	.0182		182
	40-41		5.50	6.28	50		.78	.0176		283
34-35	36-37		2.63	11.28	20		8.65	.4325		124
	37-38		2.81	5.86	20		3.05	.1525		175
	38-39		5.49	7.47	20		1.98	.099		284
	39-40		4.22	5.10	20		.88	.044		252
	40-41		5.33	7.06	50		1.73	.0346		347
	41-42		0.421	1.821	50		1.40	.028		450
35-36	37-38		1.55	13.10	20		11.15	.5575		160
	38-39		5.21	9.51	20		4.31	.2155		247
	39-40		4.27	6.15	20		1.88	.0940		270
	40-41		5.20	7.60	50		2.40	.0480		275
	41-42		0.227	1.720	50		1.493	.02966		298
	42-43		3.59	4.88	50		1.29	.0258		415
36-37	38-39		3.70	15.37	20		11.67	.5835		167
	39-40		3.41	6.78	20		3.37	.1685		193
	40-41		4.50	6.03	20		1.53	.0765		219
	41-42		-1.104	-0.307	20		.797	.03985		228
	42-43		3.20	4.59	50		1.39	.0278		279
	43-44		5.02	5.80	50		0.78	.0156		250

AR102451

LINE D

5-27-64

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a =$ 50' $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
37-38	39-40		3.62	13.42	20		9.80	.49		140.
	40-41		5.14	8.46	20		3.32	.1654		190.
	41-42		-0.786	0.865	20		1.651	.08255		237
	42-43		3.83	4.77	20		.94	.047		270
	43-44		4.88	6.24	50		1.36	.0272		273
	44-45		3.02	4.71	50		1.69	.0338		543.
38-39	40-41		5.07	13.06	20		7.99	.3995		114.
	41-42		-0.669	1.992	20		2.661	.13305		152.
	42-43		4.02	5.31	20		1.29	.0645		185.
	43-44		4.18	4.98	20		0.80	.040		229.
	44-45		4.67	6.03	50		1.36	.0272		273.
	45-46		-1.399	-0.061	50		1.338	.02676		430.
39-40	41-42		-0.832	6.90	20		7.732	.3866		[illegible].0
	42-43		3.83	6.56	20		2.73	.1365		156.[illegible]
	43-44		3.82	5.06	20		1.24	.0620		178.
	44-45		4.49	5.36	20		.87	.0435		249.[illegible]
	45-46		-1.094	0.321	50		1.415	.0283		284.[illegible]
	46-47		0.769	1.028	50		.259	.005		80.[illegible]
40-41	42-43		3.40	12.94	20		9.54	.477		137.[illegible]
	43-44		3.31	6.26	20		2.95	.1475		169.[illegible]
	44-45		4.18	5.75	20		1.57	.0785		225.[illegible]
	45-46		-1.453	-0.583	20		.870	.0435		249.[illegible]
	46-47		0.626	2.140	50		1.514	.03028		304.[illegible]
	47-48		2.04	3.65	100		1.61	.0161		258.[illegible]

AR102452

5-27-77

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$ $\rho_a = \pi N(N+1)(N+2)\, a^{\Delta V/I}$ $a = 50'$ $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^+ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
41-42	43-44		4.03	11.99	20		7.96	.398		114.
	44-45		4.92	7.95	20		3.03	.1515		174.
	45-46		-0.785	0.649	20		1.434	.0717		205.
	46-47		1.491	2.240	20		.749	.03745		215.
	47-48		2.40	4.08	50		1.68	.0336		337
	48-49		1.994	4.00	100		2.006	.02006		322.
42-43	44-45		5.43	13.61	20		8.18	.409		117.
	45-46		-0.826	2.130	20		2.956	.1478		169.
	46-47		2.54	4.07	20		1.53	.0765		219.
	47-48		2.17	3.16	20		.99	.0495		284.
	48-49		2.18	3.49	50		1.31	.0262		263
	49-50		2.88	4.84	100		2.46	.0246		395
43-44	45-46		-2.19	6.02	20		8.21	.4105		117.
	46-47		1.890	4.87	20		2.98	.1490		171.
	47-48		2.06	3.51	20		1.45	.0725		208
	48-49		1.330	2.15	20		.82	.041		235
	49-50		3.07	4.56	50		1.49	.0298		299
	50-51		1.271	2.250	100		.979	.00979		157.
44-45	46-47		2.58	11.40	20		8.82	.4410		126.
	47-48		1.885	4.930	20		3.045	.15225		174.
	48-49		0.582	2.08	20		1.498	.0749		215.
	49-50		3.36	4.41	20		1.05	.0501		287
	50-51		-1.804	-0.397	50		1.407	.02814		282.
	51-52		4.46	6.39	100		1.93	.0173		310.

AR 102453

LINE D

5-27-77

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
45-46	47-48		2.19	12.08	20		9.89	.4945		142.
	48-49		0.054	3.370	20		3.316	.1658		190.
	49-50		2.82	4.70	20		1.88	.094		270.
	50-51		-1.857	0.286	50		2.143	.04226		242.
	51-52		6.13	7.95	50		1.82	.0364		365.
	52-53		-0.935	0.215	100		1.150	.0115		184.
46-47	48-49		-1.194	8.22	20		9.414	.4707		132.
	49-50		3.18	6.91	20		3.73	.1865		214.
	50-51		-3.02	-1.100	20		1.92	.096		275.
	51-52		8.47	9.58	20		1.11	.0555		318.
	52-53		-2.010	-0.256	50		1.754	.03508		352.6
	53-54		3.67	5.66	100		1.99	.0199		320.
47-48	49-50		2.75	12.56	20		9.81	.4905		0.9
	50-51		-3.940	-0.368	20		3.572	.1786		205.
	51-52		8.09	9.89	20		1.80	.0900		258.
	52-53		-2.160	-1.272	20		0.888	.0444		255.0
	53-54		3.25	4.72	50		1.53	.0306		307.6
	54-55		2.73	4.68	100		1.95	.0195		313.0
48-49	50-51		-3.91	5.03	20		8.94	.447		128.4
	51-52		7.88	11.29	20		3.41	.1705		195.9
	52-53		-2.530	-0.757	20		1.773	.08865		254.6
	53-54		2.99	3.80	20		0.81	.0405		232.6
	54-55		2.67	4.28	50		1.61	.0322		323.
	55-56		3.14	3.59	100		.45	.0045		72.3

AR102454

5-27-77

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
49-50	51-52		7.92	16.44	20		8.52	.426		122.[illegible]
	52-53		-2.180	1.094	20		3.274	.1637		188.1
	53-54		4.07	5.82	20		1.75	.0875		251.[illegible]
	54-55		2.88	3.130	20		.25	.0125		71.8
	55-56		-2.520	-1.019	50		1.501	.030		301.6
	56-57		1.389	2.970	100		1.581	.01581		254.
50-51	52-53		-2.18	7.37	20		9.55	.4775		137.1
	53-54		4.64	7.81	20		3.17	.1585		182.[illegible]
	54-55		1.335	3.040	20		1.705	.08525		244.[illegible]
	55-56		-2.100	-1.280	20		.820	.041		235.
	56-57		2.16	3.42	50		1.26	.0252		253.[illegible]
	57-58		1.886	3.920	100		2.034	.02034		327.[illegible]
51-52	53-54		5.44	13.51	20		8.07	.4035		115.9
	54-55		2.54	5.70	20		3.16	.158		181.5
	55-56		-0.711	0.670	20		1.381	.0695		199.6
	56-57		2.78	3.60	20		.82	.041		235.[illegible]
	57-58		1.949	3.140	50		1.191	.022382		225.[illegible]
	58-59		-3.760	-1.468	100		2.292	.02292		368.[illegible]
52-53	54-55		2.58	11.42	20		8.84	.442		126.[illegible]
	55-56		-1.311	1.714	20		3.025	.15125		173.7
	56-57		2.26	3.64	20		1.38	.069		198.2
	57-58		2.98	3.57	20		.59	.0295		169.4
	58-59		-3.72	-2.05	50		1.67	.0334		3[illegible]
	59-60		-3.640	-1.354	100		2.286	.02286		367.[illegible]

AR102455

5-27-7

LINE

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a =$ 50' $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
53-54	55-56		-1.081	7.31	20		8.394	.4197		120.
	56-57		2.63	5.44	20		2.81	.1405		161.
	57-58		2.82	4.10	20		1.28	.0640		183.
	58-59		-3.33	-2.50	20		.83	.0415		238.
	59-60		-1.204	-0.105	50		1.099	.02198		220.
	60-61		5.01	5.75	100		.74	.0074		119.0
54-55	56-57		2.98	11.89	20		8.91	.4455		127.
	57-58		3.71	6.40	20		2.69	.1345		154.
	58-59		-2.810	-0.855	20		1.955	.09775		280.
	59-60		-0.050	0.643	20		.693	.03465		199.0
	60-61		4.30	5.33	50		1.03	.0206		207.
	61-62		2.93	4.78	100		1.85	.0185		297.
55-56	57-58		2.95	10.91	20		8.06	.403		5.
	58-59		-3.09	0.692	20		3.782	.1891		217.
	59-60		-0.668	0.846	20		1.514	.0757		217.
	60-61		3.76	4.50	20		.74	.037		212.
	61-62		3.55	5.04	50		1.49	.0298		299.
	62-63		-1.216	0.285	100		1.501	.01501		241.
56-57	58-59		-4.47	7.60	20		12.07	.6035		173.
	59-60		-1.957	1.594	20		3.551	.17755		204.0
	60-61		2.99	4.36	20		1.37	.0685		198.7
	61-62		2.78	3.88	20		1.10	.055		315.9
	62-63		-0.916	0.604	50		1.520	.0304		305.6
	63-64		-4.17	-0.851	100		3.319	.03319		533.

AR102456

LINE I

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N=6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
57-58	59-60		-1.457	7.620	20		9.027	.45385		130
	60-61		3.17	6.23	20		3.06	.153		175.
	61-62		3.29	5.00	20		1.71	.0855		245
	62-63		-0.653	0.237	20		.990	.0495		284
	63-64		-3.120	-1.060	50		2.06	.04012		403
	64-65		-7.35	-5.42	100		1.93	.0193		310.
58-59	60-61		4.17	13.45	20		9.29	.464		133.
	61-62		4.26	8.26	20		4.00	.200		229
	62-63		0.261	2.470	20		2.209	.11045		317.
	63-64		-1.625	0.029	20		1.654	.0827		475
	64-65		-5.44	-3.65	50		1.79	.0358		359
	65-66		12.43	13.18	50		0.75	.0150		241.
59-60	61-62		3.61	13.98	20		10.37	.5185		148.
	62-63		0.212	4.320	20		4.112	.2056		236.
	63-64		-0.856	2.080	20		2.936	.1468		421.
	64-65		-4.87	-3.65	20		1.22	.0610		350.
	65-66		13.60	14.57	50		0.97	.0194		195.
	66-67		11.55	12.61	100		1.06	.0106		170.
60-61	62-63		0.524	9.440	20		8.916	.4458		123
	63-64		-1.701	2.620	20		4.321	.21605		248
	64-65		-5.76	-4.13	20		1.63	.0815		234
	65-66		11.38	12.69	50		1.31	.0262		150.
	66-67		10.30	11.19	50		0.89	.0178		178.
	67-68		3.89	5.56	100		1.67	.0167		267

AR102457

LINE D

5-27-77

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
61-62	63-64		-1.470	9.450	20		10.920	.5460		156.[illegible]
	64-65		-5.410	-1.994	20		3.416	.1706		196.[illegible]
	65-66		10.91	11.89	20		1.97	.0990		284.[illegible]
	66-67		10.42	11.94	50		1.52	.0304		174.6
	67-68		3.28	4.59	50		1.31	.0262		263.4
	68-69		4.94	7.76	100		2.82	.0282		453.6
62-63	64-65		-5.99	3.42	20		9.41	.4705		135.1
	65-66		10.55	12.43	20		1.88	.0940		108.0
	66-67		10.80	11.71	20		.91	.0455		130.7
	67-68		3.23	4.24	20		1.01	.0505		290.1
	68-69		2.13	4.37	50		2.24	.0448		450.4
	69-70		-0.336	2.710	100		3.046	.03046		489.9
63-64	65-66		9.69	15.70	20		6.01	.3005		[illegible]3
	66-67		10.76	13.21	20		2.45	.1225		140.7
	67-68		2.87	5.34	20		2.47	.1235		354.7
	68-69		0.921	6.320	50		5.401	.10802		620.5
	69-70		-2.030	1.829	50		3.859	.07718		775.9
	70-71		2.62	6.12	100		3.50	.0350		563.0
64-65	66-67		10.63	17.57	20		6.93	.3465		99.5
	67-68		3.33	7.24	20		3.91	.1955		224.6
	68-69		0.76	3.94	20		3.18	.154		442.3
	69-70		-1.696	0.521	20		2.217	.11085		636.9
	70-71		3.75	6.28	50		2.53	.0506		505.7
	71-72		3.17	5.85	100		2.68	.0268		431.1

AR102458

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
65-66	67-68		3.36	9.55	20		6.19	.3095		88.9
	68-69		0.507	2.940	20		2.433	.12165		139.7
	69-70		-1.486	-0.096	20		1.390	.0695		199.[illegible]
	70-71		4.28	4.97	20		0.59	.0295		169.4
	71-72		2.38	3.40	50		1.02	.0204		205.1
	72-73		-0.389	0.774	100		1.263	.01263		203.
66-67	68-69		1.397	7.430	20		6.033	.30165		86.6
	69-70		-0.95	1.75	20		2.70	.1350		155.1
	70-71		4.69	5.71	20		1.02	.051		146.[illegible]
	71-72		3.16	3.89	20		.73	.0365		209.[illegible]
	72-73		-0.176	0.945	50		1.121	.02042		205.[illegible]
	73-74		2.57	4.35	100		1.78	.0178		286.
67-68	69-70		-0.546	7.490	20		8.036	.4018		115.4[illegible]
	70-71		5.03	7.31	20		2.28	.114		130.9
	71-72		3.60	4.77	20		1.17	.0585		168.[illegible]
	72-73		-0.261	0.051	[illegible]		.312	.0151		86.7
	73-74		2.75	4.59	50		1.84	.0368		369.[illegible]
	74-75		3.83	5.46	100		1.63	.0163		262.
68-69	70-71		3.99	12.31	20		9.32	.466		133.[illegible]
	71-72		2.45	5.48	20		3.03	.1515		174.[illegible]
	72-73		-1.398	0.364	20		1.762	.0881		253.
	73-74		-1.257	2.690	20		1.433	.07165		411.[illegible]
	74-75		1.634	3.520	50		1.886	.03772		379.
	75-76		5.82	7.72	100		1.90	.019		305.

AR102459

LINE I

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50'

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
69-70	71-72		2.70	11.93	20		9.23	.4615		132.
	72-73		-0.372	2.970	20		3.3412	.1671		192.
	73-74		1.923	4.850	20		2.927	.14635		420.
	74-75		1.999	3.440	20		1.441	.07205		413.
	75-76		6.96	8.79	50		1.83	.0366		367.
	76-77		0.334	2.300	100		1.966	.01966		316.
70-71	72-73		-0.889	6.550	20		7.439	.37195		106.
	73-74		2.61	7.34	20		4.73	.2365		271.
	74-75		1.901	3.960	20		2.059	.10295		295.
	75-76		7.65	8.58	20		.93	.0465		267.
	76-77		-0.624	0.750	50		1.374	.02748		276.
	77-78		10.41	11.76	100		1.35	.0135		217.
71-72	73-74		2.70	12.60	20		9.90	.495		12.
	74-75		2.29	5.84	20		3.55	.1775		203.
	75-76		7.95	9.07	20		1.12	.056		160.
	76-77		-0.306	0.459	20		.765	.03825		219.
	77-78		11.71	13.75	100		2.04	.0204		205.
	78-79		-6.69	-5.43	100		1.26	.0126		202.
72-73	74-75		1.335	11.910	20		10.575	.52875		157.
	75-76		7.30	10.07	20		2.77	.1385		159.
	76-77		-0.213	1.019	20		1.232	.0616		176.
	77-78		10.11	10.84	20		.73	.0365		209.
	78-79		-8.08	-6.89	50		1.19	.0238		239.
	79-80		5.49	7.37	100		1.88	.0188		

AR102460

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a =$ 50' $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	ΔV/I	G.F.	ρ_a
73-74	75-76		7.33	20.60	20		13.27	.6635		190
	76-77		-0.261	4.93	20		5.191	.25955		298
	77-78		11.11	13.69	20		2.58	.129		370
	78-79		-8.46	-6.86	20		1.60	.080		459.
	79-80		4.81	7.51	50		2.70	.0540		542
	80-81		2.33	5.85	100		3.52	.0352		566
74-75	76-77		-0.543	12.660	20		13.203	.66015		189.
	77-78		10.72	15.69	20		4.97	.2485		285.
	78-79		-7.82	-5.10	20		2.72	.136		390.
	79-80		4.32	5.96	20		1.64	.082		471.
	80-81		1.597	4.510	50		2.913	.05826		585
	81-82		1.022	5.660	100		4.638	.04638		746.
75-76	77-78		10.49	20.40	20		9.91	.4955		142
	78-79		-7.32	-3.29	20		4.03	.2015		231.
	79-80		3.89	6.17	20		2.28	.1140		327
	80-81		1.332	2.700	20		1.368	.0684		392
	81-82		1.286	3.730	50		2.444	.04888		491
	82-83		4.16	6.46	100		2.30	.0230		369
76-77	78-79		-6.97	3.23	20		10.20	.510		146
	79-80		3.83	8.16	20		4.33	.2165		248.
	80-81		1.511	4.00	20		2.489	.12445		357
	81-82		2.27	3.70	20		1.43	.0715		410
	82-83		3.83	5.58	50		1.75	.035		351.
	83-84		5.33	7.02	100		1.69	.0169		271

AR102461

LINE D

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ a = 50' N=6

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
77-78	79-80		3.31	12.64	20		10.33	.5165		148.3
	80-81		1.252	5.580	20		4.328	.2164		248.6
	81-82		2.13	4.10	20		1.97	.0985		282.9
	82-83		3.80	4.55	20		.75	.0375		215.4
	83-84		4.12	5.57	50		1.45	.029		291.5
	84-85		5.46	7.06	100		1.60	.016		257.
78-79	80-81		0.576	12.57	20		11.994	.5997		172.7
	81-82		1.772	5.910	20		4.138	.2069		237.7
	82-83		3.44	5.06	20		1.62	.081		232.6
	83-84		4.20	5.10	20		.90	.045		258.9
	84-85		4.03	5.38	50		1.35	.023		231.2
79-80	81-82		2.20	13.59	20		11.39	.5695		163.5
	82-83		3.66	7.34	20		3.68	.184		[illegible].4
	83-84		4.49	6.03	20		1.54	.077		221.1
	84-85		3.82	4.80	20		.98	.049		281.5
80-81	82-83		4.00	13.35	20		9.35	.4675		134.2
	83-84		4.97	8.56	20		3.59	.1795		206.7
	84-85		3.87	5.93	20		2.06	.103		295.1
81-82	83-84		4.62	14.46	20		9.84	.492		141.3
	84-85		4.34	7.75	20		3.41	.1705		195.9
82-83	84-85		3.62	12.15	20		8.53	.4265		122.5

AR102462

FARGO, BALDWIN, BARRIENTES

LINE E

5-29-87

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$ $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ $N=$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- C	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
1-2	3-4		1.239	27.700	20		26.461	1.32305	287.25	380.
	4-5		5.23	15.79	20		10.56	.528	1149.01	606.
	5-6		3.12	5.49	20		2.37	.1185	2872.53	340.
	6-7		3.24	8.16	50		4.92	.0984	5745.06	565.
	7-8		-5.26	-2.49	50		2.77	.0554	10053.86	556.
	8-9		13.70	17.46	100		3.76	.0376	16086.18	604.
2-3	4-5		2.93	34.0	20		31.07	1.5535		446.
	5-6		-0.252	7.48	20		7.732	.3866		444.
	6-7		-1.452	8.180	50		9.632	.19224		552.
	7-8		-8.98	-5.22	50		3.76	.0752		432.
	8-9		16.82	20.10	100		3.22	.0322		323.
3-4	5-6		-0.673	27.30	20		27.973	1.39865		401.
	6-7		-0.540	7.39	20		7.93	.3965		455.
	7-8		-8.26	-3.35	50		4.91	.0982		282.
	8-9		16.34	17.72	50		1.38	.0276		158.
4-5	6-7		-0.084	29.10	20		29.184	1.4592		419.
	7-8		-8.78	-3.71	20		5.07	.2535		291.
	8-9		13.03	16.91	50		3.88	.0776		222.
5-6	7-8		-9.07	9.96	20		19.03	.9515		273
	8-9		12.07	15.51	20		3.44	.172		197.
6-7	8-9		13.29	36.90	20		23.61	1.1805		339

AR102463

FARGO, BARRIENTES, WESSELMAN

LINE E (EXT.)

6-4-87

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a = 50'$ N=6

C_1C_2	P_1P_2	N	V_0	V_1^+	$\cancel{V_2^-}$ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ
1-2	34		9.83	19.76	20		9.9[illegible]	.4965	2[illegible]	142
	4-5		3.58	6.50	20		2.92	.146		16[illegible]
	5-6		3.37	6.21	50		2.8[illegible]	.056	2872.53	163
	6-7		-.386	4.090	50		4.47[illegible]	.089[illegible]	5745.06	514
	7-8		14.25	6.31	100		2.06	.0206	10053.[illegible]	207
	8-9		-1.588	3.600	200		5.188	.02594	16086.18	417
2-3	4-5		4.84	19.28	20		14.56	.728		209
	5-6		3.54	6.56	20		3.02	.151		173
	6-7		3.26	9.25	50		5.99	.1198		344
	7-8		-4.63	8.76	50		4.13	.0826		47[illegible]
	8-9		-3.61	2.53	100		6.14	.0614		617
	9-10		5.63	12.01	200		6.38	.0319		513
3-4	5-6		3.28	9.05	20		5.77	.2885		82.
	6-7		3.06	6.38	20		3.32	.166		190
	7-8		4.26	8.74	50		4.48	.0896		257
	8-9		-3.00	0.201	50		3.201	.06402		367
	9-10		5.65	9.46	100		3.81	.0381		38[illegible]
	10-11		2.04	6.68	200		4.64	.0232		37[illegible]
4-5	6-7		3.39	11.44	20		8.05	.4025		115.
	7-8		3.88	6.81	20		2.91	.1455		167.
	8-9		-1.823	2.760	50		4.583	.09166		263.
	9-10		4.59	7.26	50		2.67	.0534		306.
	10-11		2.60	4.57	100		1.97	.0197		198.
	11-12		2.61	6.47	200		3.86	.0193		310.

AR102464

LINE E (EXT.)

6-4-87

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$ $N = 6$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ
5-6	7-8		3.29	16.86	20		13.57	.6785		19
	8-9		-1.202	3.710	20		4.912	.2456		28
	9-10		4.36	9.65	50		5.29	.1058		30
	10-11		1.898	4.540	50		2.642	.05284		30
	11-12		3.13	3.95	50		.82	.0164		164
	12-13		0.798	4.810	200		4.012	.0201		32
6-7	8-9		-1.463	17.380	20		18.843	.94215		27
	9-10		4.98	10.24	20		5.26	.263		30
	10-11		2.12	7.37	50		5.25	.105		30
	11-12		3.14	5.61	50		2.47	.0494		28
	12-13		1.643	4.970	100		3.327	.03327		33
	13-14		0.587	5.380	200		4.793	.023965		38
7-8	9-10		4.31	20.20	20		15.89	.7945		22
	10-11		1.879	5.940	20		4.061	.20305		23
	11-12		3.83	7.92	50		4.09	.0818		23
	12-13		1.252	3.660	50		2.408	.04816		27
	13-14		-1.544	2.140	100		3.684	.03684		37
	14-15		-2.81	8.67	200		5.86	.0293		47
8-9	10-11		1.348	21.30	20		19.952	.9976		28
	11-12		3.09	8.31	20		5.22	.261		29
	12-13		2.34	8.75	50		6.41	.1282		36
	13-14		-0.199	2.870	50		3.069	.06138		35
	14-15		2.41	7.06	100		4.65	.0465		46
	15-16		-4.75	-2.67	200		2.08	.0104		16

AR102465

AKGO, BARRIENTES, WEESELMAN

LINE F

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_2^+}{4}$. $\rho_a = \pi N(N+1)(N+2)\, a\, \Delta V/I$ $a = 50'$ $N = 7$

$C_1 C_2$	$P_1 P_2$	N	V_0	V_1^+	V_2^+ I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
1-2	3-4		7.48	19.53	20		12.05	.6025		173.
	4-5		-3.95	9.58	20		13.53	.6765		777.
	5-6		3.70	4.16	20		.46	.023		66.
	6-7		12.30	16.66	50		4.36	.0872		500.
	7-8		-13.96	-5.60	50		8.36	.1672		1681.
	8-9		-4.28	-3.26	50		1.02	.0204		328.
	9-10		7.88	9.19	100		1.31	.0131	24129.27	3
2-3	4-5		-4.97	33.60	20		38.57	1.9285		553.
	5-6		4.30	16.71	20		12.41	.6205		712.
	6-7		10.63	18.63	50		8.00	.1600		459.
	7-8		-8.33	-3.60	50		4.73	.0946		543.
	8-9		-4.050	0.283	100		4.333	.04333		435.
	9-10		5.73	7.24	100		1.51	.0151		12.
	10-11		-0.556	-2.80	100		—	—		—
3-4	5-6		3.13	16.72	20		13.59	.6795		195.
	6-7		11.03	18.50	20		7.47	.3735		429.
	7-8		-9.110	-1.297	50		7.813	.17626		506.
	8-9		-0.380	-1.855	50		2.235	.0447		23.
	9-10		8.01	10.53	100		2.52	.0252		253.
	10-11		-2.330	-1.214	100		1.116	.01116		179.
	11-12		-1.178	0.822	200		2.000	.0100		241.
4-5	6-7		12.22	31.80	20		19.58	.979		281.
	7-8		-9.19	[illegible].89	20		6.30	.315		361.
	8-9		-0.837	3.460	50		4.297	.08594		246.
	9-10		6.08	7.30	50		1.22	.0244		140.
	10-11		-2.110	-0.485	100		1.625	.01625		163.
	11-12		-2.21	-1.[illegible]	[illegible]		.95	.0095		52.

AR102466

LINE F

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = [\pi N(N+1)(N+2)a]\,\Delta V/I$ $a = 50'$ $N = 7$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
5-6	7-8		-8.01	(6.01)	20		14.02	[illegible]		20
	8-9		0.17	2.81	20		2.98	.149		171
	9-10		5.52	7.43	50,		1.91	.0382		109.
	10-11		-1.461	-0.885	50		.576	.01152		66.
	11-12		-0.496	0.455	100		.951	.00951		95.
	12-13		0.59	5.02	100		4.43	.0443		712
	13-14		5.18	1.761	200		—	—		—
6-7	8-9		0.622	14.890	20		14.268	.7134		204
	9-10		5.39	8.96	20		3.57	.1785		205
	10-11		-1.616	0.742	50		2.358	.04716		135
	11-12		-10.094	3.00	100		3.094	.03094		177.
	12-13		3.19	6.89	200		3.70	.0185		186
	13-14		9.68	7.01 -5.77	100		—	—		—
7-8	9-10		5.29	19.53	20		14.24	.712		204.
	10-11		1.965	1.482	20		2.447	.12235		140.
	11-12		0.025	6.640	~~50~~ 100		6.615	.06615		190.
	12-13		4.39	7.77	~~50~~ 100		3.38	.0338		194
	13-14		-6.98	9.01	100		2.03	.0203		20[illegible]
8-9	10-11		-2.04	10.25	20		12.29	.6145		176.
	11-12		-0.066	3.870	20		3.936	.1968		220
	12-13		2.15	6.32	50		4.17	.0834		237
	13-14		7.84	11.96	100		4.12	.0412		236
9-10	11-12		-10.003	21.30	20		21.303	1.06515		305.
	12-13		3.33	8.43	20		5.10	.255		293
	13-14		9.74	14.74	50		5.00	.100		287.

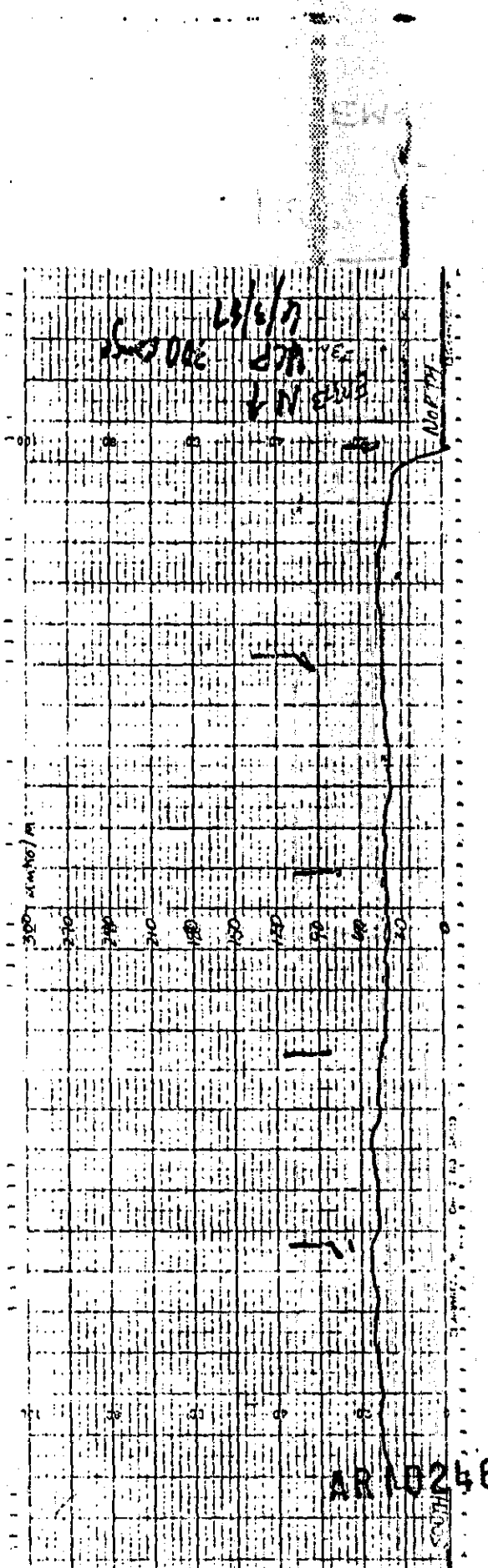
AR102467

LINE F 6-4-87

$\Delta V = V_1^+ - V_0$ $\Delta V = \frac{V_1^+ - 2V_2^- + V_3^+}{4}$. $\rho_a = \pi N(N+1)(N+2)a\,\Delta V/I$ $a = 50'$

C_1C_2	P_1P_2	N	V_0	V_1^+	V_2^- I	V_3^+	ΔV	$\Delta V/I$	G.F.	ρ_a
10-11	12-13		1.741	18.600	20		16.859	.84295		242.
	13-14		11.418	20.[illegible]	50.		9.42	.1884		216.
11-12	13-14		12.11	26.90	20		14.79	.7395		212.

AR102468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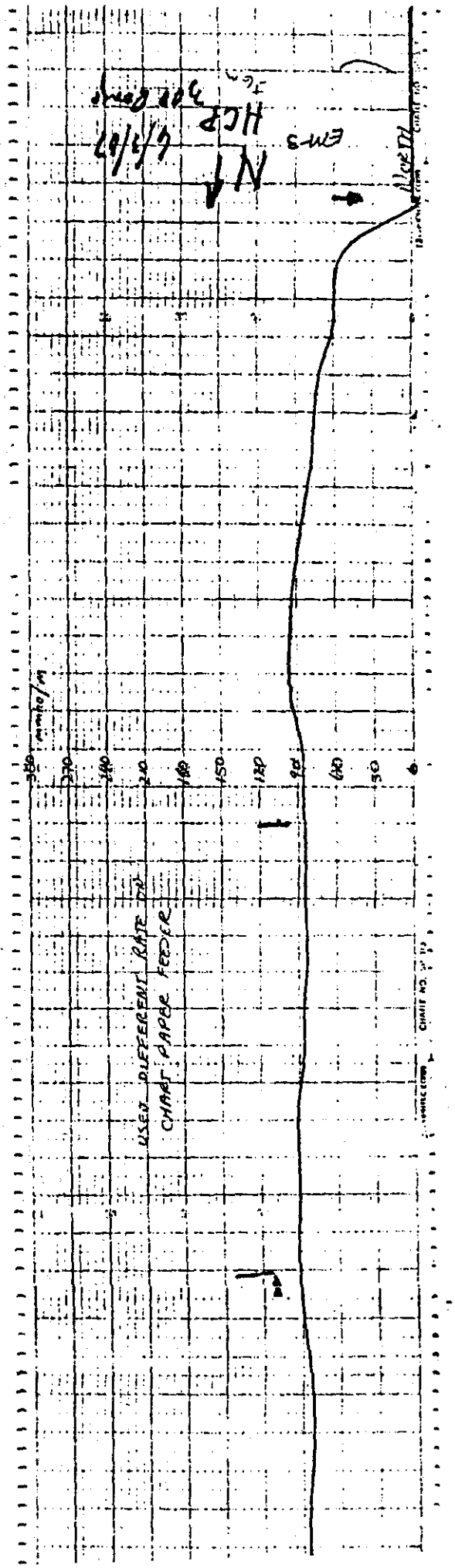
SOUTH
mmho/m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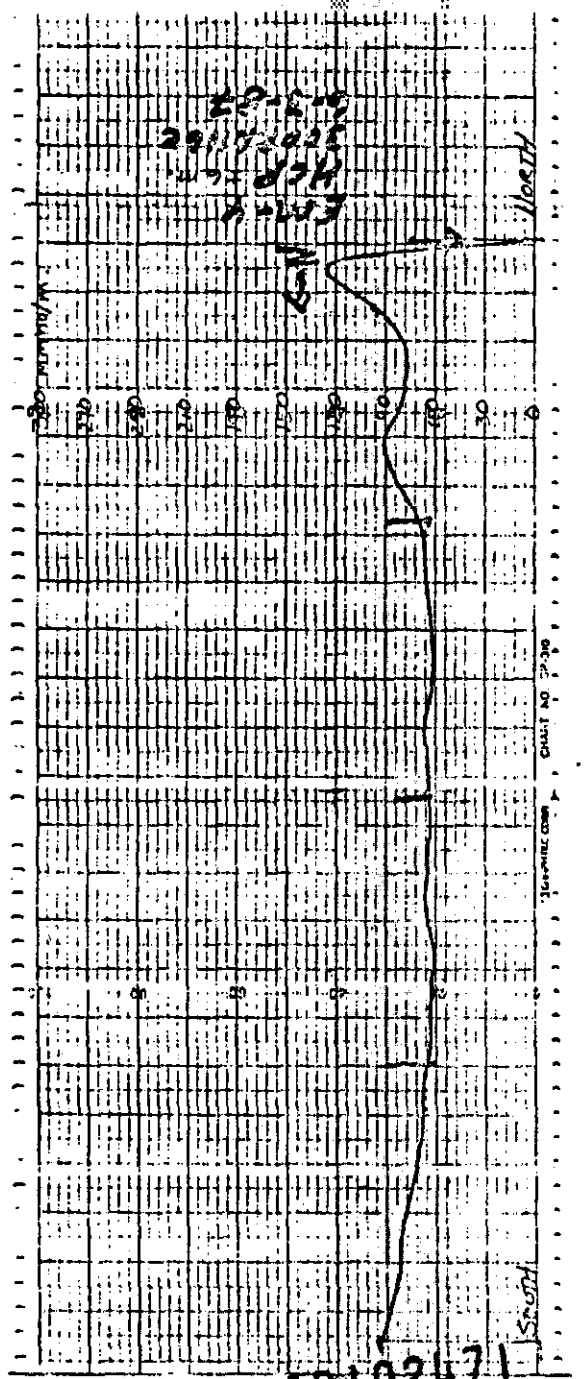
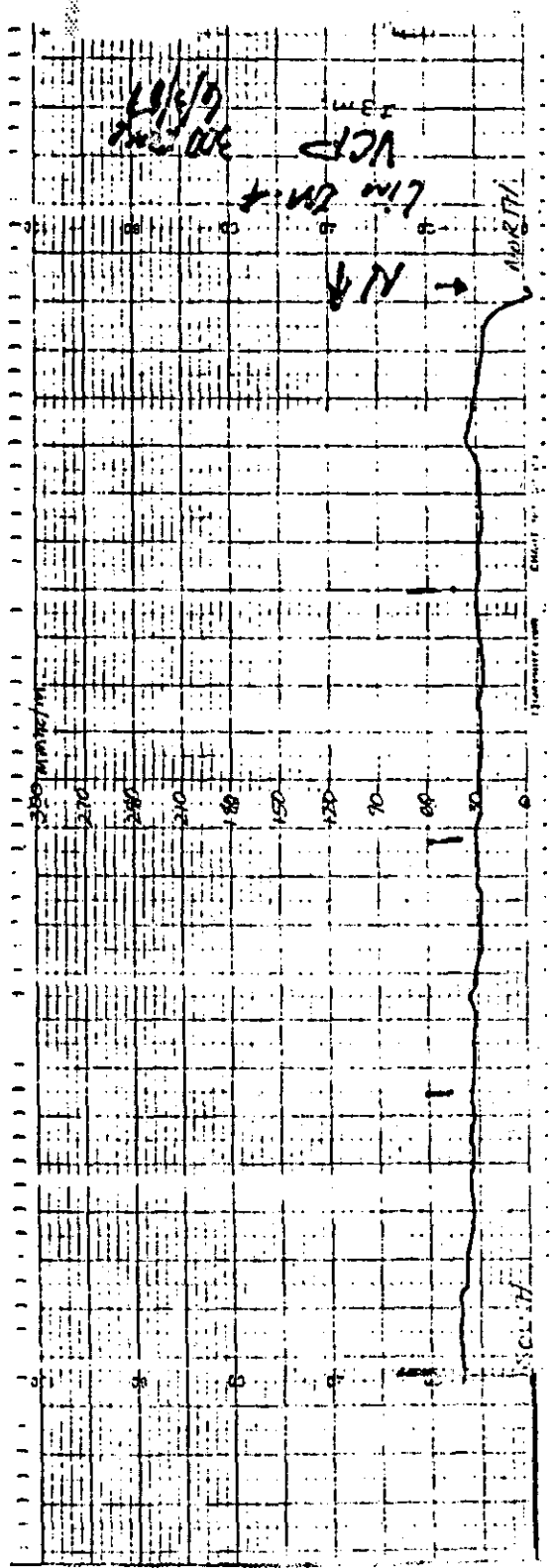
mmho/m
USED DIFFERENT RATE ON
CHART PAPER FEEDER

AR102469

HCP 300 Range
L-3-87
EM-3

AR102470





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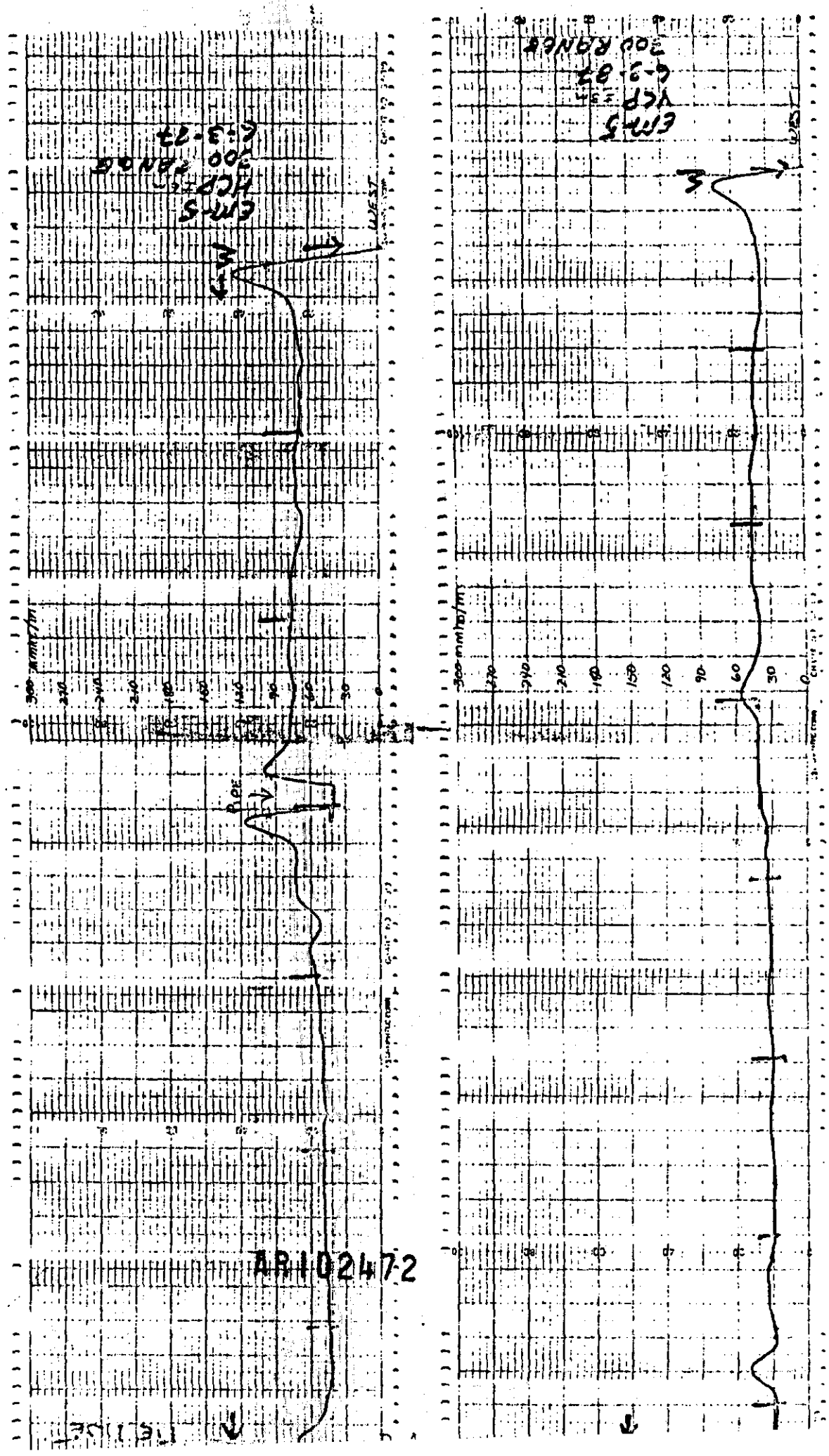
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HCP
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6-3-87
WEST
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240
210
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150
120
90
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30
0
EM-5
VCP
6-3-87
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WEST
300 mmho/m
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120
90
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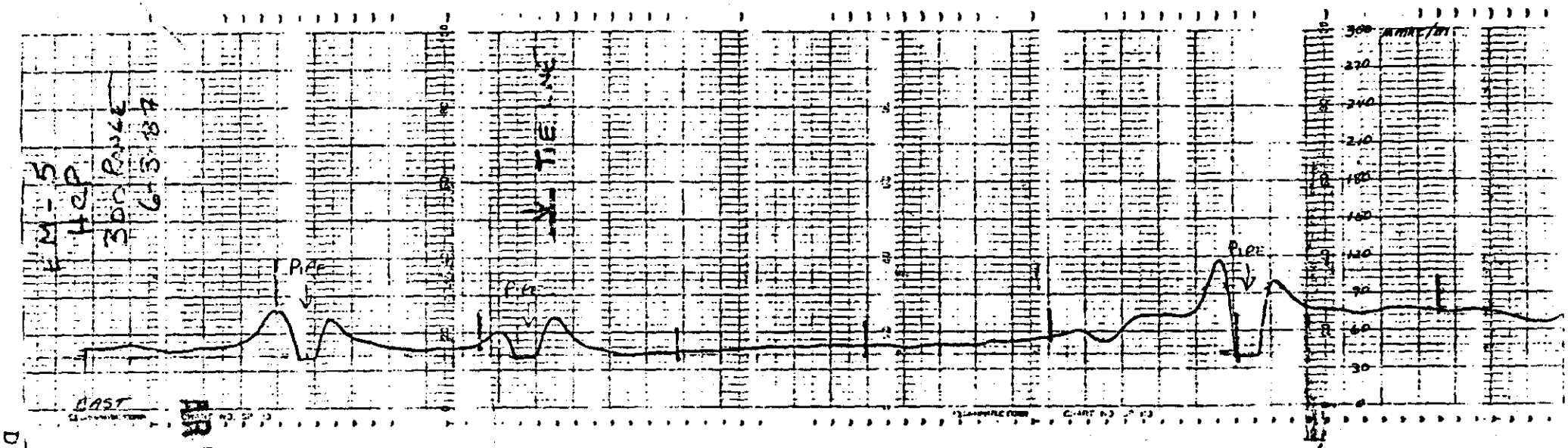
AR102472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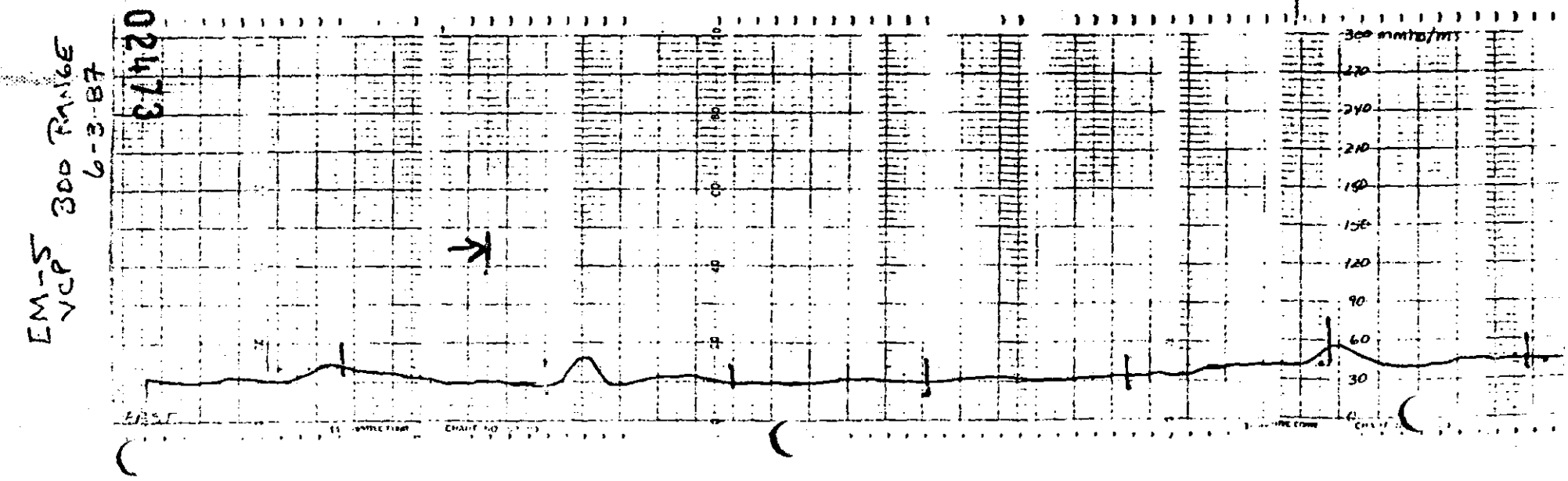
HCP
300 RANGE
6-3-87
PIPE
PIPE
PIPE
300 mmho/m
270
240
210
180
150
120
90
60
30
0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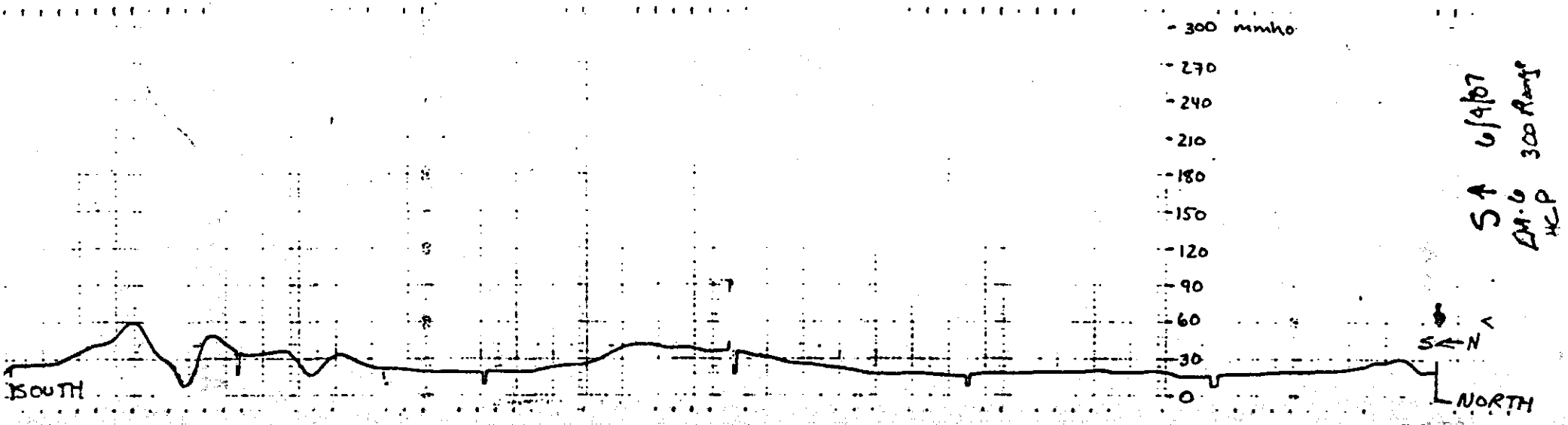
VCP
300 RANGE
6-3-87
300 mmho/m
270
240
210
180
150
120
90
60
30
0

AR102473


300 mmho
270
240
210
180
150
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90
60
30
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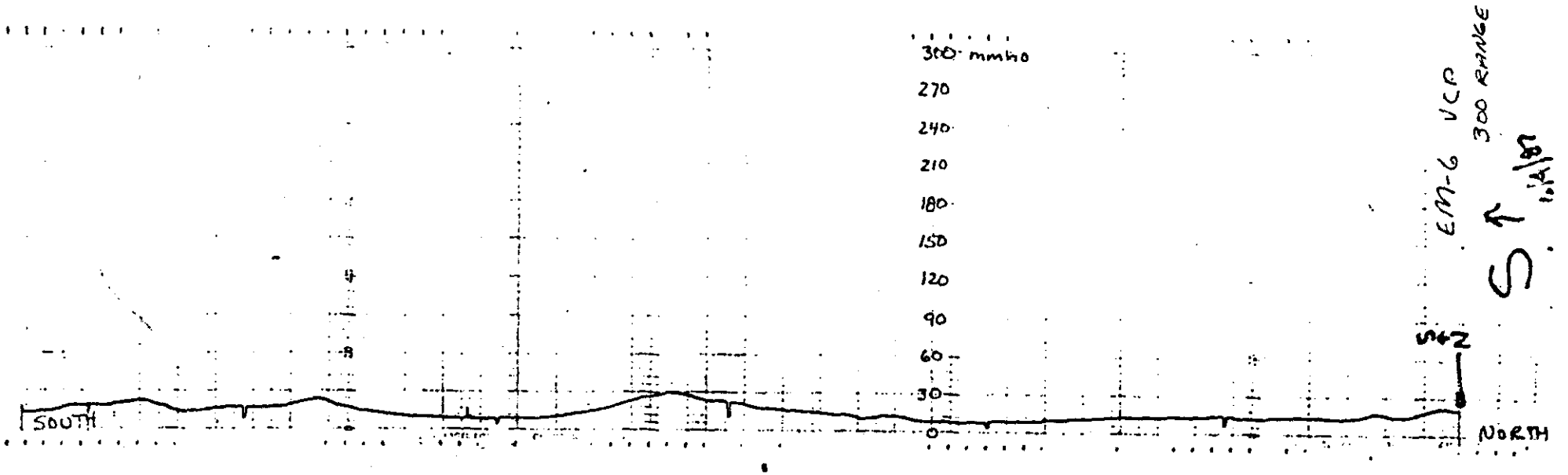
SOUTH
NORTH
S←N
S↑ 6/9/07
EM-6 300 Range
HCP

AR102474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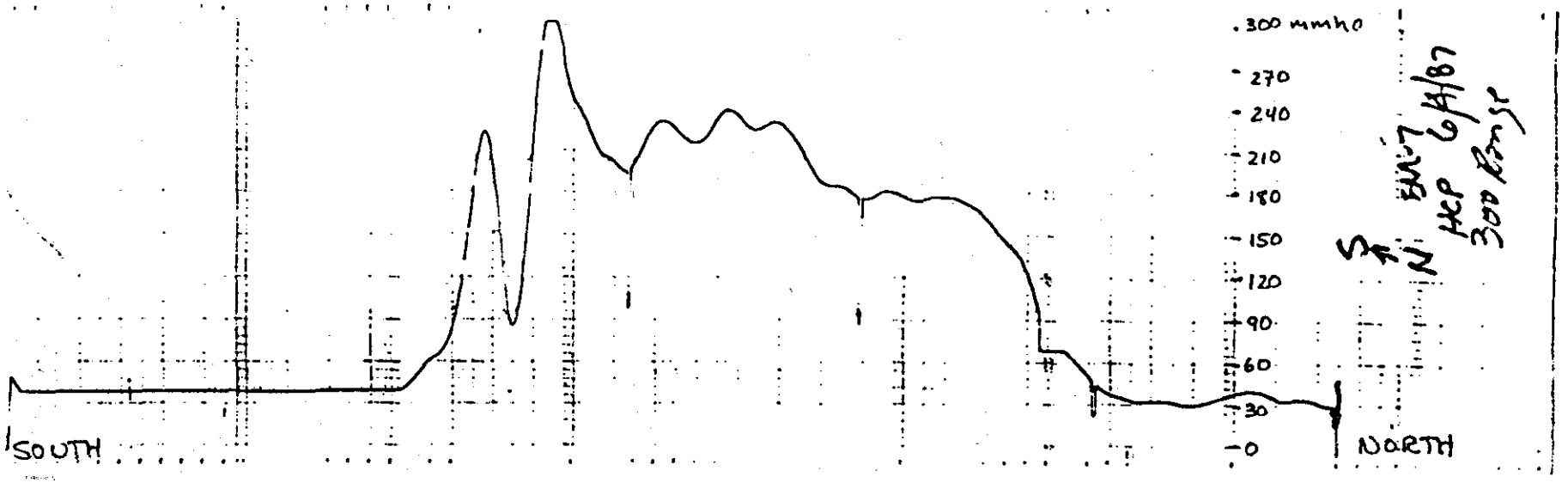
270
240
210
180
150
120
90
60
30
0
SOUTH
NORTH
S+N
EM-6 VCP
300 RANGE
S
1.4/87

AR102475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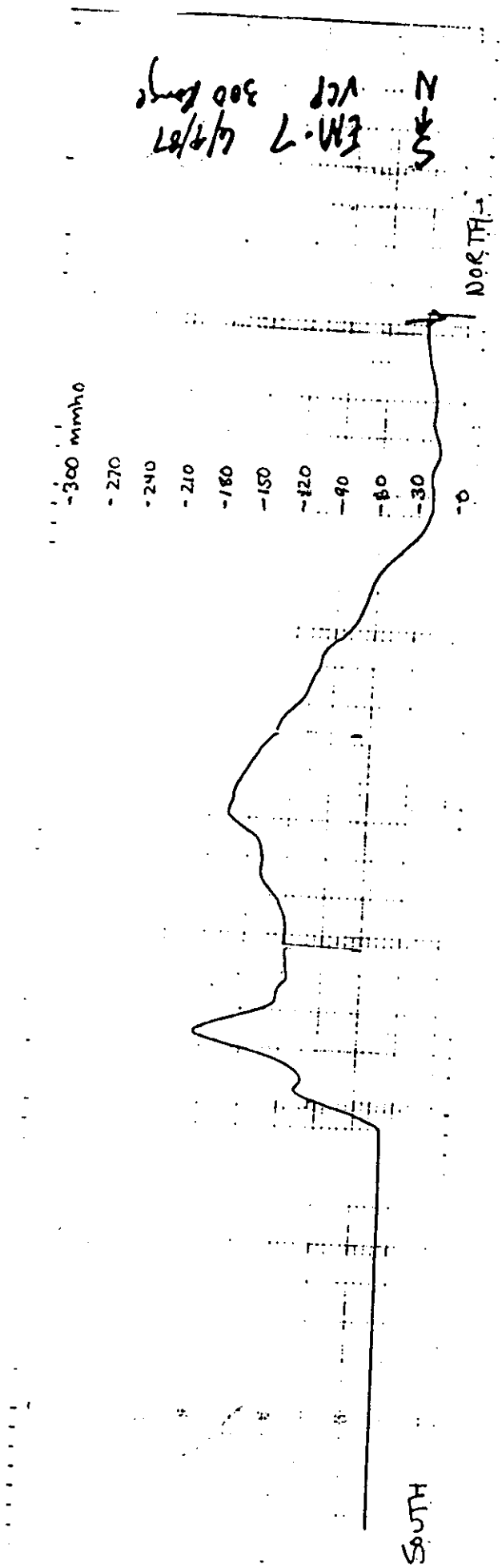
270
240
210
180
150
120
90
60
30
0
SOUTH
NORTH
S
N
EM-7
HCP 6/4/87
300 Range

AR102476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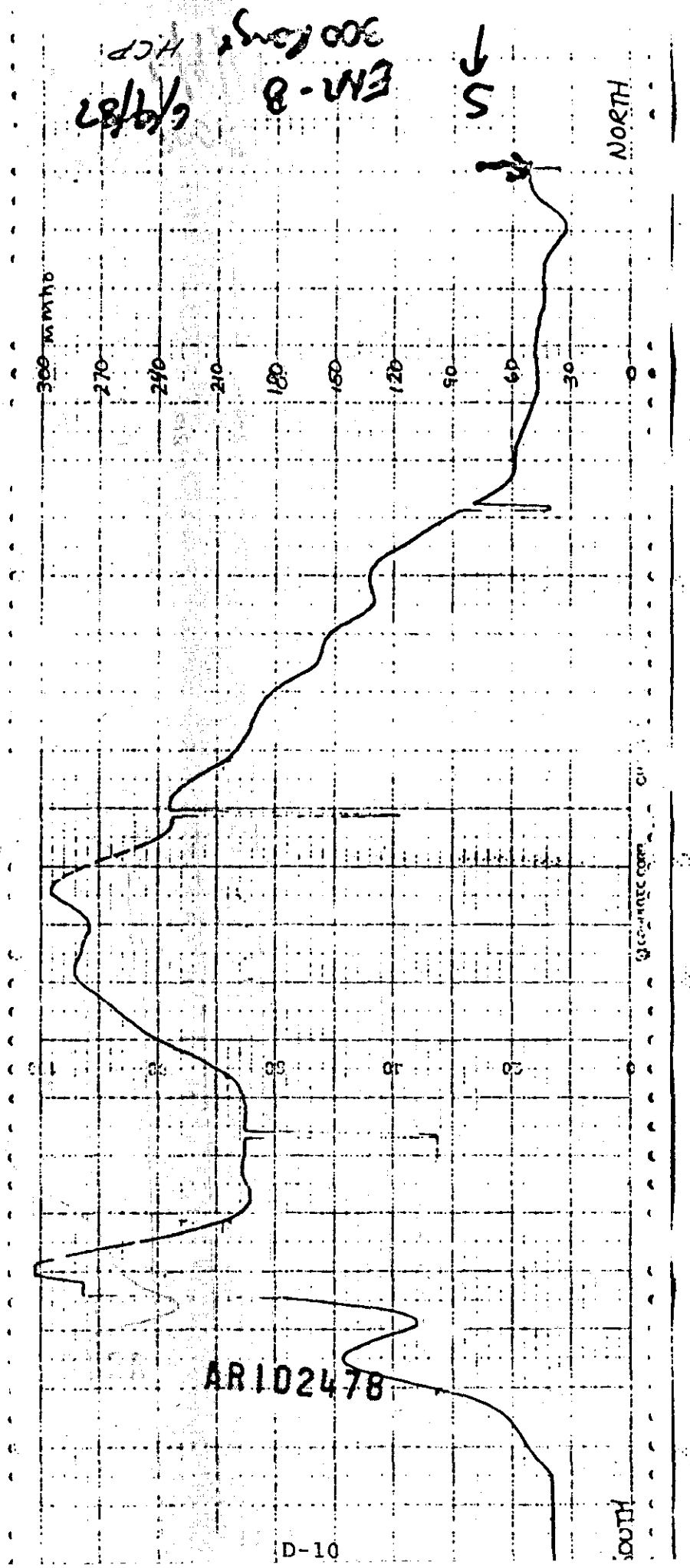

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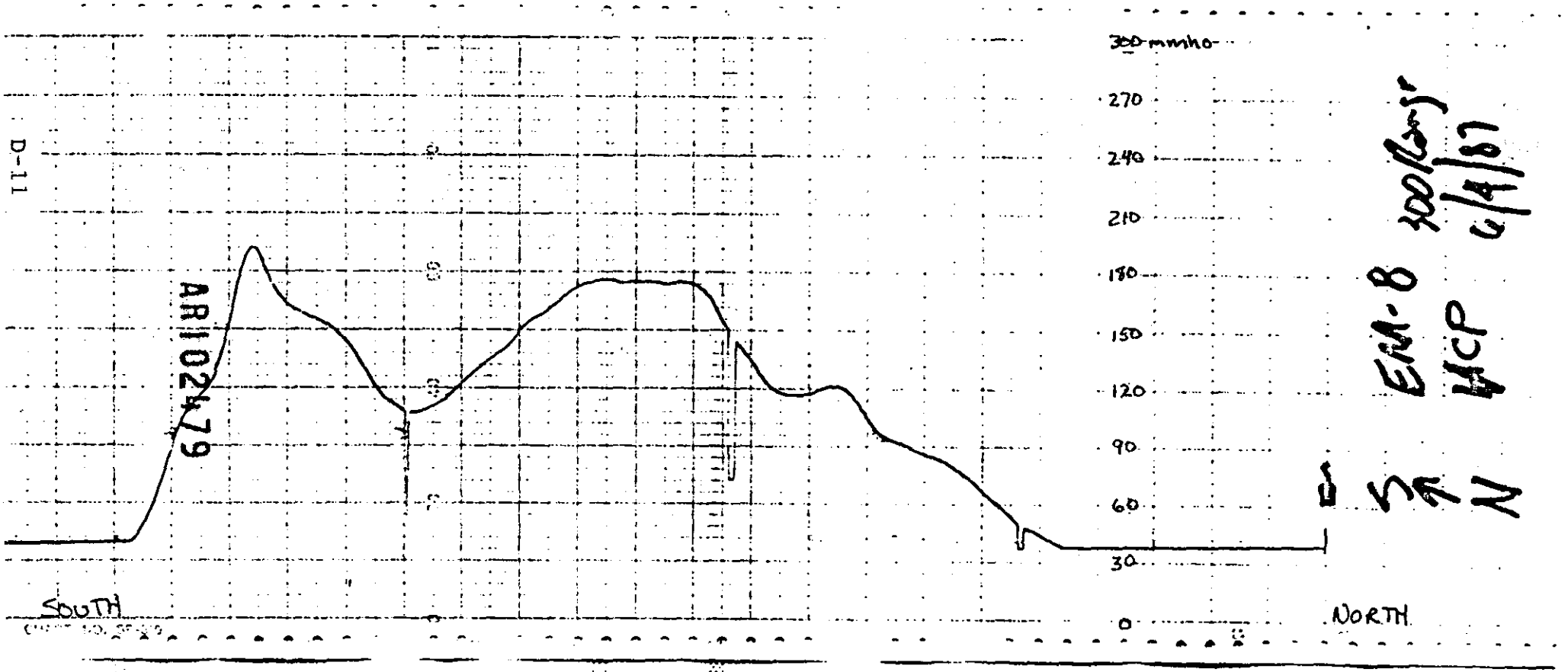
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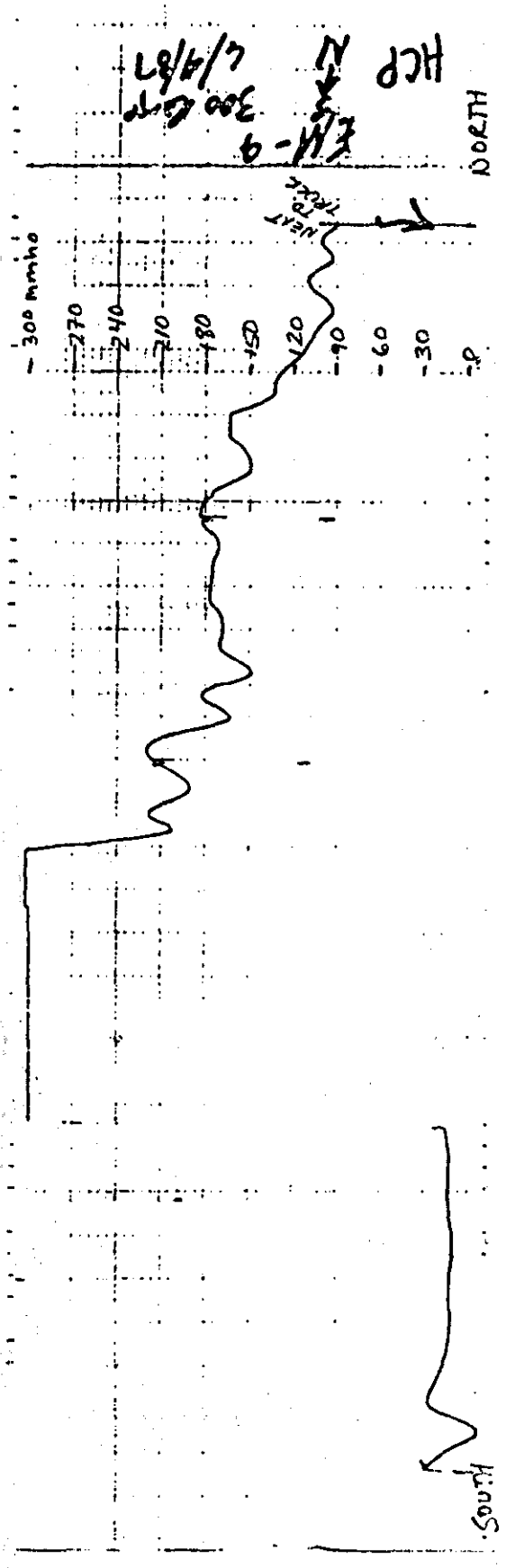
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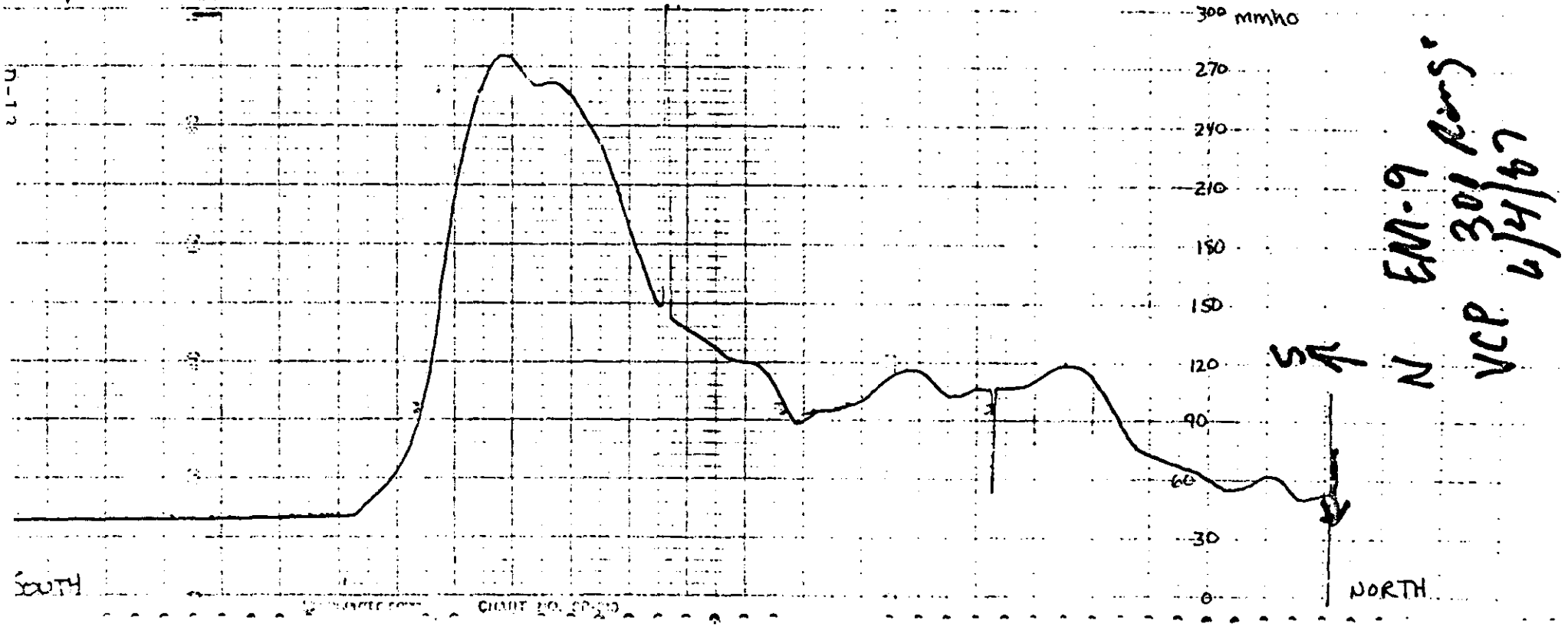
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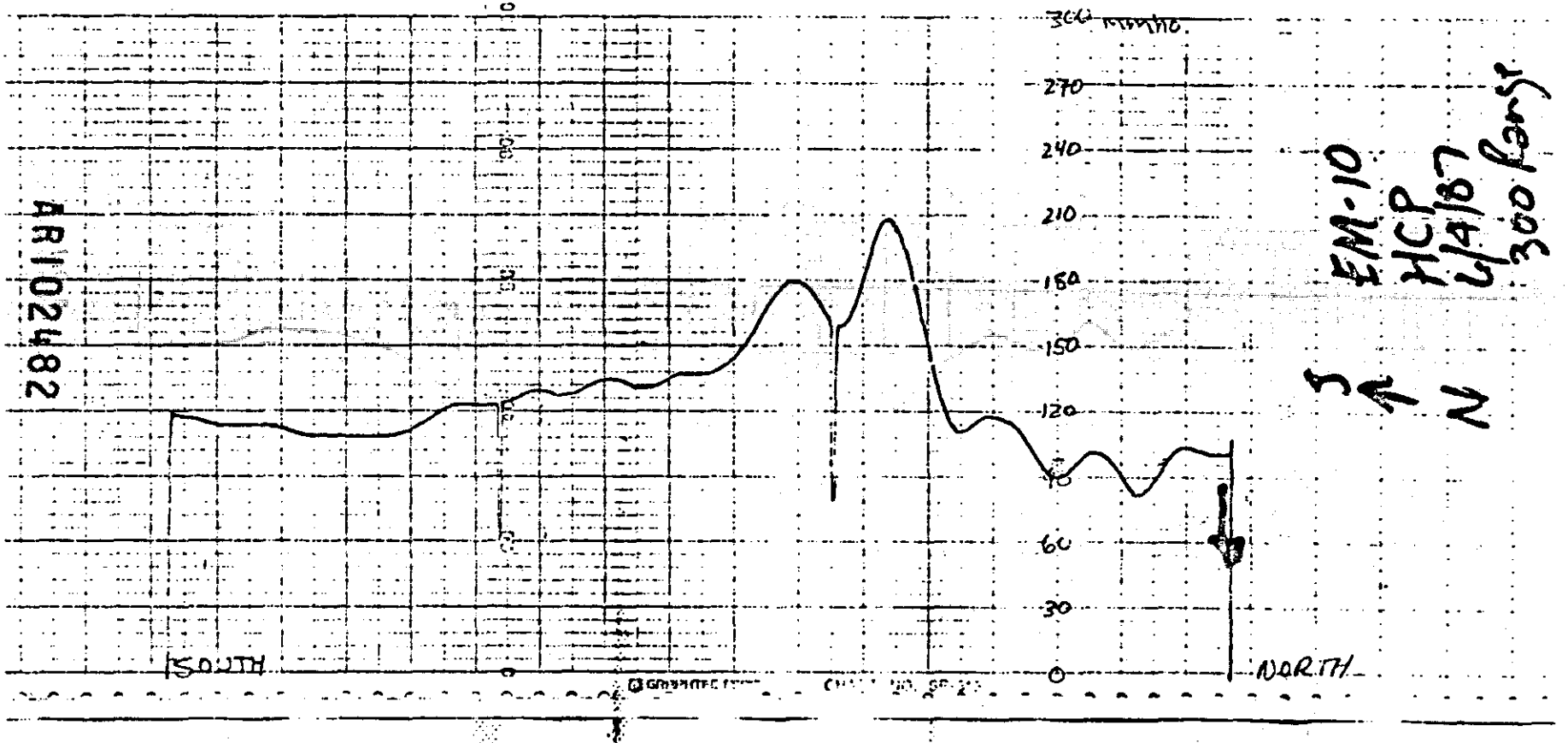
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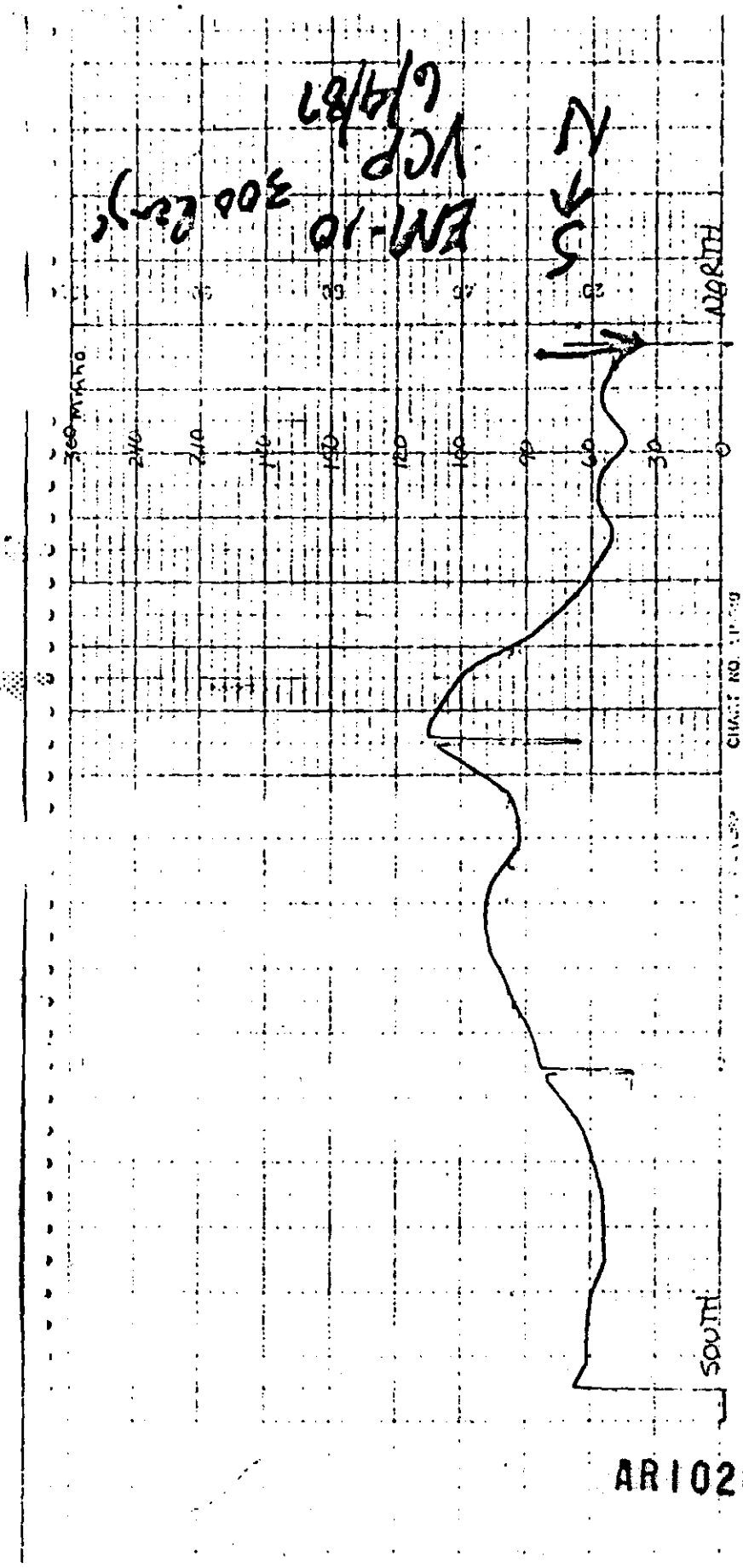
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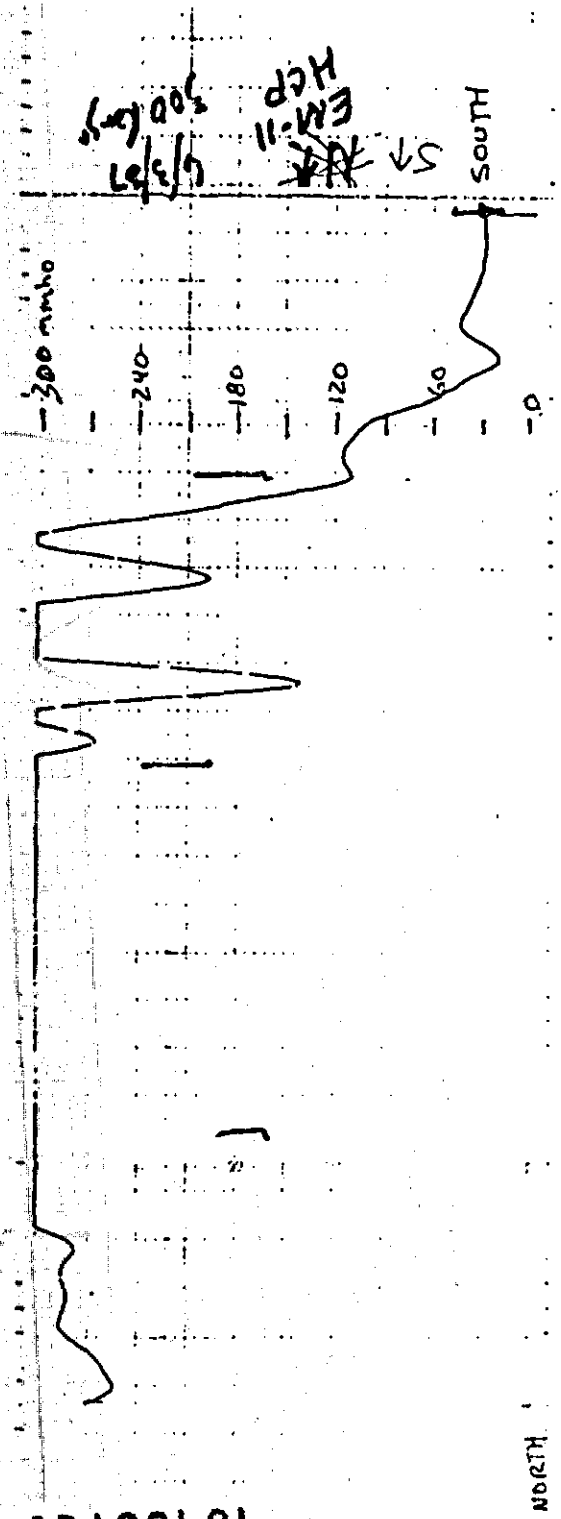

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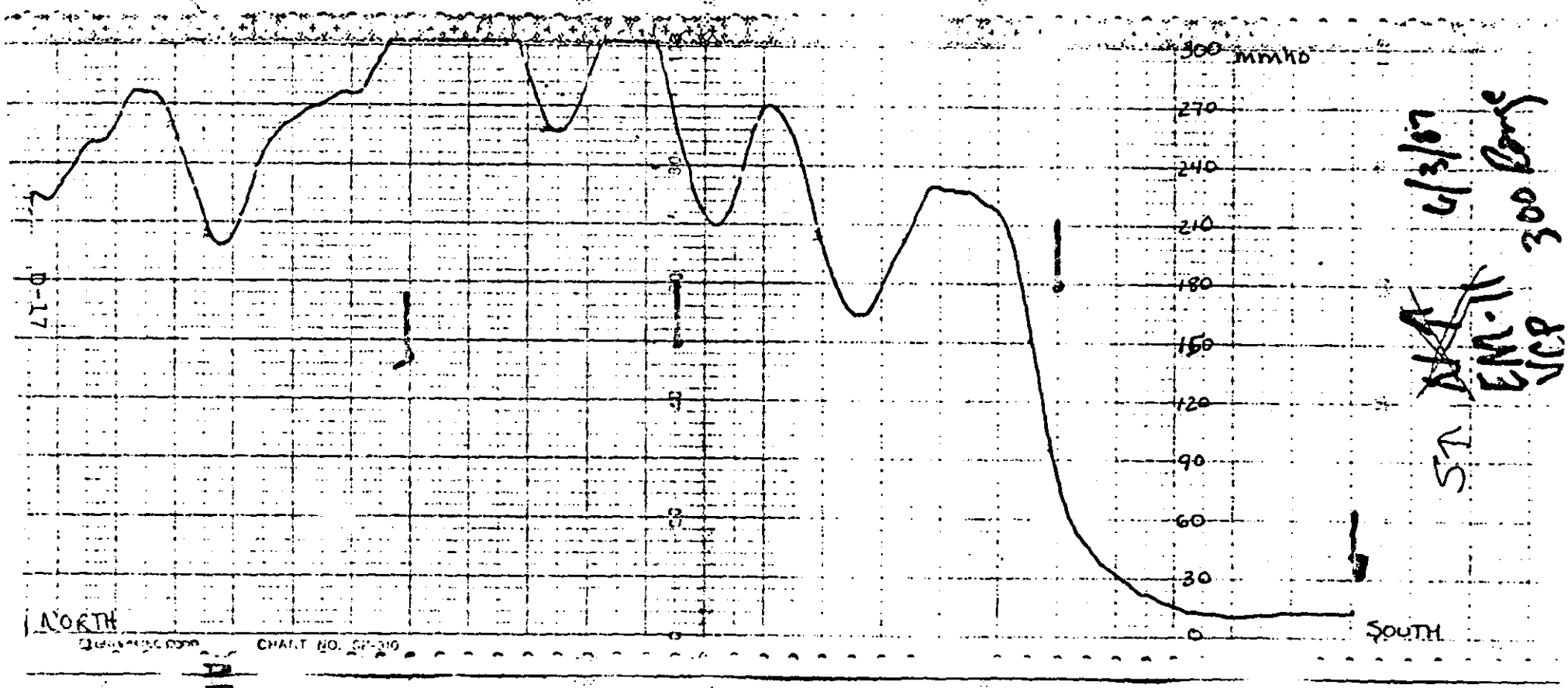

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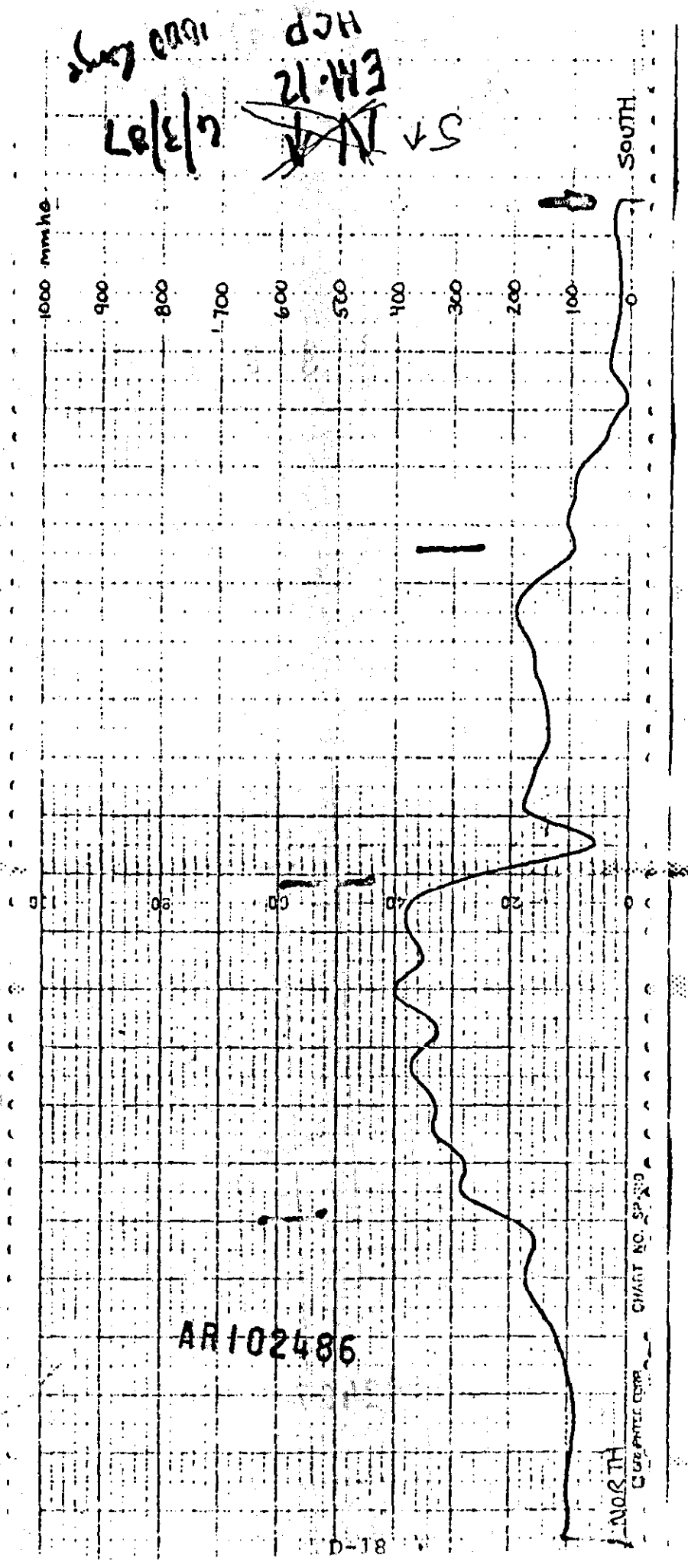

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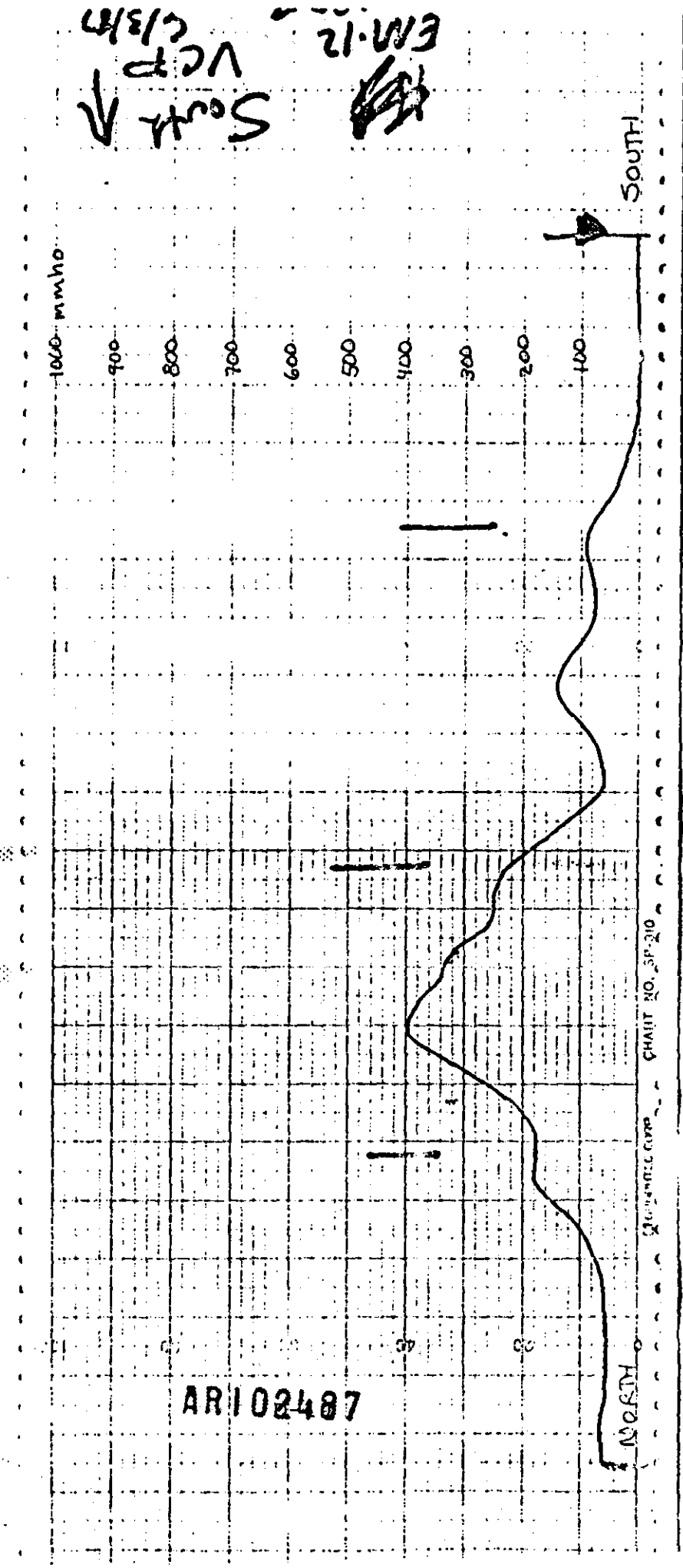
AR102486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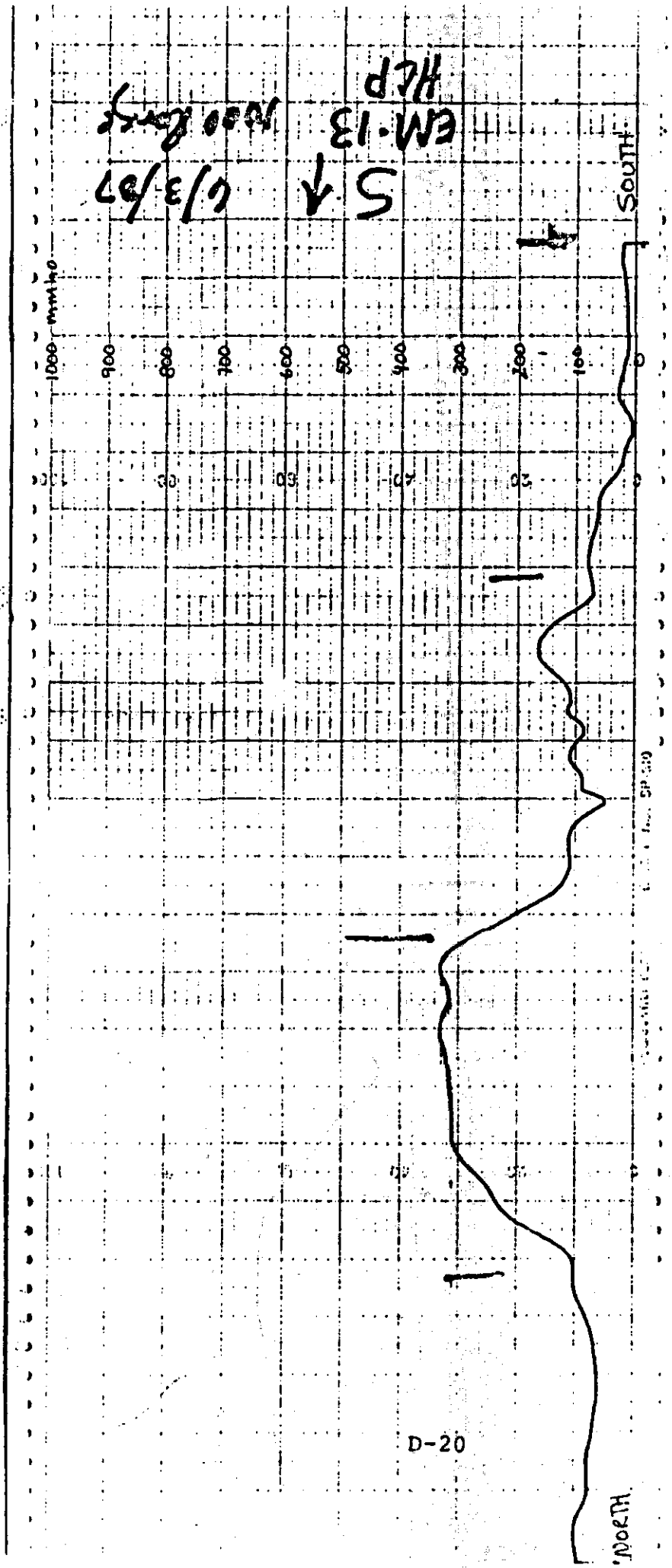
AR102487



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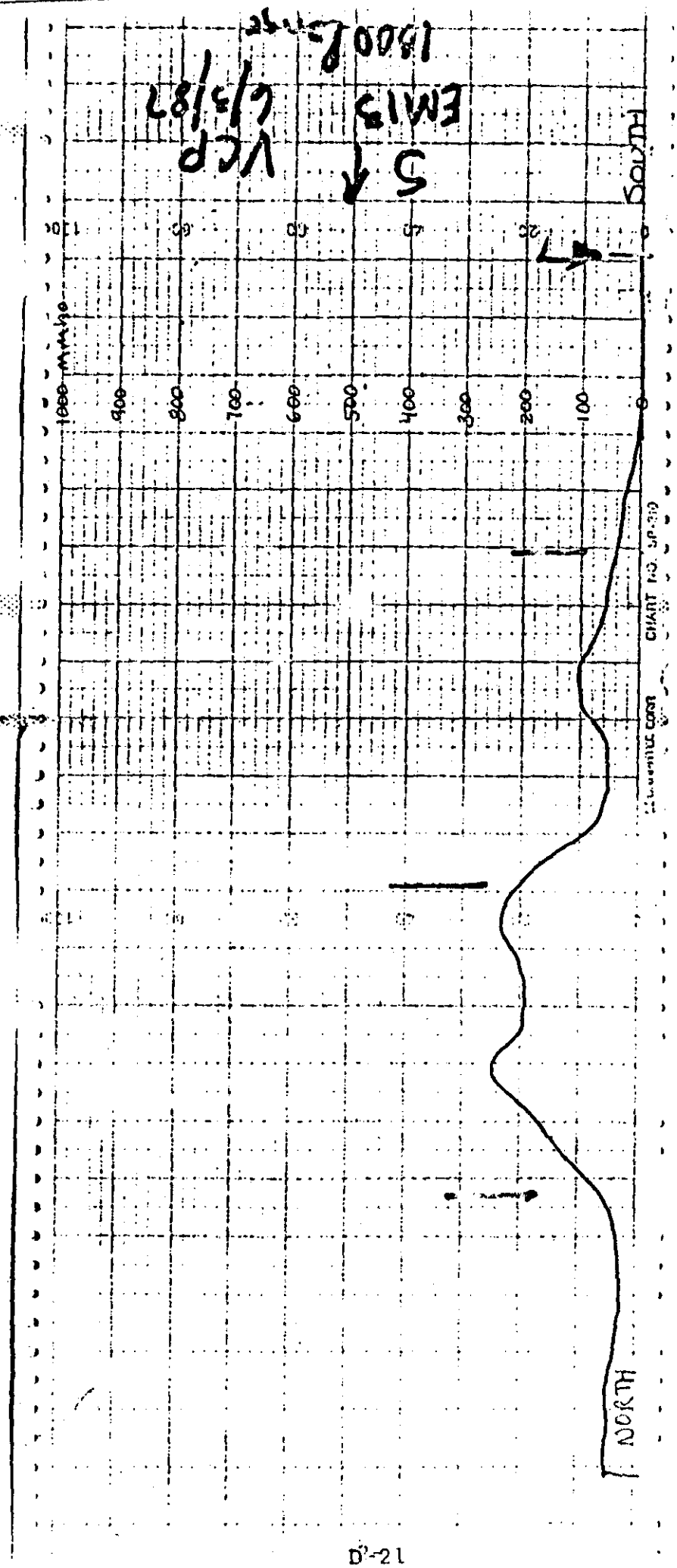
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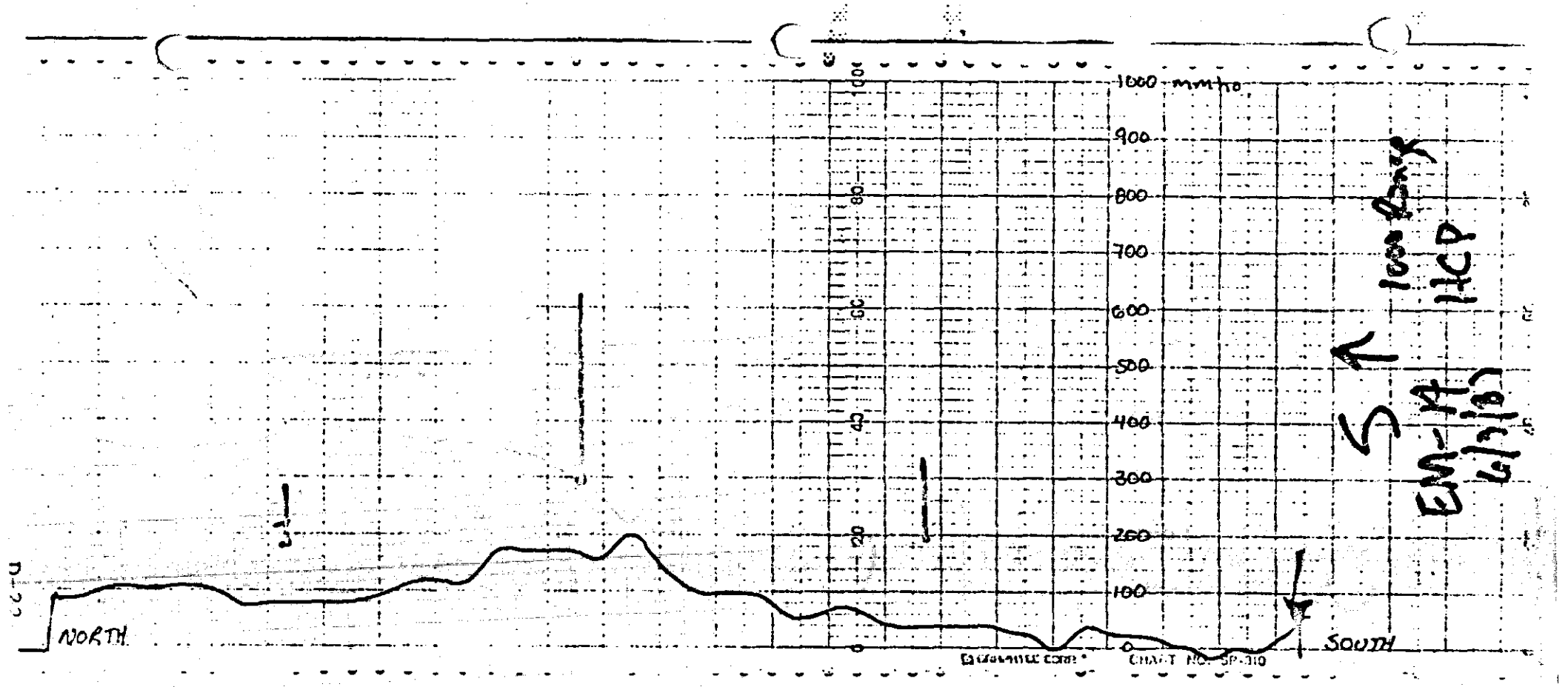
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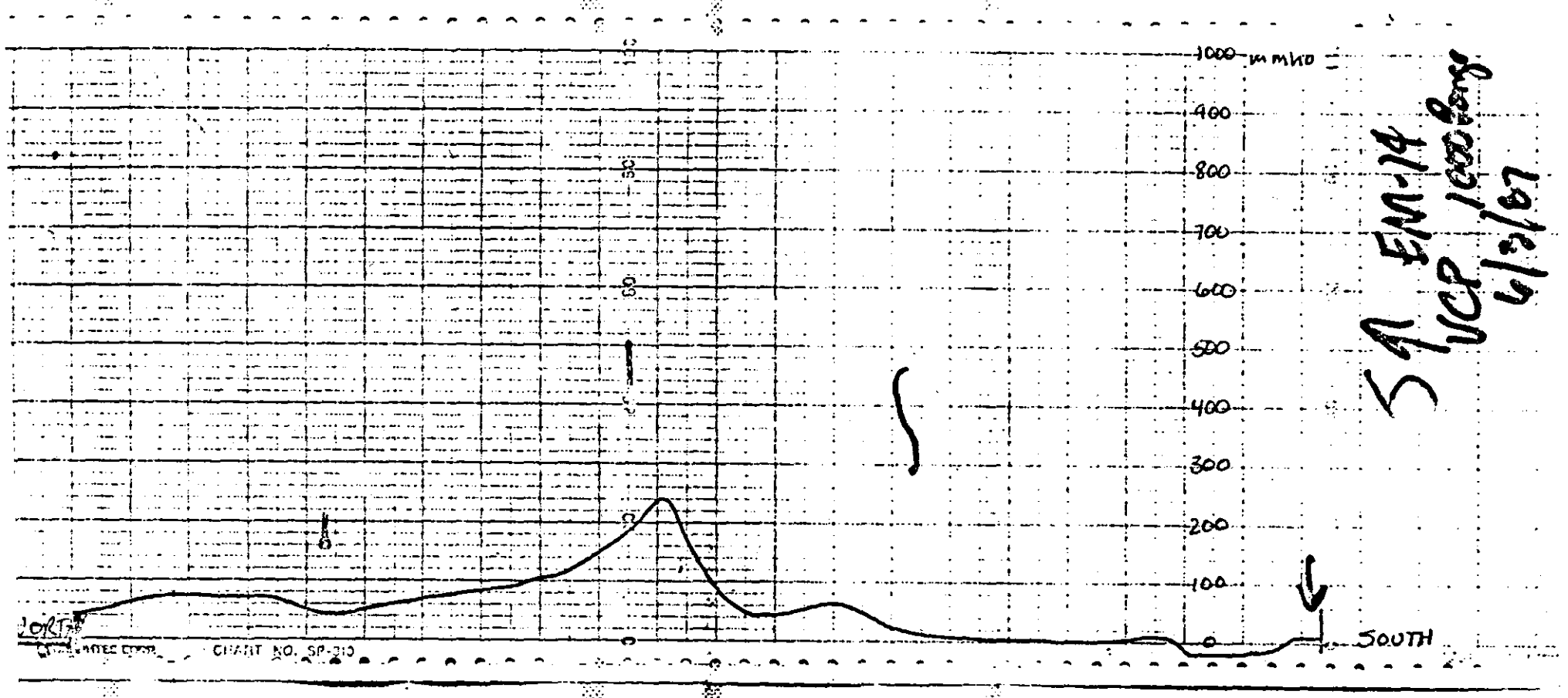

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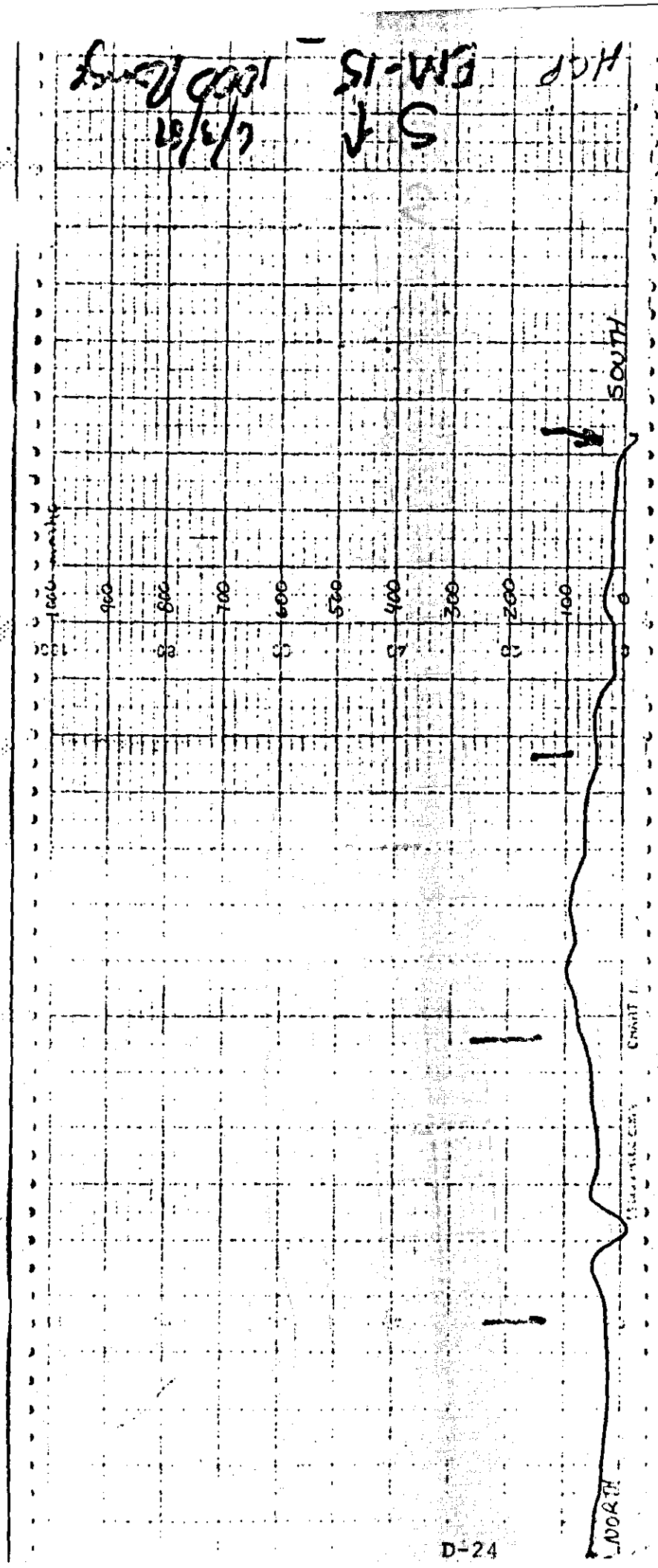
6/3/87

AR102491



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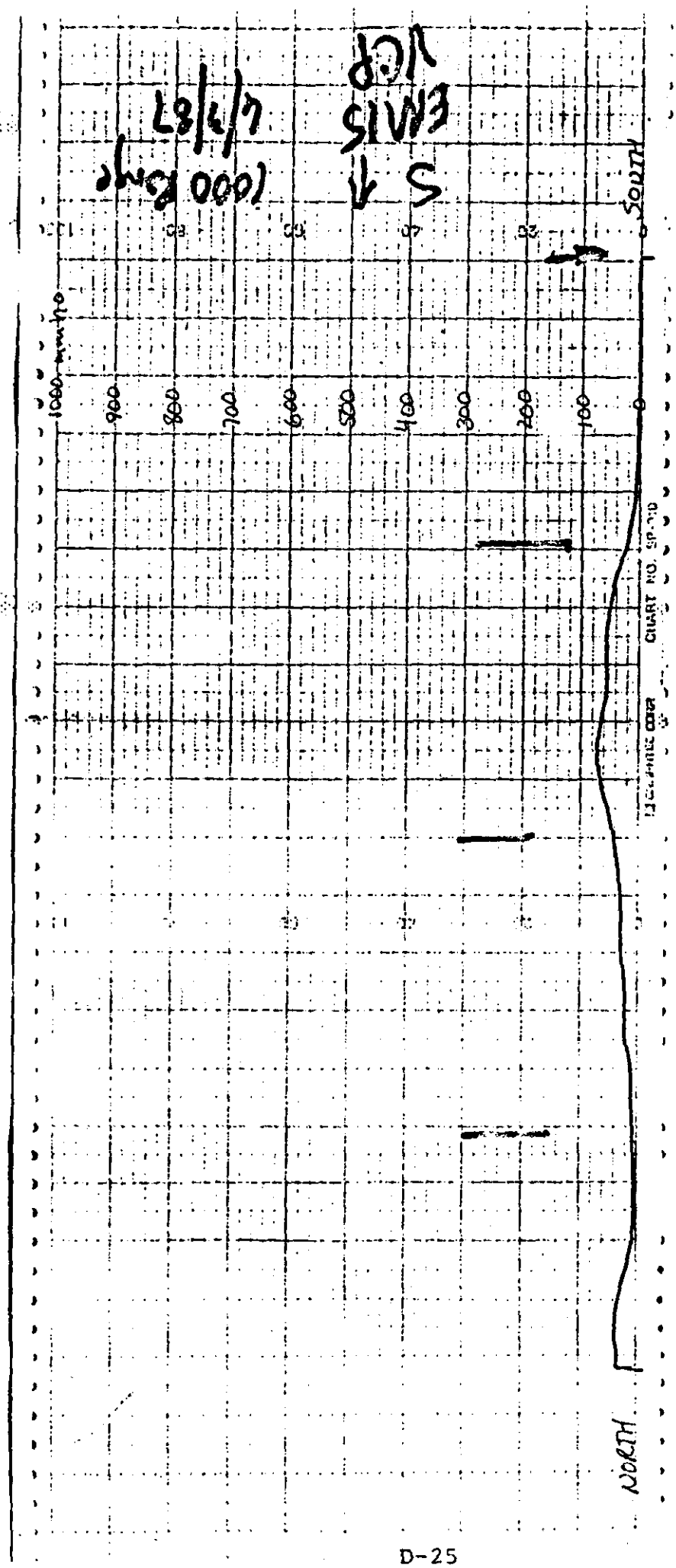
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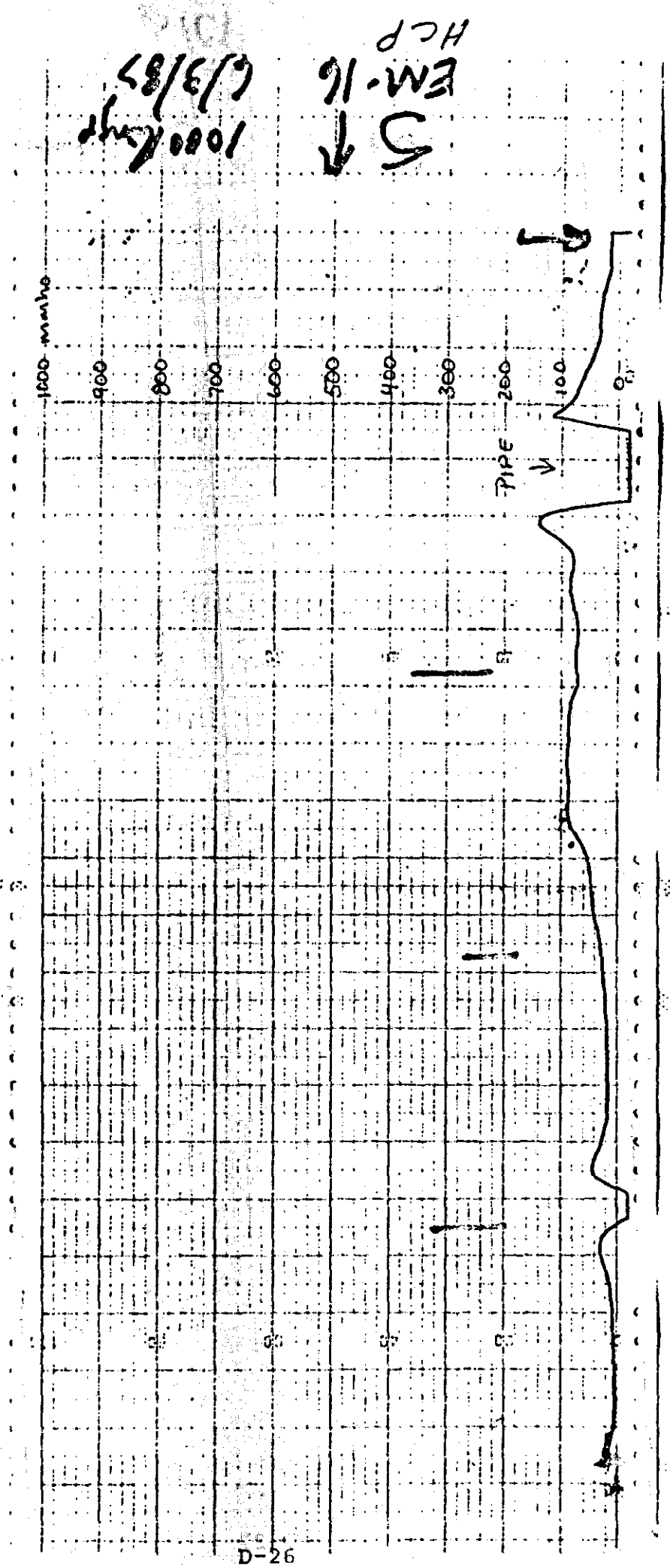
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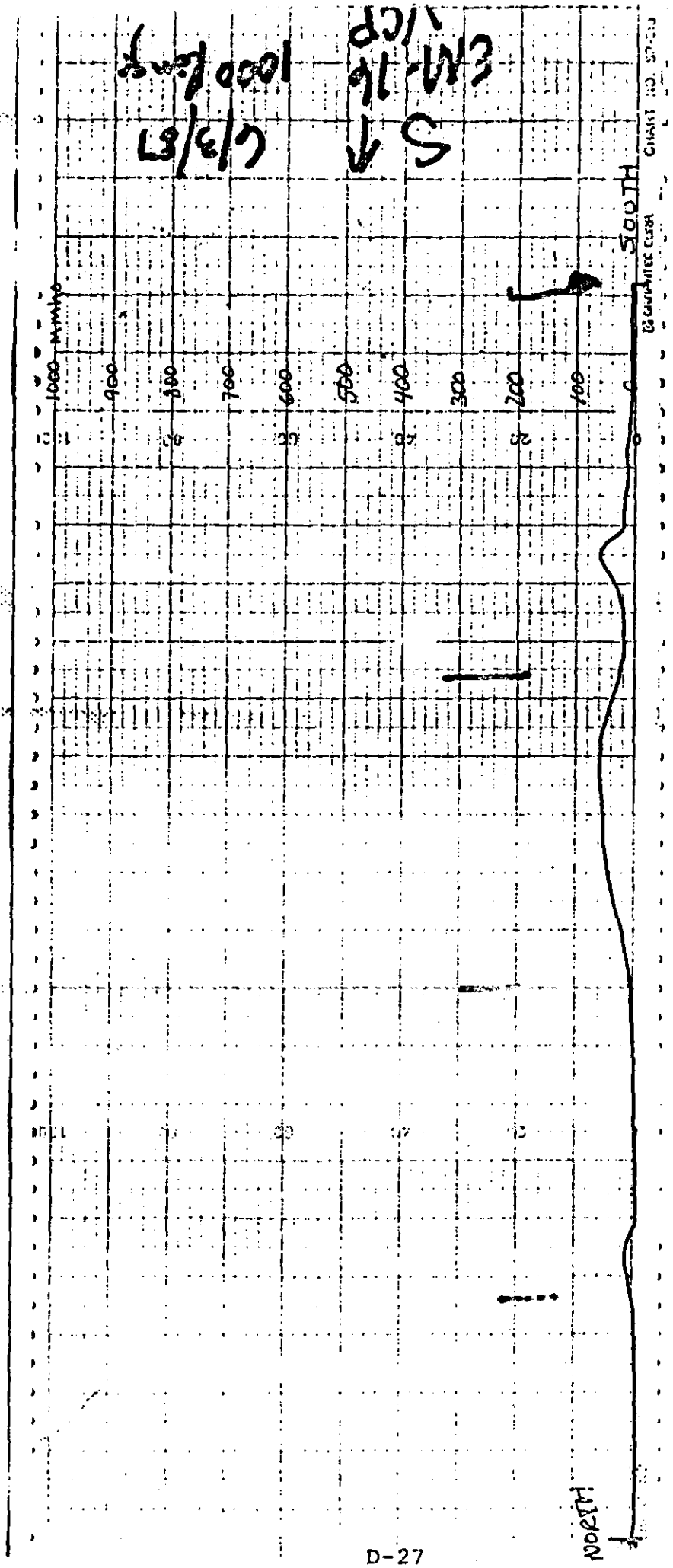

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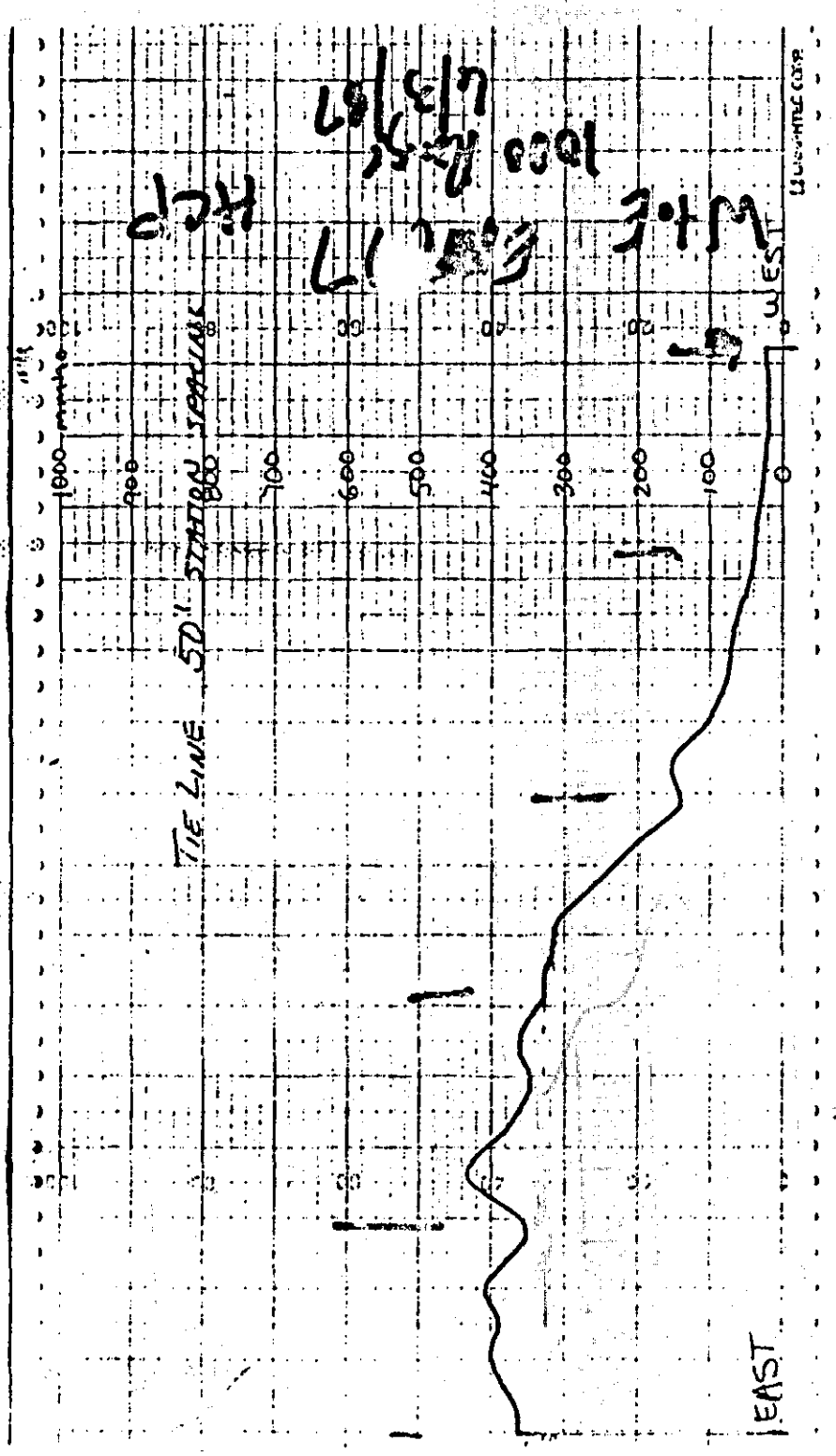
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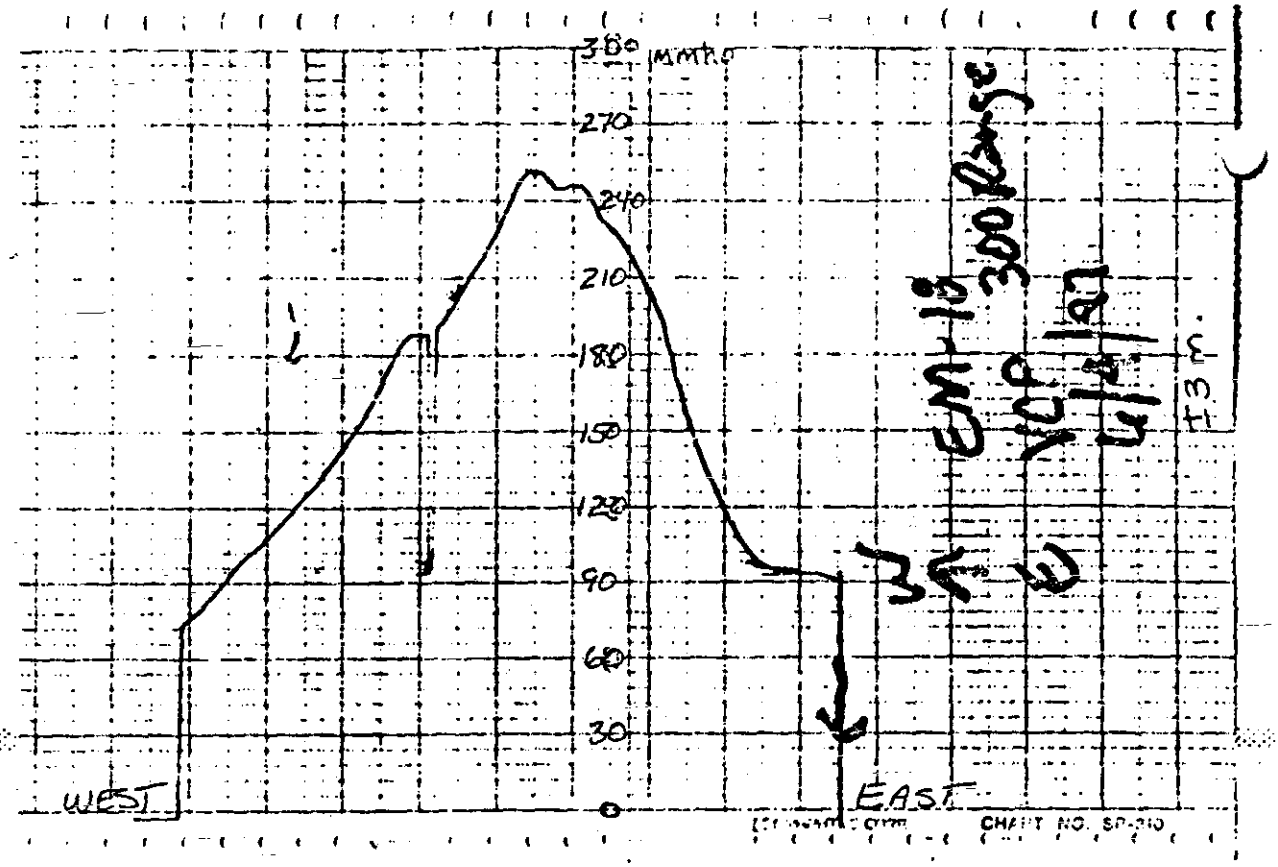
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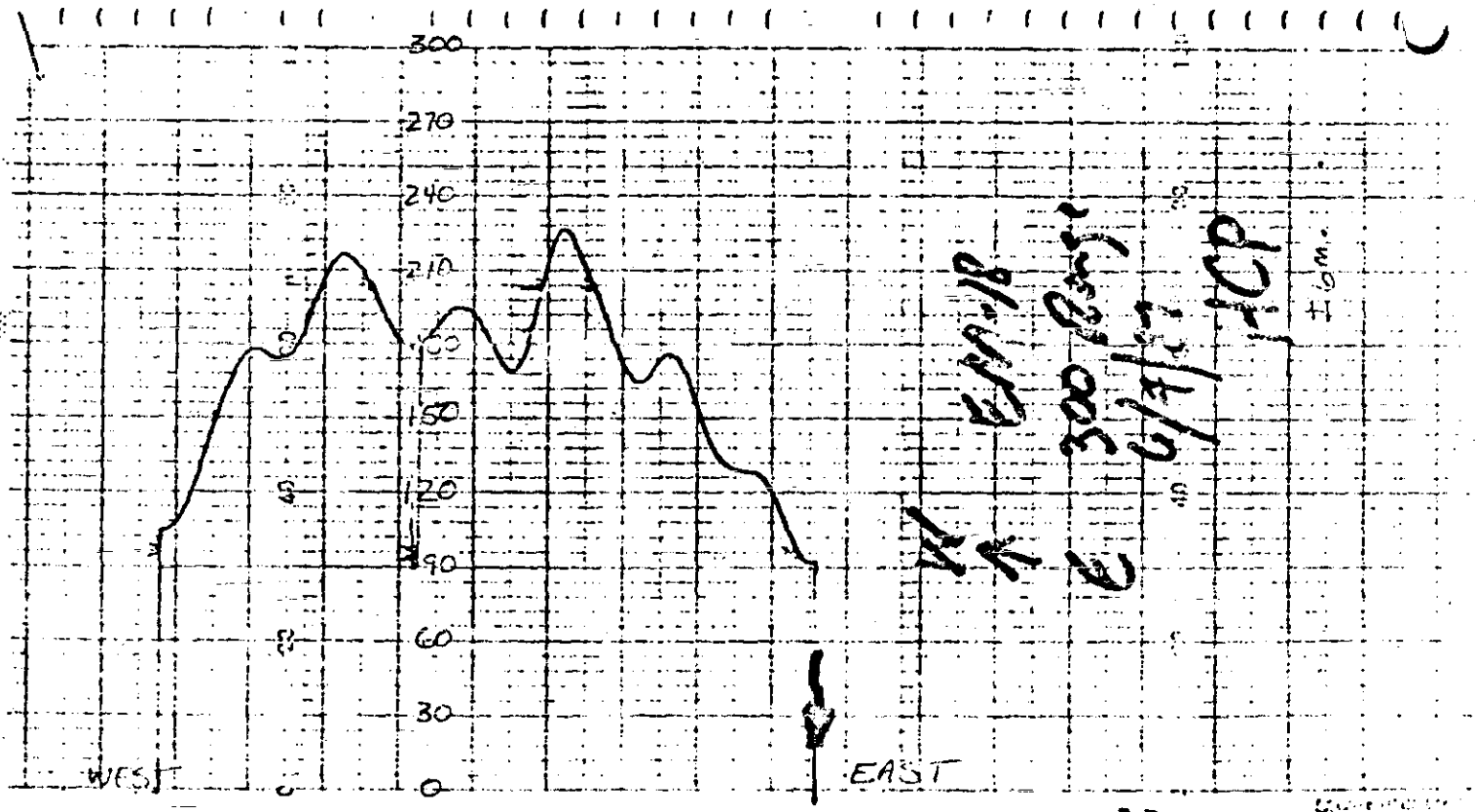
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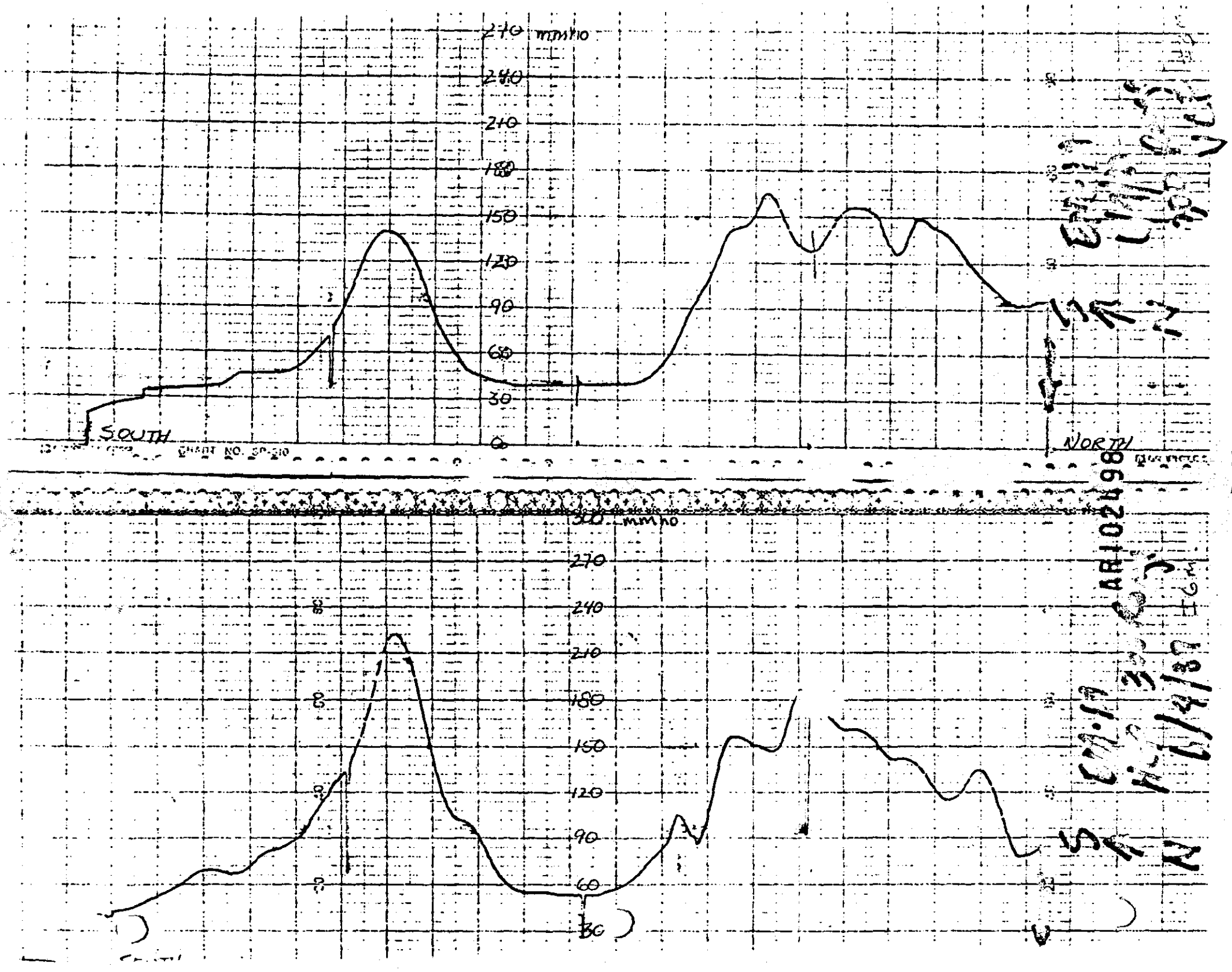
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PZ - WELL SERIES
BORING LOGS

AR102499

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CO LOG

Boring/Well PZ-1 Project/No. MO679FR6 Page 1 of 1

Site Location Avtex Fibers, Front Royal Drilling Started 6/17/87 Drilling Completed 6/22/87

Total Depth Drilled 35 feet Hole Diameter 4 inches Type of Sample/Coring Device Air cuttings

Length and Diameter of Coring Device _____ Sampling Interval 2' to 5' feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air rotary

Drilling Contractor Pennsylvania Drilling Co. Driller Bry Adams Helper Bryan Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	5'			Sand, fine to medium, silt, and organics, dark
				brown, damp.
5'	10'			Same
11'	16'			Shale, dark grey lime mudstone, wet
16'	18'			Shale, fractured lime mudstone, secondary
				minerals (calcite), filling fractures, dark
				grey, wet
18'	23'			Lime mudstone, massive, medium grey
23'	28'			Same
28'	33'			Same to friable, weathered shale
33'	35'			Same

AR102500

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-2 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers, Front Royal Drilling Started _____ Drilling Completed 6/23/87

Total Depth Drilled 16.0 feet Hole Diameter 4 inches Type of Sample/Coring Device Air Cuttings

Length and Diameter of Coring Device _____ Sampling Interval 2' to 5' feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used _____ Drilling Method Air Rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	5'			Silt, some sand, fine to medium, and organics,
				dark brown, damp
5'	10'			Silt, little sand, fine, and organics, dark
				brown, very moist
10'	12'			Shale, lime mudstone, dark grey, wet
12'	16'			Shale, lime mudstone, friable, greenish grey,
				little calcite void filling, wet

AR102501

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-3 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers, Front Royal Drilling Started _____ Drilling Completed 6/23/87

Total Depth Drilled 18 feet Hole Diameter 4 inches Type of Sample/Coring Device Air Rotary Cuttings

Length and Diameter of Coring Device _____ Sampling Interval Continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air Rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0'	5'			Sand, fine to course, some silt and organics,
				medium brown, moist
5'	6'			Same, dark brown to black, wet (weathered
				bedrock)
6'	8'			Shale, lime mudstone, fissil, dark grey
8'	13'			Same
13'	18'			Same

AR102502

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-4 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers, Front Royal Drilling Started _____ Drilling Completed 6/25/87

Total Depth Drilled 31.5 feet Hole Diameter 4 inches Type of Sample/Coring Device Air cuttings

Length and Diameter of Coring Device _____ Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air Rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	5'			Sane, medium to coarse, light brown
5'	10'			Same, with clay matrix, brown to light green
				Rock at 10.5'
10'	13.8'			Shale, weathered, black to grey, abundant calcite
13.8	17.2'			Shale, grey, some calcite filling
17.2'	31.5'			Same

AR102503

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-5 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers, Front Royal Drilling Started _____ Drilling Completed 6/30/87

Total Depth Drilled 25.5 feet Hole Diameter 4 inches Type of Sample/Coring Device Air cuttings

Length and Diameter of Coring Device _____ Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	5'			Topsoil to silty clay, wet
5'	7.5'			Silty clay, wet
7.5'	10.6'			Bedrock - shale, weathered, black to grey, calcite veins
10.6'	25.5'			Shale, grey, some calcite filling

AR102504

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-6 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers, Front Royal Drilling Started _____ Drilling Completed 6/30/87

Total Depth Drilled 23 feet Hole Diameter 4 inches Type of Sample/Coring Device Air cuttings

Length and Diameter of Coring Device _____ Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0'	5'			Silt, some sand and gravel, medium to coarse,
				dark brown, organics, damp
5'	8'			Silt, some sand, medium, organics, some
				friable lime mudstone, moist
8'	12'			Lime mudstone, some weathering, light to
				dark grey
12'	17'			Lime mudstone, friable, fissil, dark grey,
				some weathering
17'	23'			Same

AR102505

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-7 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers - Front Royal Drilling Started _____ Drilling Completed 7/2/87

Total Depth Drilled 23 feet Hole Diameter _____ inches Type of Sample/Coring Device Air cuttings

Length and Diameter of Coring Device _____ Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	5'			Sand, fine to coarse, and silt, medium brown,
				damp
5'	10'			Same
10'	11'			Shale, dark grey, weathered
11'	13'			Shale, lime mudstone, dark grey, weathered
13'	18'			Shale, lime mudstone, grey, weathered, some
				calcite filling
18'	23'			Same

AR102506

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-8 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers - Front Royal Drilling Started _____ Drilling Completed 7/7/87

Total Depth Drilled 18 feet Hole Diameter 4 inches Type of Sample/Coring Device Air cuttings

Length and Diameter of Coring Device _____ Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	5'			Silt, sand, medium to coarse, and organics, medium red brown, damp
5'	8'			Same to dark grey friable, lime mudstone, moist-wet
8'	13'			Lime mudstone, fissil, dark grey, wet
13'	18'			Lime mudstone fissil, dark grey, wet

AR102507

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-9 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers - Front Royal Drilling Started _____ Drilling Completed 7/7/87

Total Depth Drilled 28 feet Hole Diameter 4 inches Type of Sample/Coring Device Air cuttings

Length and Diameter of Coring Device _____ Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	5'			Silt, sand, medium to coarse, and organics,
				medium brown, damp
5'	8'			Same to dark grey friable lime mudstone,
				moist-wet
8'	13'			Lime mudstone, dark grey to medium grey, wet
13'	18'			Same, some weathering
18'	28'			Sa

AR102508

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Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-10 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers - Front Royal Drilling Started _____ Drilling Completed 7/30/87

Total Depth Drilled 22.5 feet Hole Diameter 4 inches Type of Sample/Coring Device Air cuttings

Length and Diameter of Coring Device _____ Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or 8" per 6 inches	Sample/Core Description
0	5'			Silt and sand, medi to coarse, organics, medium red brown, damp
5'	9'			Same to dark grey weathered limestone, damp
9'	13'			Lime mudstone, dark grey
13'	22.5'			Lime mudstone fissil, dark grey, wet

AR102509

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Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well PZ-11 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers - Front Royal Drilling Started _____ Drilling Completed 7/30/87

Total Depth Drilled 80.5 feet Hole Diameter 4 inches Type of Sample/Coring Device Air cuttings

Length and Diameter of Coring Device _____ Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Air Rotary

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By Wesselman Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	9			Silty sand with dobbles; light brown to grey,
				wet.
9'	13'			Lime mudstone, dark grey to medium grey, wet
13'	18'			Same, some weathering
18'	28'			Same
28'	33'			Same, little H_2O yield for section
33'	50'			Same, frequent zones of calcite filling
50'	77'			Limestone, light grey to dark grey, dense,
				no fractures, no ground water
77'	80.5'			Lime mudstone, dark grey, calcite veins,
				ground water ~5 gpm

AR102510

MW - WELL SERIES
BORING LOGS

AR102511

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well MW-9 Project/No. M0679FR6 Page 1 of 3

Site Location Avtex Fibers - Front Royal Drilling Started _____ Drilling Completed 7/22/87

Total Depth Drilled 45 feet Hole Diameter 4 inches Type of Sample/Coring Device Split spoon

Length and Diameter of Coring Device 18" spoon Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Auger

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
1.0	1.5'		5-3-4	Silt, clay, some sand, fine to medium, mottled light grey and medium brown, dry
1.5'	3.0'		6-10-9	Same, some coarse gravel, red brown, dry
3.0'	5.0'		3-3-5-5	Silt, some clay, some sand, medium, yellow brown to red brown, red and grey stringers, damp
5.0'	7.5'		2-4-3-3	Silt, some clay, sand medium to fine, mottled, medium brown to olive, odor, damp
7.5'	10.0'		6-6-8-4	Clay, silt and sand, fine to medium, some gravel, coarse, slightly cohesive, medium brown, damp
10.0'	12.5'		1-4-3-4	Clay and silty sand, fine to coarse, medium brown to black, damp, slightly cohesive

AR102512

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG (Cont.d)

Boring/Well MW-9

Prepared By _____

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
12.5'	15.0'		1-2-2-1	Same, moist
15.0'	17.5'		1-1-3-3	Same, saturated
17.5'	20.0'		2-4-6-6	Same, mottled, light grey to red brown, saturated
20.0'	22.5'		1-3-4-4	Same
22.5'	25.0'		2-4-7-6	Silt, clay, and sand, fine to medium, redish brown, saturated
25.0'	27.5'			Silt, clay, sand and gravel, fine to coarse, medium brown to black, saturated
27.5'	30.0'		5-5-6-10	Silt and clay, some sand and gravel, fine to medium, dark greenish black, wet, odor

AR102513

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG (Cont.d)

Boring/Well MW-9

Prepared By _____

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
30.0'	32.5'		1-3-5-6	Same
32.5'	35.0'		2-3-6-10	Same to silt and clay, some sand
				and gravel, fine to coarse, cohesive,
				medium brown with olive mottle,
				moist
35.0'	37.5'		4-20-20-21	Silt and clay, some sand and
				gravel, fine to coarse, cohesive,
				medium brown with olive mottle,
				moist
37.5'	40.0'		11-21-12-12	Silt and Sand, fine to coarse,
				little gravel, dark red brown,
				moist, cohesive
40.0'	42.5'		5-15-21-15	Same
42.5'	45.0'		15-15-21-17	Silt and sand, medium, red brown
				and grey, wet

AR102514

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well MW-10 Project/No. M0679FR6 Page 1 of 3

Site Location Avtex Fibers - Front Royal Drilling Started _____ Drilling Completed 7/23/87

Total Depth Drilled 53.5 feet Hole Diameter 4 inches Type of Sample/Coring Device Split spoon

Length and Diameter of Coring Device 18" spoon Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method auger

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	2.5		10-12-16	Silt, sand, gravel and organics, fine to coarse, medium brown, dry
2.5	5.0		4-4-5-5	Silt, clay, mottled grey and red brown, soft, cohesive, damp
5.0	7.5		1-1-3-4	Silt and sand, fine to medium, little gravel, coarse, medium brown, damp
7.5	10.0		6-5-6-4	Silt and sand, some gravel, fine to medium, cohesive, dark red brown, damp
10.0	12.5		4-8-9-11	Same, some gravel to sand, fine to medium, some silt, olive, damp
12.5	15.0		5-6-4-6	Silt, some clay, some sand and gravel, fine to medium, dark red brown, damp cohesive
15.0	17.5		3-6-8-8	Same, more clay, darker brown

AR102515

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG (Cont.d)

Boring/Well MW-10

Prepared By _____

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
17.5'	20.0'		1-3-3-5	Same with black stringers
20.0'	22.5'		3-4-7-6	Same
22.5'	25.0'		5-5-9-7	Silt and clay, light grey to red
				brown, some fine sand, trace mica,
				damp
25.0'	27.5'		5-4-7-4	Same, light brown and grey to
				medium brown
27.5'	30.0'		6-10-8-7	Silt and clay, little sand, fine
				to medium, dark brown, damp,
				cohesive
30.0'	32.5'		3-5-6-7	Same
32.5'	35.0'			Same, mottled light grey to dark
				brown
35.0'	37.5'		6-5-5-9	Silty clay, olive, trace sand,
				fine, some medium brown to black
				mottle, cohesive

AR102516

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG (Cont.d)

Boring/Well MW-10

Prepared By _____

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
37.5'	40.0'		4-7-10-11	Same
40.0'	42.5'		4-9-12-21	Clay and silt, medium to dark brown,
				damp, cohesive
42.5'	45.0'		7-12-27-25	Silt, some sand and gravel, fine
				to coarse, medium red brown, moist,
				cohesive
45.0'	47.5'		12-10-15-17	Same
47.5'	50.0'		2-6-10-12	Silt, sand and gravel, medium to
				coarse, medium grey to brown, wet

AR102517

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well MW-11 Project/No. M0679FR6 Page 1 of 2

Site Location Avtex Fibers - Front Royal Drilling Started _____ Drilling Completed 7/28/87

Total Depth Drilled 30 feet Hole Diameter 4 inches Type of Sample/Coring Device Split spoon

Length and Diameter of Coring Device 18" spoon Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Auger

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	2.5	1	1-12-12-10	Silt and sand, fine, some clay, medium brown, dry to damp
2.5	5.0		2-2-4-7	Clay, little silt, mottled red brown, light grey and yellow brown, damp, cohesive
5.0	7.5		5-9-11-12	Same, more silt
7.5	10.0		1-5-13-13	Clay, some silt, medium red brown, light grey stringers, damp, cohesive
10.0	12.5		1-4-11-13	Same, stiff clay
12.5	15.0	10	1-12-22-24	Very stiff clay, medium red brown, trace light grey stringers
15.0	17.5		4-12-23-6	Same with some silt, black organic inclusions
17.5	20.0	13	1-21-21-21	Sand and silt, fine to medium, variegated (red brown, buff, yellow brown, light grey and black), moist, odor
20.0	22.5	7	14-24-$\frac{50}{5"}$	Silt and sand, fine, buff to sand and gravel, coarse, organics, unknown sheet-like material, moist, wet

AR102518

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG (Cont.d)

Boring/Well MW-11

Prepared By _____

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
22.5'	25.0'		50/5"	Same
25.0'	27.5'		50/6"	Same with maroon colored flakes
				of shale
27.5'	30.0'		50/3"	Lime mudstone, fissil, broken,
				dark grey

AR102519

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well MW-12 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex Fibers - Front Royal Drilling Started _____ Drilling Completed 7/29/87

Total Depth Drilled 13 feet Hole Diameter 4 inches Type of Sample/Coring Device Split spoon

Length and Diameter of Coring Device 18" spoon Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used None Drilling Method Auger

Drilling Contractor Penn Drilling Driller Adams Helper Krause

Prepared By J. Moore Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	2.5		4-7-10-9	Silt, some sand, fine to medium, medium brown, organic, dry
2.5	5.0		7-40-50/5	Stiff, friable clay and silt, dark reddish brown, dry
5.0	7.5		2-18-27-50/5	Same
7.5	10.0		50/5	Silt, buff, some fine sand to shale at 9.0' (dark black)

AR102520

GERAGHTY & MILLER, INC.

VB - PIEZOMETER SERIES

BEDROCK CORE LOGS

AR102521

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well VB-1 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex - Viscose Basin 1 Drilling Started 8/31/87 Drilling Completed 8/31/87

Total Depth Drilled 10 feet Hole Diameter 3 inches Type of Sample/Coring Device NX coring

Length and Diameter of Coring Device 10 ft. Sampling Interval continuous feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used City water Drilling Method Nx

Drilling Contractor Pennsylvania Drilling Company Driller Adams Helper Krause

Prepared By M. Gaudette Hammer Weight ____ Hammer Drop ____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
26	28	10		mudstone, fine grain, light brown to tan, iron staining
				present, small fractures present particularly at
				between 27.5' and 28', fracture orientation 45° to 50°
28	29			mudstone, tan to light grey, fine grain.
29	36			mudstone, light grey, fine grain, rust stained fr
				30' to 33' 10".
				Unconformities present at 30' 4" (mudstone/silstone
				contact); 32' (mudstone/siltstone); 32.5', 33',
				Vertical fractures appear to be present between 32'
				and 33'; rock discoloration present, iron stained at
				32.5'.

AR102522

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well VB-2 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex - Viscose Basin 2 Drilling Started 8/11/87 Drilling Completed 8/12/87

Total Depth Drilled 10 feet Hole Diameter 3 inches Type of Sample/Coring Device NX Coring

Length and Diameter of Coring Device 10 ft. Sampling Interval Continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used City Water Drilling Method Nx

Drilling Contractor Pennsylvania Drilling Company Driller Adams Helper Krause

Prepared By M. Gaudette Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
25	35	10		mudstone, fine grain, light to med grey, iron stained
				throughout some fracturing (poss vertical) in through-
				out core, other small fractures present at 30', thin,
				verticle calcite seams at 27.5' and between 29' and 31'.
				mudstone/siltstone contact present between 27.5'
				and 31'.

AR102523

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well VB-3 Project/No. M0479FR6 Page 1 of 1

Site Location Avtex - Viscose Basin 3 Drilling Started 8/15/87 Drilling Completed 8/20/87

Total Depth Drilled 10 feet Hole Diameter 3 inches Type of Sample/Coring Device NX Coring

Length and Diameter of Coring Device 10 ft. Sampling Interval continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used City water Drilling Method Nx

Drilling Contractor Pennsylvania Drilling Company Driller Adams Helper Krause

Prepared By M. Gaudette Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
29	38	9		Core consists of fine grey mudstone with medium grained
				material between 36 and 37.5'.
				Thin calcite seams are present through the entire core.
				Iron staining present at 37.3', 38.6' and 39'.
				Small 45° fractures present at 29.7', 30.6', 31', 31.5'
				32.2', 32.8', 33.4', 34', 35', 36.5', 37', 37.6', and
				38.3'.

AR102524

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well VB-7 Project/No. M0679FR6 Page 1 of 1

Site Location Avtex - Viscose Basin 7 Drilling Started 9/1/87 Drilling Completed 9/1/87

Total Depth Drilled 10 feet Hole Diameter 3 inches Type of Sample/Coring Device NX

Length and Diameter of Coring Device 10 ft. Sampling Interval Continuous feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used City water Drilling Method Nx

Drilling Contractor Pennsylvania Drilling Co. Driller Adams Helper Krause

Prepared By M. Gaudette Hammer Weight _____ Hammer Drop _____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
30'	33'			Mudstone, fine grained, lt. to medium brown, crumbly,
				Iron-stained seams present throughout, highly
				fractured throughout - most fractures appear to be at
				45° angle - Major 45° fractures at 30'7", 30'10", 31',
				31'7"
33'	40'			Mudstone, fine grained, med. to dark grey, iron stained
				throughout, small fractures present between 33 and 35 ft.,
				most appear to vary between 45° and 50°. Fractures
				at 33'4", 33'10", 34', 34'5", 35'.
				Between 37' and 39.5', poss. fine grain siltstone/mud
				contact present; vertical fracturing also present
				from 37' to 39'.

AR102525

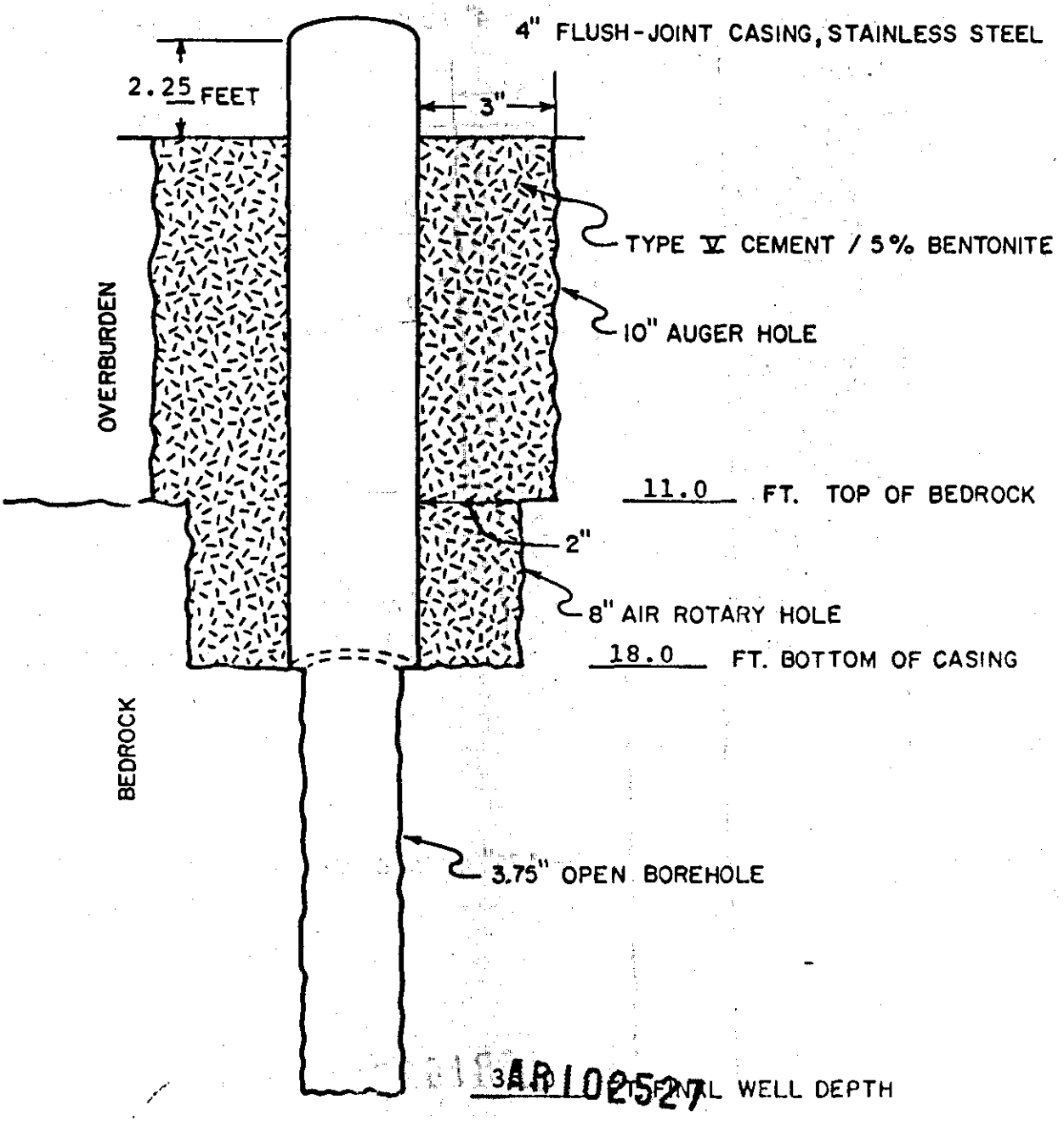
GERAGHTY & MILLER, INC.

P2-WELL SERIES
CONSTRUCTION DETAILS

AR102526

RIVERBANK WELL CONSTRUCTION DETAIL

WELL: PZ-1

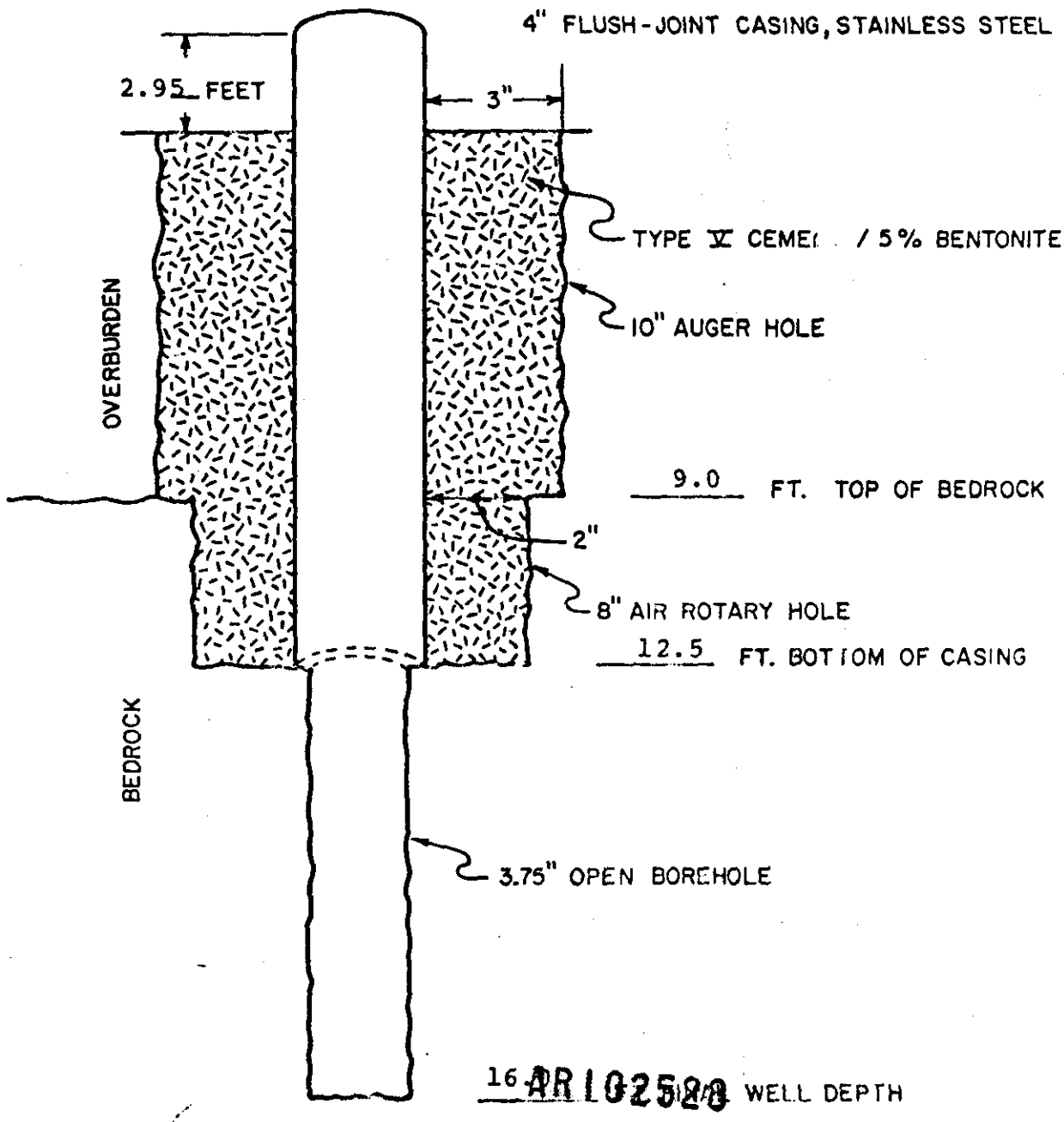


AR102527

AR102527

RIVERBANK WELL CONSTRUCTION DETAIL

WELL: PZ-2

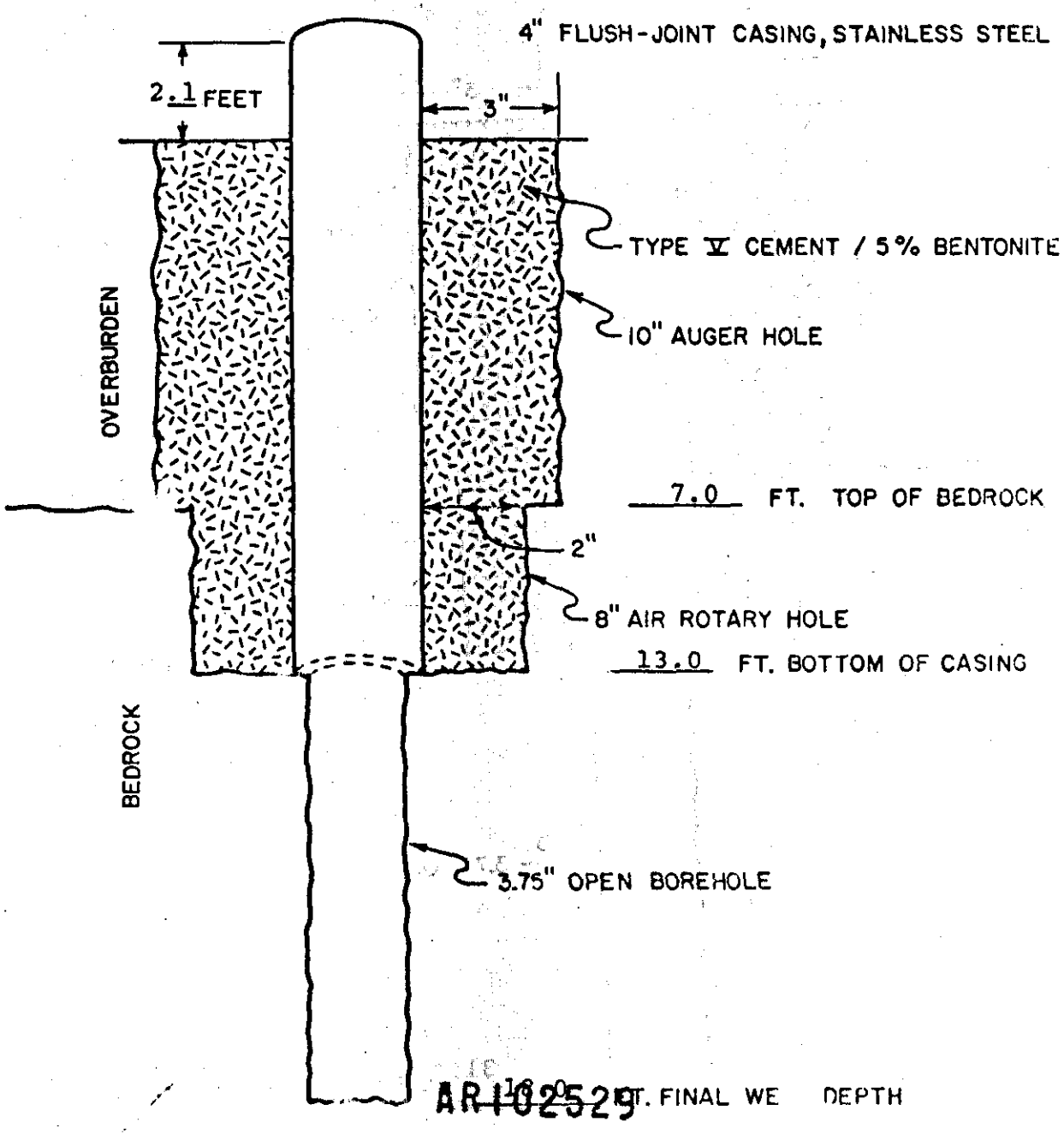


AR102528

AR102528

RIVERBANK WELL CONSTRUCTION DETAIL

WELL: PZ-3

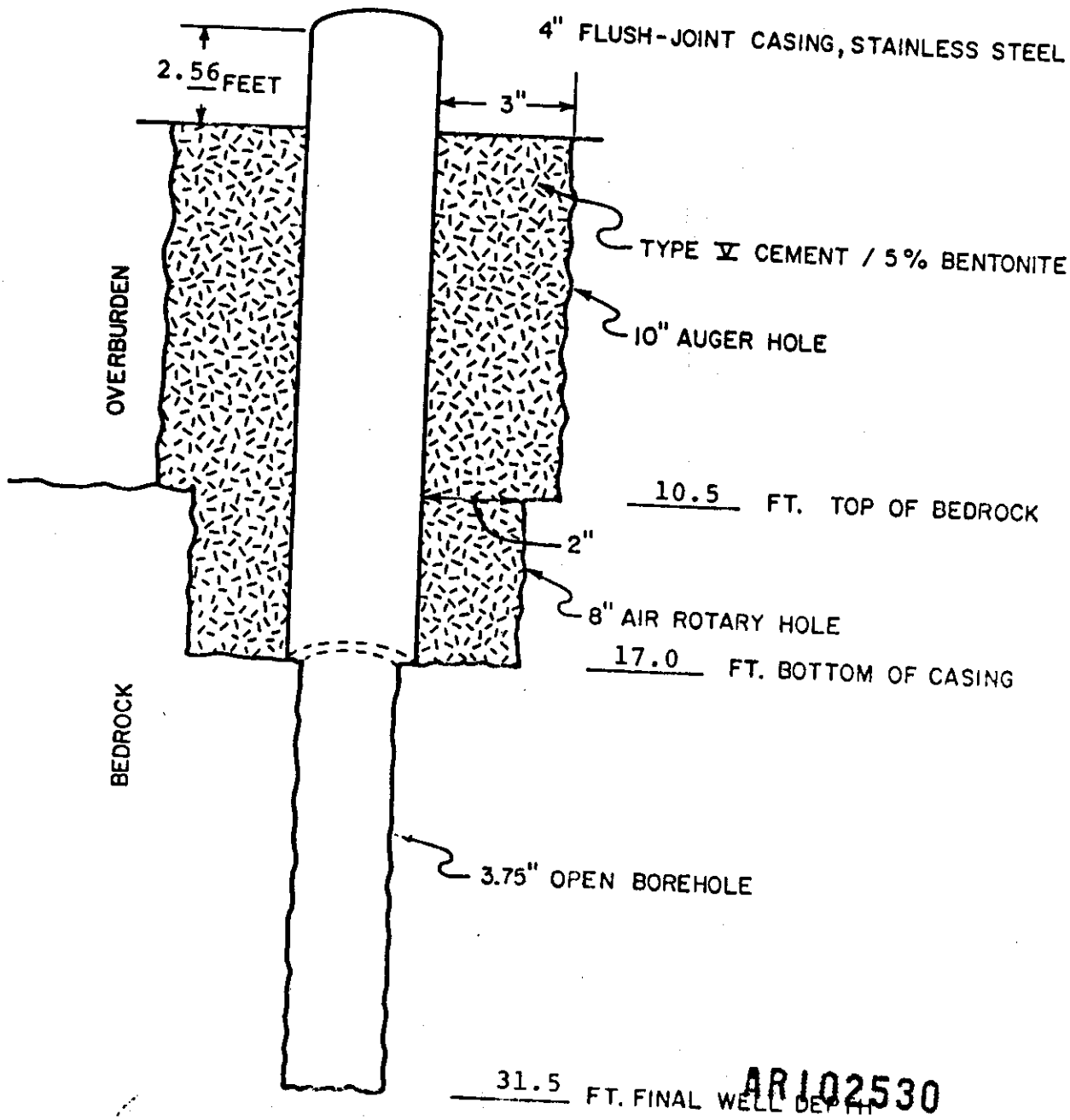


AR102529

AR102529

RIVERBANK WELL CONSTRUCTION DETAIL

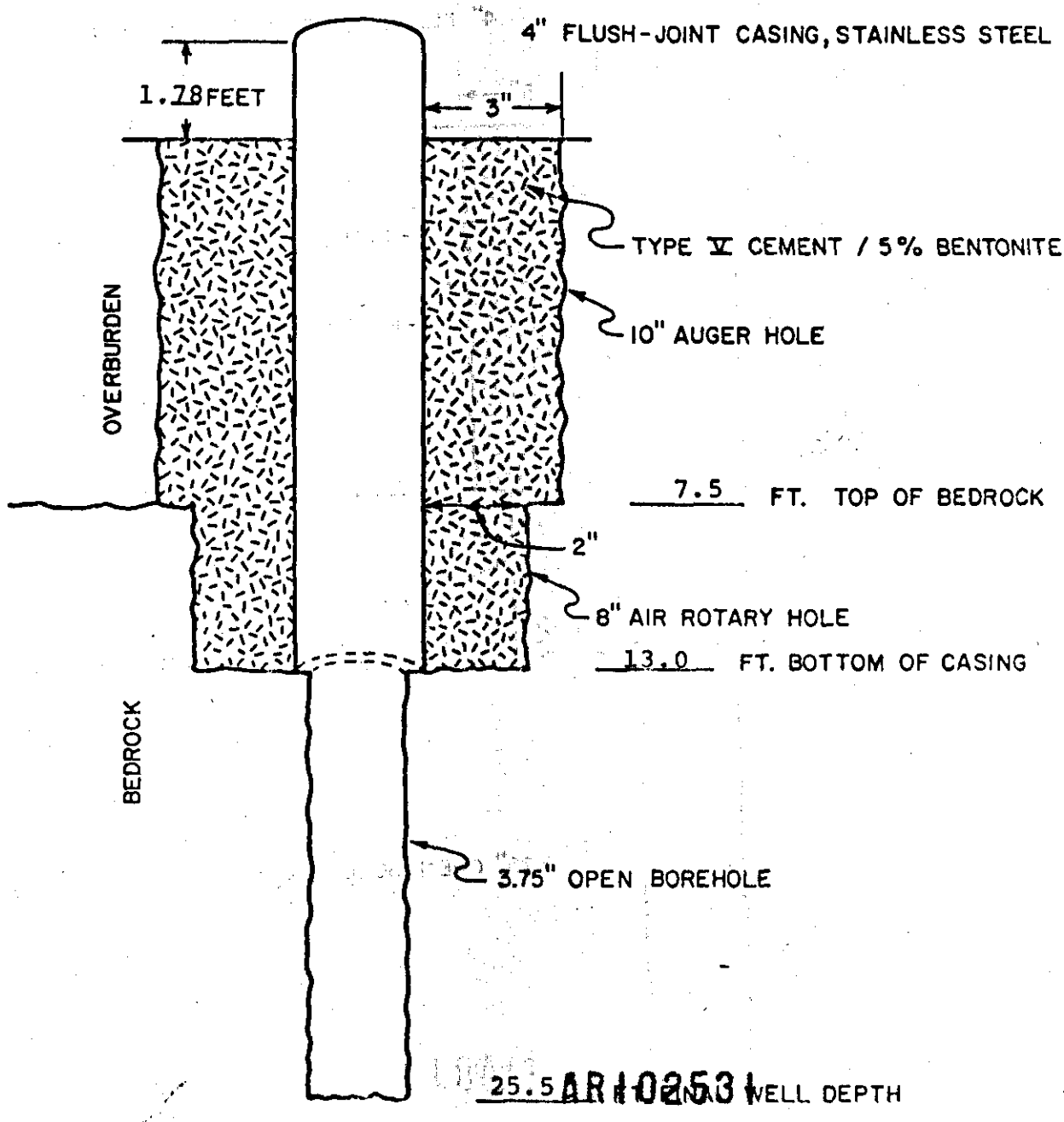
WELL: PZ-4



AR102530

RIVERBANK WELL CONSTRUCTION DETAIL

WELL: PZ-5

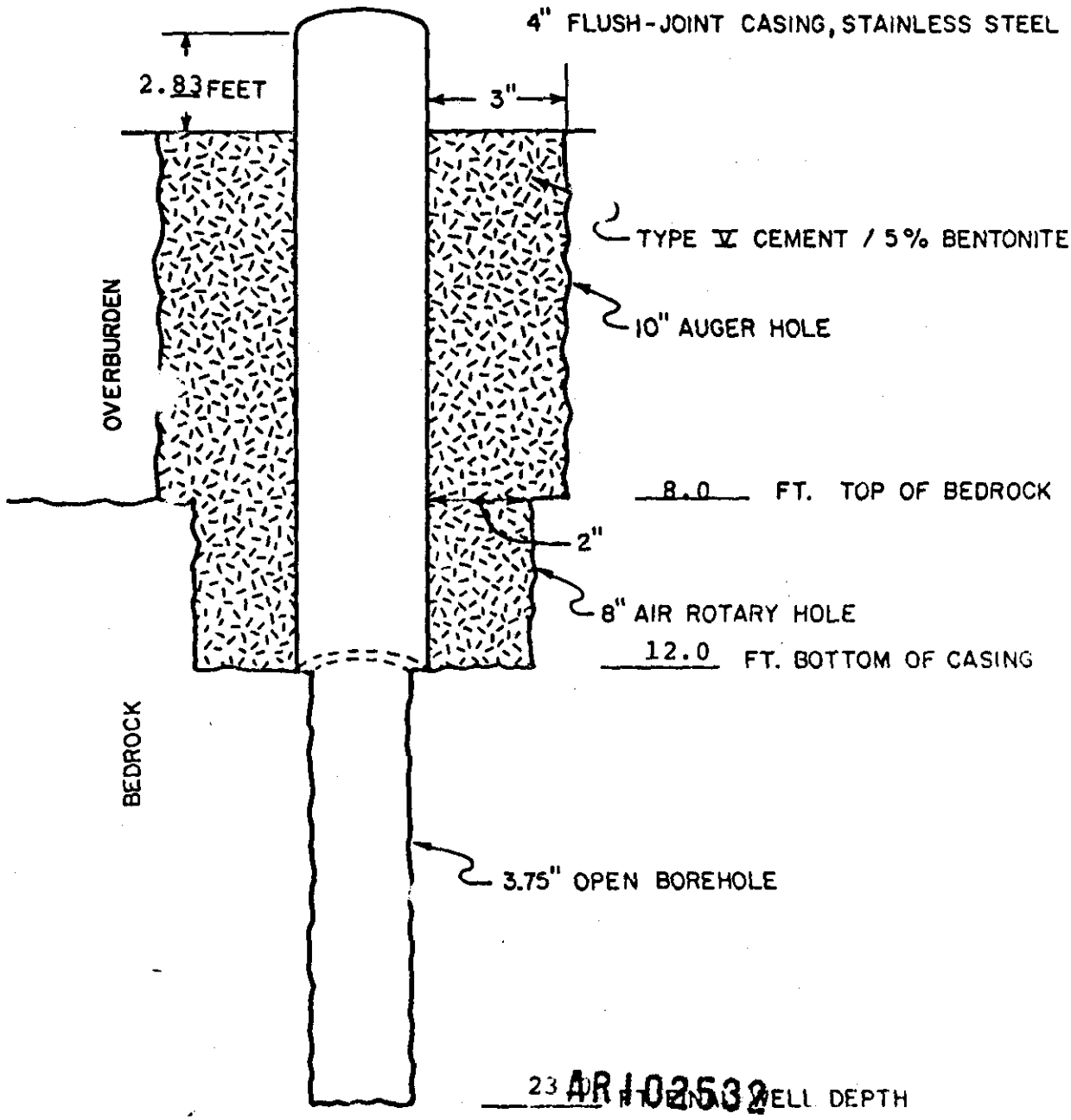


AR102531

AR102531

RIVERBANK WELL CONSTRUCTION DETAIL

WELL: PZ-6

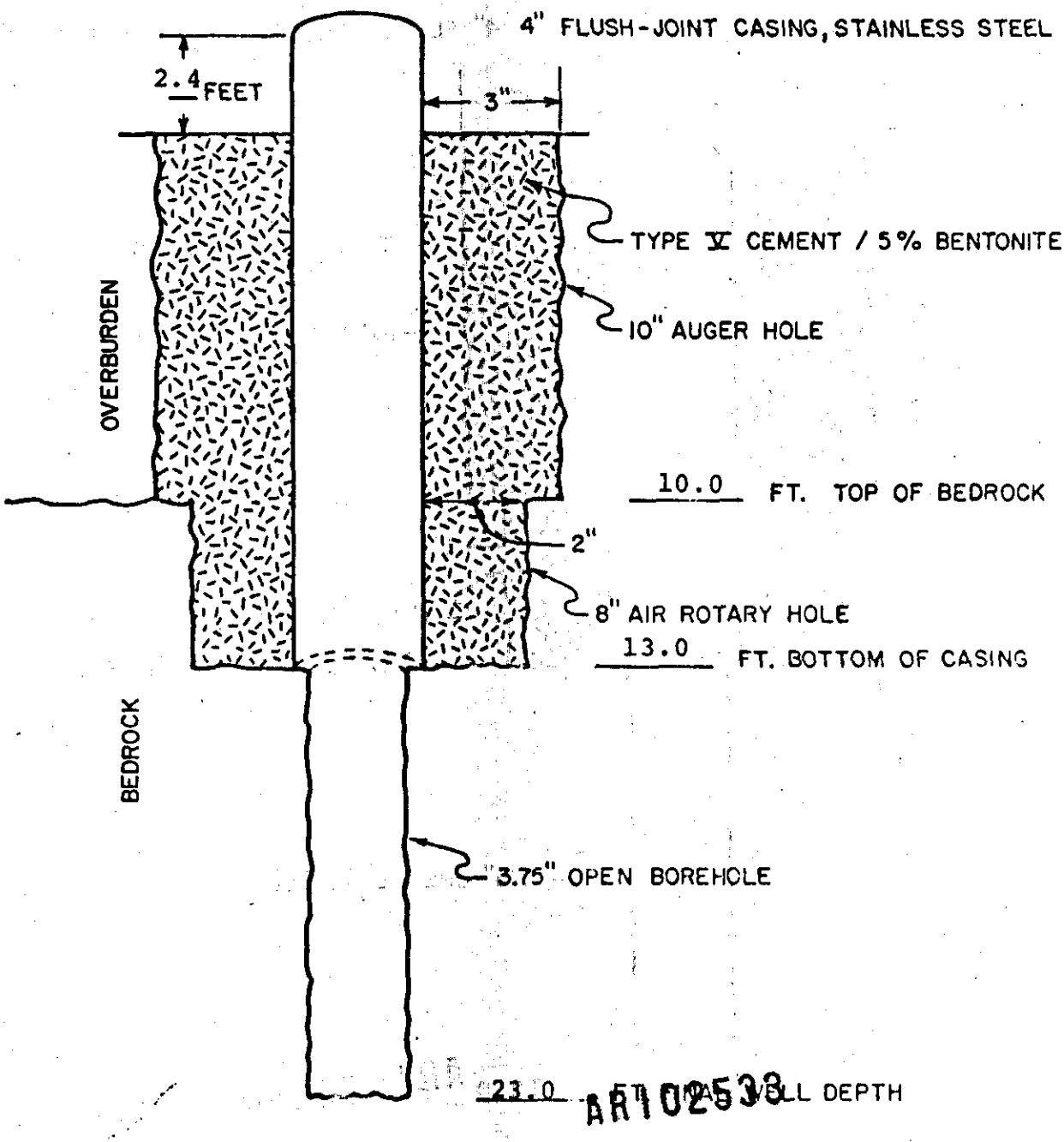


AR102532

AR102532

RIVERBANK WELL CONSTRUCTION DETAIL

WELL: PZ-7

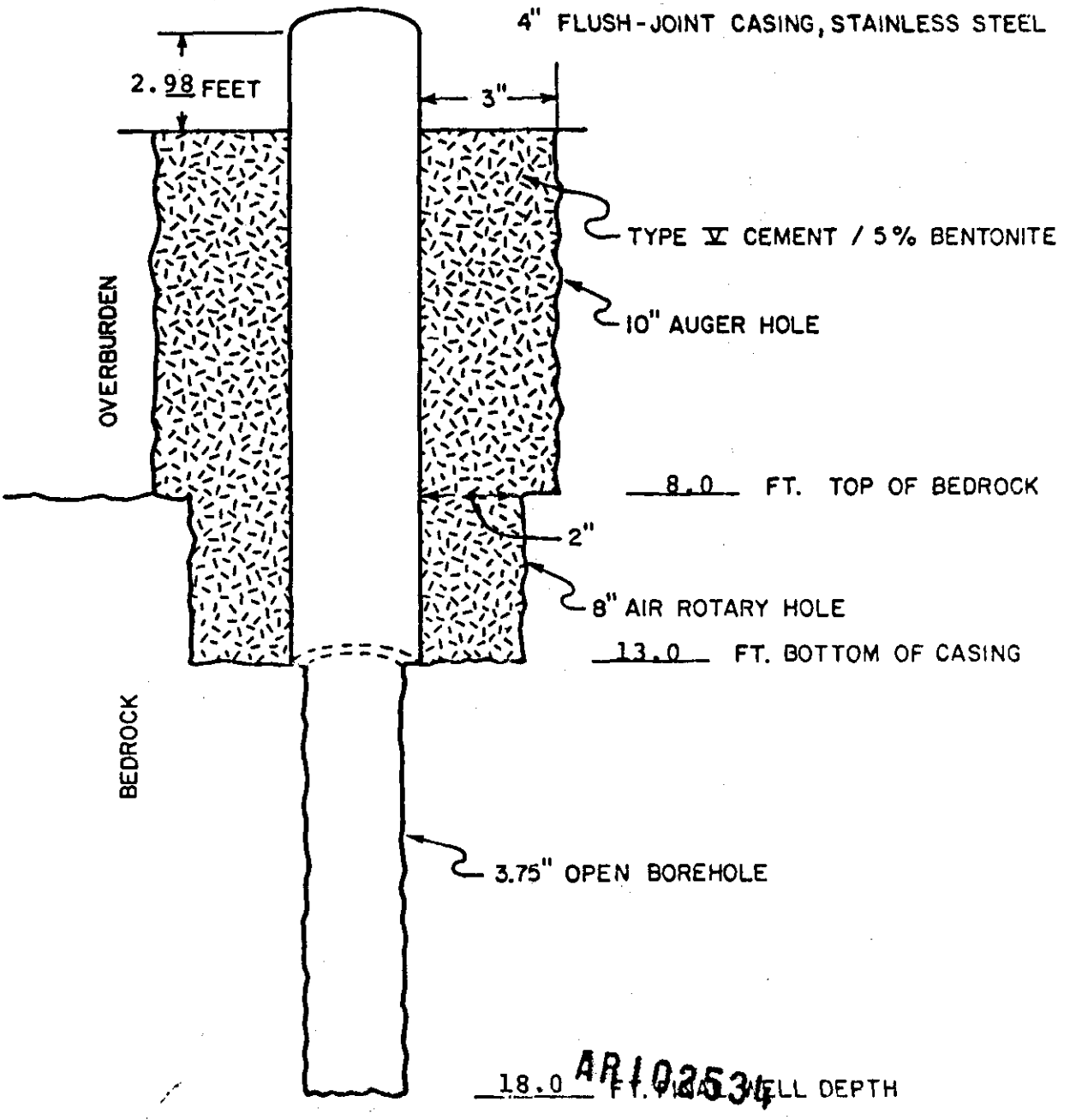


AR102533

AR102533

RIVERBANK WELL CONSTRUCTION DETAIL

WELL: PZ-8

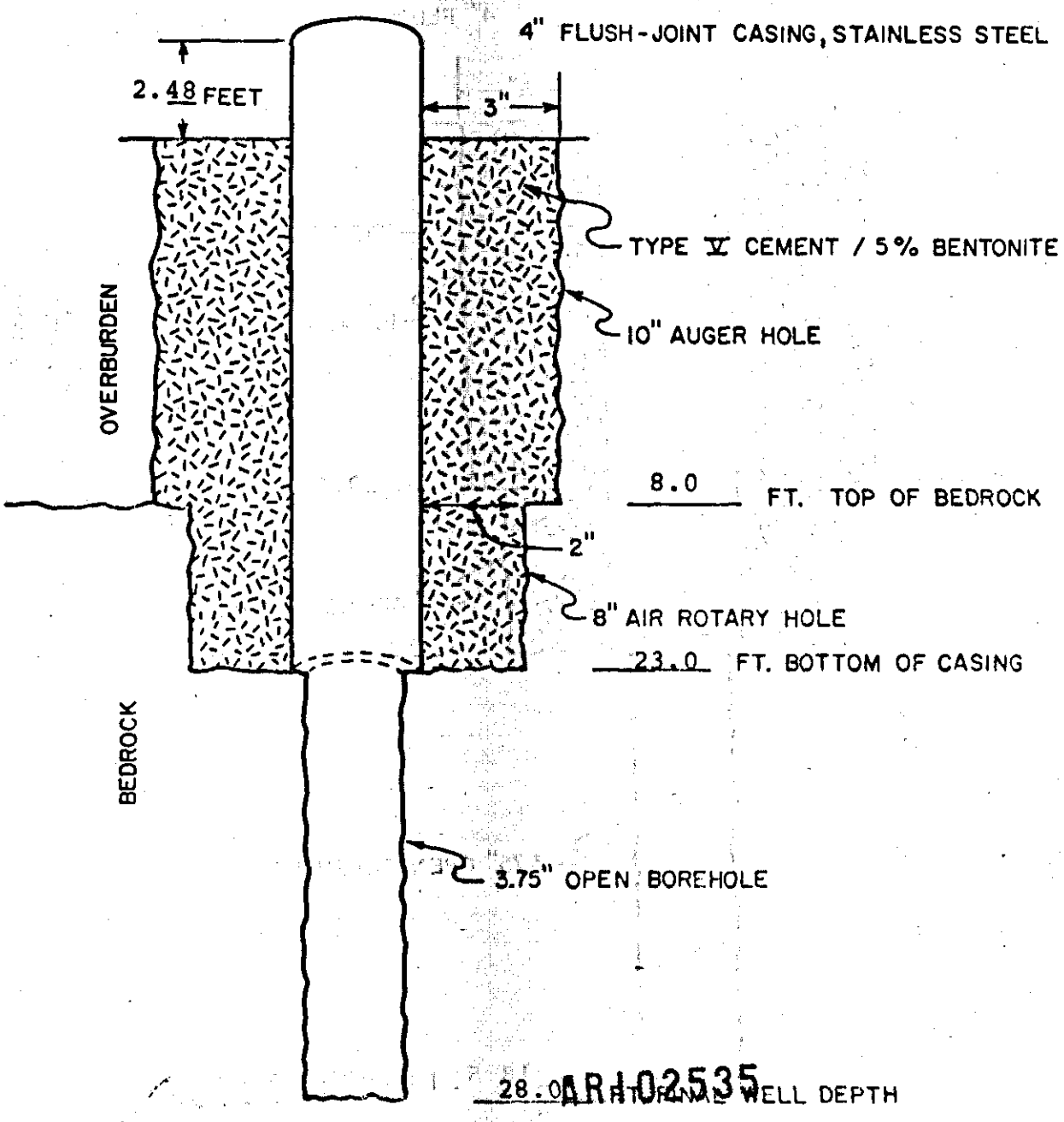


AR102534

AR102534

RIVERBANK WE ' CONSTRUCTION DETAIL

WELL: PZ-9

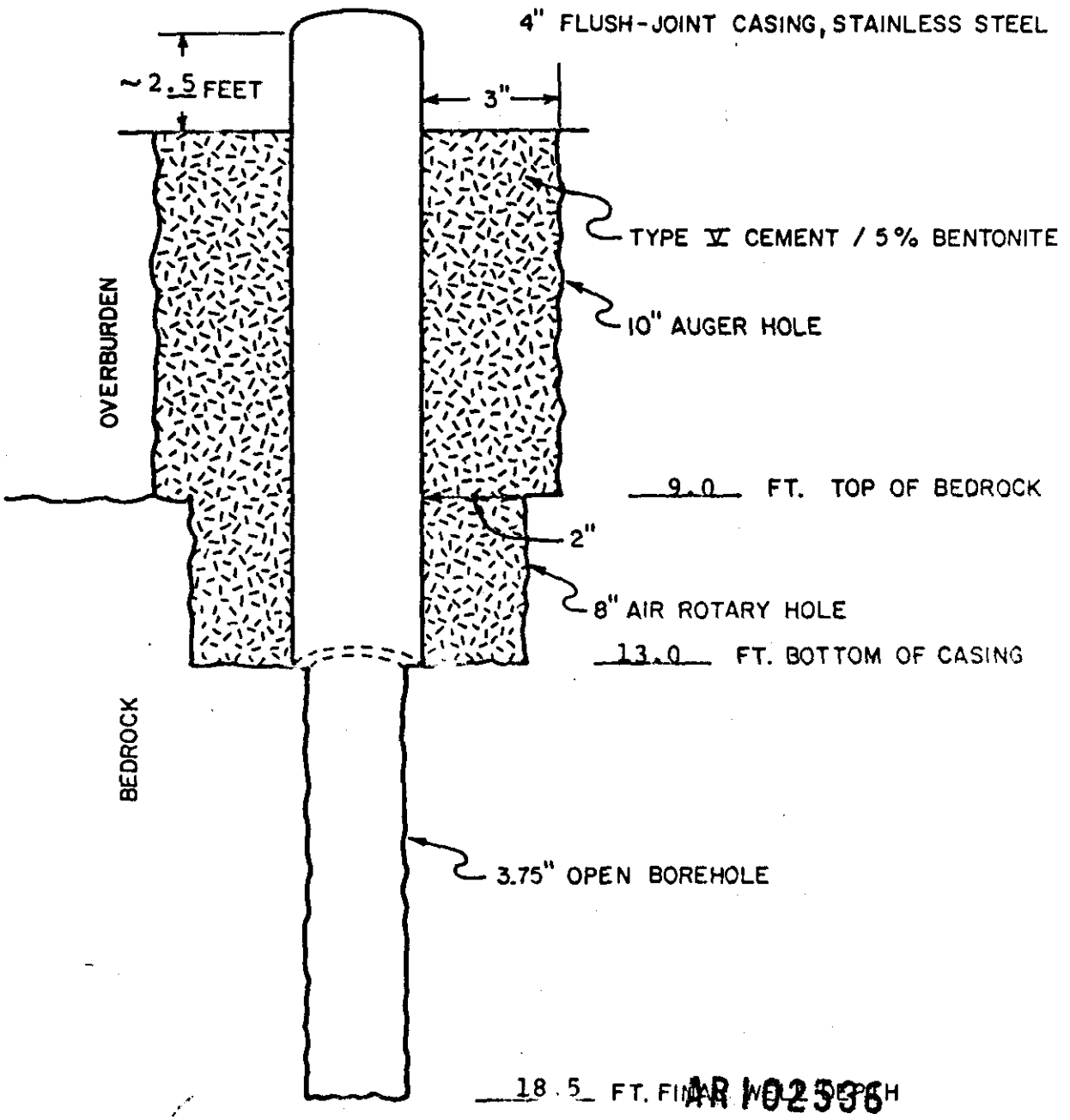


AR102535

AR102535

RIVERBANK WELL CONSTRUCTION DETAIL

WELL: PZ-10

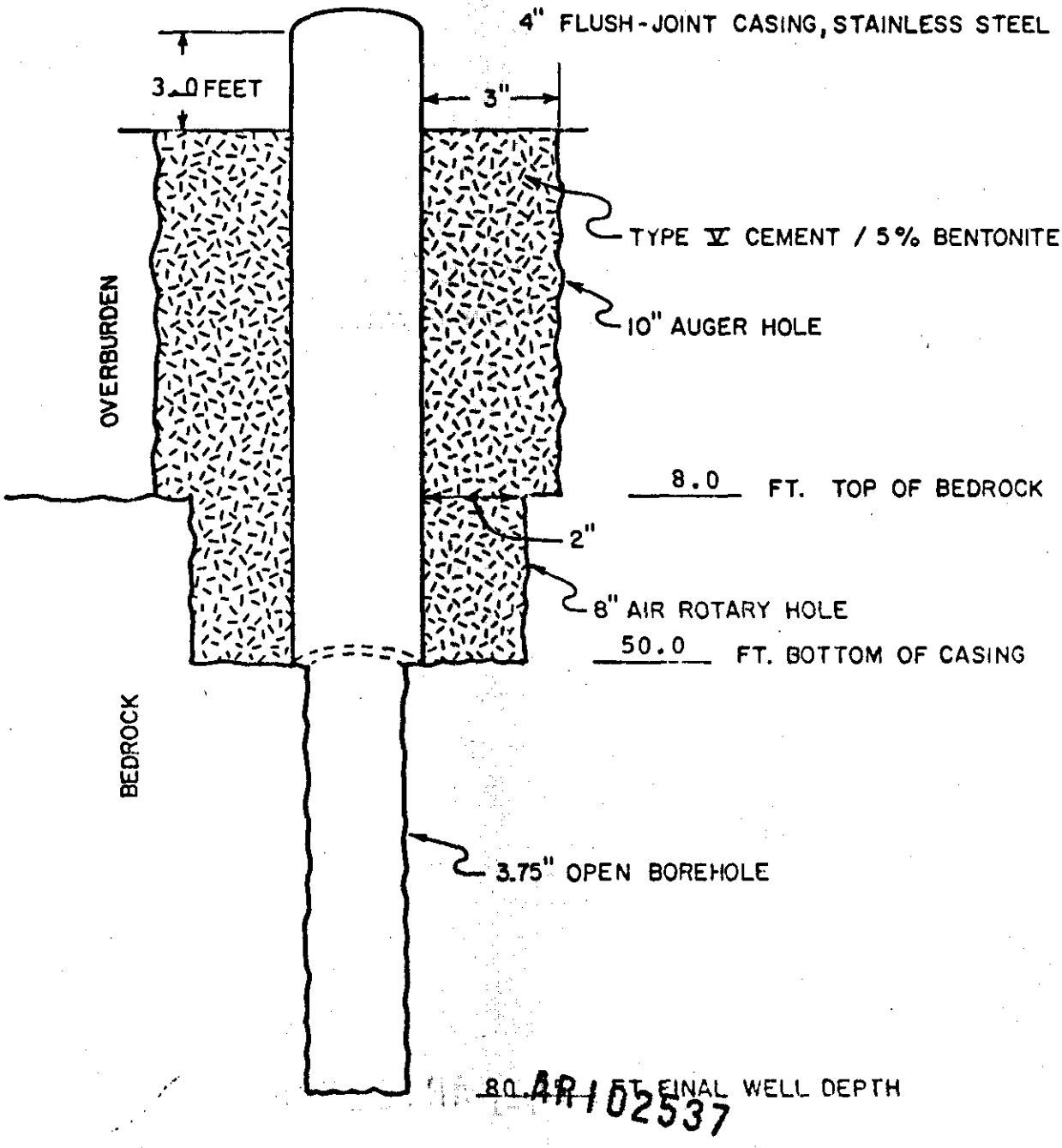


AR102536

AR102536

RIVERBANK WELL CONSTRUCTION DETAIL

WELL: PZ-11



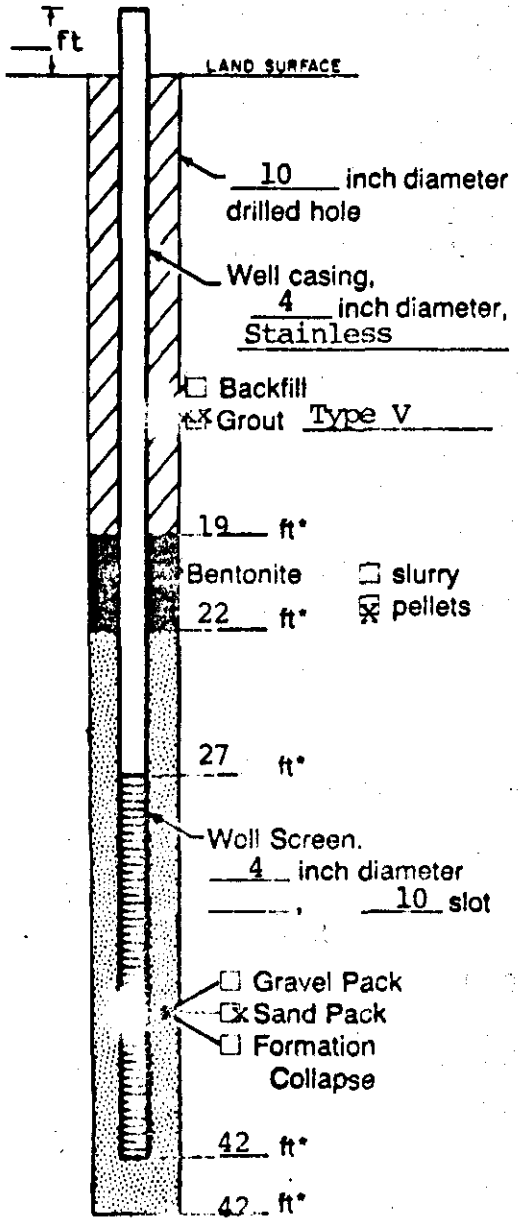
AR102537

GERAGHTY & MILLER, INC.

MW - WELL SERIES
CONSTRUCTION DETAILS

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG



Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Avtex Fibers, Inc. RI/FS Well MW-9

Town/City Front Royal

County Warren State Virginia

Permit No.

Land-Surface Elevation and Datum _____ feet ☐ surveyed ☐ estimated

Installation Dates(s)

Drilling Method Hollow Stem Auger

Drilling Contractor Pennsylvania Drilling Co.

Drilling Fluid None

Development Techniques(s) and Date(s)
To be performed by air-lift, week of August 10

Fluid Loss During Drilling N.A. gallons

Water Removed During Development N.A. gallons

Static Depth to Water _____ feet below M.P.

Pumping Depth to Water N.A. feet below M.P.

Pumping Duration N.A. hours

Yield N.A. gpm Date

Specific Capacity _____ gpm/ft

Well Purpose Monitoring of shallow groundwater in the vicinity of the viscose basins.

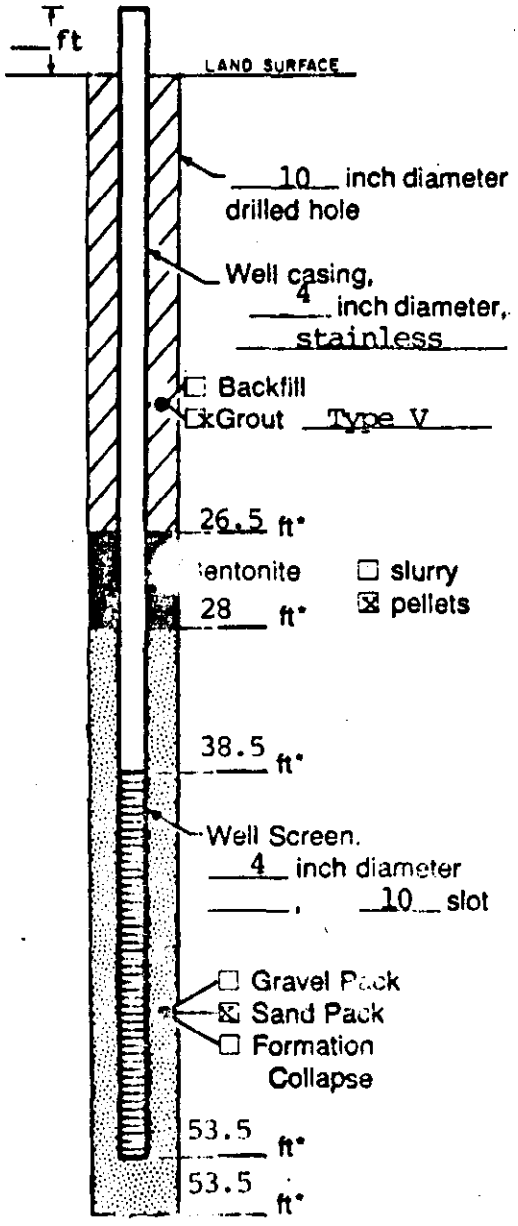
Remarks

AR102539

Prepared by Jeff Moore

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG



Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Avtex Fibers, Inc. RI/FS Well MW-10
Town/City Front Royal
County Warren State Virginia
Permit No.
Land-Surface Elevation
and Datum _____ feet ☐ surveyed ☐ estimated
Installation Dates(s)
Drilling Method Hollow Stem Auger
Drilling Contractor Pennsylvania Drilling Co.
Drilling Fluid None

Development Techniques(s) and Date(s)
To be performed by air-lift, week of August 10

Fluid Loss During Drilling N.A. gallons
Water Removed During Development N.A. gallons
Static Depth to Water _____ feet below M.P.
Pumping Depth to Water N.A. feet below M.P.
Pumping Duration N.A. hours
Yield N.A. gpm Date
Specific Capacity _____ gpm/ft
Well Purpose Monitoring of shallow groundwater in the vicinity of the viscose basins.

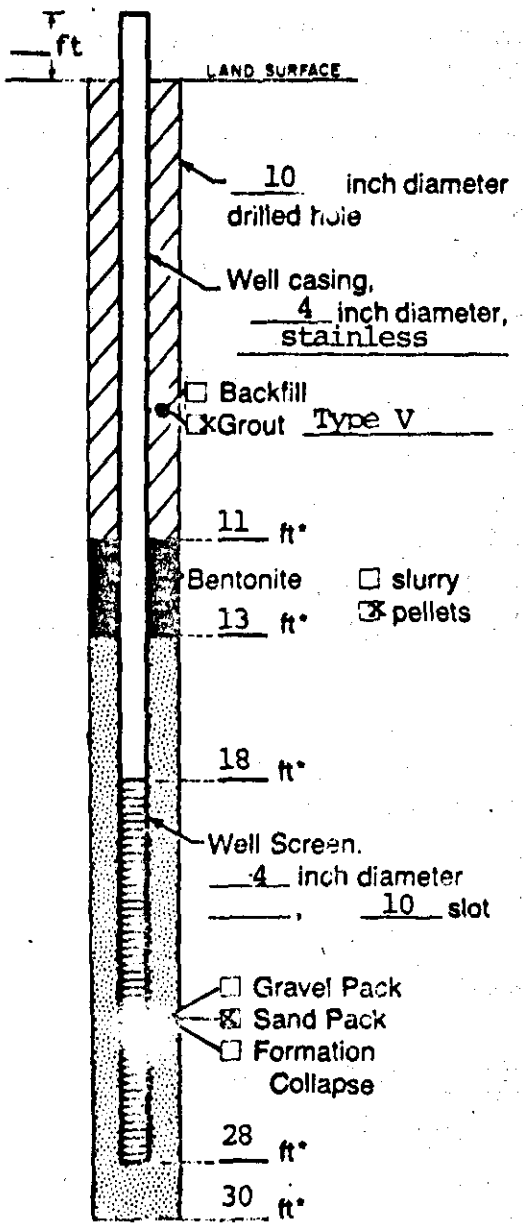
Remarks

AR102540

Prepared by Jeff Moore

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG



Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Avtex Fibers, Inc. RI/FS Well MW-11

Town/City Front Royal

County Warren State Virginia

Permit No. _____

Land-Surface Elevation and Datum _____ feet ☐ surveyed ☐ estimated

Installation Dates(s) _____

Drilling Method Hollow Stem Auger

Drilling Contractor Pennsylvania Drilling Co.

Drilling Fluid None

Development Techniques(s) and Date(s)
To be performed by air-lift, week of August 10

Fluid Loss During Drilling N.A. gallons

Water Removed During Development N.A. gallons

Static Depth to Water _____ feet below M.P.

Pumping Depth to Water N.A. feet below M.P.

Pumping Duration N.A. hours

Yield N.A. gpm Date _____

Specific Capacity _____ gpm/ft

Well Purpose Monitoring of shallow groundwater in the vicinity of the viscose basins.

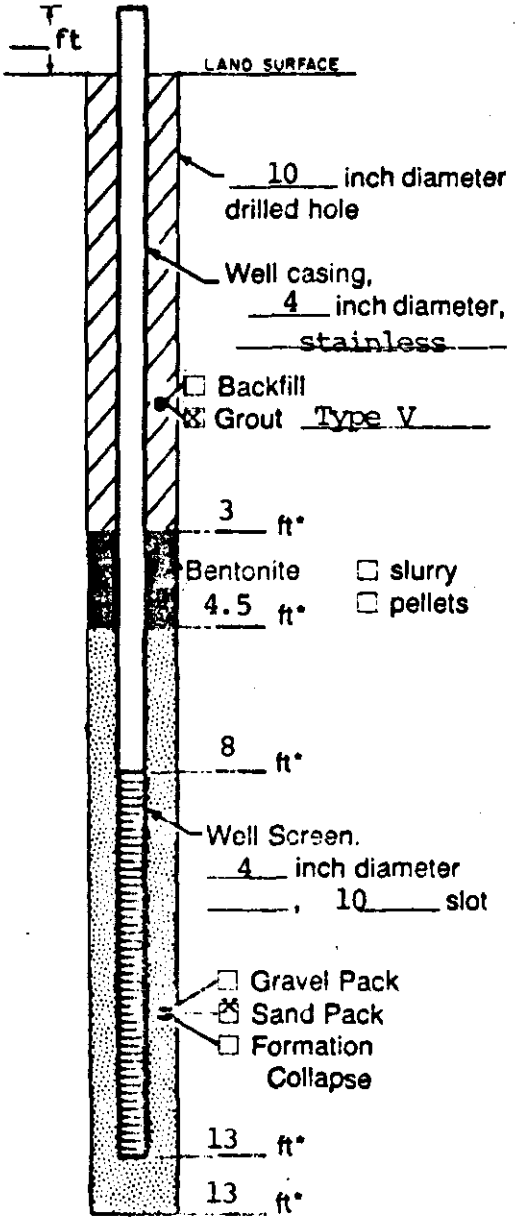
Remarks _____

AR102541

Prepared by Jeff Moore

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG



Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Avtex Fibers, Inc. RI/FS Well MW-12
Town/City Front Royal
County Warren State Virginia
Permit No. ____
Land-Surface Elevation and Datum ____ feet ☐ surveyed ☐ estimated
Installation Dates(s) ____
Drilling Method Hollow Stem Auger
Drilling Contractor Pennsylvania Drilling Company
Drilling Fluid None

Development Techniques(s) and Date(s)
To be performed by air-lift, week of August 10

Fluid Loss During Drilling N.A. gallons
Water Removed During Development N.A. gallons
Static Depth to Water ____ feet below M.P.
Pumping Depth to Water N.A. feet below M.P.
Pumping Duration N.A. hours
Yield N.A. gpm Date ____
Specific Capacity ____ gpm/ft
Well Purpose Monitoring of shallow groundwater in the vicinity of the viscose basins.

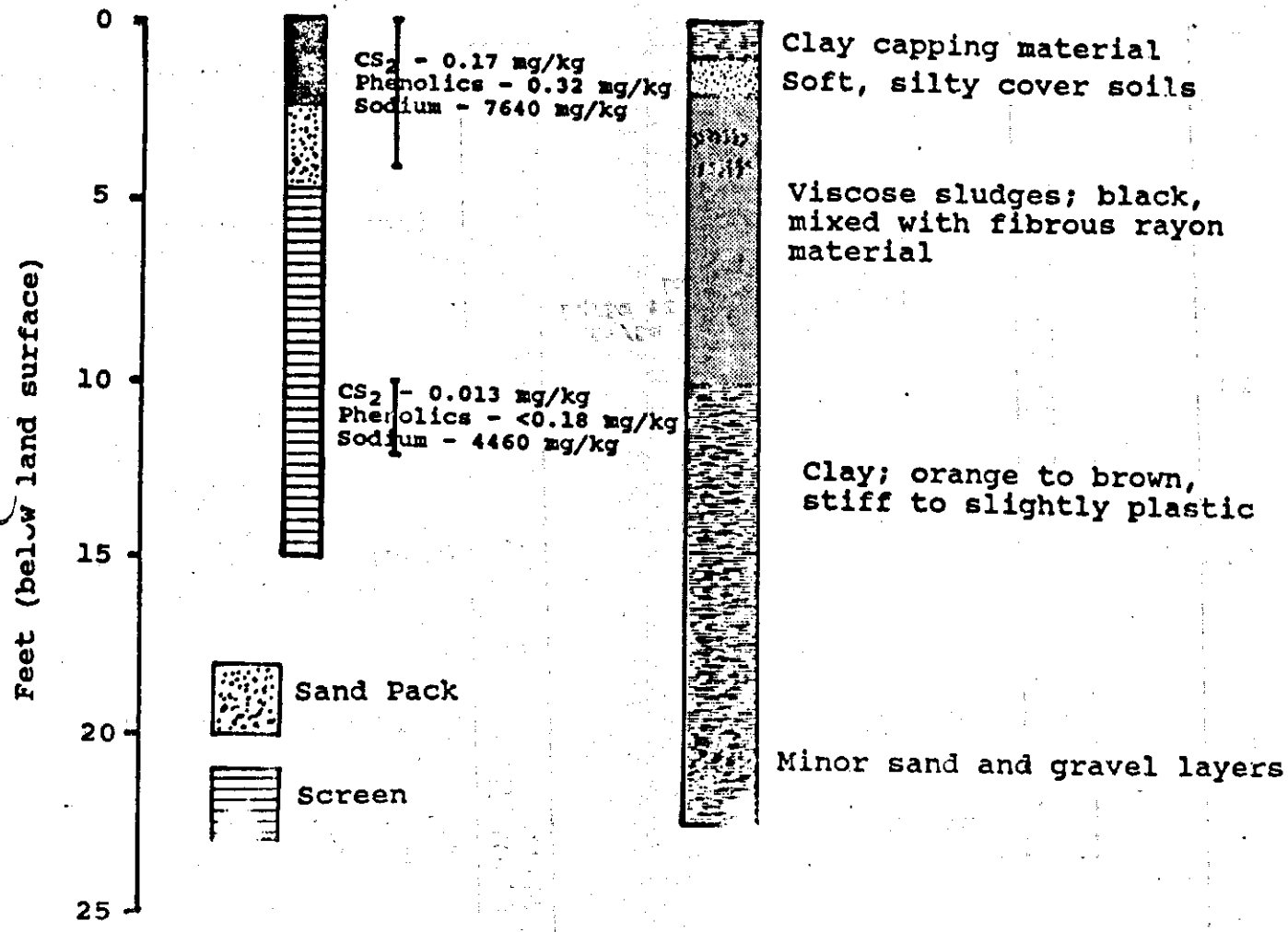
Remarks ____

AR102542

Prepared by Jeff Moore

GERAGHTY & MILLER, INC.

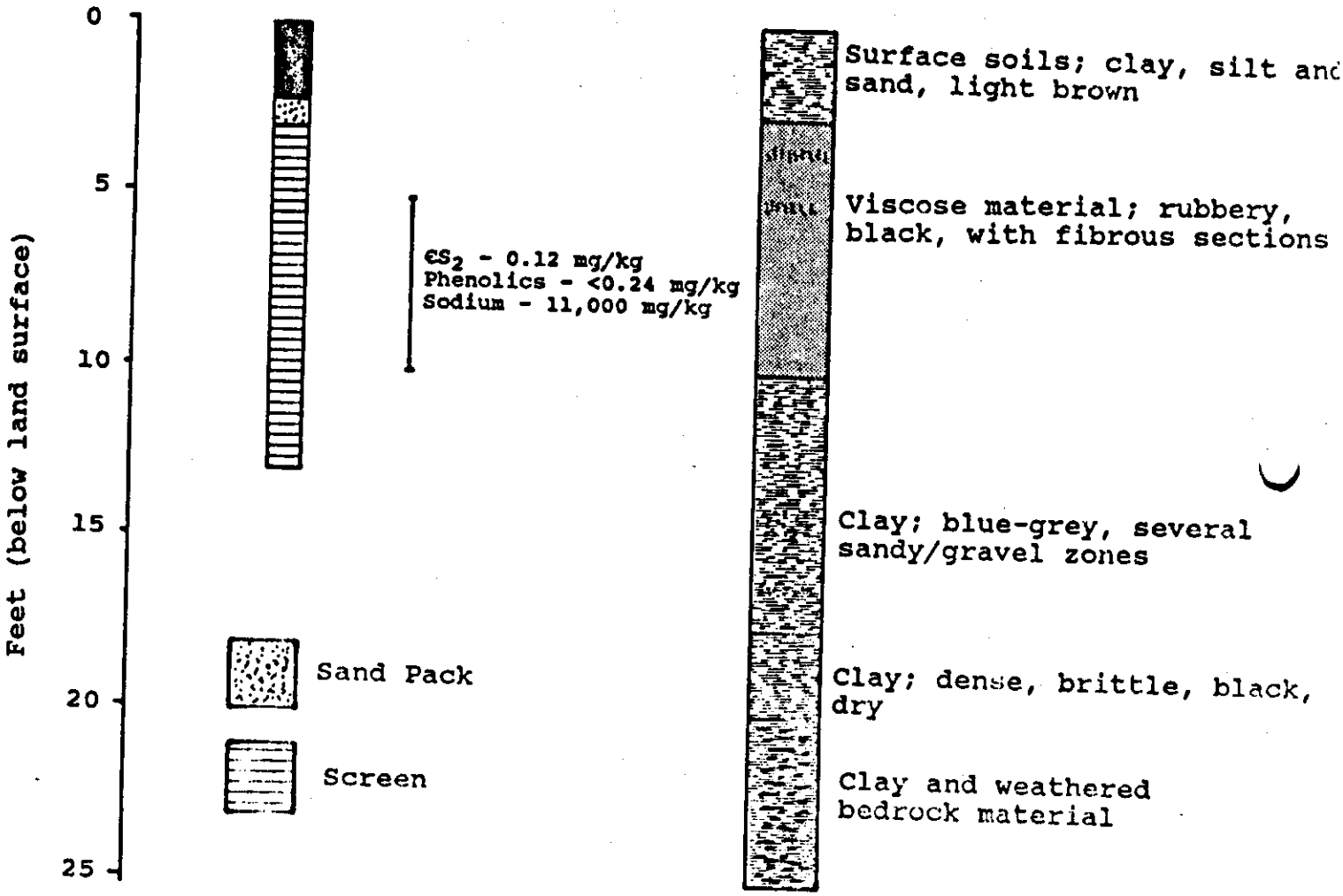
VISCOSE BASIN NO. 1
VB-1



Basin Liquid Sample: CS_2 - <0.05 mg/l
Phenolics - 0.2 mg/l
Sodium - 10,000 mg/l

AR102543

VISCOSE BASIN NO. 2
VB-2

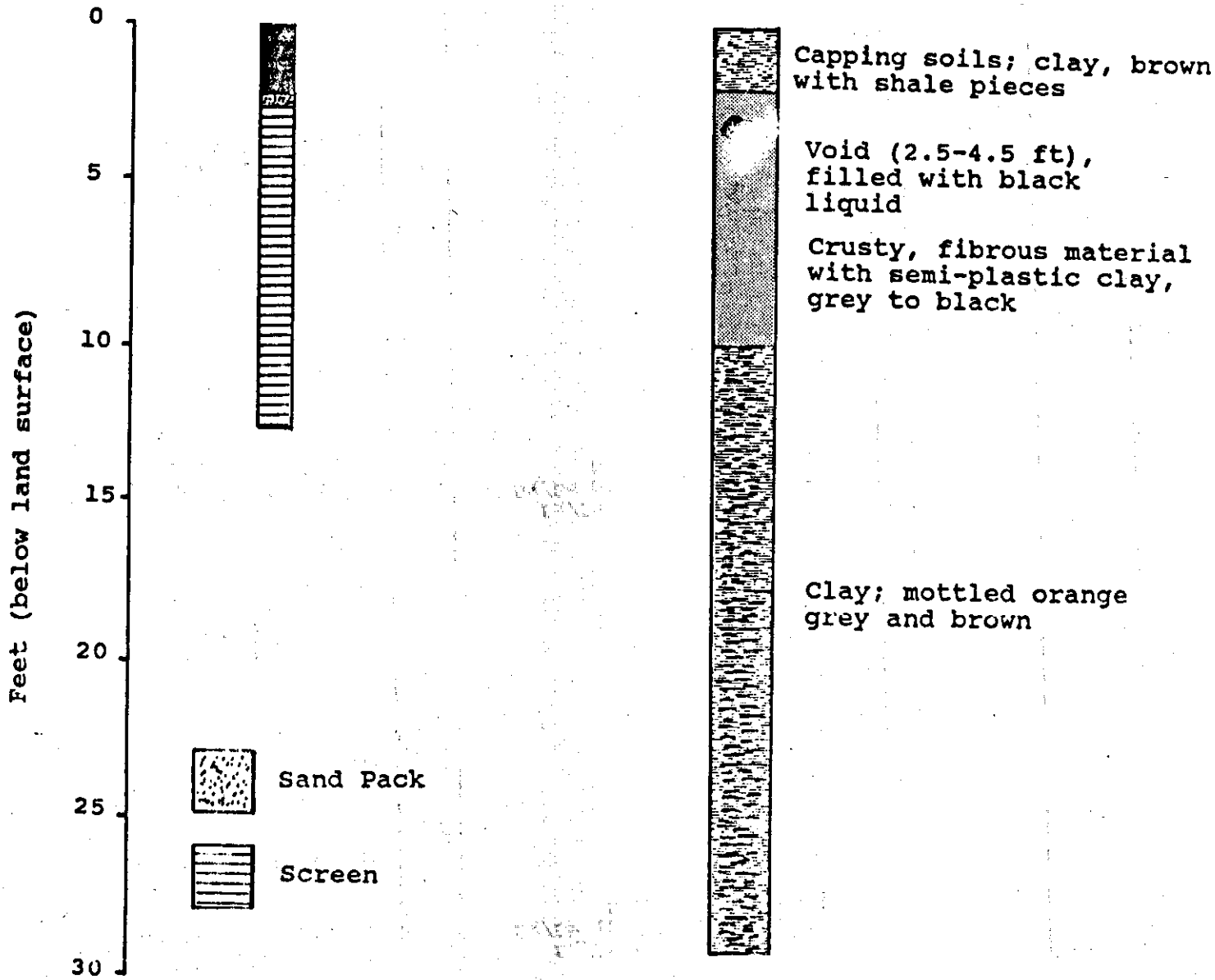


Basin Liquid Sample: CS_2 - <0.05 mg/l
Phenolics - 0.02 mg/l
Sodium - 2400 mg/l

AR102544

GERAGHTY & MILLER, INC.

VISCOSE BASIN NO. 3
VB-3

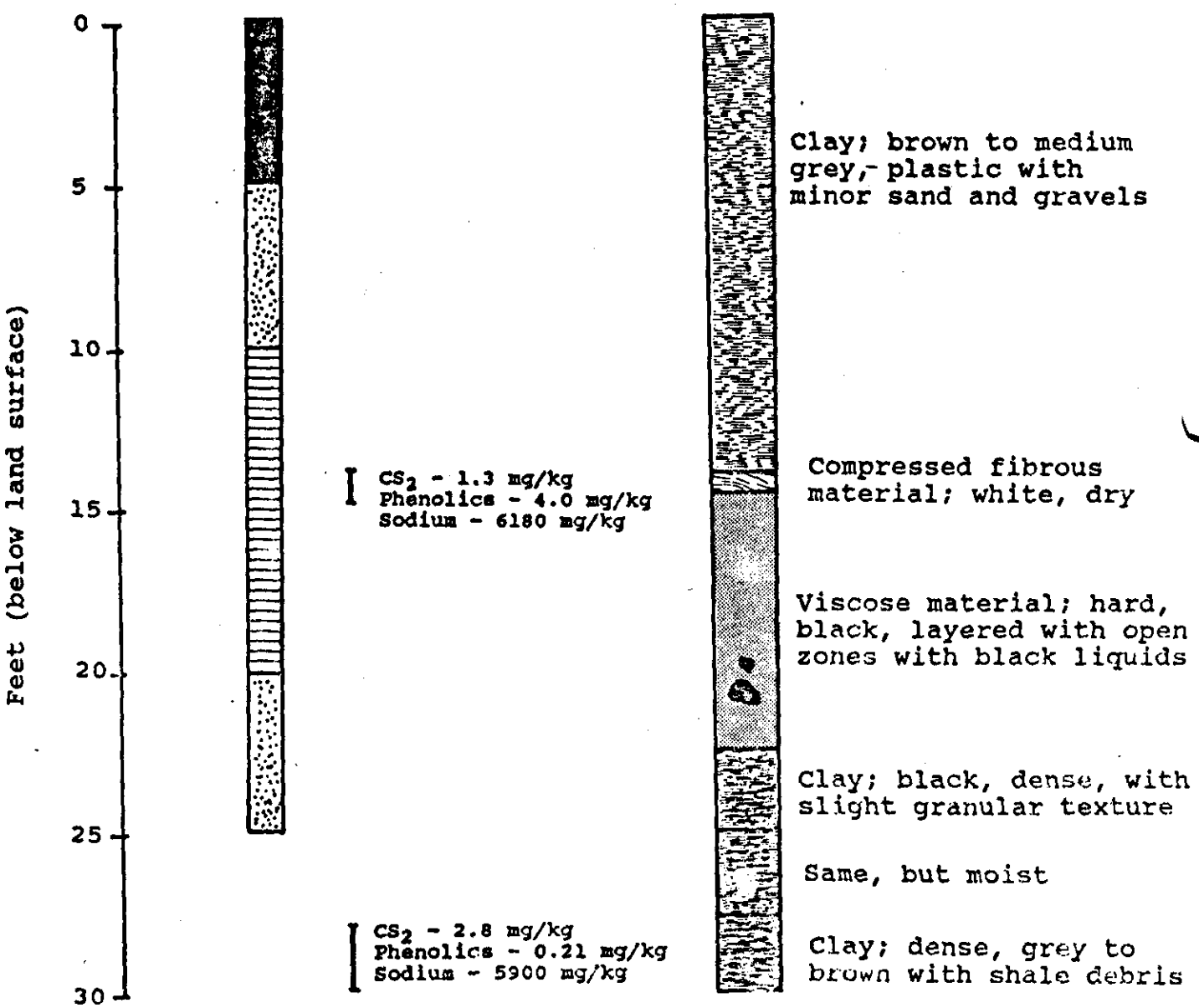


Basin Liquid Sample: CS_2 - <0.05 mg/l
Phenolics - 7.1 mg/l
Sodium - 5600 mg/l

AR102545

GERAGHTY & MILLER, INC.

VISCOSE BASIN NO. 7
VB-7



Sand Pack

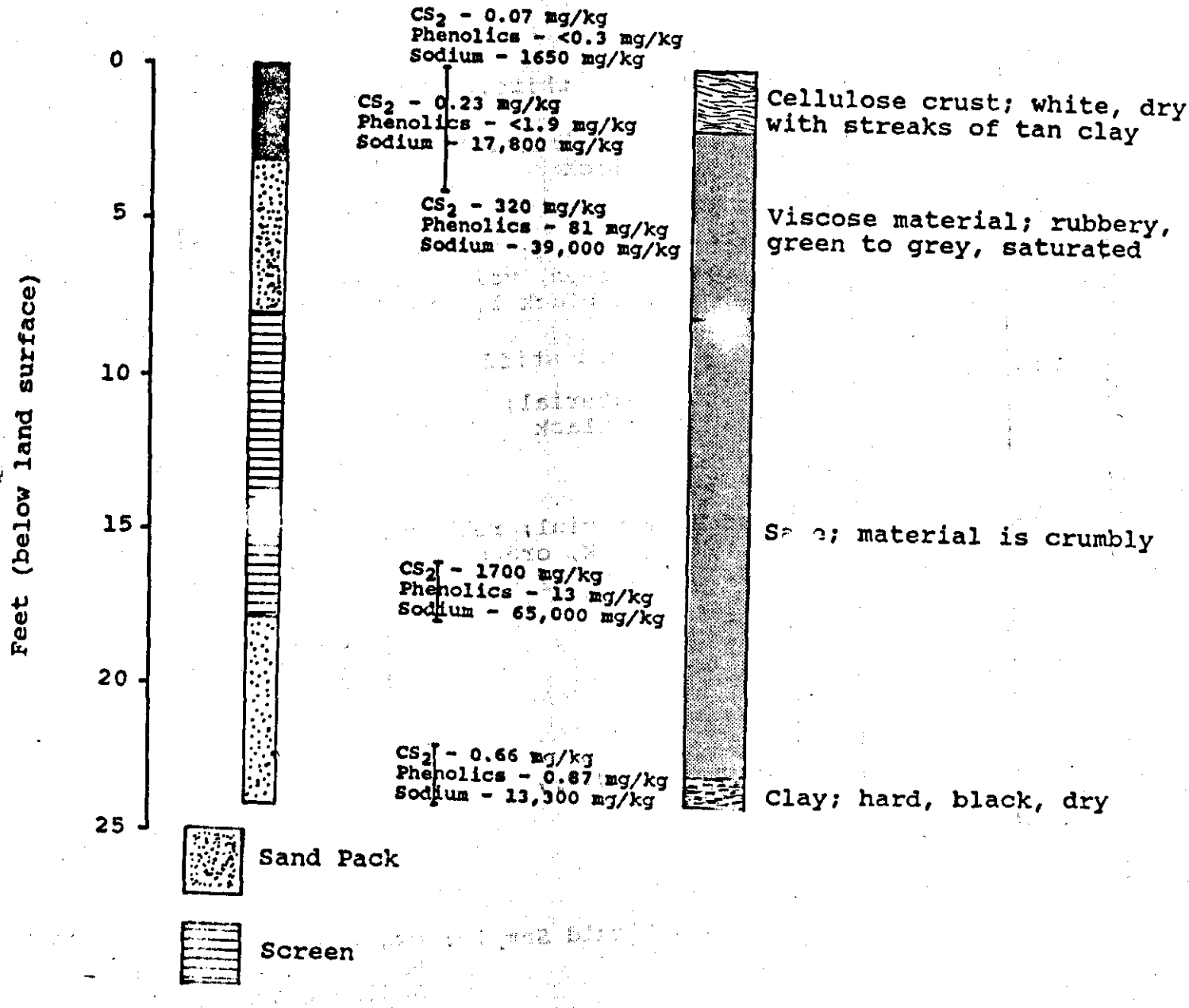
Screen

AR102546

Basin Liquid Sample: CS_2 - 1.5 mg/l
Phenolics - 0.06 mg/l
Sodium - 2700 mg/l

GERAGHTY & MILLER, INC.

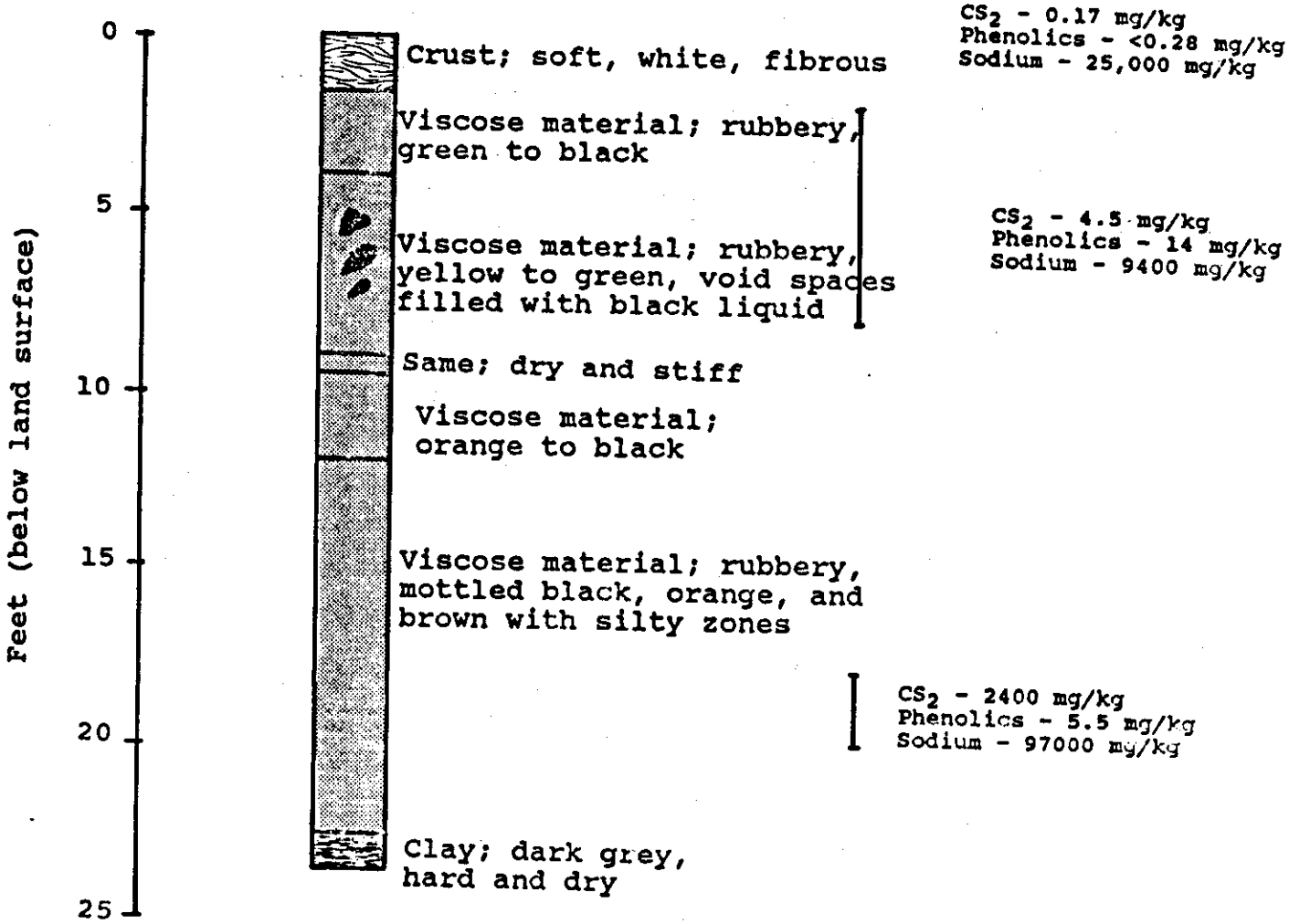
VISCOSE BASIN NO. 9
VB-9



Basin Liquid Sample: CS_2 - 710 mg/l
Phenolics - 12 mg/l
Sodium - 10,000 mg/l

AR102547

VISCOSE BASIN NO. 10
VB-10

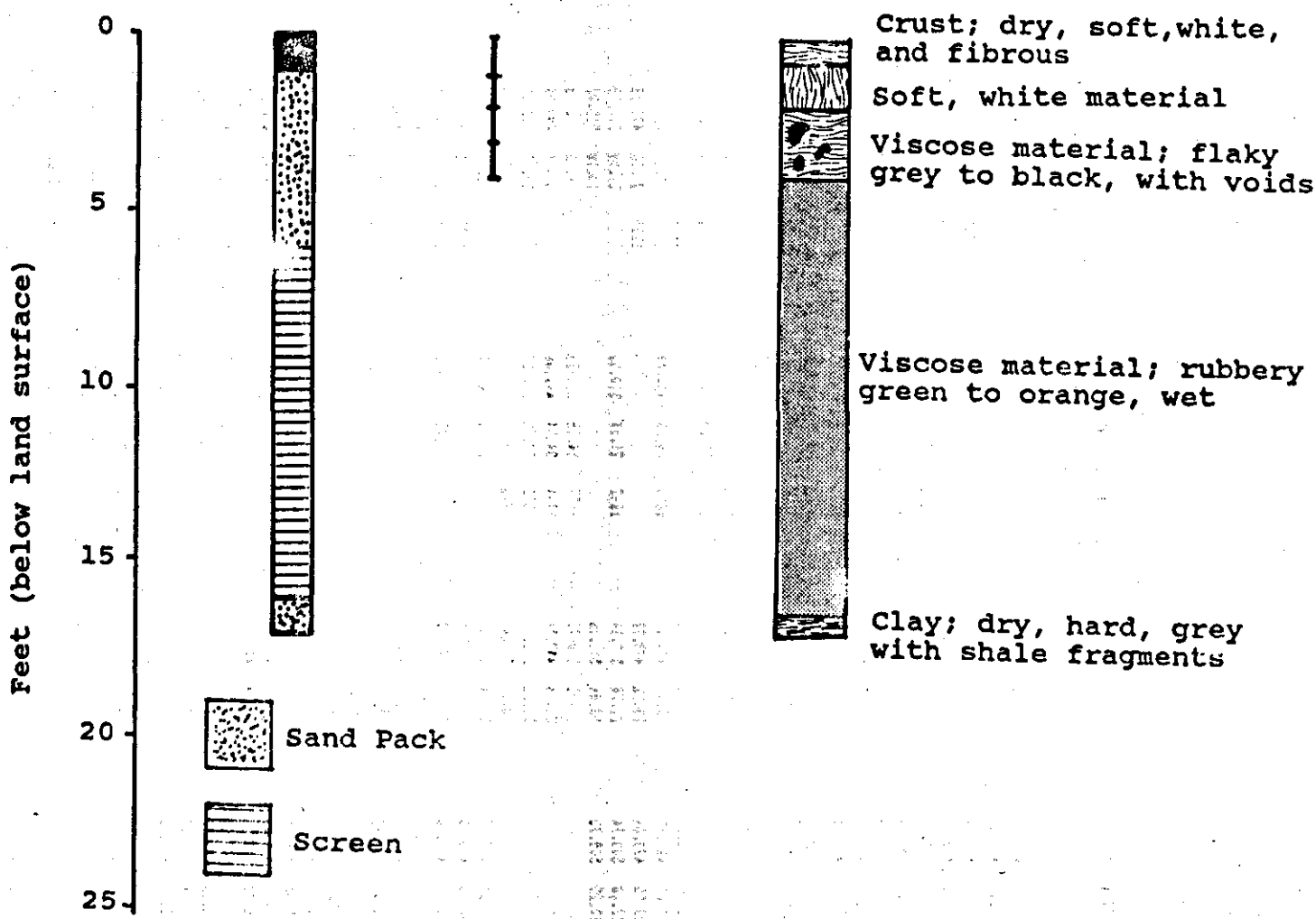


Basin Liquid Sample: CS_2 - 320 mg/l
Phenolics - 20 mg/l
Sodium - 9800 mg/l

AR102548

GERAGHTY & MILLER, INC.

VISCOSE BASIN NO. 11
VB-11



Sample Depth (feet)	CS_2 (mg/kg)	Phenolics (mg/kg)	Sodium (mg/kg)
Surface	0.016	<0.28	46
0 - 1	12.	<2.6	56,700
1 - 2	6.	<2.1	40,000
2 - 3	8300.	15.	92,300
3 - 4	20000.	14.	113,000
Liquid Sample:	3431. mg/l	0.07 mg/l	15,000 mg/l

AR102549

AVTEX WATER LEVELS

WELL NO.	ELEVATION MSL	JUNE 10, 1987 LEVEL FT	JUNE 10, 1987 ELEVATION MSL	AUGUST 17, 1987 LEVEL FT	AUGUST 17, 1987 ELEVATION MSL	JANUARY 5, 1988 LEVEL FT	JANUARY 5, 1988 ELEVATION MSL	JANUARY 10, 1988 TIME	JANUARY 10, 1988 LEVEL FT	JANUARY 10, 1988 ELEVATION MSL	JANUARY 11, 1988 TIME	JANUARY 11, 1988 LEVEL FT	JANUARY 11, 1988 ELEVATION MSL	JANUARY 12, 1988 TIME	JANUARY 12, 1988 LEVEL FT	JANUARY 12, 1988 ELEVATION MSL
GA-1A	500.39	28.95	471.44	29.22	471.17	28.66	471.73				1225	28.53	471.86	1414	28.83	471.56
GA-1B	497.72	25.8	471.92	26.05	471.67	25.42	472.3				1224	25.46	472.26	1412	25.75	471.97
GA-2A	489.86	16.61	473.25	16.44	473.42	16.33	473.53				1000	16.31	473.55	1200	16.4	473.46
GA-2B	490.44	17.15	473.29	16.6	473.84	16.33	474.11				955	16.36	474.08	1158	16.43	474.01
GA-3	485.26	13.71	471.55	14.61	470.65	13.69	471.57	1618	13.9	471.36		13.9	471.36	1311	13.81	471.45
GA-4	490.4	6.95	483.45	7.8	482.6	6.29	484.11	1609	6.58	483.82		6.58	483.82	1308	6.51	483.89
GA-5	498.99	25.69	473.1	27.65	471.34	[illegible]	472.15				1215	26.88	472.11	1247	26.98	472.01
GA-6	497.9	21.79	476.11	21.15	476.75	[illegible]	477.3				1229	20.44	477.46	1417	20.62	477.28
GA-7	486.08	10.16	475.92	10.67	475.41	9.97	476.11	1654	10.27	475.81		10.27	475.81	1358	10.17	475.91
GA-8	525.55	35.55	490	30.14	495.41	30.15	495.4	1709	29.66	495.89		29.66	495.89	1344	29.52	496.03
GA-9	505.99	30.79	475.2	30.81	475.18	30.02	475.97				1239	30.02	475.97	1329	30.01	475.98
GA-10	505.07	14.51	490.56					1615	14.59	490.48						
MW-1	552.73	8.44	544.29	10.73	542	8.44	544.29	1602	9.21	543.52		9.21	543.52	1304	9.24	543.49
MW-2	526.57	18.58	507.99	20.47	506.1	20.51	506.06	1715	20.57	506		20.57	506	1319	20.34	506.23
MW-3	526.2	21.15	505.05	23.49	502.71	21.84	504.36	1721	21.89	504.31	1452	21.8	504.4	1315	21.81	504.39
MW-4	498.59	24.45	474.14	25.8	472.79	24.86	473.73				1218	24.9	473.69	1351	24.9	473.69
MW-5	492.6	9.33	483.27	10.65	481.95	7.97	484.63	1606	8.53	484.07		8.53	484.07	1307	8.63	483.97
MW-6	502.59	[illegible]24	478.59	23.55	479.04	23.32	479.27				1235	23.06	479.53	1325	23.03	479.56
MW-7	532.92	21.58	511.34	23.18	509.74	21.78	511.14	1642	21.99	510.93		21.99	510.93	1409	21.95	510.97
MW-8	530	18.72	511.28	20.25	509.75	18.84	511.16					14.18	515.82	1411	19	511
MW-9	524.26					14.03	510.23	1657	14.18	510.58		14.18	510.58	1330	14.23	510.53
MW-10	527.[illegible]					35.19	492.51	1731	34.84	492.86		34.84	492.86	1352	34.54	493.16
MW-11	525.9[illegible]					22.32	503.[illegible]	1625	22.35	503.63		22.35	503.63	1318	22.12	503.86
MW-12	507.[illegible]					3.67	503.46	1726	3.84	503.29		3.84	503.29	1315	3.72	503.41
PW-0	506.[illegible]	28.19	477.84	28.56	477.49	28.14	477.89		28.33	477.7		28.34	477.69	1333	28.15	477.88
PW-1	505.[illegible]	30.85	475.05	30.85	475.05	30.1	475.8				1243	30.11	475.79	1329	30.12	475.78
PW-2	498.[illegible]	22.85	475.47	21.76	476.56	21.15	477.17		21.22	477.1	1231	21.22	477.1	2300	21.28	477.04
PW-3	499.[illegible]	27.15	471.53	27.31	471.37	26.92	471.76				1227	26.97	471.71	1425	27.32	471.36
PW-4	496.[illegible]	20.59	475.69	22	474.28	21.44	474.84				1221	21.51	474.77	1406	21.67	474.61
PZ-1	478.[illegible]			8.68	469.47	7.88	470.27				1331	7.97	470.18	1342	8.02	470.13
PZ-2	477.5[illegible]			7.49	470.07	6.75	470.81				1327	6.9	470.66	1343	6.95	470.61
PZ-3	475.01			5.3	469.71	4.73	470.28				1321	4.96	470.05	1355	5.06	469.95
PZ-4	479.91			10.3	469.61	9.62	470.29				1316	9.98	469.93	1359	10.14	469.77
PZ-5	477.04			6.68	470.36	5.85	471.19				1312	6.1	470.94	1418	6.26	470.78
PZ-6	478.81			7.34	471.47	6.37	472.44				1309	6.46	472.35	1421	6.69	472.12
PZ-7	479.75			6.72	473.03	5.9	473.85				1256	6.05	473.7	1348	6.17	473.58
PZ-8	479.37			[illegible]	472.88	6.35	473.02		6.61	472.76	1302	6.55	472.82	1355	6.65	472.72
PZ-9	478.81			6.85	471.96	5.22	473.59		5.44	473.37	1304	5.39	473.42	1354	5.37	473.44
PZ-10	480.17			9.8	470.37	9.19	470.98				1250	9.52	470.65	1344	9.72	470.45
PZ-11	479.54			5.78	473.76	6.87	472.67		5.94	473.6	1306	5.92	473.62	1353	5.98	473.56
VB-1	529.59					3.33	526.26	1626	3.65	525.94		3.65	525.94	1321	3.63	525.96
VB-2	533.05					3.34	529.71	1630	3.46	529.59		3.46	529.59	1326	3.48	529.57
VB-3	533.42					2.12	531.3	1625	2.31	531.11		2.31	531.11	1328	2.36	531.06
VB-7	529.36					14.02	524.34	1644	14.05	524.31		14.05	524.31	1334	14.09	524.27
VB-9	518.75					2.64	515.11	1702	2.66	515.09		2.66	515.09	1333	2.65	515.1
VB-11	522.76					6.66	516.1							1320	6.77	515.99
[illegible](178)	491.8	21.96	469.84	22.92	468.88	22.07	469.73				1537	22.5	469.3	1233	22.33	469.47
[illegible](133)	495.5	13.13	482.37	14.82	480.68						1531	15.37	480.13	1225	13.95	481.55
[illegible](163)	[illegible]	18.31	47[illegible].59	[illegible]9	470.9	18.38	471.52				1525	18.95	470.95	1130	18.52	471.38
[illegible](141)	4[illegible]	19.66	472.38	20	472.04	19.33	472.71				1506	19.7	472.34	1205	19.42	472.61

APR 1 0 1989

AVTEI WATER LEVELS

ELL NO.	ELEVATION MSL	JUNE 10, 1987 LEVEL FT	JUNE 10, 1987 ELEVATION MSL	AUGUST 17, 1987 LEVEL FT	AUGUST 17, 1987 ELEVATION MSL	JANUARY 5, 1988 LEVEL FT	JANUARY 5, 1988 ELEVATION MSL	JANUARY 10, 1988 TIME	JANUARY 10, 1988 LEVEL FT	JANUARY 10, 1988 ELEVATION MSL	JANUARY 11, 1988 TIME	JANUARY 11, 1988 LEVEL FT	JANUARY 11, 1988 ELEVATION MSL	JANUARY 12, 1988 TIME	JANUARY 12, 1988 LEVEL FT	JANUARY 12, 1988 ELEVATION MSL
ARTIN(185)	492.85	19.35	473.5	20.95	471.9	19.87	472.98									
AE!(136)	494.78	18.04	476.74	20.4	474.38	17.34	477.44				1518	20.27	472.58	1138	20.14	472.71
.TTER(9.)	6:1.8										1509	18.95	475.83	1151	18.96	475.82
CHILLING(181)	491.2	18.95	472.25	19.5	471.7	18.65	472.55							1217	72.4	539.4
.ITH(137)	489.89	18.25	471.64	18.62	471.27	17.91	471.98				1508	18.99	472.21	1154	18.79	472.41
EATHER-BLTZ(179)	491.9	20.9	471	22.3	469.6	21.49	470.41				1150	17.94	471.95	1139	18.03	471.86
CLNG(.77)	499.7	26.14	473.56	25.9	473.8	25.43	474.27							1230	21.71	470.19
WES(PUMP HOUSE)	496	25.84	470.16	25.75	470.25	24.98	471.02				1513	25.78	473.92	1149	25.51	474.19
											1643	25.61	470.39	1359	25.66	470.34

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AVTEX WATER LEVELS

WELL NO.	ELEVATION MSL	JANUARY 13, 1988 TIME	LEVEL FT	ELEVATION MSL	JANUARY 14, 1988 TIME	LEVEL FT	ELEVATION MSL	JANUARY 15, 1988 TIME	LEVEL FT	ELEVATION MSL	JANUARY 16, 1988 TIME	LEVEL FT	ELEVATION MSL	FEBRUARY 1, 1988 TIME	LEVEL FT	ELEVATION MSL
GR-1A	500.29				1704	29.08	471.31	1418	28.99	471.4	2319	30.6	469.79	1148	28.57	471.82
GR-1B	497.72				1705	26.14	471.58	1405	25.88	471.84	2359	27.38	470.34	1147	25.51	472.21
GR-2A	485.86	1714	16.65	473.21	1644	18.04	471.82	1400	17.01	472.85	1005	16.85	473.01	1358	16.35	473.51
GR-2B	490.44	1713	16.67	473.77	1800	18.11	472.33	1415	17.11	473.33	1015	16.81	473.63	1400	16.36	474.08
GR-3	485.26				1740	14.04	471.22	1132	13.9	471.36	1450	13.93	471.33	1016	[illegible]	471.65
GR-4	490.4				1735	6.85	483.55	1128	6.72	483.68	1453	6.66	483.74	1010	[illegible]	484.58
GR-5	498.99				1718	27.44	471.55	1140	27.03	471.96	1505	27.35	471.64	1131	26.97	472.02
GR-6	497.9				1655	22.45	475.45	1223	21.18	476.72	1538	21.52	476.38	1206	20.44	477.46
GR-7	486.08				1618	10.41	475.67	1035	10.25	475.83				1229	9.98	476.1
GR-8	525.55	900	29.34	496.21	1705	29.39	496.16	1050	29.38	496.17				1058	28.79	496.76
GR-9	505.99	1701	30.32	475.67	1742	53.1	452.89	1231	31.43	474.56	1534	30.88	475.11	1213	29.86	476.13
GR-10	505.97															
MW-1	552.73				1745	9.48	543.25	1123	9.4	543.33	1441	9.43	543.3	1005	7.86	544.87
MW-2	526.57	855	20.08	506.49	1641	20.77	505.8	1101	20.64	505.93	1351	20.58	505.99	1110	20.17	506.4
MW-3	526.2	1637	21.76	504.44	1637	22.19	504.01	1302	22.08	504.12	1350	22.06	504.14	1111	21.49	504.71
MW-4	498.59				1716	25.21	473.38	1142	24.91	473.68	1506	24.93	473.66	1132	24.8	473.79
MW-5	[illegible]				1734	8.78	483.82	1126	8.83	483.77	1455	8.84	483.76	1009	7.34	485.26
MW-6	[illegible]	16.54	23.02	479.57	1755	27.35	475.24	1226	25.07	477.52	1530	24.5	478.09	1209	23.08	479.51
MW-7	[illegible]				17.0	22.37	510.55	1105	22.21	510.71	1402	22.11	510.81	1040	21.12	511.8
MW-8	530															
MW-9	524.76	856	14.16	510.6	1652	14.19	510.57	1039	14.18	510.58	1353	14.17	510.59	1050	13.7	511.06
MW-10	527.7				1700	34.87	492.83	1055	35	492.7	1355	34.86	492.84	1105	34.05	493.65
MW-11	525.98				1721	22.58	503.4	1109	22.42	503.56	1421	22.3	503.68	1023	21.85	504.13
MW-12	507.13				1717	4.03	503.1				1443	3.8	503.33	1120	2.93	504.2
PW-0	506.03	1619	28.38	477.65	1756	37.6	468.43	1234	29.12	476.91	1537	28.68	477.35	1215	27.81	478.22
PW-1	505.9	1715	30.69	475.21	1744	66.78	439.12	1229	31.59	474.31	1532	31.9	474	1211	29.93	475.97
PW-2	498.32	1610	21.42	476.9	1600	23.21	475.11	1415	21.89	476.43		21.94	476.38	1208	21.33	476.99
PW-3	493.68				1762	27.64	471.04	1430	27.8	470.88	1530	27.69	470.99	1200	27.02	471.66
PW-4	496.28				1711	22.08	474.2	1145	21.68	474.6	1515	21.17	475.11	1141	20.62	475.66
PZ-1	474.15				1721	[illegible]	469.8	1140	8.05	470.1	1459	8.13	470.02	1127	7.9	470.25
PZ-2	[illegible]				1720	[illegible]	470.18	1149	6.37	470.59	1501	7.08	470.48	1128	6.78	470.78
PZ-3	475.02				1716	[illegible]	469.65	1155	5.05	469.96	1510	5.2	469.81	1138	4.86	470.15
PZ-4	[illegible]				1710	10.25	469.66	1207	[illegible]	469.9	1518	10.11	469.8	1145	9.68	470.23
PZ-5	477.09				1707	6.51	[illegible]	1415	6.4	470.64	1522	6.37	470.67	1155	6.95	470.09
PZ-6	473.81	1657	6.15	472.66	1800	[illegible]	[illegible]	1345	7.02	471.79	1535	7.13	471.68	1158	6.41	472.4
PZ-7	479.75	942	6.13	473.62	1805	9.47	470.28	1242	6.62	473.13	1542	6.54	473.21	1236	5.94	473.81
PZ-8	479.37	1700	6.67	472.7	1830	14.35	465.02	1240	7.2	472.17	1548	7.07	472.3	1241	6.35	473.02
PZ-9	475.81	1708	5.5	473.31	1800	15.5	463.31	1238	6.09	472.72	1546	5.94	472.87	1239	5.15	473.66
PZ-10	480.17				1743	9.81	470.36	1238	9.75	470.42	1549	9.81	470.36	1232	9.32	470.85
PZ-11	475.54	1707	6.25	473.29	1800	16.7	462.84	1239	7.04	472.5	1547	6.53	473.01	1240	5.81	473.73
VW-1	526.59				1724	3.78	525.81	1113	2.73	525.86	1429	2.82	525.77	1025	3.04	526.55
VW-2	533.05				1728	3.53	529.52	1115	3.52	529.53	1432	3.52	529.53	1030	2.93	530.12
VW-3	533.42				1731	2.42	531	1118	2.43	530.99	1435	2.45	530.97	1034	2.01	531.41
VW-4	538.36				[illegible]	[illegible]	524.28	1107	14.09	524.27	1410	14.1	524.26	1045	13.87	524.49
VW-5	[illegible]				[illegible]	[illegible]	515.09	1044	2.62	515.13				1052	2.08	515.67
VW-1	[illegible]															
[illegible](178)	[illegible]	939	22.4	469.4	1653	22.48	469.32				1056	22.38	469.42	1350	22.02	469.78
[illegible](133)	[illegible]	935	13.96	481.54	1609	14.02	481.48				1102	13.92	481.58	1341	12.51	482.99
[illegible]	[illegible]				1728	19.43	470.42				1130	18.62	471.28	1417	18.43	471.47
[illegible](141)	[illegible]	934	19.58	472.46	1702	19.73	[illegible]	1423	19.69	472.35	2359	21.01	471.03	1337	19.42	472.62

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AFTER WATER LEVEL

WELL NO.	ELEVATION MSL	JANUARY 13, 1989 TIME	LEVEL FT	ELEVATION MSL	JANUARY 14, 1988 TIME	LEVEL FT	ELEVATION MSL	JANUARY 15, 1989 TIME	LEVEL FT	ELEVATION MSL	JANUARY 16, 1988 TIME	LEVEL FT	ELEVATION MSL	FEBRUARY 1, 1988 TIME	LEVEL FT	ELEVATION MSL
MARTIN(185)	492.85	1714	20.29	472.57	1726	21.44	471.41				1127	20.36	472.49	1415	19.69	473.16
NAST(.25)	494.72	932	19.7	475.09	1722	19.28	475.5				1116	19.55	475.23	1407	18.31	484.47
RITTER(91)	511.8	954	72.25	539.55	1712	72.79	539.01				1112	72.61	539.19	1328	71.94	539.86
SCHILLING(183)	491.2	1709	19.55	472.25	1716	18.07	472.13	1422	19.15	472.05	1025	19.05	472.15	1355	18.65	472.55
SMITH(152)	489.89	1712	18.24	471.65	1745	20.96	469.03				1124	18.16	471.73	1413	17.8	472.09
WEATHER-ULT(179)	491.9	937	21.75	470.15	1655	21.35	470.05				1100	21.86	470.04	1346	21.26	470.64
YOUNG(.77)	499.7	1702	25.79	473.91	1724	27.42	472.28				1120	25.94	473.76	1410	25.46	474.24
RIVER(PUMP HOUSE)	495	930	25.31	470.69	1615	25.39	470.61	1030	25.16	470.84	1345	25	471	1225	25.14	470.86

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