See J.W. Townsend memo 2/13/59 in Folder #1

Narrative report in this MF-104 intended to serve also as Opr.'s final report.

OFFICIAL FILE COPY
O. M. E.
RECEIVED FEB 16 1959
DATE | INITIALS

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
REGION III

Administrative Audit Difference Statement

Food Machinery and Chemical Corporation
161 East 42nd St.
New York 17, New York

Date: February 12, 1959
Payee's Reference: August 13, 1958, through October 4, 1958

Gentlemen:

Upon examination of the above Payee's Reference a difference was found which made it necessary to suspend your account accordingly:

Amount Claimed	$	21,469.60
Difference	$	3,854.54
Amount Approved	$	17,615.06

The reason for the difference was due to:

Disallowance, Non-core Drilling

Reported cost, 23,718 feet at total cost of $15,619.20

Allowable cost, 20,119 feet at $0.65 per foot $13,077.35

Amount to be disallowed ---------- $2,541.85

Disallowance, Radiometric Logging

Reported cost, 23,462 feet at $0.075 per foot $1,759.66

Allowable cost, 20,006 feet at $0.075 per foot $1,500.45

Amount to be disallowed ---------- $ 259.21

(CONTINUED ON ATTACHED SHEET)

Any reclaim for deductions made above must be supported by the ORIGINAL of this form.

Very sincerely yours,

N. E. Stokes
Audit Section

I-B & F Form No. 4
5-52 D

Disallowance, Incidental Allowance

Reported cost, 23,718 feet at total cost of $3,955.74

Allowable cost, 20,119 feet at $0.145 per foot ---------- $2,917.26

Amount to be disallowed ---------- $1,038.48

Disallowance, Bulldozing

The Operator has reported 11.25 hours bulldozing; however, the bulldozing contractor's statement shows that only 10 hours of bulldozing was performed. The reported cost for 1.25 hours bulldozing is disallowed, as follows:

Disallowed, reported cost for 1.25 hours bulldozing at $12.00 per hour ---------- $ 15.00

Total amount disallowed ---------- $3,854.54

Withheld an amount of $500.00 from reimbursement to the Operator, pending resolution of matters prerequisite to closing the account. The contract was considered completed on completion of 81 of the possible 83 holes under Stage I, and the Operator was so notified by letter of January 19, 1959, a copy of which was forwarded to you at the time of writing.

224 New Customhouse
Denver 2, Colorado
February 10, 1959

Memorandum

To: T. A. Christensen

From: Executive Officer, GME Field Team, Region III

Subject: Docket No. DMEA 5009 (Uranium) Contract Idm-E1290
Food Machinery and Chemical Corporation, (Westvaco
Mineral Products Division) McKinley County, New Mexico,
Operator's Monthly Progress Report for the period,
August 15 through October 4, 1958

Enclosed are the original and four copies each of Forms MF-104 and MF-104a, Operator's Narrative Report, and Engineer's Report for the above period.

The work is being performed partly under independent subcontract and partly at fixed unit costs. The drilling rates are as low or lower than the rates contained in the lowest and best bid submitted with the application, and are considered to be reasonable.

Except as otherwise indicated below, we consider that the Operator has complied with the intent of the contract, and the work for which payment is recommended is acceptable to the Government. Payment is recommended on the following basis contingent on your verification of the correctness of applicable rates and arithmetical accuracy of computations.

The Operator has reported considerable excess drilling below the objective stated in the contract. The excess drilling could have been avoided by applying controls which are in common use in the project area, therefore, the reported costs for excess non-core drilling, incidental allowances, and radiometric probing, are to be disallowed, based on the attached tabulation submitted by the GME field inspectors.

<u>Disallowance, Non-core Drilling</u>

Reported cost, 23,718 feet at total cost of	$15,619.20
Allowable cost, 20,119 feet at $0.65 per foot	13,077.35
Amount to be disallowed	$2,541.85

Disallowance, Radiometric Logging

Reported cost, 23,462 feet at $0.075 per foot	$1,759.66	
Allowable cost, 20,000 feet at $0.075 per foot	1,500.45	
Amount to be disallowed		$ 259.21

Disallowance, Incidental Allowance

Reported cost, 23,718 feet at total cost of	3,955.74	
Allowable cost, 20,119 feet at $0.145 per foot	2,917.26	
Amount to be disallowed		1,038.48

Disallowance, Bulldozing

The Operator has reported 11.25 hours bulldozing, however, the bulldozing contractor's statement shows that only 10 hours of bulldozing was performed. The reported cost for 1.25 hours bulldozing is to be disallowed, as follows:

Disallow, reported cost for 1.25 hours bulldozing at $12.00 per hour	15.00
Total amount to be disallowed	$3,854.54

Withhold an amount of $500.00 from reimbursement to the Operator, pending resolution of matters prerequisite to closing the account. The contract was considered completed on completion of 81 of the possible 83 holes under Stage I, and the Operator was so notified by letter of January 19, 1959, a copy of which was forwarded to you at the time of writing.

Reconciliation With Amount Reported by the Operator on Form MF-104 for the Period, August 15-October 4, 1958

Amount reported on Form MF-104 for the period, August 15-October 4, 1958	$21,469.60
Amount to be disallowed	3,854.54
Total acceptable cost	$17,615.06
Government participation at 50 percent	8,807.53
Amount to be withheld	500.00
Balance due the Operator	$ 8,307.53

Remarks:

Date of Report----------December 20, 1958
Date Received in Field Office----------December 29, 1958
Date Received in Region Office----------February 6, 1959
Reason for delay: Held in Field Office pending transfer of footage from Stage II to Stage I.

Original signed
W. W. TOWNSEND
J. W. Townsend

Enclosures

JWC:hmb

cc: Chmn. Op. Comm. (2)
Romalo, OMR/TSC.
MF-104 file, Reg. III
Harshman)
Emerick) w/copy Engr's Report
Cooper)
Chron

Hole No. N.	Hole No. E.	Drilled	Operator's Base* of Poison Canyon	Footage claimed by Operator	Base of Poison Canyon	Footage allowed by Field Examiners	Allowable Logging	Remarks
300	4950	320	---	105	---	106	106	Footage allowed to 25 feet below first recognizable contact, or Westwater Canyon-Recapture contact at 81'; see text for explanation.
600	4950	228	---	109	---	149	149	" " " " " " " " " " " "
900	4950	162	---	162	---	162	162	Hole stopped at 10' below Westwater Canyon-Recapture contact.
1200	4950	86	***NR	86	72	86	86	
1500	4950	149	***NR	149	139	149	147	
1800	4950	170	***NR	170	163	170	168	
2100	4950	320	285	311	217	242	242	
2400	4950	290	***NR	290	259	290	290	
2700	4950	44[illegible]	429	442	308	333	333	
3000	4950	465	465	465	375	400	400	Operator does not indicate Westwater-Recapture contact.
3300	4950	466	***NR	466	415	440	440	
3600	4950	562	555	562	463	488	488	
3900	4950	405	362	405	320	345	345	Operator's base of Poison Canyon more likely at 390'.
4200	4950	240	219	240	140	171	171	
4500	4950	240	202	227	139	164	164	
4800	4950	210	***NR	210	203?	210	203	Bottom 7' of hole filled with debris and not electrically logged; [redacted]
5100	4950	341	271	296	213	238	238	
150	4450	142	---	142	---	142	139	See remarks for Holes 300-4950, 600-4950, 900-4950.
450	4450	164	---	164	---	164	145	" " " " " " " .
750	4450	120	***NR	120	109	120	118	
1350	4450	230	***NR	230	207	230	230	
1650	4450	290	***NR	290	254	279	279	
1950	4450	318	***NR	318	302	318	318	
2250	4450	396	***NR	396	364	389	389	
2550	4450	470	***NR	470	414	439	439	
2850	4450	470	***NR	470	436	461	461	
3150	4450	475	---	475	---	475	475	Total depth allowed because critical units not recognizable by either logging method owing to Fault zone.
3450	4450	390	***NR	390	210	235	235	
3750	4450	225	***NR	225	147	172	172	
4050	4450	316	210	261	159	184	184	
4350	4450	255	223	250	182	207	207	
4650	4450							Not drilled -- inaccessible.
4950	4450	300	285	300	219	244	244	
300	3950	150	***NR	150	125	150	149	
600	3950	210	***NR	210	195	210	208	
900	3950	301	***NR	301	232	257	257	
1200	3950	416	391	416	278	303	303	
1500	3950	379	***NR	379	345	370	370	
1800	3950	488	470	488	367	392	392	
2100	3950	426	***NR	426	420	426	425	
2400	3950	510	***NR(?)	510	468	510	509	Examiners allow all below top Poison Canyon contact because of nearness to fault and possible drag increasing section & otherwise obscuring definite contacts.

Hole No. N.	Hole No. E.	Drilled	Operator's Base* of Poison Canyon	Footage claimed by Operator	Base of Poison Canyon	**Footage allowed by Field Examiners	Allowable Logging	Remarks
2700	3950	230	***NR	223	195	223	223	
3000	3950	330	194	209	194	209	209	Westwater appears to have a muddier facies than usual.
3300	3950	245	***NR	202	183	202	202	Relationship obscure below Poison Canyon.
3600	3950	270	196	221	108	133	133	
3900	3950	255	210	230	120	145	145	
4200	3950	265	215	244	130	161	161	
4500	3950	270	224	231	145	170	170	
4800	3950	300	225	229	151	176	176	
5100	3950	270	232	257	162	187	187	
150	3450	264	257	204	193	223	223	
450	3450	270	***NR	270	260	270	269	
750	3450	330	***NR	330	318	330	329	
1050	3450	366	348	366	348	366	366	Examiners interpret Poison Canyon as 2 sandstones with mud split.
1350	3450	512	503	512	372	397	397	
1650	3450	495	***NR	495	435	470	470	
1950	3450	220	172	199	155	180	180	
2250	3450	300	175	201	159	184	184	
2550	3450	262	196	221	179	204	204	
2850	3450	225	180	206	96	123	123	
3150	3450	220	213	220	120	145	145	
3450	3450	280	200	227	117	142	142	
3750	3450	305	203	230	121	146	146	
4050	3450	250	215	241	136	161	161	
4350	3450	270	229	253	149	174	174	
4650	3450	280	230	253	160	185	185	
4950	3450	250	238	250	165	190	190	
300	2950	449	418	440	326	351	351	
600	2950	435	***NR	435	370	395	395	
900	2950							Not completed -- lost circulation.
1200	2950	465	***NR	465	?	465	395	All allowed -- indeterminate -- lower part of hole unrecognizable.
1500	2950	255	***NR	206	180	205	205	
1800	2950	185	***NR	185	180	185	184	
2100	2950	229	***NR	224	175	200	200	
2700	2950	229	213	229	121	146	146	
3000	2950	335	306	330	243	268	268	
3300	2950	330	317	330	225	250	250	
3600	2950	335	315	335	230	255	255	
3900	2950	320	298	320	215	240	240	
4200	2950	316	239	269	155	180	180	
4500	2950	350	320	345	242	267	267	
4800	2950	274	255	274	173	198	198	
5100	2950	288	250	277	167	192	192	
Total 81 Holes		24,954		23,594		20,119	20,006	

OME
DEPARTMENT OF THE INTERIOR
FEB 6 - 1959
REGION III
DENVER, COLORADO

February 4, 1959

Memorandum

To: J. W. Townsend, Executive Officer, OME Field Team, Region III

From: T. M. Rosalo, Mining Engineer, Tucson, Arizona

Subject: Progress Report for Aug. 14 to Oct. 4, 1958, Docket DMEA-5009 (Uranium), Contract Ida-8122D, Food Machinery and Chemical Corporation (Westvaco Mineral Products Division), McKinley County, N. Mex.

On September 2, 1958 while in the vicinity on OME business I briefly visited the exploratory project of subject contract. I was accompanied by Robert Kirchman, the corporation's superintendent of mines, and Robert Tipton, a consulting mining geologist retained by the corporation principally for supervision of the project. Wet drilling, which reportedly had started August 14, 1958 after completion of necessary surveys, was being done with 3 rotary type rigs owned by Stewart Bros. & Parker Drilling Co. of Grants, N. Mex. The location of the drilling sites and thereupon procedures appeared to be as specified by the contract. According to Mr. Tipton, radiometric logging of the holes, all of which were barren on the basis of tests made on drill cuttings, was about to be started by Log-Master Services, Inc. An inspection of the field work that was reportedly completed October 4, was made by me October 14, 1958 in the company of W. L. Emrich, geologist, U. S. Geological Survey, and Messrs. Kirchman and Tipton. The findings indicated that no zones of significant uranium mineralization had been encountered in the drilling of 81 of the authorized 83 holes. Above background radioactivity appeared to be confined to about 1 foot of 0.03 to 0.05 percent U_3O_8 in hole 2100-2950 and approximately 1 foot of 0.01 percent U_3O_8 in hole 1350-3480. The findings also indicated that the average depth to which holes were drilled was much greater than had been anticipated.

In answer to E. N. Hansmann's letter of October 29, 1958, the Operator's letter of November 5, 1958 stated that additional drilling of section 21 under stage II is not justified, and also requested that Governmental participation

CC Base. Off. (Orig. & 8)
OME/Tuc.Pro.Rpt. DMEA-5009
DF

TMRosalo:fr]

in the excessive drilling be provided for by transferring the total funds and units of work of Stage II to Stage I. The Operator was informed in your letter of November 19, 1958 that no action on the request could be taken until complete data pertaining to the Stage I drilling is received. Upon receipt of 1 set of the complete data Dec. 29, 1958, Mr. Emerick and I made a detailed analysis of the Stage I drilling. Our findings were included in a joint memorandum to you of Jan. 8, 1959. On this date we also forwarded to you a memorandum containing our recommendation relative to termination and non-certification of the project.

ANALYSIS OF THE OPERATOR'S REPORT

The present distribution of the several items of the Operator's Report as listed in R. C. Kirchman's letter to you of December 12, 1958 is as follows:

Attached to this report: Original and 4 copies of each the MF-104 and 104A forms, and statements by each Stewart Bros. and Parker, Jack Elkins, and the Grants Engineering Co. The latter statement is not a necessary part of the report. Also attached are the original and 4 copies of Log-Master Services, Inc.'s statement that was submitted with the report but which was not listed by Mr. Kirchman.

Retained at Tucson: One copy of each of the items listed by Mr. Kirchman plus a copy of the logging contractor's statement.

Retained in Denver: Six copies of each map Nos. 1 and 2 and the hole logs and one copy of each of the items listed above as being attached to this report.

The approved drilling and logging footages as given below are those recommended by Mr. Emerick and me in our joint memorandum to you of Jan. 8, 1959.

Form MF-104A

Drilling (non-core)

Vouchered Cost: The vouchered cost is $15,619.20 for 23,718 feet of drilling at the authorized cost of $0.65 per foot, plus $202.50 for 13½ hours of stand-by time at $15.00 per hour.

Approved Cost: The approved cost is $13,077.25 for 20,119 feet of drilling at $0.65 per foot. The disapproved portion of the vouchered costs totals $2,541.86 of which $202.50 is for the non-authorized stand-by time and the remaining $2,339.36 represents the cost of 3,599 feet of drilling. The 3,599 feet of drilling comprises the 124 feet overcharged by the drilling contractor and the 3,475 feet disapproved by the DNEA field examiner.

Performance of the drilling at the authorized cost per foot is documented by Stewart Bros. and Parker Drilling Co.'s attached statement.

Bulldozing

Vouchered Cost: The vouchered cost is $135.00 for 11.25 hours of work at $12.00 per hour.

Approved Cost: The approved cost is $120.00 for the 10 hours of work documented by Jack Ellis' statement at the contract's specified cost of $12.00 per hour. A total of $15.00 of the vouchered cost is not allowable.

Logging

Vouchered Cost: The vouchered cost of $1,759.46 which includes an overcharge of 1 cent, is for 23,462 feet of logging at $0.075 per foot.

Approved Cost: The approved cost is $1,500.45 for 20,006 feet of logging at the authorized cost of $0.075 per foot. The disapproved portion of the vouchered cost totalling $259.21 represents the 3,456 feet of excessive logging, as determined by the field examiner, at $0.075 per foot.

Performance of the logging at $0.075 per foot is documented by Log-Master Services, Inc.'s attached statement.

Incidental

Vouchered Cost: The vouchered cost of $3,956.74 is for 23,718 feet of drilling at approximately $0.167 per foot and not $0.67 as shown and requested on form MF-104A.

Approved Cost: The approved cost of $2,917.26 is the additional cost of the field examiner allowable 20,119 feet of drilling at the contract's fixed cost of $0.145 per foot. The disapproved portion of the vouchered costs is $1,038.48.

Totals

The vouchered, disapproved, and approved costs for the report period during which all allowable work was performed are as follows:

	Vouchered	Disapproved	Approved
Drilling	$15,419.20	$2,541.85	$13,077.35
Bulldozing	135.00	15.00	120.00
Logging	1,759.66	259.21	1,500.45
Incidental	3,985.74	1,038.48	2,917.26
	$21,469.60	$3,854.54	$17,615.06

Form 104-A

The form has been completed in an unsatisfactory manner. It contains errors which have been noted in my analysis of Form MF-104 and many entries for authorized units and unit costs that are not as specified by the contract.

Narrative Report

This portion of the report is contained in the acceptable Final Report. Included with the report is a location map and a map of stratigraphic and structural sections.

RECOMMENDATION

Withhold payment to the operator of an amount commensurate with the Government's share of the cost of the project pending resolution of matters prerequisite to closing the contract.

T. M. Rosale

Form MF-104 (Rev.)
(April 1952)

Budget Bureau No. 42-R1036.5

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

OPERATOR'S MONTHLY REPORT AND VOUCHER

Period xxxxxxx Aug. 15 thru Oct 4 8

Month of ..... 195 ..... Docket No. DMEA 5009 ..... Contract No. IDM E 1220

Operator's Name Food Machinery & Chemical Corp ..... Minerals Uranium

Address P.O. Box 327, Grants New Mexico

Contract Amount, $ 14,962.00 ..... Government Participation: 50 % ..... Amount, $ 21,469.60

ITEMS OF COSTS	Period xxxxx Monthly Total	Totals Previously Reported	Totals To Date	Approved Monthly Total	Approved Totals Previously Reported	Approved Totals To Date
	FOR OPERATOR'S USE			FOR GOVERNMENT USE ONLY		
(1) Independent Contracts: Short Form none core	15,619.20	none	15,619.20			
Drilling	135.00	none	135.00			
Bulldozing						
xxxxxxx Logging	1,759.66	none	1,759.66			
Crosscutting						
xxxxx Incidental	3,955.74	none	3,955.74			
Drifting						
(2) Labor and Supervision:						
Labor						
Supervision						
Technical Services						
(3) Operating Mat'ls. and Supplies:						
Timber						
Explosives						
Pipe						
Track						
(4) Operating Equipment:						
Rental						
Purchase						
Depreciation						
(5) Initial Rehabilitation and Repairs						
(6) New Bldgs., Improvements, etc.						
(7) Miscellaneous:						
Repairs to Equipment						
Sampling and Analysis						
Payroll Taxes						
xxxxxxxxxxxxtotal	21,469.60		21,469.60			
Contract amount stage I	14,962.00		14,962.00			
difference	6,507.60		6,507.60			
(8) Contingencies (specify): Request transfer Stage II funds to stage 1	6,507.60		6,507.60			
Totals	21,469.60	none	21,469.60	17615.06		17615.06

I certify that the above bill is correct and just and that payment therefor has not been received.

Date 12-20-58 *Payee Food Machinery & Chemical Corp.

Per B C Buchman Title Supt. of Mines

*When a voucher is signed or receipted in the name of a company or corporation, the name of the person writing the company or corporate name, as well as the capacity in which he signs, must appear. For example: "John Doe Company, per John Smith, Secretary," or "Treasurer," as the case may be.

NOTE.—Title 18, U. S. Code (Crimes), section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

(Instructions on reverse)

Pursuant to authority vested in me, I certify that this account is correct and proper for payment in the amount of:

$8307 63

Signature ..... (Authorized Certifying Officer)

Date 2/12/59 Voucher No. DMEA 59-88

(See other side)

FEB 20 1959
U.S. BUREAU OF MINES SOUTHWEST EXPERIMENT STATION DEC 30 1958 TUCSON, ARIZONA
OME DEPARTMENT OF THE INTERIOR DEC 24 1958 DENVER, COLORADO

(For Government use only)

CERTIFICATION BY GOVERNMENT REPRESENTATIVE:

I certify that to the best of my knowledge and belief the contractor submitting this voucher is operating a Defense Minerals Exploration Administration project under Contract No. Fm-E 1220 in accordance with the terms of the contract.

Signature T. M. Ramsdo Title Mining Engineer Date 1/4/59

APPROVAL BY DMEA EXECUTIVE OFFICER OR ALTERNATE: Checked for Engineering Allowability

Signature [illegible] Title Executive Officer Date FEB 10 1959

MONTHLY REPORT OF OPERATOR

The Operator (Contractor) of an exploration project is required to make a monthly report to the Government through the Regional Executive Officer. This report consists of three parts as follows:

(a) *Form MF-104—Operator's Monthly Report and Voucher.*—This form details expenditures and constitutes a voucher for reimbursing the Operator for the Government's share of costs;

(b) *Form MF-104A—Operator's Unit Cost and Progress Report.*—This is a statistical report of expenditures which shows costs for the various types of operation; and

(c) *Narrative.*—A concise narrative description of progress made, results accomplished, and any unusual difficulties encountered must be furnished as an attachment to this Report and Voucher. Wherever possible, the narrative is to be illustrated with maps or sketches showing formations penetrated and location and assays of samples taken as well as advances in workings. In the case of diamond drilling or churn drilling, the location and inclination of holes is to be shown on a map; logs and assays also are to be submitted.

The Monthly Report of Operator should be prepared in an original and four copies all of which must be sent to the Executive Officer of the Region not later than the 15th of the month following.

Preparation of Form MF-104—Operator's Monthly Report and Voucher.—All the applicable spaces in Form MF-104 should be filled in by the Operator, and the Operator or his agent should sign the certification in the lower left corner of the form.

The items of costs are arranged in the order they appear in Article 6 (a) of Form MF-200 (Revised February 1952), however, this form is readily adaptable for use in reporting activities under other contract forms.

Under Item (1) delete words "Short Form" if the contract is a sub-contract under Form MF-200; and delete word "Independent" if the contract reported is on Form MF-200 (A). Also, report work paid for on a unit basis under contract Form MF-200 as though it were performed under an independent contract.

Under Item (2) include labor, supervision and technical services incurred for the exploratory operations. Do not include labor, supervision and technical services used for work performed under items (5) and (6).

Under Item (3) include the costs of material and supplies used in the project other than that used under items (5) and (6).

Under Item (4) appear the three types of operating equipment expenditures, that is, rental, purchase and depreciation. The expenditures made for renting equipment belonging to a third party will be reported under "Rental". The amount paid or duly obligated for payment for the purchase of equipment will be reported under "Purchase". The amount of expenditures due the Operator to reimburse him for depreciation of equipment owned will be reported under "Depreciation".

Item (5) comprises costs of labor, supervision, technical services, materials, etc., which are used in the initial rehabilitation and repair of existing buildings, installations, fixtures, and equipment. These costs, therefore, should not be reported under items (2) and (3).

Item (6) includes the labor, supervision, technical services, materials, etc., used in the installation or construction of new buildings, fixed improvements, etc., necessary for the project. These costs, therefore, should not be reported under items (2) and (3).

Item (7) covers miscellaneous types of expenditure such as payroll taxes, liability insurance, workmen's compensation insurance, repairs to equipment and sampling and analysis. Only that part of payroll taxes, liability insurance and workmen's compensation which are paid by the operator should be reported under item (7). The share paid by the employee as a payroll deduction is to be included under item (2) as labor costs.

Item (8) includes any unforeseen costs not included in the other seven categories.

The original of Form MF-104 when submitted for reimbursable expenses incurred under contract Form MF-200 must be supported by original documentation or by certified copies of purchase orders, payrolls or transcripts of payrolls, unless such documentation has been waived by the Regional Executive Officer. This certification may be stated thus, "Certified True Copy (or Transcript)", followed by appropriate signature. If the Executive Officer of the Region determines that a contract under Form MF-200 should have an "on-site" audit, that is, a Government auditor should make an audit of the Operator's books and records of account, the Operator need not support his monthly voucher with original or certified documents except in cases of equipment purchases whose individual costs exceed $50.00. In these cases the original or a certified copy of the purchase order or invoice should be attached to the Monthly Voucher. N. B.—Only the *original* of Form MF-104 is required to be documented. The four copies of Form MF-104 are not to be thus supported.

Form MF-104 submitted for reimbursement under fixed price contracts on Form MF-200 (A), however, are not required to be supported by documentation of any kind. The Operator will submit his claim under item (1) of Form MF-104 by deleting as stated above the word "Independent" and by showing the number of feet or other units immediately after the appropriate descriptive word, such as, drilling, bulldozing, crosscutting, drifting, etc., and giving the "Monthly Total" amount due. "Totals Previously Reported", and "Totals to Date" columns should also be filled in.

Form MF-104A
(April 1952)

Budget Bureau No. 42-R1151.2

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

FEB 16 1959
O.M.E.

OPERATOR'S UNIT COST AND PROGRESS REPORT

Period 7/15 thru 10/4

XXXXXX 8 5009 DM E1220

Month of Food Machinery & Chemical Corp DMEA Contract No. Uranium

Operator's Name P. O. Box 327 Grants, New Mexico Minerals

Address

OPERATION	Unit	Costs This Month	Units This Period	Costs to Date	Units to Date	Unit Costs to Date	Authorized by Contract: Units	Authorized by Contract: Unit Costs
							STAGE I *	
Drifting								
Crosscutting								
Raising								
Shafts								
Winzes none	23,718		23,718	15,416.70	23,718	$0.65	23,718	$0.65
Drilling: Core								
Churn								
Auger								
Stripping								
XXXXXX Bulldozer				135.00	11.25hrs	$12.00	11.25hrs	$12.00
Trenching								
XXXXXX Logging			23,462	1,759.66	23,462	$0.075	23,462	$0.075
Test Pits								
XXXXXXXXXXXX Stand by time Drill				202.50	-	$15.00	13.5hrs	$15.00
Roads and Trails								
Incidental			23,718	3,955.74	23,718	$0.67	23,568	$0.67
Total Distributed Costs				21,469.60				Total Costs Authorized by Contract
Operating Equipment Purchased								
Initial Rehabilitation and Repairs								
New Buildings, Improvements, etc.								
Total Costs				21,469.60				

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this report is correct and complete to the best of their knowledge and belief.

Date 12-20-58 Operator Food Machinery & Chemical

Per R. C. Kirkman Title Supt of Mines

Remarks: * Request: transfer 7,118' Stage II footage allowance to Stage I allowance.
Transfer 6,968' Stage II Logging footage to Stage I allowance
Transfer 7,118' Stage II Incidental footage cost to Stage I Allowance
Increase Incidental allowance $0.145 per foot to $0.67 per foot

NOTE.—Title 18, U. S. Code (Crimes), section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

(Instructions on reverse)

(For Government use only)

T. M. Romero

INSTRUCTIONS

Preparation of Form MF-104A—Operator's Unit Cost and Progress Report.—Applicable places on Form 104A should be filled in by the Operator. The purpose of this form is twofold as follows: (1) to furnish the supervising engineers and other administrators with statistical information necessary to better determine the progress of the project; and (2) to furnish more permanent information on mining costs for future use. The more important phases of operation on which permanent information is desired have been outlined in the form. There are blank lines, however, for those unusual phases which may need to be reported for a particular project. It will be necessary for the Operator to distribute his costs among the applicable phases reported with the exception of three items the costs of which are not to be distributed by the Operator. These three items are: "Operating Equipment Purchased", "Initial Rehabilitation and Repairs", and "New Buildings, Improvements, etc." The reason for not distributing these items on a monthly basis is doubtless clear to the Operator, since such distribution might well overstate the cost for any one month or period short of the entire contract period.

Form MF-104A has been designed to tie in with Form MF-104 for both monthly and cumulative costs. The "Total Costs" on Form MF-104A for each month should equal the monthly "Total Costs" as reported on Form MF-104. This is also true of the "Total Costs To Date".

In preparing Form MF-104A, it will be necessary frequently to distribute certain costs over a number of items. For instance, supervisory and engineering costs may have to be distributed over several phases, such as, drifting, crosscutting, raising, etc., provided that these items were reported active for the month. Such distributions should be made on the basis of time spent on the various phases, on man days of labor charged to such phases, or on some other equitable basis. "Operating Equipment", "Initial Rehabilitation and Repairs", and "New Buildings Improvements, etc.", will be distributed to the several phases of the project by the Washington Office of DMEA at the close of the project if determined necessary. The last two columns headed "Authorized by Contract" will be filled in by the Operator if such information is found in the contract. This information is usually a part of Exhibit "A" of the contract. A space for remarks has been provided for the use of the Operator to call attention to any unusual circumstances causing excessive or disproportionate unit costs.

GPO 872894

Net 30 days

INVOICE No.

VIA

[illegible] Ray-R[illegible]
[illegible]. 21, T1[illegible]

[illegible]-21-58	H[illegible]	[illegible]	149'
	"	[illegible]	118'
	"	[illegible]	145'
	"	[illegible]	130'
[illegible]-58	"	[illegible]	[illegible]'
	"	[illegible]	[illegible]'
[illegible]-58	"	[illegible]	[illegible]'
[illegible]-58	"	[illegible]	[illegible]'
	"	[illegible]	[illegible]'
[illegible]-58	"	[illegible]	[illegible]'
	"	[illegible]	219'
[illegible]-58	"	[illegible]	217'
	"	[illegible]	[illegible]'
	"	[illegible]	[illegible]'
[illegible]-58	"	[illegible]	86'
	"	[illegible]	147'
	"	[illegible]	[illegible]'
[illegible]-58	"	[illegible]	[illegible]'
	"	[illegible]	291'
[illegible]-58	"	[illegible]	[illegible]'
	"	[illegible]	396'

W.D.T.

Log-Master Services, Inc.

ENID, OKLAHOMA

E. S. CORNISH, PRES.

CUSTOMER'S ORDER REFERENCE | DISTRICT

DATE | TERMS

INVOICE No.

DATE SHIPPED | VIA | PREPAID | FROM | F.O.B.

ITEM NO.	QUANTITY	DESCRIPTION				CREDIT OR DEBIT	UNIT PRICE	
	262	9-19-58	Hole no.		3450-4450	375'		
	"	"	"	"	5100-3950	270'		
	"	"	"	"	3000-2950	335'		
	264	9-20-58	"	"	3750-4450	224'		
	"	"	"	"	4050-4450	316'		
	"	"	"	"	3300-2950	330'		
	265	9-22-58	"	"	3600-2950	335'		
	266	9-23-58	"	"	1350-3450	511'		
	"	"	"	"	3900-2950	320'		
	267	9-24-58	"	"	1500-2950	255'		
	"	"	"	"	1800-2950	475'		
	"	"	"	"	4500-2950	350'		
	268	9-25-58	"	"	3600-4950	561'		
	"	"	"	"	4200-2950	316'		
	269	9-26-58	"	"	4800-2950	274'		
	"	"	"	"	1650-3450	475'		
	"	"	"	"	3150-4450	475'		
	"	"	"	"	5100-2950	288'		
	270	9-29-58	"	"	4350-4450	251'		
	"	"	"	"	2550-3450	261'		
	"	"	"	"	2100-2950	230'		
	271	9-30-58	"	"	3900-4950	390'		
	"	"	"	"	4200-4950	240'		
	"	"	"	"	2700-2950	229'		
	[illegible]	[illegible]-1-58	"	"	2700-2950	237'		
		"	"	"	[illegible]-4950	240'		
		[illegible]-58	"	"	[illegible]	336'		
			"	"	[illegible]	305'		
		[illegible]			[illegible]	[illegible]		

Extensions checked by [illegible]

Appr'd for payment [illegible]

Appr'd for payment [illegible]

Payment date [illegible]

Voucher No. [illegible]

Account No. [illegible]

STATEMENT

DATE October 10 1959

NAME Westvaco Mineral Products, Inc

ADDRESS Grants

New Mexico

In Account With

Stewart Bros. & Parker

Drilling Company

Phone AT 7-4416 P. O. Box 2067

GRANTS, NEW MEXICO

	Amount
Exploration drilling on your Section 21, EMRA Drilling program, as per attached schedule:	
Rig #10 - 11,551 feet, 9 hours	
Rig #11 - 6,000 feet, 2 hours	
Rig #15 - 7,527 feet, 2½ hours	
25,078 feet, 13½ hours	
25,078 feet @ 64¢ per foot	$16,050.72
13½ hours @ $15.00 per hour	202.50
	$16,253.22
2% New Mexico School Tax	325.06
TOTAL	$16,578.28

Certified true and correct:

Stewart Bros. & Parker Drilling Company

By Hm Stewart Parker

Westvaco Mineral Products Div. of Food Machinery & Chemical Company

By B C Kirkman

Extensions checked by WOT

Appr'd for pay'nt Grants

Appr'd for pay'nt Farmington

Payment date

Voucher No.

Account No.

Westvaco Mineral Products - Section 21
DMEA Drilling Program
RIG #10

Date	Hole	Footage	Hours	Remarks
8/20	300-3950	150		
8/21	450-4450	164		
	150-4450	142		
8/22	150-3450	264		
8/25	300-2950	449		
8/27	600-2950	435	1	Awaiting Probe
8/28	1500-4950	149		
8/29	2100-4950	320		
8/30	2700-4950	442		
9/2	1500-3950	379		
9/3	1200-3950	416		
9/4	900-3950	301		
	600-3950	210		
9/5	1950-3450	220		
9/6	2250-3450	300		
9/8	1800-2950	185		
9/9	2400-3950	510		
9/10	2100-3950	426		
9/11	2850-3450	349		
	3150-3450	220		
9/12	3450-3450	280		
9/13	3750-3450	305		
9/15	4050-3450	250		
9/16	4350-3450	270		
9/17	4650-3450	280		
	4950-3450	250		
9/18			2	Washout 4650-3450
9/19	3000-2950	335		
9/20	3300-2950	330		
9/22	3600-2950	335		
9/23	3900-2950	320		
9/24	4500-2950	350		
9/25	4200-2950	316		
9/26	4800-2950	274		
	5100-2950	288		
9/29	2100-2950	229		
9/30	2700-2950	229		
	2700-3950	238		
10/2	5100-4950	341		
10/4	4950-4450	300		
		11,551	3	Total for Rig #10
	900-2950			225 feet, No Charge. Hole blind, did not reach desired depth.

Westvaco Mineral Products - Section 21
DMEA Drilling Program
RIG #11

Date	Hole	Footage	Hours	Remarks
8/25	1200-2950	465		
8/26	300-4950	320		
8/27	600-4950	228		
8/28	1200-4950	86		
	900-4950	162		
	1800-4950	170		
8/29	2400-4950	290		
8/30	2250-4450	396		
9/3	1950-4450	318		
	1650-4450	290		
9/4	1350-4450	230		
9/5	1050-3450	366		
9/8	2550-4450	470		
9/9	2850-4450	470		
9/23	1650-3450		2	[redacted] Dozer
9/24	1800-3950	488		
9/25	3600-4950	562		
9/26	3150-4450	475		
9/29	2550-3450	262		
		6,048	2	Total for Rig #11

WESTVACO MINERAL PRODUCTS - SECTION 21
DMEA DRILLING PROGRAM
RIG #15

Date	Hole	Footage	Hours	Remarks
8/21	750-4450	120		
8/22	750-3450	330		
8/23	450-3450	270		
9/10	3000-4950	465		
9/11	3300-4950	466		
9/12	3000-3950	330		
	3300-3950	245		
9/13	3600-3950	270		
9/15	3900-3950	255		
9/16	4200-3950	285		
	4500-3950	270		
9/17	4800-3950	360		
9/18	5100-3950	270		
9/19	3450-4450	390	1	Washout 5100-3950
9/20	3750-4450	225		
	4050-4450	316		
9/23	1350-3450	512		
9/24	1500-2950	255		
9/26	1650-3450	495	6	Washouts
	4350-4450	255		
9/29	3450-4450		1½	Washout
9/30	3900-4950	405		
	4200-4950	240		
10/1	4500-4950	240		
	4800-4950	210		
		7,479	8½	Total for Rig #15

S TEMENT

P. O. BOX 1246 SAM ELKINS Call GRANTS, N.M. INFORMATION FOR PHONE

[redacted] CONTRACTOR

PREWITT, NEW MEXICO

DATE October 7 1958

FOOD - MACHINERY - CHEMICAL CORPORATION

MINERALS DEVELOPMENT

DATE		CHARGES	CREDITS	BALANCE
	DRILL-SITES, ROAD, AND ZONING			
Sept. 22	- 4 hours			
" 23	- 2½ "			
" 24	- 3 "			
	10 hours @ $13.50 per hour			135.00
	5% tax			6.75
				141.75
	202-100			

Extensions checked by WDT

Appr'd for paym't Grants BCK

Appr'd for paym't Pocatello

Payment date

Voucher No.

Account

GRANTS ENGINEERING CO.

316 W. Santa Fe Avenue
Grants, New Mexico
Tel. ATwater 7-4832

STATEMENT

Food, Machinery & Chemical Corporation
P. O. Box 327
Grants, New Mexico.

16 Prints	27" x 31"	219 sq. ft. @ .07	$ 15.33
16 Prints	31" x 36"		

Printing Logs:

1st Run	2902.5 Sq. ft. @ .05		145.13
2nd Run	1885.5 Sq. ft. @ .05		94.28
	Total		254.74
	3% Tax		7.64
	Total Due		$262.38

Extensions checked by WDT

Appr'd for paym't Grants BEK

Appr'd for paym't Pocatello ___

Payment date _____

Voucher No. _____

Account No. _____

_____

_____

_____

12-20-58

Mr. J. W. Townsend
Executive Officer, OME
Field Team, Region III
224 New Customhouse
Denver 2, Colorado

Re: Docket No. DMEA 5009
(Uranium) Contract IDM -K1220
Food Machinery & Chemical Corp.
E/2 Sec 21, T. 13N. R. 9W.
McKinley County, New Mexico

Dear Mr. Townsend:

Stage I exploration of the above captioned contract was started Aug. 15, 1958 and completed Oct. 4, 1958. The required information and evidence pertaining to the work and costs thereof are submitted to that office as follows:

6 Copies, Map no. 1 (drill hole map)
6 Copies, Map no. 2 (Stratigraphic and structural sections)
1 Original and 5 copies of Log Master logs for each hole drilled in the E/2 sec. 21, T. 13N. R. 9W. as listed and shown on map no. 2.
1 Original and 5 copies of narrative report.
1 Original and 5 copies, Stewart Bro's and Parker statement.
1 Original and 5 copies, Jack Elkins statement.
1 Original and 5 copies, Grants Engineering Co. Statement.
1 Original and 5 copies, USDA - DMEA form MF 104 (rev)
1 Original and 5 copies, USDA - DMEA for MF 104 A.

Explanation of the Exploration program, in considerable detail, is included in the report.

Hoping the required information is complete and contained in the transmittal.

Yours very truly,

R C Kirchman

R. C. Kirchman
Supt. of Mines

1 copy of each item listed above to
T. M. Romslo, Mining Engineer,
Bureau of Mines
P. O. Box 4097, University Sta.
Tucson, Arizona

RCK;cb

OME
DEPARTMENT OF THE INTERIOR
DEC 24 1958
REGION III
DENVER, COLORADO

Westvaco Mineral Products Division
Food Machinery & Chemical Corporation
Star Route - Box 24, Grants, New Mexico

FINAL REPORT

Docket No. DMEA 5009 (Uranium)
Contract Idm-E1220

E½ Section 21, T. 13 N., R. 9 W.
McKinley County, New Mexico

December 16, 1958

U.S. BUREAU OF MINES
SOUTHWEST EXPERIMENT STATION
DEC 29 1958
TUCSON, ARIZONA

PURPOSE

On June 24, 1958, Food Machinery and Chemical Corp. was awarded Contract Idm-E1220, Docket No. DMEA 5009 (Uranium) with the Defense Minerals Exploration Administration, for the purpose of uranium exploration on E½ Sec. 21, T. 13 N., R. 9 W., NMPM. Under the terms of the contract, the project was to be started on or before August 15, 1958 and completed on or before November 30, 1958. The project (exploratory drilling) was started August 14, 1958 and completed October 4, 1958.

Two stages of exploration drilling were established under the agreement that the Defense Minerals Administration will provide 50 percent of the funds and Food Machinery and Chemical Corp. will provide the remaining 50 percent of the funds under specified provisions of the contract. The locality explored is E½ Sec. 21, T. 13 N., T. 9 W., NMPM, McKinley County, New Mexico.

LOCATION AND TOPOGRAPHY

New Mexico State Highway 53, diagonally tranverses the E½ Sec. 21, T. 13 N., R. 9 W., This locality is approximately 13.5 miles north of the intersection of State Highway 53 and U.S. Highway 66, west of Milan and Grants, New Mexico. It is situated on the south margin of the so-called Ambrosia Lake Basin, in the San Mateo Sag, about two miles east of Poison Canyon.

Topographically, the locality (E½ Sec. 21, 13-9) is variable, it is mostly situated in flat alluvial-filled valleys

with a mesa rim essentially bordering it along the west boundary, it includes a portion of a small mesa in the north part and a portion of the west limb of a domal structure in the east part. It has an average elevation of about 6950 feet with an extreme relief of about 100 feet.

SURFACE

The surface is mostly soil and alluvial cover that directly rests on the several stratigraphic units across the San Mateo Sag structure. This geological situation is due to a negative structure (downwarp) and the consequential cutting of a shallow canyon, by erosion, that truncated the formations and the subsequential filling of the canyon, by alluvium.

GEOLOGY

The locality (E½ Sec. 21, 13-9) is regionally situated on the northeast flank of the Zuni Uplift and locally in the San Mateo Sag, on the peripherial margin and on the rim of the so-called Ambrosia Lake Basin.

The uppermost formation is the alluvium that overlies Mancos shale which overlies the Dakota sandstone along the deep part of the San Mateo Sag. (See topographic Sections Map No. 2) The Mancos is successively underlain by the Dakota sandstone, which is the cuesta former that caps the mesas, and the Morrison formation. The so-called Dakota sandstone is divided into two units on the basis of lithology. The upper part is designated the Dakota sandstone and the lower lignitic part that heretofore has been called basal Dakota is herein

designated the Purgatoire unit of the Dakota formation. The purpose of the Purgatoire designation of the so-called basal Dakota is that it is a distinct mappable unit and it is an excellent marker bed. The upper part, or the top stratigraphic units of the Morrison, with which we are concerned, consists of five members on the basis of lithology. These members, in decending order, are: Brushy Basin mudstone (shales), Upper Poison Canyon sandstone, Transitional mudstone, Lower Poison Canyon sandstone and Multicolored mudstone that may be the so-called Recapture shales.

Stratigraphy (Reference Map No. 2, Stratigraphic Cretaceous (upper) Sections)

Recent

Recent sediments are the alluvium or valley fill that consists of soil, sand and gravel in the San Mateo Sag and small tributary valleys confluent with the Sag. This valley fill overlies the Mancos shale and ranges from a thin edge, adjacent to the mesas, up to about 130 feet thick along the topographic and structural low of the Sag.

Mancos Shale

The Mancos is not known to outcrop anywhere in the locality, but it was encountered in several drill holes which indicates that it underlies the alluvium and fill along the lowermost part (structural low) of the San Mateo Sag. It is generally light black to dark gray fissile, carbonaceous, gypsiferous, shales composed of heterogenous clays with interspersed thin sandstone lenses. The formation encountered

in the drill holes ranges from approximately 5 or 6 feet up to about 120 feet in thickness. The variable thickness of the Mancos Section penetrated by the drill, in this locality, is mostly the result of truncation and beveling by erosion, before the alluvial fill.

Dakota

The sandstone is gray to white and buff, fine and medium grained, mostly fine grained quartz sandstone. The formation wherever it is exposed in the locality is massive and locally crossbedded. It ranges from about 15 feet up to about 80 feet in thickness, in the drill holes. The variable thickness of the Dakota Section penetrated by the drill, in this locality, is mostly the result of truncation and beveling by erosion, before the alluvial fill.

Purgatoire Unit (Basal Dakota)

The Purgatoire unit consists of light gray, light grayish-tan and buff, fine grained quartz lignitic and carbonaceous sandstone interlayered with thin lignitic shales, siltstones and mudstones. This unit ranges from about 5 feet up to about 15 feet in thickness, in the drill holes.

Morrison: Upper Jurassic -- Although classified as one formation, Morrison has been subdivided as follows:

a. Brushy Basin -- This unit is a varigated and somewhat multicolored mudstone consisting of light grayish-green, blue-green (turquoise), light gray, light grayish lavender, grayish-red and maroon bentonitic mudstone. The unit, as a whole, is an imcompentent gypsiferous mudstone with buff colored fine and

medium grained channel type sand lenses that appear identical to the Poison Canyon sandstone underlying the Brushy Basin. This unit ranges in thickness from only a few feet up to about 120 feet in the drill holes. The thin part of the Brushy Basin encountered in the drill holes is mostly the result of truncation and beveling by erosion before the sag and tributary valleys were filled with alluvium.

b. Upper Poison Canyon unit -- The upper Poison Canyon sandstone unit is inherently a light grayish-red, coarse, medium and fine grained, at least partially arkosic sandstone. Where channel facies have developed, clay galls of varying sizes and shapes occur as inclusions in the sandstone. Wherever mineral bearing solutions have passed through or penetrated the sandstone, the inherent light grayish-red coloration has been altered to tan, buff or a grayish-white. These varying color effects are probably due to the amount and/or the reactive strength of the solutions that have penetrated or passed through the formation. In cross-section, this unit varies considerably in thickness; it ranges from probably about 6 feet up to a maximum of about 40 feet. This variation seems to depend on the thickness of the overlying Brushy Basin mudstone and the thickness of the underlying transitional mudstone. An increase in thickness of the sandstone seems to be at the expense of the mudstone and an increase in thickness of the mudstone seems to be at the expense of the sandstone.

c. Transitional Unit -- The transitional unit is so designated because it is a feature of a transitional sedimentary

invironment where the lithology changes abruptly from sandstone to mudstone. Also, it is the stratigraphic divider or key marker mudstone layer that separates the upper and lower Poison Canyon sandstone units. The Poison Canyon units seem to transitionally merge to form one unit and transitionally separate to form two or more units.

This unit is varigated and multicolored mostly bentonitic mudstone that lithologically appears to be about the same as the Brushy Basin member, but the multiple colored layers indicate it is somewhat more varigated. The drill hole sections indicate that this mudstone member pinches and swells relative to the thickness or thinness of the upper Poison Canyon unit or the lower Poison Canyon unit or both of those sandstone units. The thickness of the transitional unit varies from a thin edge up to more than 40 feet, however, the thickness of a typical section ranges between 15 feet and 20 feet.

d. Poison Canyon Sandstone (lower) -- The lower Poison Canyon sandstone unit is similar to and apparently relative to the upper Poison Canyon sandstone member. It is inherently a light grayish-red, coarse, medium and fine grained, at least partially arkosic sandstone unit, that exhibits about the same facies characteristics as does the upper Poison Canyon sandstone. However, where the apparent channel facies occurs, the sandstone tends to be coarse to conglomeratic, containing a greater density of clay galls than was detected in the upper Poison Canyon sandstone. Also, the coarse, porous zones are apparently more frequent and developed to a greater extent in

this lower Poison Canyon member. Wherever there is a detectable color change (bleaching) in the lower Poison Canyon member, it appears as it does in upper Poison Canyon member to be due to mineralizing action by mineral bearing solutions. Wherever mineral bearing solutions have passed through or penetrated the sandstone, the inherent light grayish-red coloration has been altered to tan, buff or a grayish-white. These varying color effects are probably due to the amount and/or the reactive strength of the solutions that have penetrated through the formation.

In cross section this unit is also of variable thickness and, in general, it is somewhat thicker than the upper Poison Canyon unit. Thickness of the unit varies from about 15 feet up to about 90 feet.

The relative thickness of each Poison Canyon sandstone unit is variable and seems to be somewhat interrelated. This apparently depends upon the stratigraphic position and the thickness of the Transitional mudstone layer. Where this mudstone layer pitches upward, the upper Poison Canyon member is thinner and the lower Poison Canyon member is thicker. Where the mudstone layer pitches downward, the converse seems to be true.

e. Mudstone (multicolored) (Recapture?) -- This mudstone is a varigated multicolored unit of interstratified light grayish-green, light gray, light grayish-lavender, grayish-red, grayish-brown and grayish-maroon mudstone, siltstone and fine grained sandstone. Thicker and more persistent

fine grained grayish-lavender colored sandstone seems to underlie the multicolored mudstone-siltstone unit. There were no exploratory drill holes penetrating this formation to a depth of more than 240 feet. Re: Drillhole No. 300-4950.

There is considerable lithologic variation in the mudstone and sandstone units, such as apparent abrupt changes from sandstone to mudstone units by lithologic facies changes and splits and visa versa. However, these units are mostly characterized by abrupt changes in the relative thickness of the mudstones and the sandstones. As previously stated, the mudstone seems to have thickened at the expense of the sandstone or the sandstone seems to have thickened at the expense of the mudstone. Wedging, splitting and interfingering are indicated throughout the locality, but splitting of the units seems to be more pronounced along the north side of the locality.

Subsurface data indicates apparent easterly-westerly trends of relatively thick Poison Canyon sandstone unit or units that alternate with intervals or belts of relatively thin Poison Canyon sandstone and thicker mudstone units. These trends do not seem to be continuous but occur, probably, as sandstone and mudstone lenses that may be aligned more or less in a trend or lineation.

Structure

Section 21, T. 13 N., R. 9 W., is on the northeast flank of the Zuni Uplift (regional structure) that generally dips three to four degrees northeastward. Locally it is situated in the San Mateo Sag (trough) that trends north 35° to 40° east

diagonally across the monoclinal feature that has been designated the peripherial rim of the so-called Ambrosia Lake Basin. This monoclinal feature is also probably a structural feature related to the McCarty Syncline from the standpoint of area and regional structure.

The San Mateo trough is apparently an assymetrical negative flexure with a relatively long, uniformly dipping southeasterly limb and a short, abrupt, steeply northwesterly limb that has been faulted. The sedimentary beds on the southwesterly limb generally dip 15° to 20° and the beds of the northwesterly limb apparently dip at considerably steeper angle which has not been determined. This sag or trough is an areawise structural feature that apparently is due to the combined effects of flexing and faulting.

The fault structure (San Mateo fault) transects the San Mateo Sag, across the E½ Sec. 21, in a general course of about N. 35° E. It seems to occur along the inflection line or belt on the side where the most abrupt flexure change occurs.

Mineralization

In Section 21, the Poison Canyon sandstone, upper and lower units are the favorable uranium bearing host units of the Morrison formation. Coffinite (?) is the dominant ore mineral adjacent to the locality (Doris Mine and New Doris orebody, W½ Sec. 21) and it usually occurs in association with black or dark colored bituminous material. Some yellow secondary minerals occur in the joints, fractures and shear planes in the Doris Mine.

None of the DMEA exploration drill holes penetrated ore grade mineralized rock. However, slight uranium mineralization was encountered in the drill holes listed as follows:

2100-3950

0.5' to 1.0' mineralization indicated range, 0.03% - 0.05% U_3O_8 at 418' to 420' at the base of the upper Poison Canyon sandstone.

1350-3450 About 1.5' mineralization indicated about 0.01% U_3O_8 at 500' to 503' at the base of the lower Poison Canyon sandstone.

3000-3950

3450-3450

Mineralization in the median part of the transitional mudstone indicated range from 0.015% to 0.03% U_3O_8.

300-2950	2850-3450
2100-2950	150-4450
2700-2950	600-4950
	900-4950

3600-2950

Mineralization of various levels in the multicolored (Recapture?) mudstone of indicated range from 0.015% to 0.05% U_3O_8.

There were no chemical or radiometric scaler analyses of material taken from the anomalous radioactive horizons because the radioactivity intensities from the cutting samples and as recorded on Log Master Logs did not indicate justification for the effort and expense. Furthermore, the physical appearance of the drill cuttings taken from the drill holes did not indicate very much favorability for uranium mineralization, much-less, favorability for significant uranium orebodies.

The sandstone host unit or units appear generally as a light grayish red sandstone which seems to be its original color. However, there is some mildly to moderately bleached Poison Canyon sandstone due to some kind of solution action. The bleached horizons do not seem to be continuous and the bleaching may occur in one or both of the sandstone units as either the entire unit bleached or as bleached horizons within the unit. The bleached horizons more commonly occur either at the very top of the unit immediately underlying the upper mudstone unit or at the very bottom of the unit, immediately overlying the lower mudstone unit. There may be an east-west trending belt of bleaching along the west side and an east-west trending belt of bleaching through the central part of the locality which seems to align somewhat along the trends of the thicker sandstone units. (Re: Log Master Logs). Apparently, there is very little or no carbon trash or bituminous material occurring in the Poison Canyon within the locality since there was none detectable in the drill cuttings. Occasional or scattered pyrite was detectable in the bleached parts of the sandstone units.

EXPLORATION

Drilling

DMEA authorized 83 holes drilled in E½ Sec. 21 for uranium exploration. As specified by the DMEA, the holes were drilled in five north-south lines spaced 500 feet apart with the holes in each row 300 feet apart and offset (staggered) with respect

to holes in the adjoining rows. As indicated on the maps, the holes are omitted in areas that were previously drilled. Each hole was plug drilled wet (non-core) to test the upper and lower Poison Canyon sandstone units. Wet drilling was required because of the general instability of the surface (soil and sand) for dry drilling and a small amount of ground water in the formations precluded dry drilling to the required depth even where the surface is stable.

The total depth of Stage I exploratory drill holes is 25,078 as compared to an estimated depth of 16,600 feet. The average depth of each drill hole (309.6') exceeded the estimated average depth of 200 feet by 109.6 feet. The actual drilled footage exceeded the estimated footage mostly because the host unit or units that were tested (Poison Canyon sandstone) are deeper in the subsurface than were anticipated. The data used for the estimate were based mostly on subsurface information outside the locality (E½ Sec. 21) since there was very little subsurface information within the locality. The contributing factors for increased depth of the drill holes are: greater thickness of the alluvium than anticipated, the presence of Mancos and an entire section of Dakota in the subsurface across the San Mateo Sag was not known, a normal or average Brushy Basin section, and a somewhat thicker host unit because of splits and interfingering. About 1/3 of the drill holes penetrated the multicolored mudstone underlying the Poison Canyon units deeper than the 25 foot limit that was tentatively agreed as the limit of depth into the lowermost mudstone for

which the government would consider as valid for participating payment. The additional footage (1360') is mostly the result of drilling to sufficient depth to positively determine if the host units had been penetrated. The deeper holes were drilled into the lower horizon as tests for the Westwater Canyon sandstone.

A depth pattern for the drill holes across the locality could not be maintained because of varying depths to the host unit (Poison Canyon) due to the flexed and faulted structure. Moreover, the Morrison stratigraphic units were sometimes difficult to determine because of unusual color and unusual lithology that probably resulted from flexing and faulting. The transitional mudstone and the multicolored mudstone (Recapture?) were often indistinguishable, therefore, where the Poison Canyon merged into one unit or where it split into two or more relative thin units, it was necessary to drill to such a depth that the multicolored mudstone was positively identifiable.

Logging

Samples were taken at 2-foot intervals from the top of the Poison Canyon sandstone to the bottom of the hole. The wet cuttings were collected from a small sump prepared for that purpose. All samples were checked for radioactivity with a scintillation counter. Because no significant radioactivity was detected there were no samples split and as previously stated, there were no analyses. All samples collected were inspected by a U.S. Bureau of Mines engineer and a USGS geologist

and authorized by these men to be disposed of by the operator rather than be stored. All cuttings from each drill hole were geologically logged as a matter of identifying the formations and formational units and briefly describing the characteristics of each.

All drill holes were radiometrically and electrically (resistivity) logged and graphically recorded by Log Master. Formation and formational unit boundaries were selected by interpretation of Log Master logs and information from the geologic logs. The stratigraphic boundaries were then drawn and the geologic log information transferred to the Log Master logs.

The following are exploratory drill holes that did not penetrate or completely penetrate the Poison Canyon sandstone unit.

<u>900-2950</u> Lost circulation in this hole - unable to drill through the Dakota because fluid circulation could not be maintained.

450)
750 (3450 These holes penetrated the upper Poison Canyon
1050) sandstone unit but did not completely penetrate the lower unit. The holes were drilled at the beginning of the drilling program before it was known there were two host units to be tested. These holes were not deepened later because of the general unfaverability of the host rock did not seem to justify the additional expense.

300 - 3950)
600 - 3950) These holes bottom in an indeterminate mudstone unit. The lower Poison Canyon unit may be missing here.

1500 - 3950 Lost circulation - unable to drill this hole to completion through the lower Poison Canyon unit.

2100 - 3950 A drillers error - This hole was not deepened to penetrate both Poison Canyon units because the general unfavorability of the host rock did not seem to justify the expense of drilling additional footage.

1350)
1650)
1950(4450 These holes did not either penetrate or completely
2250)
2550) penetrate the lower Poison Canyon unit because of
2850) the uncertainty of that host unit at the time they were drilled. These holes were not deepened later because of the apparent general unfavorability of the host rock.

2400 - 4950 This hole did not penetrate the lower Poison Canyon unit because of the uncertainty of the horizon at the time the hole was bottomed. This hole was not deepened later because of the general unfavorability of the host rock.

3000 - 4950)
3300 - 4950) These holes did not penetrate the lower Poison Canyon unit completely because of mudstone galls or a thin mudstone layer that the driller interpreted as the multicolored mudstone.

4650 - 4450 The hole was not drilled on this location due to inaccessability with drilling equipment because of difficult terrain (jointed and broken mesa rim). A no-test at this site is not considered serious because of the general unfavorability of the Poison Canyon host units.

Drill holes that bottomed in the multicolored (Recapture?) mudstone underlying the Poison Canyon sandstone below 25-feet.

Drill Hole No.	Depth Drill Hole bottomed below the Poison Canyon	Excess Footage
300 - 2950	34.0	9.0
1200 - 2950	Indeterminate (Fault?)	
1500 - 2950	74.0	49.0
2100 - 2950	30.0	5.0
3000 - 2950	30.0	5.0
4200 - 2950	72.0	47.0
4500 - 2950	30.0	5.0
5100 - 2950	36.0	11.0
1950 - 3450	46.0	21.0
2250 - 3450	124.0	99.0
2550 - 3450	66.0	41.0
2850 - 3450	44.0	19.0
3450 - 3450	78.0	53.0
3750 - 3450	100.0	75.0
4050 - 3450	34.0	9.0
4350 - 3450	42.0	17.0
4650 - 3450	52.0	27.0
2400 - 3950	Indistinguishable material because of fault.	
2700 - 3950	40.0	15.0
3000 - 3950	146.0	121.0
3300 - 3950	64.0	39.0
3600 - 3950	74.0	49.0
3900 - 3950	44.0	19.0
4200 - 3950	66.0	41.0
4500 - 3950	64.0	39.0
4800 - 3950	156.0	131.0
5100 - 3950	38.0	13.0
3150 - 4450)	The lower mudstone indeterminate because of	
3450 - 4450)	indistinguishable material attributable to fault movement (depth test on fault structure)	

Drill Hole No.	Depth Drill Hole bottomed below the Poison Canyon	Excess Footage
4050 - 4450	80.0	55.0
4350 - 4450	30.0	5.0
300 - 4950	240.0	215.0
600 - 4950	84.0	59.0
2100 - 4950	34.0	9.0
3900 - 4950	The lower mudstone indeterminate because of indistinguishable material attributed to fault movement (depth test on fault structure).	
4500 - 4950	38.0	13.0
5100 - 4950	70.0	45.0
	Total	1360.0

The aggregate footage of Stage 1 drilling totaled 25,078 feet less 1360 excessive footage equals 23,718 feet that were required to adequately penetrate the Poison Canyon host units. The estimated total Stage I footage allowance is 16,600 feet, therefore the drilled footage exceeded the estimate by 7,118 feet.

Because it was necessary to drill the exploratory holes deeper than the Stage I estimate and there is no requirement for Stage II drilling, then 7,118 feet of Stage II estimated footage allowance can be transferred under the contract to Stage I footage allowance. The transfer of 7,118 feet from Stage II to Stage I would then be 23,718 feet of Stage I exploratory drill hole in which FMC and the government would participate. FMC considers 1360 feet as excess depth which is not chargeable to the government.

COST AND STATISTICS

Expenditures (Under DMEA)

Stage I Non-core drilling 25,078 ft, at $0.65 per foot, less tax	$ 16,300.70
Stand-by time (drills and crews) 13½ hours at $15.00 per hour	202.50
Radiometric and electrical (resistivity) Logging as per statement, less tax	1,861.66
Bulldozer work 11.25 hours at $12.00 per hour, less tax	135.00
Incidental costs	3,955.74
Total costs	$ 22,455.60
Less cost of 1360 feet (excess footage drilled)	884.00
	$ 21,571.60
Less cost of 1360 feet (excess drill hole logged)	102.00
Total cost of project for requested DMEA Stage I & Stage II participation	$ 21,469.60
DMEA Share -- 50%	$ 10,734.80
FMC Share -- 50%	$ 10,734.80

Incidental cost

Geological and engineering	$ 2,800.00
Drilling permit	200.00
Transportation	400.00
Materials	280.00
Office and reproduction	275.74
Total . . .	$ 3,955.74

CONCLUSIONS AND RECOMMENDATIONS

The exploratory drilling did not encounter uranium ore, the drill holes that encountered uranium mineralization are listed under the mineralization section of this text. The radiometric equivalent, in percentage of U_3O_8, taken from the Log Master is shown after each hole. This mineralization is weak to moderate and it occurs mostly in the mudstone which is not considered as significant occurrences.

The San Mateo Sag and the San Mateo fault should be favorable structures in and around which ore grade uranium mineralization should occur. However, these structures seem to be barren of uranium mineralization and the fault structure appears more unfavorable than the surrounding undisturbed host beds.

It is possible that uranium orebodies could have been missed by the wide spacing of the drill holes due to their discontinuous and sinuous nature as in the adjoining locality to the west, but this seems improbable. Drill hole information (drill cuttings and Log Master logs) indicate general unfavorability for significant uranium mineralization.

In view of the concept of structural deformation influencing the movement of uranium bearing solutions and the emplacement of these solutions, it is concluded that for the most part, the San Mateo structures are post mineral.

In consideration of the apparent unfaverability for uranium ore occurrences in the E½ Sec. 21, T. 13 N., R. 9 W., further exploration is not recommended at this time.

APPENDIX I

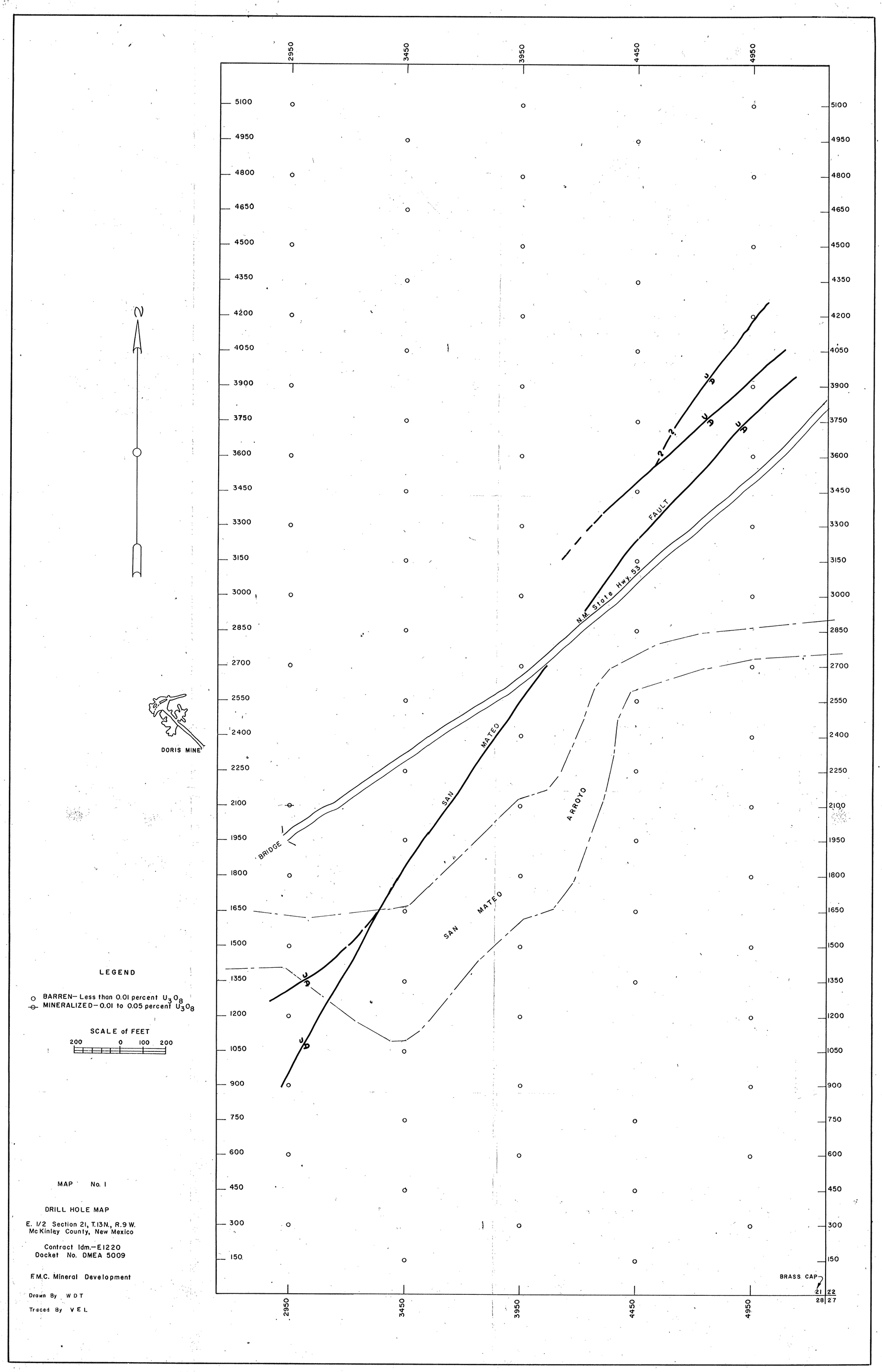
Stage I Drill Holes Tabulated

Hole No.	Depth Drilled (feet)	Hole No.	Depth Drilled (feet)
300-4950	320	300-3950	150
600-4950	228	600-3950	210
900-4950	162	900-3950	301
1200-4950	86	1200-3950	416
1500-4950	149	1500-3950	379
1800-4950	170	1800-3950	488
2100-4950	320	2100-3950	426
2400-4950	290	2400-3950	510
2700-4950	442	2700-3950	238
3000-4950	465	3000-3950	330
3300-4950	466	3300-3950	245
3600-4950	562	3600-3950	270
3900-4950	405	3900-3950	255
4200-4950	240	4200-3950	285
4500-4950	240	4500-3950	270
4800-4950	210	4800-3950	360
5100-4950	341	5100-3950	270

150-4450	142
450-4450	164
750-4450	120
1050-4450	Not drilled (old drill holes)
1350-4450	230
1650-4450	290
1950-4450	318
2250-4450	396
2550-4450	470
2850-4450	470
3150-4450	475
3450-4450	390
3750-4450	225
4050-4450	316
4350-4450	255
4650-4450-	Not drilled (inaccessible)
4950-4450	300

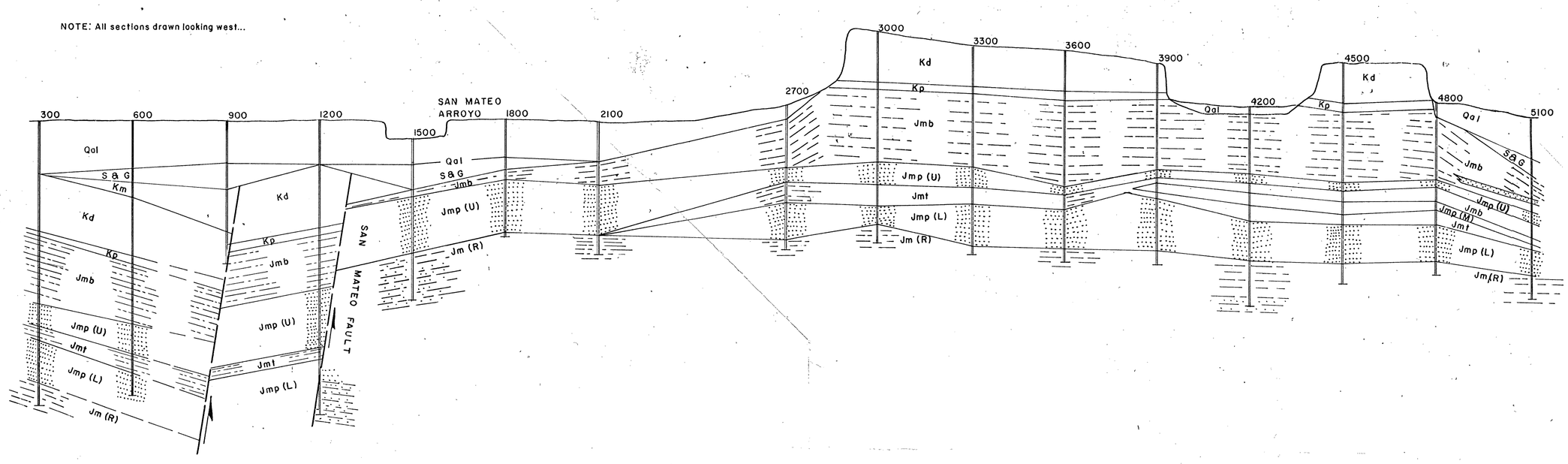
Stage I Drill Holes Tabulated (cont.)

Hole No.	Depth Drilled (feet)	Hole No.	Depth Drilled (feet)
150-3450	264		
450-3450	270		
750-3450	330		
1050-3450	366		
1350-3450	512		
1650-3450	495		
1950-3450	220		
2250-3450	300		
2550-3450	262		
2850-3450	225		
3150-3450	220		
3450-3450	280		
3750-3450	305		
4050-3450	250		
4350-3450	270		
4650-3450	280		
4950-3450	250		
300-2950	449		
600-2950	435		
900-2950	Not completed (lost circulation)		
1200-2950	465		
1500-2950	255		
1800-2950	185		
2100-2950	229		
2400-2950	Not drilled (old drill holes)		
2700-2950	229		
3000-2950	335		
3300-2950	330		
3600-2950	335		
3900-2950	320		
4200-2950	316		
4500-2950	350		
4800-2950	274		
5100-2950	288		


N
DORIS MINE
BRIDGE
SAN MATEO FAULT
SAN MATEO ARROYO
N.M. State Hwy. 53
U D
BRASS CAP
21 22
28 27
2950
3450
3950
4450
4950
5100
4950
4800
4650
4500
4350
4200
4050
3900
3750
3600
3450
3300
3150
3000
2850
2700
2550
2400
2250
2100
1950
1800
1650
1500
1350
1200
1050
900
750
600
450
300
150
LEGEND
BARREN– Less than 0.01 percent U_3O_8
MINERALIZED– 0.01 to 0.05 percent U_3O_8
SCALE of FEET
200 0 100 200
MAP No. 1
DRILL HOLE MAP
E. 1/2 Section 21, T.13N., R.9 W.
McKinley County, New Mexico
Contract Idm.–E1220
Docket No. DMEA 5009
F.M.C. Mineral Development
Drawn By W D T
Traced By V E L

NOTE: All sections drawn looking west...

LINE 2950



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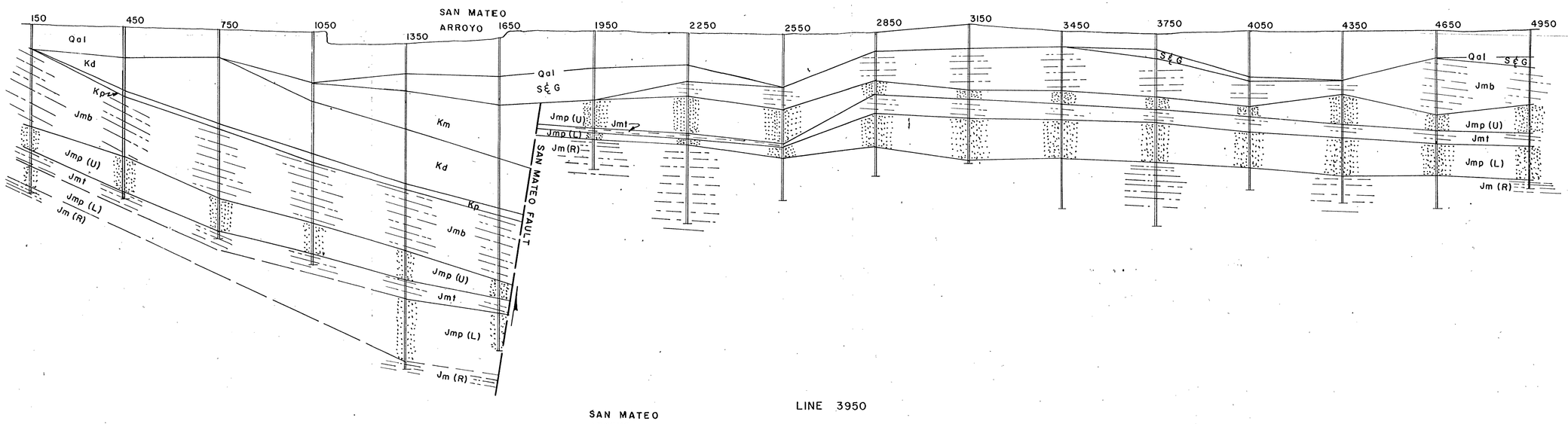
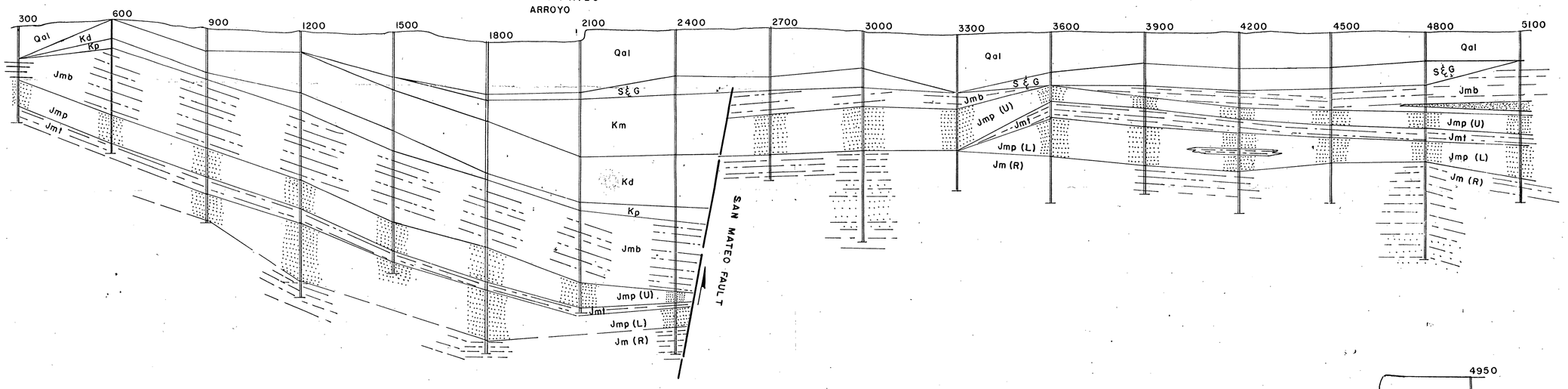


SOUTH

NORTH

LINE 3950



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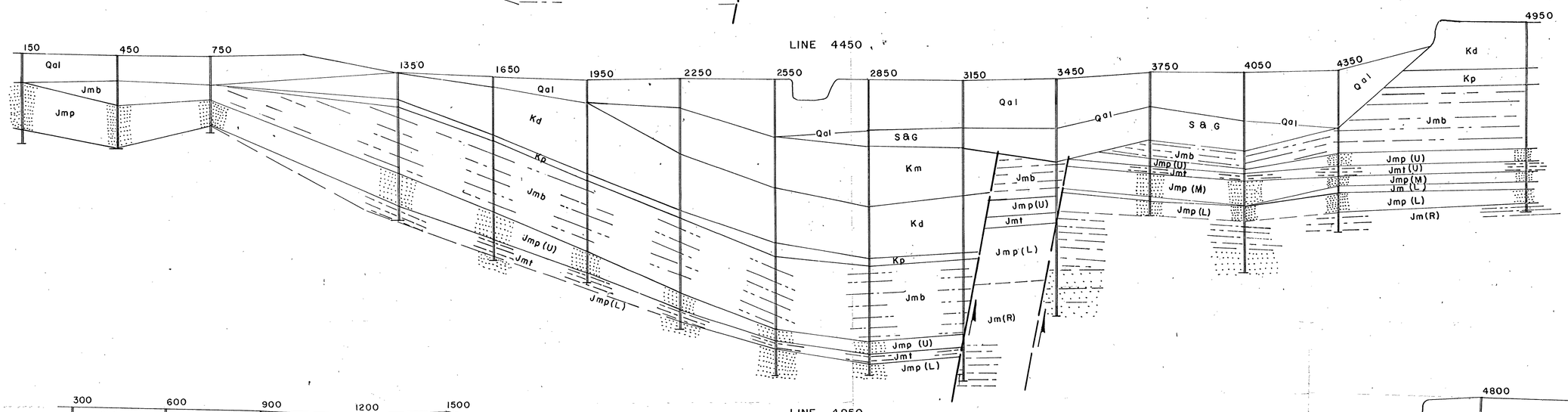

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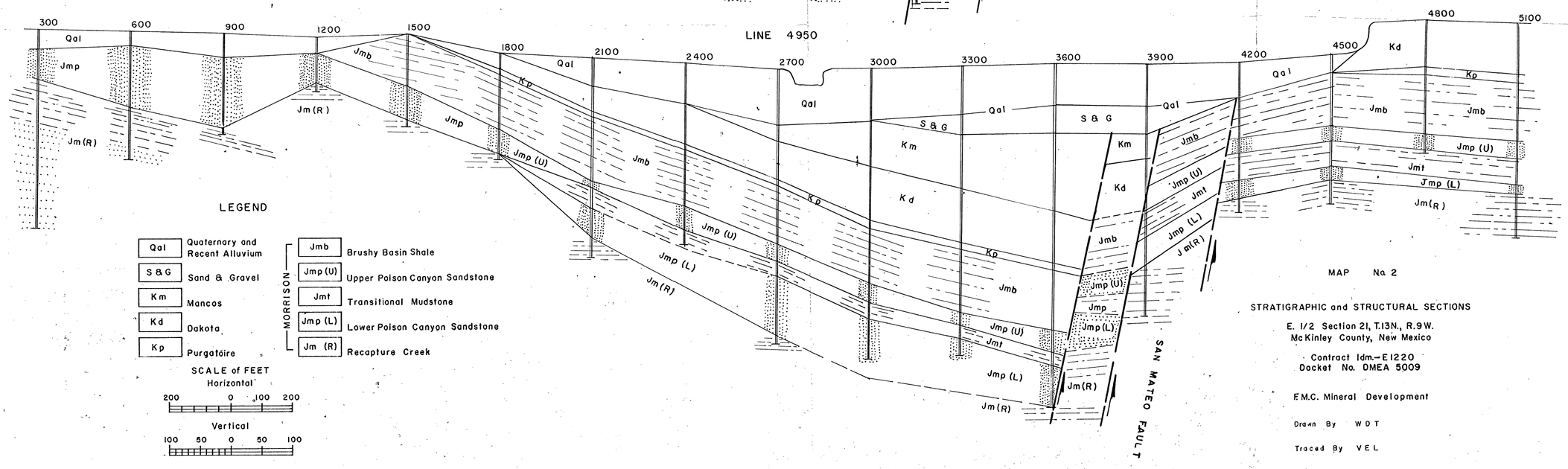

LEGEND

Qal	Quaternary and Recent Alluvium
S & G	Sand & Gravel
Km	Mancos
Kd	Dakota
Kp	Purgatoire
MORRISON: Jmb	Brushy Basin Shale
MORRISON: Jmp (U)	Upper Poison Canyon Sandstone
MORRISON: Jmt	Transitional Mudstone
MORRISON: Jmp (L)	Lower Poison Canyon Sandstone
MORRISON: Jm (R)	Recapture Creek

SCALE of FEET

Horizontal

200 0 100 200

Vertical

100 50 0 50 100

MAP No. 2

STRATIGRAPHIC and STRUCTURAL SECTIONS

E. 1/2 Section 21, T.13N., R.9W.
McKinley County, New Mexico

Contract Idm.-E1220
Docket No. DMEA 5009

F.M.C. Mineral Development

Drawn By W D T

Traced By V E L