DMEA Form 9

UNITED STATES
DEPARTMENT OF THE INTERIOR
Defense Minerals Exploration Administration

OFFICIAL DOCKET FILE

DMEA NO. 4569

Application (Denied
(Withdrawn ✓
(After disposition, delete items not applicable)

Contract (Terminated - not Certified
(Cancelled
(Terminated - Certified
(Royalty Agreement

This is the official contract file containing all official records of the project. The records contained in the files are checked and are arranged in this order:

Left Side

Interim Royalty Audits
Reports of Royalty Review
Certification of Discovery
Certificate of Audit (Final)
Interim Audit(s)
Report of Review
Termination Notice or Agreement
Recision Notice
Assignment of Contract
Contract Amendments (latest on top)
Contract with all exhibits and annexes
✓ Owner's Consent to Lien
Subordination Agreement
✓ Leases and assignments of leases
✓ Application and attachments
(3) ✓ Envelope for maps

Right Side

✓ Project summary
Work completed analysis
All other material is filed in chronological order with correspondence including the following reports as checked:

Final Field Team Report (Tab)
Operator's Final Report
(2R) Interim Reports
(2R) Operator's monthly reports and all attachments (latest on top)
✓ On-site Exam Report(s) (Tab)
(4) Settlement Sheets

When the volume of records is expected to warrant additional folders, or when convenience of reference warrants separate folders for certain records, they should be set up in this order:

Left Side

Folder No. 2: (In chron. order)
Interim Summary Reports by W. O. Engineers

Right Side

Operator's Semi-Annual Report for Certified Project, Field Team Interim Reports, Operator's Monthly Report with transmittal, narrative, maps, and Field Team review.

Folder No. 3: Maps (Use pocket folder or envelope. Fold maps with title block out and show reference to related document or correspondence.)

Folder No. 4: Settlement Sheets

Folder No. 5: Drill Logs

9775

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

OFFICIAL FILE COPY
DMEA
RECEIVED APR 15 1957

DATE	INITIALS	CODE
4/15	C	220
4/15	Ava	600

April 11, 1957

Memorandum

To: Operating Committee, DMEA - Washington, D. C.

From: DMEA Field Team, Region V - Knoxville, Tennessee

Subject: DMEA-4569 (Rutile), Craven, Shufflebarger and Patterson, Greiner Tract, Nelson County, Virginia.

Enclosed are three (3) copies of the option agreement between T. E. Shufflebarger, one of the partners in the subject application, and the owners of the Greiner Tract.

If an assignment of this option from Shufflebarger to the partnership is required, we suggest that a request for it be sent direct from the Washington office to the Applicant.

Robert A. Laurence
Robert A. Laurence
Executive Officer, DMEA
Region V

V. J. Lynch
V. J. Lynch, Member
Bureau of Mines

RAL/as
cc
Opr. Com. 2
Lynch
Millar
Files

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DMEA
RECEIVED APR 15 1957
DATE | INITIALS | CODE

THIS OPTION AGREEMENT, made and entered into this the 20th day of March, 1957, by and between Harry T. Greiner and Sadie L. Greiner, his wife, parties of the first part, hereinafter called "Seller"; and Thomas E. Shufflebarger, party of the second part, hereinafter called "Buyer":

- W I T N E S S E T H -

That for and in consideration of the sum of Five Hundred ($500.00) Dollars, cash in hand paid, the receipt of which is hereby acknowledged, and in the further consideration of the terms, conditions, covenants and agreements hereinafter set forth, the said seller does hereby grant and convey, with general warranty of title, unto said buyer, the exclusive right or option to purchase the following described real estate, subject to the terms, conditions, covenants and agreements hereinafter set forth:

All that certain tract of land lying near Shady Lane, on Allen's Creek, in the Massie's Mill Magisterial District of Nelson County, Virginia, containing 120 acres, subject to the Bourne Graveyard with rights to ingress and egress previously reserved, subject to the previous reservations of mineral rights therein, and together with the outlet to the public highway, which real estate was conveyed from John M. Harvey and wife to said Harry T. Greiner by deed dated September 15th, 1938, of record in the Clerk's Office of said County in Deed Book 66, page 419, with which deed there is recorded a plat of said land, showing said graveyard containing 1 acre, and showing said outlet.

The option to purchase hereinabove granted is subject to the following terms, conditions, covenants and agreements:

(1)-The said buyer, from the date hereof until midnight on March 20th, 1958, shall have the exclusive right or option to purchase said real estate, and in order to exercise said option the buyer shall notify the seller in writing on or before midnight on March 20th, 1958, that he will purchase said real estate hereunder, and thereupon, said seller shall execute and deliver unto

ROBERT C. GOAD
ATTORNEY AT LAW
LOVINGSTON, VA.

the said buyer a proper deed, conveying said real estate with general warranty and the usual covenants of title, upon the payment of the purchase price hereinafter set forth.

(2)-In addition to the rights hereinabove granted to said buyer, to purchase said real estate within the time set forth above, the buyer shall, at his option, have the exclusive right to renew this option agreement for an additional period of one year, beginning midnight March 20th, 1958, and ending midnight March 20th, 1959, and in order to exercise said option to renew this agreement, said buyer, if the option to purchase said real estate shall not have been exercised, shall pay to said seller, in cash, or by certified or cashier's check, an additional consideration of Five Hundred ($500.00) Dollars on or before midnight March 20th, 1958, which payment shall of itself renew this entire agreement for said additional period ending midnight March 20th, 1959; if this agreement is so renewed, said buyer, if the option to purchase said real estate is not exercised during the period set forth in paragraph No. 1 above, shall, until midnight on March 20th, 1959, have the exclusive right or option to purchase said real estate, and in order to exercise said option the buyer shall notify the seller in writing on or before midnight on March 20th, 1959, that he will purchase said real estate hereunder, and thereupon, said seller shall execute and deliver unto said buyer a proper deed, conveying said real estate with general warranty and the usual covenants of title, upon the payment of the purchase price hereinafter set forth.

(3)-The purchase price for said real estate shall be as follows: for the dwelling house on said real estate and five acres surrounding same upon which it is located the sum of Thirteen Thousand ($13,000.00) Dollars; the balance of said real estate, which totals 120 acres, including said 5 acres and including said 1 acre graveyard, is 114 acres, being the total of 120 acres, less said 5 acres and 1 acre graveyard, and the purchase price for said

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LOVINGSTON, VA.

balance of 114 acres shall be Twenty-two Thousand Eight Hundred ($22,800) Dollars, or Two Hundred ($200.00) Dollars per acre, making the total purchase price for said real estate Thirty-five Thousand Eight Hundred ($35,800.00) Dollars, to be paid in cash if the option to purchase same is exercised hereunder, and if said option to purchase said real estate is exercised hereunder, it shall be to purchase the whole of said real estate as described above.

(4)-The seller hereby agrees to defend the title to said real estate during the time that this option agreement is in effect, and if said option to purchase hereunder is exercised, and upon title examination the title of the seller to said real estate is found not to be good and merchantable in the opinion of the examining attorney, upon notification of such the seller shall proceed with all reasonable dispatch to correct such defects; and the buyer shall have the option, but not the duty, to correct such defects and deduct the cost thereof from said purchase price.

(5)-The rights of all parties hereunder may be assigned in whole or in part, and the provisions hereof shall extend and enure to the benefit of and be binding upon the heirs, successors and assigns of the parties hereto, but no change or division in the ownership of said real estate, however accomplished, shall operate to enlarge the obligations or diminish the rights and privileges of the buyer; and no change or division in the ownership of said real estate shall be binding upon the buyer for any purpose until the buyer shall be furnished with satisfactory written evidence thereof.

(6)-Time is the essence of this option agreement, and if said buyer shall not notify said seller in writing within the first period set forth above, or within the second period set forth above if this agreement is renewed for said additional period, that he will purchase said real estate hereunder, then this agreement shall forthwith become fully and completely null, void and of no effect.

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(7)-If the option to purchase is exercised by the buyer hereunder, said payments for this option, either $500.00 or $1,000.00, as the case may be, shall be credited on said purchase price.

(8)-If the option to purchase is exercised by the buyer hereunder, the conveyance to the buyer shall be, in the opinion of the examining attorney, free and clear of all liens and encumbrances of every nature, and the deed shall, in the opinion of the examining attorney, convey to the buyer a good and merchantable, fee simple title to said real estate, subject only to the said graveyard of one acre, with rights to ingress and egress, previously reserved, and subject to the prior reservation of said mineral rights, and the term "real estate" as used in this paragraph, and in this agreement shall expressly include said 120 acre tract, subject to the above two reservations only, all buildings or improvements thereon, all appurtenances thereunto belonging, and expressly including said outlet to the public highway.

(9)-If the option to purchase is exercised by the buyer hereunder, the deed conveying said real estate to the buyer shall include a provision giving the seller possession of the dwelling house and 5 acres surrounding the same upon which it is located for a period of not longer than 6 months from the date of said deed, which 5 acres shall include the peach orchard, and extend back to the line fence of the property of American Cyanamid.

WITNESS THE FOLLOWING SIGNATURES AND SEALS:

Harry T. Greiner (SEAL) Sadie L. Greiner (SEAL)
Harry T. Greiner Sadie L. Greiner

Thomas E. Shufflebarger (SEAL)
Thomas E. Shufflebarger

STATE OF VIRGINIA, COUNTY OF NELSON, TO-WIT: I, ROBERT C. GOAD, a Notary Public in and for the County aforesaid in the State of Virginia, do hereby certify that Harry T. Greiner, & Sadie L. Greiner ~~and Thomas E. Shufflebarger~~ whose names are signed to the foregoing writing dated March 20th, 1957, have each this day acknowledged the same before me in my said County. My commission expires on the 23 day of AUGUST, 1959.

Given under my hand this the 20 day of MARCH, 1957.

Robert C. Goad, NOTARY PUBLIC.

ROBERT C. GOAD
ATTORNEY AT LAW
LOVINGSTON, VA.

District of Columbia
City of Washington

~~[illegible]~~, TO-WIT:

I, [illegible], a Notary Public in and for ~~the County of [illegible] in the State of Virginia~~, do hereby certify that Thomas E. Shufflebarger, whose name is signed to the foregoing writing dated March 20th, 1957, has this day acknowledged the same before me in my said ~~County~~. DISTRICT AND CITY.

My commission expires on the 14th day of March, 1961.

Given under my hand this the 1st day of April, 1957.

[illegible], NOTARY PUBLIC.

THIS LEASE, made and entered into this 1st day of December, 1956, by and between Grace B. Saunders and J. M. Saunders, her husband; Rose B. Staples, widow; P. B. Bourne and Laura Bourne, his wife; Q. C. Bourne, unmarried; C. B. Bourne and Frances Bourne, his wife; Mary Lewis Bourne, widow; Henry W. Bourne and Mary Bourne, his wife; C. T. Bourne and Sallie Bourne, his wife; Sue B. Hall and Alvin Hall, her husband; Bernice B. Mahone and Morris Mahone, her husband, all parties of the first part, hereinafter called Lessor, and John L. Patteson, Carrol E. Craven and Thomas E. Shufflebarger, parties of the second part, hereinafter called Lessee,

- W I T N E S S E T H -

1. The Lessor hereby leases and rents to the Lessee, and the Lessee hereby hires from the Lessor, subject to the terms and conditions hereinafter set forth, the mining and mineral rights in the following described real estate:

Tract No. 1: all that certain tract of land containing 207 1/16 (two hundred seven and one-sixteenths) acres, more or less, lying on Allen's Creek, near Rose Union Church, in the Massie's Mill Magisterial District of Nelson County, Virginia, which was conveyed to Dr. Cyrus T. Bourne from William H. Roberts and wife, by deed dated April 3rd, 1857, of record in the Clerk's Office of Nelson County, in Deed Book 15, page 70, which deed contains a written survey of said tract. Reference is here made to the agreement dated November 3rd, 1955, of record in said Clerk's Office, in Deed Book 89, page 326, for a more particular description of said tract of land, the chain of title thereto and the present owners of the surface rights thereto.

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DATE | INITIALS | CODE

ROBERT C. COLE
ATTORNEY AT LAW
LYNCHBURG, VA.

Tract No. 2: all those two certain tracts of land, of which Susan B. Bourne died seized and possessed, lying in the same vicinity of Nelson County, Virginia, as tract No. 1 above, the first containing 32 (thirty-two) acres, lying in Piney Woods, designated as Lot No. 5 on the Plat recorded in said Clerk's Office in Deed Book 21, page 211; and the second containing 78.55 (seventy-eight and fifty one/five/hundred sixtieths) acres, near Jennie's Creek, designated as Lot No. 1 on the Plat recorded in said Clerk's Office in Deed Book 21, page 212. Reference is here made to said agreement of November 3rd, 1955, for a more particular description thereof, the chain of title thereto and the present owners of the surface rights thereto.

2. This lease shall be for a term of 25 (twenty-five) years, beginning January 1st, 1957, and ending January 1st, 1982, and the Lessee shall have the right to renew this lease for an additional term of twenty-five years thereafter by giving the Lessor notice in writing of his intention to so renew the lease, which notice shall be given by the Lessee at least six months before the expiration of the original term of twenty-five years. The Lessee may terminate the lease at any time by giving to the Lessor thirty days notice in writing of his intention so to do.

3. The Lessee shall pay a royalty to the Lessor equivalent to 2½% (two and one-half per cent) of the gross sales price of all minerals mined and sold, F. O. B. at the mill, per month, provided, however, that when the production and sale of minerals commences hereunder the Lessor, or any one or more of the parties of the first part, may at their option accept their proper share of $40,000.00 (Forty Thousand dollars) according to their respective interest or interests in said mining and mineral rights, to be credited against future royalties, which option shall be binding on the Lessee upon notification in writing within thirty days after notification.

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ATTORNEY AT LAW
LOVINGSTON, VA.

4. During the operation of this lease the Lessee shall have and is hereby granted the exclusive right to mine, quarry, dig or drill for, bore for, sink pits or shafts for, remove, process, develop and sell all minerals, ores and elements on, in or under said land, together with full power and authority to enter upon and occupy said real estate; to construct and use all necessary roads thereon, to use all rights of way appurtenant thereto for ingress and egress, to use all necessary machinery, supplies and equipment on said land, to use waters on or adjoining said land, to erect all such necessary structures and buildings on said land and to do all other things necessary and proper in the exercise and full enjoyment of said mining and mineral rights or incident thereto; and upon the termination of said lease the Lessee shall have the right to remove all buildings, structures, equipment and machinery from said land.

5. The Lessor hereby expressly agrees to defend the title to said mining and mineral rights during the operation of this Lease and agrees that the Lessee, at his option, but without any duty to do so, may pay and discharge in whole or in part any liens or charges against said mining and mineral rights and in that event the Lessee shall be subrogated to such lien or charge with full right to enforce the same, and in addition may retain for the satisfaction of such lien or charge and interest thereon, all royalties accruing hereunder. If, upon title examination, the title of the Lessor to said mining and mineral rights is found not to be good and merchantable in the opinion of the examining attorney, upon notification of such the Lessor shall proceed with all reasonable dispatch to correct such defects, or the Lessee shall have the option but not the duty to correct such defects and deduct the cost thereof from said royalties.

6. The Lessee shall keep proper books of account of the mining operations under this lease, which shall be open to

ROBERT C. COAD
ATTORNEY AT LAW
LEXINGTON, VA.

inspection by the Lessor at all reasonable times.

7. The Lessee shall at all times during the operation of this lease endeavor, in every reasonable way, to prevent any unnecessary damages to the surface of said land.

8. Should any dispute arise between the Lessor and Lessee under this lease, it shall be submitted to a Board of Arbitration for decision, which shall be binding upon said Lessor and Lessee, said Board to consist of three arbitrators, one appointed by the Lessor, one by the Lessee and the other by the first two appointed.

9. The rights of all parties hereunder may be assigned in whole or in part and the provisions hereof shall extend and ensure to the benefit of and be binding upon the heirs, successors and assigns of the parties hereto, but no change or division in the ownership of said mining and mineral rights or royalties, however accomplished, shall operate to enlarge the obligations or diminish the rights and privileges of the Lessee. No change or division in the ownership of said mining and mineral rights or royalties shall be binding upon the Lessee for any purpose until the Lessee shall be furnished with satisfactory written evidence thereof.

10. The following are the names, addresses and respective shares or interests of all present owners of said mining and mineral rights upon which the lessee shall have the right to rely until he has been notified of any change in ownership as set forth above:

Grace B. Saunders,	Arrington, Va.	1/8
Rose B. Staples,	Arrington, Va.	1/8
P. B. Bourne,	Arrington, Va.	1/8
Q. C. Bourne,	Arrington, Va.	1/8
C. B. Bourne,	Arrington, Va.	1/8
Mary Lewis Bourne,	3432 Adenham St. Roanoke, Va.	2/8

ROBERT C. GOAD
ATTORNEY AT LAW
LYNCHBURG, VA.

Note Change of address,
40-39-78th St
Jackson Heights

Henry W. Bourne,	~~[illegible] 92nd St.~~ ~~[illegible]~~, Long Island New York	1/32
C. T. Bourne,	572 Roxbury St. Clifton Forge, Va.	1/32
Sue B. Hall,	Towanda, Pa.	1/32
Bernice B. Mahone,	Amandale, Va.	1/32

WITNESS THE FOLLOWING signatures and seals:

Grace B. Saunders (SEAL)	J. M. Saunders (SEAL)
Rose B. Staples (SEAL)	Q. C. Bourne (SEAL)
P. L. Bourne (SEAL)	Laura Bourne (SEAL)
C. B. Bourne (SEAL)	Frances Bourne (SEAL)
Mary Lewis Bourne (SEAL)	Henry W. Bourne (SEAL)
Mary Louis Bourne (SEAL)	C. T. Bourne (SEAL)
Sallie Bourne (SEAL)	Sue B. Hall (SEAL)
Alvin Hall (SEAL)	Bernice B. Mahone (SEAL)
Morris Mahone (SEAL)	John L. Patterson (SEAL)
Thomas E. Shufflebarger (SEAL)	Carrol E. Craven (SEAL)

State of Virginia)
(TO-WIT:
County of Nelson)

I, Kathleen D. Hubel, a Notary Public in and for the County aforesaid, in the State of Virginia, do hereby certify that Grace B. Saunders, J. M. Saunders and Rose B. Staples, whose names are signed to the foregoing writing dated December 1st, 1956 have each this day acknowledged the same before me in my said County.

My commission expires on the 24 day of Feb, 1960.
Given under my hand this 21 day of December, 1956.

Kathleen D. Hubel NOTARY PUBLIC

ROBERT C. COLE
ATTORNEY AT LAW
LYNCHBURG, VA.

State of Virginia)
City of Roanoke) To-Wit:

I, J B Anderson, a Notary Public in and for the City aforesaid, in the State of Virginia, do hereby certify that Mary Lewis Bourne, whose name is signed to the foregoing writing, dated December 1st, 1956, has this day acknowledged the same before me in my said City.

My commission expires on the 10 day of July, 1960.
Given under my hand this 21st day of December, 1956.

J B Anderson NOTARY PUBLIC

State of Virginia)
City of Roanoke) To-Wit:
County of Botetourt)

I, William E. Naughton, a Notary Public in and for the City aforesaid, in the State of Virginia, do hereby certify that Bernice B. Mahone and Morris Mahone, whose names are signed to the foregoing writing, dated December 1st, 1956, have each this day acknowledged the same before me in my said County.

My commission expires on the 1st day of Mar., 1960.
Given under my hand this 11 day of January, 1957.

William E. Naughton NOTARY PUBLIC

State of Virginia)
City of Clifton Forge) To-Wit:

I, Aubrey E. Dean, a Notary Public in and for the City aforesaid, in the State of Virginia, do hereby certify that C. T. Bourne and Sallie Bourne, whose names are signed to the foregoing writing dated December 1st, 1956, have each this day acknowledged the same before me in my said City.

My commission expires on the 17 day of September, 1957.
Given under my hand this 12 day of January, 1957.

Aubrey E. Dean NOTARY PUBLIC
My Commission Expires September 17, 1957

State of New York)
County of Queens) To-Wit:

I, Vincent F. Magliano, a Notary Public in and for the County aforesaid, in the State of New York, do hereby certify that Henry W. Bourne and Mary Bourne, whose names are signed to the foregoing writing, dated December 1st, 1956, have each this day acknowledged the same before me in my said County.

My commission expires on the 30 day of March, 1957.
Given under my hand this 7 day of January, 1957.

(AFFIX NOTARIAL SEAL HERE)

Vincent F. Magliano NOTARY PUBLIC

VINCENT F. MAGLIANO
NOTARY PUBLIC, STATE OF NEW YORK
No. 41-1595400
Qualified in Queens County
Term expires March 30, 1957

HENRY C. COHEN
ATTORNEY AT LAW
ROANOKE, VA.

State of Pennsylvania)
(To-Wit:
County of Bradford)

I, Alberta M. McGee, a Notary Public, in and for the County aforesaid, in the State of Pennsylvania, do hereby certify that Sue B. Hall and Alvin Hall, whose names are signed to the foregoing writing, dated December 1st, 1956, have each this day acknowledged the same before me in my said County.

My commission expires on the 17 day of January, 1957.
Given under my hand this 4 day of January, 1957.

(AFFIX NOTARIAL SEAL HERE) Alberta M. McGee NOTARY PUBLIC
my com expires Jan 17, 1957

State of Virginia)
(To-Wit:
County of Nelson)

I, Kathleen D. Abel, a Notary Public, in and for the County aforesaid, in the State of Virginia, do hereby certify that P. B. Bourne, Laura Bourne, J. C. Bourne, C. B. Bourne and Frances Bourne, whose names are signed to the foregoing writing, dated December 1st, 1956, have each this day acknowledged the same before me in my said County.

My commission expires on the 24 day of Feb, 1960.
Given under my hand this 21 day of December, 1956.

Kathleen D. Abel NOTARY PUBLIC

State of Virginia)
City
County of Bedford (To-Wit:

I, Dorothy E. Thomas, a Notary Public, in and for the County aforesaid, in the State of Virginia, do hereby certify that John L. Patteson, Thomas E. Shufflebarger and Carrol E. Craven, whose names are signed to the foregoing writing, dated December 1st, 1956, have each this day acknowledged the same before me in my said County.

My commission expires on the 23 day of December, 1959.
Given under my hand this 26 day of January, 1957.

Dorothy E. Thomas NOTARY PUBLIC

VIRGINIA: In the Clerk's Office of the Circuit Court of Nelson County: The foregoing instrument of writing was presented in said office and, upon the certificate(s) of acknowledgment(s) thereto annexed, admitted to record at Eight o'clock P. M., on January 30 1957.
$9.15 Tax Pd. Teste: Austin Tomboson, Clerk

ROBERT C. GOAD
ATTORNEY AT LAW
LOVINGSTON, VA.

The foregoing consisting of 7 page(s) is a true copy of LEASE recorded in my office in DEED Book 90 page 355. Teste:
Austin Tomboson Clerk
Circuit Court of Nelson County, Va.

RECEIVED
DEC 10 1956
D.M.E.A.

APPLICATION FOR

D. M. E. A. AID

Partnership of

CRAVEN, SHUFFLEBARGER, AND PATTESON

Piney River
Nelson County
Virginia

GREINER TRACT

PROPOSAL No. 1

October, 1956

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Form Approved.
Budget Bureau No. 42-R1035.2.

RECEIVED DEC 10 1956 D.M.E.A.

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

Not to be filled in by applicant

Docket No. 4569
Metal or Mineral Rutile
Date Received 12-10-56
Estimated Cost $28,152.60
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: Partnership of Craven, Shufflebarger and Patteson
Address: Care of John Louis Patteson, Piney River, Va.

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers.

(*d*) If a partnership, add to the above statement the names and addresses of all partners.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract
GREINER TRACT as described in accompanying report

(*b*) State any mine name by which the property is known.

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise
Lessee and/ or purchaser under contract

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property.

(*e*) If you own the land, describe any liens or encumbrances on it none

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes.

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you.

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points.

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

5. *The exploration project.*—State the mineral or minerals for which you wish to explore Rutile

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc.

(*c*) The work will start within 30 days and be completed within 2 months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations.

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project:

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants.

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel.

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be.

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project.

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project.

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes.

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs.

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)?

(*b*) How do you propose to furnish your share of the costs?

[X] Money [ ] Use of equipment owned by you [ ] Other

Explain in detail on acompanying paper.

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated _____, 195__

_____
(Applicant)

By _____

_____ Secy Treas

_____

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.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

RECEIVED
DEC 10 1986
DMEA

PROPERTY DESCRIPTION

MINE NAMES

LIST OF OFFICERS

COPY OF OPTION AGREEMENT

LAND OWNER LIEN

Reference to Application
3(a) 3(b) 3(d)

REFERENCE OT APPLICATION 3(a) DESCRIPTION OF PROPERTIES

The accompanying Property Plan shows the location of three properties now under option by the Partnership of Craven, Shufflebarger and Patteson. The location plan also accompanying this application shows the location of these propertieswith respect to other outstanding features of the Piney River District.

GREINER TRACT

This application deals with the Greiner Tract only. The mineral rights on this property which comprises 207 1/16 acres, are owned by a group of people, the heirs of Dr. Cyrus T. Bourne and Susan Bourne as set forth in the accompanying agreement. The Partnership of Craven, Shufflebarger and Patteson has made an agreement with the heirs of Dr. Cyrus T. and Susan Bourne in which the Partnership has the exclusive rights to lease the mineral lands for a period of 50 years. Surface rights on the property are owned by H. T. Greiner, W. H. Giles and J.M. Harvey. The owners of the surface rights are in agreement with the exploration programme. It is the intention of the Partnership to arrange a satisfactory settlement and agreement with the owners of the surface rights when it becomes apparent that sufficient quantities of rutile bearing saprolite are available for mining purposes. It is interesting to note, however, that Virginia Law recognizes mineral rights as being from grass roots down.

DEC 10 1955

REFERENCE TO APPLICATION 3 (d)

The property has not been assigned a "mine name". No work ~~has been done~~ previous to that done by the Partnership has been attempted.

LIST OF PARTNERS AND OFFICER

The following is a list of the partners and officer. The partnership of Craven, Shufflebarger and Patteson consists of a group of responsible people who have formed this association to investigate the rutile-ilmenite possibilities on various properties in the Piney River District.

NAME	ADDRESS	OCCUPATION
C. E. Craven	505 Oak Ridge Drive Lynchburg, Va.	Engineer
T. E. Sufflebarger	384 Apple Tree Drive Alexandria, Va.	Geologist
J. L. Patteson	Piney River Virginia.	Personal Manager
J. D. Hagan	Dillwyn Virginia.	Mining Engineer Consultant

Heirs, etc, of Dr. Cyrus T. Bourne and Susan B. Bourne, both deceased

TO: AGREEMENT CONCERNING MINERAL RIGHTS (234)

J. L. Davidson

THIS AGREEMENT, made and entered into this 3rd day of November, 1955, by and between Grace B. Saunders and J. M. Saunders, her husband; Rose B. Staples, widow; P. B. Bourne and Laura Bourne, his wife; Q. C. Bourne, unmarried; C. B. Bourne and Frances Bourne, his wife; Mary Lewis Bourne, widow; Henry W. Bourne and Mary Bourne, his wife; C. T. Bourne and Sallie Bourne, his wife; Sue B. Hall and Alvin Hall, her husband, Bernice B. Mahone and Morris Mahone, her husband, all parties of the first part, hereinafter called "Owner"; and J. L. Davidson, party of the second part, hereinafter called "Tenant".

WHEREAS, Dr. Cyrus T. Bourne died many years ago, seized and possessed of a certain tract of land lying on Allen's Creek, near Rose Union Church, in the Massie's Mill Magisterial District of Nelson County, Virginia, containing 207-1/16ths acres, more or less, which was conveyed to him from William H. Roberts and wife by deed dated April 3rd, 1857, recorded in the Clerk's Office of said County in Deed Book 15, page 70, which deed contains a written survey of said tract;

WHEREAS, under the will of Dr. Cyrus T. Bourne, deceased, recorded in said Clerk's Office in Will Book "N", page 275, title to said tract passed to his nine children; and by deed dated June 27th, 1911, recorded in said Clerk's Office in Deed Book 39, page 38, said devisees conveyed to Grace B. Saunders and J. M. Saunders, her husband, a 46 acre portion of said 207 acre tract, a plat of which 46 acres is recorded in said Clerk's Office in Deed Book 39, page 40, in which deed it was recited that all of said devisees retained title to the mineral and mining rights in the whole of said 207 acre tract as tenants in common; said 46 acre tract is now owned by W. H. Giles, Jr., under various deeds recorded in said Clerk's Office, a recent plat of which tract is recorded in said Clerk's Office in Plat Book 3, page 6, designated thereon as Lot No. 3; the remainder of said 207 acre tract, containing 161 acres, more or less, was conveyed by said devisees to Q. C. Bourne by deed dated February 16th, 1920, recorded in said Clerk's Office in Deed Book 45, page 81, in which deed said devisees reserved all mineral rights; under various deeds of record in said Clerk's Office, Harry T. Greiner is now the owner of a 120 acre portion of said 161 acre tract, a plat of which 120 acres is recorded in said Clerk's Office in Deed Book 66, page 420; Samuel Rose is the owner of a 2 acre portion of said 161 acre tract, a plat of which 2 acres is recorded in said Clerk's Office in Deed Book 87, page 358; and Virginia S. Harvey, widow of John M. Harvey, deceased, is the owner of the remainder of said 161 acre tract;

WHEREAS, Susan B. Bourne, wife of Dr. Cyrus T. Bourne, died many years ago, intestate, seized and possessed of two tracts of land in the same vivinity of Nelson County as the 207 acre tract above mentioned, the first containing 32 acres, lying in Piney Woods, designated as Lot No. 5 on the plat recorded in said Clerk's Office in Deed Book 21, page 211, and the second containing 78-55/160 acres, near Jennie's Creek, designated as Lot No. 1 on the plat recorded in said Clerk's Office in Deed Book 21, page 212; title to said two tracts, totalling 110-55/160 acres, passed to her nine children as her sole heirs at law, and by deed dated February 16th, 1920, recorded in said Clerk's Office in Deed Book 45, page 91, said heirs conveyed said two tracts of land to C. B. Bourne, P. B. Bourne and Bessie B. Bourne, in which deed the mineral and mining rights were reserved;

WHEREAS, the parties of the first part are the present owners of the mining and mineral rights in the above described real estate

totalling 317-65/160 acres, more or less, as devisees or heirs of Dr. Cyrus T. Bourne and Susan B. Bourne, both deceased, or as devisees, or heirs, or assignees of certain of the said original nine children, which mining and mineral rights were reserved and retained in the deeds hereinabove set forth;

NOW THEREFORE, THIS AGREEMENT, WITNESSETH:

That for and in consideration of the sum of One ($1.00) Dollar, cash in hand paid, the receipt of which is hereby acknowledged, and in the further consideration of the terms, conditions, covenants and agreements hereinafter set forth, the said owner does hereby grant and convey, with general warranty of title, unto said tenant, (a) the exclusive right, for a period of one year ending December 31, 1956, to enter upon the above described real estate to prospect and explore for mineral deposits therein, and (b), the exclusive right or option to lease said mining and mineral rights in said real estate, according to the terms, conditions, covenants and agreements as follows:

(A)

The exclusive right to prospect

1. During the period of one year ending December 31st, 1956, said tenant shall have the exclusive right to prospect and explore for mineral deposits in said real estate, and for this purpose the exclusive right to sample, examine, diamond drill, develop and mine said land, in such manner as the tenant shall deem proper, and to erect and install thereon all such machinery, equipment or supplies as the tenant shall deem proper, and to remove from said land reasonable quantities of minerals or ore for assay and testing purposes.

2. During the prospecting operations said tenant shall not prospect upon any land immediately adjacent to any of the buildings on said land, nor cause any unreasonable damages to said land, and all test holes or shafts bored or sunk thereon shall, upon the conclusion of the prospecting operations, be filled in or capped so as to leave the premises safe for persons or livestock, if the option to lease is not exercised hereunder.

3. If the option to lease is not exercised hereunder, the tenant shall make available to the owner all information of value obtained from the prospecting operations; the tenant shall have the right to remove from said land all of his machinery, equipment and supplies; and at any time during the period of one year ending December 31st, 1956, the tenant shall have the right to terminate this entire agreement and all rights granted herein by giving to the owner thirty days notice in writing of his intention so to do.

(b)

The exclusive option to lease

1. The tenant from the date hereof until December 31st, 1956, shall have the exclusive right or option to lease said mining and mineral rights in said land for a period of twenty-five years as hereinafter set forth, and in order to exercise said option the tenant shall notify the owner in writing on or before December 31st, 1956, that he will lease said mining and mineral rights hereunder, and thereupon, said owner shall execute and deliver unto the tenant a proper lease hereunder.

2. The owner hereby expressly agrees to defend the title to said mining and mineral rights during the term of said lease, and agrees that the tenant, at his option but without any duty to do so, may pay and discharge in whole or in part any liens or charges against said mining and mineral rights, and in that event the tenant shall be subrogated to such lien or charge with full right to enforce the same, and in addition may retain for the satisfaction

of such lien or charge and interest thereon all royalties accruing hereunder. If upon title examination, the title of the owner to said mining and mineral rights is found not to be good and merchantable in the opinion of the examining attorney, upon notification of such the owner shall proceed with all reasonable dispatch to correct such defects, or the tenant shall have the option, but not the duty, to correct such defects and deduct the cost thereof from said royalties.

3. The lease shall be for a term of twenty-five (25) years, with the right to the tenant to renew the lease for an additional twenty-five (25) years; provided, however, that the tenant may terminate the lease at any time by giving to the owner thirty days notice in writing of his intention so to do.

4. The tenant shall pay a royalty to the owner during the term of said lease equivalent to two and one-half (2½%) per cent of the gross sales price of all minerals mined and sold, F. O. B. at the mill, per month; provided, however, that when the production and sale of minerals commences under said lease, the owner, or any one or more of them, may at their option accept their proportionate share of Forty Thousand ($40,000.00) Dollars, according to their respective interest or interests in said mining and mineral rights, to be credited against future royalties, which option shall be binding on the tenant upon notification in writing within thirty days after notification.

5. The tenant shall keep proper books of account of the mining operations under the lease, which shall be open to inspection by the owner at all reasonable times.

6. The lease shall grant to the tenant the exclusive right to mine, quarry, dig or drill for, bore for, sink pits or shafts for, remove, process, develop and sell all minerals, ores and elements on, in or under said land, together with full power and authority to enter upon and occupy said real estate, to construct and use all necessary roads thereon, to use all rights of way appurtenant thereto for ingress and egress, to use all necessary machinery, supplies and equipment on said land, to use waters on or adjoining said land, to erect all such necessary structures and buildings on said land and to do all other things necessary and proper in the exercise and full enjoyment of said mining and mineral rights, or incident thereto; upon the termination of said lease the tenant shall have the right to remove all buildings, structures, equipment and machinery from said land.

7. The tenant shall at all times during the term of the lease endeavor in every reasonable way to prevent any undue damages to the surface of said land.

8. Should any dispute arise between the owner and tenant, it shall be submitted to a board of arbitration for decision which shall be binding upon said owner and tenant, said board to consist of three arbitrators, one appointed by the owner, one by the tenant and the other by the first two appointed.

9. The owner hereby agrees to execute all necessary papers which may be required by the United States Dovernment, in the event said Government agrees to lend financial assistance to the tenant in the exploration or development or exercise of said mining and mineral rights.

10. The rights of all parties hereunder may be assigned in whole or in part, and the provisions hereof shall extend and enure to the benefit of and be binding upon the heirs, successors and assigns of the parties hereto, but no change or division in the ownership of said mining and mineral rights or royalties, however accomplished, shall operate to enlarge the obligations or diminish the rights and privileges of the tenant. No change or division in the ownership of said mining and mineral rights or royalties shall be binding on the tenant for any purpose until the tenant shall be furnished with satisfactory written evidence thereof. The original

lease given hereunder, if said option to lease is exercised, shall set forth the names, addresses and respective shares or interests of all owners of said mining and mineral rights, upon which the tenant shall have the right to rely, until he has been notified of any change in ownership as set forth above.

WITNESS THE FOLLOWING signatures and seals:

Grace B. Saunders	(SEAL)	J. M. Saunders	(SEAL)
Rose B. Staples	(SEAL)	P. B. Bourne	(SEAL)
Laura Bourne	(SEAL)	Q. C. Bourne	(SEAL)
C. B. Bourne	(SEAL)	Frances Bourne	(SEAL)
Mary Lewis Bourne	(SEAL)	Henry W. Bourne	(SEAL)
Mary Bourne	(SEAL)	C. T. Bourne	(SEAL)
Sallie Bourne	(SEAL)	Sue B. Hall	(SEAL)
Alvin R. Hall Alvin Hall	(SEAL)	Bernice E. Mahone Bernice B. Mahone	(SEAL)
Morris Mahone	(SEAL)	J. L. Davidson	(SEAL)

State of Virginia)
(To-wit:
County of Nelson)

I, Agnes Little, a Notary Public in and for the County aforesaid, in the State of Virginia, do hereby certify that Grace B. Saunders, J. M. Saunders, and Rose B. Staples, whose names are signed to the foregoing writing dated November 3rd, 1955, have each this day acknowledged the same before me in my said County.
My commission expires on the 12 day of February, 1958.
Given under my hand this the 16 day of Nov. 1955.

(Notarial Seal) Agnes Little, Notary Public.

State of Virginia)
(To-wit:
City of Roanoke)

I, J. B. Andrews, a Notary Public in and for the City aforesaid, in the State of Virginia, do hereby certify that Mary Lewis Bourne, whose name is signed to the foregoing writing, dated November 3rd, 1955, has this day acknowledged the same before me in my said City.
My commission expires on the 1st day of June, 1956.
Given under by hand this the 10th day of December, 1955.

J. B. Andrews, Notary Public

State of Virginia)
(To-wit:
County of Fairfax)

I, Sarah L. Uhler, a Notary Public in and for the County aforesaid, in the State of Virginia, do hereby certify that Bernice B. Mahone and Morris Mahone, whose names are signed to the foregoing writing, dated November 3rd, 1955, have each this day acknowledged the same before me in my said County.
My commission expires on the 13 day of May, 1959.
Given under my hand this the 18 day of January, 1956.

(Notarial Seal) Sarah L. Uhler, Notary Public.

State of Virginia (
(To-wit:
City of Clifton Forge)

I, C. M. Brown, a Notary Public in and for the City aforesaid, in the State of Virginia, do hereby certify that C. T. Bourne and Sallie Bourne, whose names are signed to the foregoing writing, dated November 3rd, 1955, have each this day acknowledged the same before me in my said City.
My commission expires on the 14 day of June, 1959.
Given under my hand this the 20 day of Dec. 1955.

C. M. Brown, Notary Public.

State of New York)
(To-wit:
County of Queens)

I, Norman N. Gaynor, a Notary Public in and for the County aforesaid, in the State of New York, do hereby certify that Henry W. Bourne and Mary Bourne, whose names are signed to the foregoing writing, dated November 3rd, 1955, have each this day acknowledged the same before me in my said County.
My commission expires on the 30th day of March, 1957.
Given under my hand and notarial seal this the 14th day of January, 1956.

(Notarial Seal) Norman N. Gaynor, Notary Public.

State of Pennsylvania)
(To-wit:
County of Bradford)

I, Alberta N. McNeal, a Notary Public in and for the County aforesaid, in the State of Pennsylvania, do hereby certify that Sue B. Hall and Alvin Hall, whose names are signed to the foregoing writing, dated November 3rd, 1955, have each this day acknowledged the same before me in my said County.
My commission expires on the 17 day of January, 1957.
Given under my hand and notarial seal this the 17 day of January, 1956.

(Notarial Seal) Alberta M. McNeal, Notary Public.

State of Virginia)
(To-wit:
County of Nelson)

I, Agnes Little, a Notary Public in and for the County aforesaid, in the State of Virginia, do hereby certify that P. B. Bourne, Laura Bourne, Q. C. Bourne, C. B. Bourne and Frances Bourne, whose names are signed to the foregoing writing, dated November 3rd, 1955, have each this day acknowledged the same before me in my said County.
My commission expires on the 12 day of February, 1958.
Given under by hand this the 19 day of December, 1955.

(Notarial Seal) Agnes Little, Notary Public.

State of Virginia)
(To-wit:
City of Lynchburg)

I, Margaret S. Howell, a Notary Public in and for the City aforesaid, in the State of Virginia, do hereby certify that J. L. Davidson, whose name is signed to the foregoing writing, dated November 3rd, 1955, has this day acknowledged the same before me

in my said County.
My commission expires on the 28th day of August, 1957.
Given under my hand this the 16th day of Feb. 1956.

Margaret S. Howell, Notary Public.

VIRGINIA: In the Clerk's Office of the Circuit Court of Nelson County: The foregoing instrument of writing was presented in said office and, upon the certificate of acknowledgment thereto annexed, admitted to record at 3:00 o'clock P.M., on May 22nd, 1956.

$0.15 Tax Pd. Teste: Austin Embrey, Clerk.

The foregoing is a true copy of agreement recorded in my office in Deed Book 89, pages 326-330.

Teste: Austin Embrey, Clerk,
Circuit Court of Nelson County,
Virginia.

THIS AGREEMENT, made this 23rd day of January, 1956, by and between J. L. DAVIDSON, party of the first part, CARROL E. CRAVEN, JOHN L. PATTESON, and THOMAS E. SHUFFLEBARGER, parties of the second part:

WHEREAS, the party of the first part as agent for the parties of the second part entered into an agreement with Grace B. Saunders, et als, dated the 3rd day of November, 1955, concerning the mineral rights and an option to lease certain property in Nelson County, Virginia, more particularly described in said agreement; and

WHEREAS, it is the desire of the parties hereto to assign from the said party of the first part to the said parties of the second part all of his rights in said agreement and to release said party of the first part from any liability under said agreement;

NOW THEREFORE IN CONSIDERATION of the premises, said party of the first part hereby assigns in equal undivided interest to the parties of the second part all of his right, title and interest in and to any mineral rights or option to lease acquired under the aforesaid agreement with Grace B. Saunders, et als, and the parties of the second part hereunder assume all liability under said agreement and agree to save harmless the said party of the first part any loss, damages, expenses or any liability which might be incurred by reason of said agreement.

GORMAN
VA.

January, 1956, have each personally appeared before me in my City and State aforesaid and acknowledged the same.

My commission expires December 23, 1957.

Given under my hand this 15th day of February, 1956.

Dorothy E. Hines
NOTARY PUBLIC

VIRGINIA: In the Clerk's Office of the Circuit Court of Nelson County: The foregoing instrument of writing was presented in said office and, upon the certificate(s) of acknowledgment(s) thereto annexed, admitted to record at 3:00 o'clock P. M., on May 22nd 1956.
$.15 Tax Pd. Teste: Lucy Spencer, Deputy, Clerk

SUMMARY OF

MINING HISTORY

ACCESSIBILITY OF PROJECT

AVAILABILITY OF MAN POWER AND SUPPLIES

WATER AND POWER

RECEIVED
DEC 10 1956
D.M.E.A.

REFERENCE TO APPLICATION

4(a) 4(b) 4(c) 4(d) 4(e)

REFERENCE TO APPLICATION 4(a) 4(b) 4(c)

The American Cyanamid Company whose property borders on and is contigious to the Greiner Tract, are currently operating a mill (concentrator) which has a capacity of about 700 tons per day and is supplied by titanium ore mined from this bordering property. The mine had its origin as a "soft ore" operation and has subsequently converted to a hard rock mining method in recovering the titanium minerals. Included in the immediate area is the former operation of the American Rutile Company which operated for period of 43 years from 1902 to 1945. The large open pits and ming excavations are evidence that a large operation existed on that property at one time. the location of this old mine is shown on the property location plan accompanying this application.

The rutile ilmenite mineralization has an expression on surface as fragments of float or gossan which have not been greatly altered from the original state found in the rock. These fragments range in size from a coarse black sand to pieces as large as one foot. An average fragment is estimated to contain 20 to 30 % titanium minerals. The float is found in concentrations covering areas of several acres.

These float fragments originated from a series of veins in the rocks below the zone of oxidation. The bedrock consists of an anorthosite into which a network of veins of blue quartz has been injected. The rutile- ilmenite Mineralization is

apparently associated with these veins of blue quartz.

The area has experienced an intensive natural process of oxidation whereby the rocks above the water table have been highly altered and reduced to a "rotten rock" commonly known as saprolite. The saprolite consists chiefly of a mixture of clays and gravels with particles and fragments of the harder rocks and minerals which have resisted the oxidation process. For practical mining purposes this zone of oxidation which has an average depth of about 60 feet may be considered as overburden in which there is an occurrence of rutile and ilmenite.

RECEIVED DEC 10 1956 D.M.E.A.

Some drilling has been done by the Partnership of Graven, Shufflebarger and Patteson. Cunningham Core Drilling and Grouting Company was employed to do this work. Thirty two drill holes (4 inch vertical auger holes) have been drilled. These auger holes are located on the accompanying drilling plan. A list of the available data on these holes is shown on the following pages.

This drilling serves to indicate that there is an area or areas of concentrated titanium bearing minerals. Unfortunely, this information is very meagre. While no estimate of volume or average grades can be calculated, the deposit appears to be large.

It is proposed to drill additional auger holes as shown on the accompanying plan. The purpose of this drilling is to arrive at a conclusion of volumes of material and average grades by which it may be determined whether or not commercial ore bodies are present.

WITNESS the following signatures and seals this 23rd day of January, 1956:

Thomas E. Shufflebarger (SEAL)

Carrol E. Craven (SEAL)

John L. Patteson (SEAL)

J. L. Davidson (SEAL)

STATE OF VIRGINIA:)
: TO-WIT:
CITY OF LYNCHBURG:)

I Margaret L. Howell, a Notary Public in and for the State and City aforesaid, do certify that J. L. Davidson, whose name is signed to the foregoing agreement dated the 23rd day of January, 1956, has personally appeared before me in my City and State aforesaid and acknowledged the same.

My commission expires 8-28-57.

Given under my hand this 16th day of Feb., 1956.

Margaret L. Howell
NOTARY PUBLIC.

STATE OF VIRGINIA:)
: TO-WIT:
CITY OF LYNCHBURG:)

I, Dorothy E. Hines, a Notary Public in and for the State and City aforesaid, do certify that Carrol E. Craven, John L. Patteson and Thomas E. Shufflebarger, whose names are signed to the foregoing agreement dated the 23rd day of

DRILLING RESULTS

The following is the available data from the auger drilling on the Greiner Tract.

Hole No.	Depth	% Heavy Minerals in Dry Originals	% TiO_2 in Dry Originals	Average % TiO_2 in Hole
1	0-10	3.5	1.6	
	10-20	0.6	0.3	
	20-30	5.5	2.0	
	30-40	3.3	1.8	
	40-50	3.1	1.4	
	50-60	4.7	2.4	1.6 %
2	0-10	4.3	1.1	
	10-20	3.7	0.5	
	20-30	2.2	0.7	
	30-40	1.7	0.6	
	40-50	2.1	0.8	
	50-60	1.7	0.6	
	60-70	5.6	0.6	0.7 %
3	0-10	3.9	1.5	
	10-20	3.0	1.1	
	20-30	4.9	1.1	
	30-40	10.4	1.9	
	40-50	15.7	1.1	1.1 %
4	0-10	5.5	1.3	
	10-20	3.0	1.1	
	20-30	3.2	0.4	
	30-40	2.2	0.5	
	40-50	4.8	0.9	
	50-58	9.9	2.5	1.1 %
5	0-10	6.9	3.3	
	10-20	2.7	0.9	
	20-30	8.2	2.9	
	30-40	5.4	2.9	
	40-50	4.6	4.1	3.1 %

Hole No.	Depth	% Heavy Minerals in Dry Originals	% TiO_2 in Dry Originals	Average % TiO_2 in Hole
6	0-10	3.5	1.7	
	10-20	10.1	6.6	
	20-30	4.0	1.3	
	30-40	9.7	5.0	
	40-50	5.6	2.8	
	50-60	3.9	1.4	3.1 %
7	No Data Available			
8	0-40			0.5 %
9	0-40			0.5 %
10				0.8 %
11	0-60			0.8 %
12	0-70			1.2 %
13	0-10		3.0	
	10-20		0.6	
	20-30		1.1	
	30-40		0.5	
	40-50		0.6	
	50-60		1.2	1.1 %

Hole No.	Depth	% Heavy Minerals in Dry Originals	% TIO2 in Dry Originals	Average % TIO2 in Hole
14	0-10		1.7	
	10-20		3.0	
	20-30		3.0	
	30-40		2.5	2.5 %
15	Traces			
16	No Data			
17	No Data			
18	No Data			
19	0-10	3.5	0.60	
	10-20	1.97	0.46	
	20-27	1.20	0.35	0.47 %
21	No Data			
22	0-10		2.97	
	10-20		2.84	
	20-30		1.27	
	30-40		0.60	
	40-50		0.80	1.7 %

Hole No.	Depth	% Heavy Minerals in Dry Originals	% TIO2 in Dry Originals	Average % TIO2 in Hole
23	0-10		7.08	
	10-20		5.20	
	20-30		3.86	
	30-40		5.58	
	40-50		4.63	5.2 %
24	0-10		2.30	
	10-20		3.80	
	20-30		4.80	
	30-40		1.70	
	40-50		1.50	
	50-60		2.00	2.7 %
25	0-10		2.1	
	10-20		2.4	
	20-30		1.5	2.0 %
26	0-10		2.4	
	10-20		0.6	
	20-30		0.6	
	30-40		0.5	
	40-50		0.3	
	50-60		7.4	1.9 %
27	0-10		4.3	
	10-20		3.1	
	20-30		2.6	
	30-40		2.6	
	40-50		2.4	
	50-60		3.0	3.0 %
28	60			1.6 %

Hole No.	Depth	% Heavy Minerals in Dry Originals	% TIO2 in Dry Originals	Average % TIO2 in Hole
29	60			2.8 %
30				0.5 %
31	No Data			
32	60			5.5 %

Please note that these samples were deslimed prior to assaying.

The following is a summary of a mill test by Bruce Williams Laboratories, Joplin, Missouri on a sample from 40 to 50 feet in hole No. 30.

	Wt. in Grams	% TIO2	Wt. of TIO2 Grams	% of TIO2 Compared to Original Sample
Original Sample	100	0.66	0.66	100
Sand	33.48	1.44	0.48	
Slimes	66.52	0.27	0.18	27.27 (This is Lost)
	100.00		0.66	
SINK AND FLOAT TEST ON SANDS				
Float	32.07	0.16	0.05	7.58 (This is Lost)
Sink	1.41	30.57	0.43	
	33.48		0.48	
MAGNETIC TEST ON SINK MATERIAL				
Wt. of Magnetic	0.48	44.27	0.21	31.82 (This is Ilmenite)
Wt. of Non Magnetic	0.93	23.66	0.22	
			0.43	
SOLUBILITY TEST ON MAGNETIC MATERIAL				
Soluble Magnetic	0.48	43.20	0.21	
Non Soluble Magnetic	None	--	--	
SOLUBILITY TEST ON NON MAGNETIC MATERIAL				
Soluble Non Magnetic	0.25	1.06	0.027	4.09 (This is Ilmenite)
Non Soluble Non Magnetic	0.68	28.38	0.193	29.24
	0.93			

Of the 0.68 grams of non soluble non magnetic, 0.193 is rutile.

Recovery of rutile $= \frac{0.193}{0.66} =$ 29.24 % of original TIO2 content in sample.

CONCLUSION ON MILL TEST

1. % of TiO_2 in original sample that is lost = 27.27 plus 7.58 = 34.85 %

2. % of TiO_2 in original sample that is ilmenite = 31.82 plus 4.09 = 35.91 %

3. % of TiO_2 in original sample that is rutile = = 29.24 %

100.00 %

Therefore, of the original sample about 35% of the TiO_2 would be lost and about 65% would be recovered.

% Rutile in concentrate = $\frac{29.24 \times 100}{65.15}$ = 45%

AVAILABILITY AND ACCESSIBILITY REFERENCE 4(d) 4(e)

The Greiner Tract is readily reached by State Routes 151 and 158which lead from the United States Highway No. 29. A well kept farm road traverses the property which may be used except perhaps in extremely wet weather.

RECEIVED DEC 10 1956 D.M.E.A.

The main line of the Southern Railway passes within ten miles of the property. A branch line known as the Virginia Blue Ridge Railway lies within 2 miles of the property and connects Piney River with the main line.

Ample electric power is available. While water for purposes of core drilling is not within a reasonable distance, an ample supply may be obtained for milling purposes at the nearby Buffalo River.

The property lies in the west side of the gently rolling terrain of the Piedmont Plateau close to the foot hills of the Blue Ridge Mountains. The area is well suited to farming and several well kept farms are nearby. A good supply of manpower is available from theses Nearby farming communities.

ACCOMPANYING GEOLOGICAL REPORT

by

T. E. SHUFFLEBARGER

This report is the result of a survey of a part of the Piney River area, particularly the Bourne mineral land and contiguous properties, to determine the relative mineral values, if any, relating to these lands.

The results of the survey, specifically, indicate the occurrence of at least three mineral prospects (rutile), comprising three types of ore. The three types of ore, these being represented by as many discrete mineral occurrences, are (see map):

(1) South orebodies, chiefly rutile-nelsonite or an admixture of rutile and apatite, ilmenite being present as the accessory mineral

(2) North orebody, chiefly rutile-nelsonite, but the orebody appears to contain intercalations of ilmenite

(3) Rutile, segregated as stringers and veins, and/or disseminated in anorthosite as in the occurrence northeast of Rose Union Church

Concerning the the three aforementioned mineral occurrences, surficial evidence of the outcrop area as well as a prominent display of rutile mineralization in float, outcrop and residual soil, lends credence that more exhaustive exploration is worthy of consideration.

The weathered mantle[1/], typically red and brown clays, which forms the surface in the vicinity of the orebodies, appears to contain sufficient rutile to warrant exploration for placer-type development.

GEOGRAPHY

The Piney River-Roseland, Nelson County, Virginia mining district is delimited by an occurrence of predominantly plagioclase-bearing rock[2/], an area situated nearly equally distant between Charlottesville and Lynchburg, Virginia.

1/ The zone of weathering, the residual clay mantle, may extend to depths in excess of 100 feet as on the prospect southwest of Rose Union Church.

2/ Anorthosite: Locally the rock is composed chiefly of plagioclase feldspars which range from albite to andesine in composition; granulation and other evidence of cataclastic action is common.

The area discussed herein lies along the foot of the eastern slopes of the Blue Ridge Mountains, and nearly 10 miles northwest of the Southern Railway at Tye River Depot, Nelson County, Virginia.

Railway transportation is provided by the Virginia Blue Ridge Railway which connects the Piney River area with the Southern Railway at Tye River Depot. US Route 29, Virginia State Routes 151 and 158, and the county road system traverse the area generally.

DRAINAGE

The Piney River-Roseland district is drained by the Piney and Tye Rivers, which, joined by Buffalo River, are tributary to the James River at Norwood, Buckingham County, Virginia. Allen Creek, a tributary to Piney River, provides the area of the Bourne mineral properties with its principal drainage.

PREVIOUS INVESTIGATIONS

Previous investigators, in the Piney River-Roseland district, Watson and Taber (1) and Ross (2). Of the two investigations, the report by Watson and Taber serves best to describe the geology and petrology in an economic sense; the work of Ross is concerned chiefly with petrogenesis.

Other investigators include Davidson, et al, (3), who notes exception, principally, to Ross' predilection for a replacement or secondary origin for the titaniferrous minerals. Again, Davidson describes the anorthosite as an oligoclase-andesine differentiate of a parent magma, the same magma acting as the source-melt for similarly differentiated pyroxene/hornblende-and-titania-mineral suites.

Ross (1941, pp. 15-22), shows two incursions of ore and rock-forming minerals, observing that ilmenite, rutile and apatite have, as "physicochemical" agents, invaded older or "pyrogenic" minerals.[3/]

3/ Minerals resulting from magmatic segregation

(1)-(2)-(3), etc.: See References Page 7-a

Watson and Taber (1913, pp. 151-154) conclude that the 'nelsonite' clan formed in situ in a hot anorthositic mass, the formation proceeding in order of increasing density as regards the ferro-mineral constituency, i.e., rutile-nelsonite and amphibole nelsonite are end-members.

Regardless of the several concepts (in other respects) as to the genesis of the titania-bearing minerals, the mechanics of such processes, implied or factual, as well as the extensive evidence of mineralization surficially, provide reason to assume that the orebodies are extensive in depth.[4] Further in connection with depth of mineralization, the logs of diamond-drill holes have indicated rutile-nelsonite, in weathered form, to depths in excess of 100 feet.

GENERAL GEOLOGY

The Piney River area is underlain by two relatively distinct, crystalline bedrock units into which has been injected a third body of rock composed chiefly of plagioclase feldspars and quartz; the latter is generally referred to as anorthosite. Concurrent with the formation of the anorthosite, and occurring elsewhere as a common cohabitant with this type of mineralization, a mutual-parent source delivered up the rutile-rich rocks which occur in the Roseland, Nelson County area, and the ilmenite-apatite member mined presently by American Cyanamid Company, Piney River.

Presumably during the post-injection period, perhaps following partial solidification or occurring as a potassic differentiate during late molten stages, certain parts of the anorthositic mass were charged, to the exclusion of other parts, with potash-bearing feldspars or mineralizing agents resulting in the formation of such. This latter feature as well as certain physical aspects of dynamic and chemical alteration manifest herein, has led investigators to refer to the potassic

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4/ The writer's personal experience: The depth dip-wise, of an ilmenite-nelsonite orebody locally is known to approximate at least 400 feet.

rocks as aplites or rocks of aplitic habit. Such is the rock quarried by Dominion Minerals, Incorporated, at Piney River.

COLUMNAR SECTION OF ROCKS IN THE GENERAL VICINITY OF PINEY RIVER, NELSON COUNTY, VIRGINIA */

CAMBRIAN (?) 3,500' to 11,000'	Slippery Creek Volcanics	- Dacite/tuff
	Mt. Athos Formation	- Quartzite) Conglomerate) Marble)
	Sixmile Schist	- Sencite schists
	Arch Marble	- Blue-gray marble
	Joshua Schist	- Blue-gray schist
	Candler Formation	- Gray-green phyllite, schists
PRE-CAMBRIAN (?)	Roseland Anorthosite	- (rutile and ilmenite) intrusive into Lovingston gneiss and (?) Lynchburg gneiss
	Lynchburg Gneiss	- biotite-quartz gneiss and schist - Rockfish conglomerate at base
	Lovingston Quartz Monzonite Gneiss	- dark, coarse-grained, biotite-quartz monzonite augen gneiss; migmatite or transition-phase at top (?)
	Hypersthene Granodiorite	- greenish gray, coarse-grained granodiorite; hyperstene-bearing in part; abundant blue quartz

*/ Columnar Section modified after W. R. Brown, Virginia Academy of Science, Annual Field Trip, May, 1951.

THE GEOLOGY OF THE RUTILE OCCURRENCES, THE BOURNE MINERAL TRACTS, PINEY RIVER, NELSON COUNTY, VIRGINIA

1. The Bedrock Occurrences

A border facies (2, pp. 17-18) of the Roseland anorthosite forms, in part, the bedrock which underlies the Bourne - and contiguous lands - in the vicinity of Piney River and Rose Union Church, Nelson County, Virginia.

Occurrences of rutile in the bedrock, locally, are evidenced by two modes of mineralization or mineral association. Currently, three orebodies are known to occur on that part of the Bourne mineral lands, the surface of which is owned by Mr. H. T. Griner. The float (or 'gossans'),*/ which discloses the presence of the last-mentioned orebodies as well as the logs of diamond-drill holes reveal the ores as (1) admixtures of rutile and apatite with minor amounts of ilmenite, and (2) as rutile disseminated throughout a feldspathic host-rock.5/

The Bourne land mineral occurrences are unlike the Roseland rutile deposit in that the latter contained little or no apatite.

The subject mineral occurrences, however, may bear resemblance to the Piney River ilmenite deposit in that the mineralized zones appear to accord with local foliation and schistosity.

Because of weathering, the apatite-content of the rocks is less in evidence than is the lustrous, kidney-red to black-colored rutile. The rutile quite generally exhibits good cleavage while the ilmenite occurs in comparatively finer grain sizes as well as with poorly-formed (ragged) particle outlines. There is considerable evidence, in the float and in the cores from diamond-drill holes, of iron, exsolution, possibly the result of weathering of the ilmenite.

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*/ The float or 'gossan' is characterized by its superior density, attributable to the high rutile content, and by a marked tendency to a regular but polyhedral cleavage as respects the rock mass.

5/ The results of core-drilling and augering will constitute, in part, a report submitted later by engineers.

Preliminary drilling reveals an orebody in excess of 100 feet in width while assays of float and sludges (corings) range from 12% to 60% TiO_2, (rutile). The length of orebody(s) has not been explored fully to date.

The bedrock mineral deposits appear to occur in dike-like masses, the masses generally constituting a 'swarm' as on the H. T. Griner farm, where three individual 'dikelets' may be recognized.

The pod-like 'dikelets' or rutile-nelsonite orebodies which occur on the above-mentioned farm are situated en echelon, having their longer axis oriented nearly N 45 degrees E. Results of preliminary core-drilling indicates that the rutile-nelsonite orebodies are either disposed vertically or dip at relatively steep angles to the northwest. The rutile nelsonite orebody, the north orebody, appears to occur as a sharply-defined massed enclosed by an anorthositic rock which forms both hanging-and footwall. At a distance of approximately 25 feet southeast of (or 25 feet below) the north orebody, the 'footwall' rock encompasses a 12-foot-thick vein of rutile-bearing, quartzose anorthosite. The latter is presumably similar to the source-rock which underlies the placer prospect northeast of Rose Union Church.

2. <u>The Placer or Weathered-Mantle Occurrences</u>

The soil-mantle which covers the aforementioned bedrocks ranges, locally, from 5 feet to 100 feet in depth.*/ This property comprises nearly 300 acres in areal extent and samples from the soil-section disclosed a TiO_2 content (rutile) averaging nearly 5 percent.

SUMMARY AND CONCLUSIONS

The Bourne rutile prospects occur as two distinct economic possibilities, (1) a weathered soil which may contain an average of 3 percent rutile or an excess thereof,

*/ Power-auger holes, on the Bourne property just northeast of Rose Union Church, ranged from 5' to 40' in depth; holes on the H. T. Griner (surface rights to Griner) portion of the Bourne mineral lands ranged from 40' to 100' in depth.

(2) a bedrock deposit which constitutes two modes of mineral occurrence, viz: a rutile-nelsonite associated with the border facies of the Roseland anorthosite, and rutile disseminated in an anorthositic groundmass, the average tenor, mineral-wise, being unknown.

Prospectively, there are indications that the tonnage, possibly represented by an average 50-foot soil depth forming in excess of 300 acres of land, is of such proportion as to warrant further and extensive exploration - - - bedrock mineral-content would represent additional reserves.

T. E. Shufflebarger, Jr.
Industrial and Agricultural Development Department
Washington, D. C.

REFERENCES

(1) Watson, T. L., and Taber, Stephen

Geology of the titanium and apatite deposits of Virginia: Virginia Geological Survey Bulletin III-A, 308 pages, map, 1913.

(2) Ross, Clarence S.

Occurrence and origin of the titanium deposits of Nelson and Amherst Counties, Virginia: United States Geological Survey P.P. 198, 59 pages, 1941.

(3) Davidson, D. M., et al.

-------: Economic Geology, Volume 41, No. 7, pp. 738-748, -------/.

SELECTED BIBLIOGRAPHY

Gillson, J. L.:

(References in) Genesis of titaniferrous magnetites and associated rocks of the Lake Sanford District, New York, AIME, trans., Volume 8, No. 3, March, 1956.

Turner, F. J., and Verhoogen, Jean:

Igneous and Metamorphic Petrology, 1st Edition, pp. 225 - 239; 252 - 257; 365 - 366, McGraw-Hill Book Company, 1951.

ACCOMPANYING MAPS

RECEIVED
DEC 10 1966
D.M.E.A.

1. LOCATION PLAN
2. PROPERTY PLAN
3. GEOLOGICAL PLAN
4. AUGER DRILLING PLAN

RECEIVED
DEC 10 1956
D.M.E.A.

PROPOSED DRILLING

TIME TO COMPLETE THE PROJECT

EXPERIENCE AND BACKGROUND OF APPLICANT

REFERENCE TO APPLICATION

5(b) and 5(d)

REFERENCE TO 5(b)

At present, 32 vertical auger holes 4 inches in diameter have been drilled on the Greiner Tract. These holes penetrated the overburden to an average depth of about 60 feet. Five diamond drill holes were laid out. Of the 5 holes, no. 1 was the only one drilled to depth. The hole was stopped at 247 feet. It was drilled on an angle of 45 degrees and direction of bore was about N 45 W. The log is shown in stage 2 of this application.

This drilling has shown the presence of rutile bearing saprolite and it is apparent that there is a definite zoning or deposit from the distribution of the float on surface.

The purpose of the exploration programme is to investigate the commercial possibilities of the deposit and to determine its size and percent rutile contained therein.

It is proposed to conduct the programme in three stages as outlined on the following pages.

STAGE NO 1

Reference is made to the accompanying Drill Hole Plan on a scale of 1 inch equals 100 feet. The proposed drilling has been laid out on 9 cross-sections at right angles to the regional strike. The cross-sections are 200 feet apart.

CROSS SECTION NO.	HOLE NOS.	NO. OF HOLES	AVERAGE DEPTH(ft)	TOTAL DRILLING (ft)
1	101 to 116	16	60	960
2	201 to 214	14	60	840
3	301 to 315	15	60	900
4	401 to 415	15	60	900
5	501 to 516	16	60	960
6	601 to 616	15	60	900
7	701 to 715	15	60	900
8	801 to 815	15	60	900
9	901 to 917	17	60	1020
		138 holes		8280 feet

TOTAL NO. OF PROPOSED HOLES	138
AVERAGE DEPTH OF HOLE	60
TOTAL DRILLING	8280 feet

TIME TO COMPLETE PROJECT

NO. OF DRILLS TO BE EMPLOYED	3
RATE OF DRILLING	100 feet per day per drill
NO. OF SHIFTS	one 10 hour daily shift
NO OF DAYS PER WEEK	5

3 drills at 100 feet per day — 300 feet per day

or 1500 feet per week

MINIMUM TIME TO COMPLETE PROJECT $\frac{8280}{1500} = 5.5$ weeks

Allowance for unforeseen delays, moving and time to complete final report. — 2.5 weeks

8.0 weeks

MAXIMUM TIME TO COMPLETE PROJECT — 2 months

STAGE 2

Stage 2 will be dependent upon the success of Stage 1. The following is a general outline of stage 2.

1. Continue ayger drilling, if warrented.

2. 1000 feet of core drilling to test hard rock below zone of oxidation in 3 or 4 drill holes.

3. It is suspected that large pieces of float will stop auger drilling; also that some pieces may be forced into the side of the hole. As a check on this condition, the lage 36" auger may be used .

These holes will be laid out in plan and cross-section before Stage 2 will be entered into.

STAGE 3

5000 feet of diamond core drilling depending on the success of Stage 2 and to be laid out with the completion of Stage 2.

SAMPLING AND ASSAYING

The following is offered to present the problems involved in sampling and assaying and the methods that may be employed to solve these problems.

I. Size of auger hole — 4 inches

Total no. of samples $\frac{8280}{10}$ = 828

Sample interval in each hole — 10 feet

Weight of 1 cu.ft. of material — 133 pounds

There weight of each sample = $\pi r^2 h \times 133$

= $3.14 \times \frac{1}{6} \times \frac{1}{6} \times 10 \times 133$

= 116 lbs.

TOTAL WEIGHT OF 828 SAMPLES ≅ 96,048 pounds

= 48 tons

The bulk of each sample is too great and it is proposed to reduce the size of the sample using the following means.

A 2 inch Jones Splitter will be used in the field. The samplewillbe reduced to a weight of 14½ pounds by passing the sample over the splitter three times. That is , by the first pass the sample will be reduced to 58 pounds, by the second to 29 pounds and by the third to 14½ pounds. Any pieces over 2 inches in size will be broken by hammer.

RATE OF DRILLING 100 feet per day

NO. OF SAMPLES PER DRILL PER DAY $\frac{100}{10} = 10$

TOTAL WEIGHT OF 10 SAMPLES 1160 pounds

The individual sample is to be split 3 times

Therefore, there should be one sampler at each drill working 10 hrs. per day. His job will be:

1. To reduce each sample to 14½ pounds.
2. To bag each sample and deliver to the drier each day.

The 14½ pound sample will be dried and ground to about 20 mesh using laboratory type equipment. The sample will then be passed over a ¼ inch Jones Splitter and reduced to a sample of about 1½ pounds. The one portion (1½ lbs.) will be tagged and sent to the assayer via air express and the other portion (1½lbs.) will be filed for future reference.

There will be one man in charge of the operation of reducing the ssample to 1½ pounds. This will require a building or the rental of a small shed. It will be the duties of this man to:

1. Receive and Dry samples.
2. Grind the samples to ± 20 mesh.
3. Split the samples.
4. Send the samples every second day to the assayer.
5. File and maintain records of samples.

Since there will be 10 samples per drill per day, it will be the reponsibility of the chief sampler to handle 30 samples per day.

LABORATORY EQUIPMENT REQUIRED

3	Jones Sample Splitters 2 inch size @ $90.	$270.
1	Jonse Sample Splitter ¼ inch size @ 45.	45.
1	Laboratory Grinder	600.
1	Oven Drier	400.
		$1315.

II ASSAYING

The samples taken from the auger drilling will consist of a mixture of rutile and ilmenite. The samples should be assayed in such a manner as to show % rutile.

COST OF ASSAYING INDIVIDUAL SAMPLE % TiO_2	$2.50
COST OF MILL TEST ON INDIVIDUAL SAMPLE to determine % rutile	$ 35.00

COST TO RUN MILL TEST ON 828 SAMPLES 828 X 35 = $28,980.00

This assaying cost is felt to be excessive and it is proposed to use the following means to reduce this cost and arrive at a satisfactory result with respect to % rutile in each hole.

Each sample (1½ lbs.) should be assayed for % TiO_2. A composite sample should be made by taking the samples from each of 5 adjacent auger holes and thoroughly mixing the material. This composite sample will be representative of the material in the 5 holes or in 30 samples. A mill test will be run on the composite sample to determine:

1. The % loss in the slimes and float.

2. The relative proportion of rutile to ilmenite. The average sample of each drill hole may then be corrected to show % rutile and % ilmenite.

Assaying costs would then be:

828	samples @ $2.50	$2070.00
28	mill tests @ $35.00	980.00
		$3050.00

5-d.

CARROL EARL CRAVEN

American Citizen.

Born April 24, 1906.

Married - 2 Children.

Fluent Spanish.

Member- American Institute of Mining and Metallurgical Engineers 1930.

-Elks

-Industrial Management Club of Lynchburg, First Vice-President.

-Explorer Advisor B. S. A.

Registered Metallurgical Engineer - State of Arizona.

Graduate - University of Denver School of Engineering Degree B. S. in Chemistry E. in 1929.

President - Magna Exploration Company, Roseland, Va.

PROFESSIONAL RECORD

1955-56 - Exploration Engineer - Pigments Division American Cyanamid Co.

1945-55 - Production Superintendent - Mine, Mill, Acid Plant, Yard and Titanium Plant, American Cyanamid Co. Pigment Division, Piney River, Virginia.

1944-45 - Metallurgical Superintendent. Mammoth St. Anthony Ltd. Tiger, Arizona.

1944- Assistant Manager - Cia. Industrial de Balleza, S. A., Huepec, Sonora, Mexico.

1942-43 Senior Engineer, Defense Plant Corp. & Reconstruction Finance Corp., Washington 25, D. C. Ferro-silicon magnesium reduction plant, lime plant, ferro-silicon plant & sea water magnesia plant.

Supervision of construction of magnetic separator plant for Defense Plant Corp., Coquille, Oregon.

Representative for R. F. C. druing construction and operation of facilities for Krome Corporation, Marshfield, Oregon. Production of Chromite.

1937-42- Mill Superintendent. Cia de Minas de Colquiri. Oruro, Colivia. Operation of 700 ton a day heavy media, gravity concentration, flotation plant for tinores.

1935-37- Mill Superintendent, Cia. de Estano de Araca, Viloco, Bolivia.
Operation of 150 ton a day tin mill.
Construction of new mill.

1934-35- Research Metallurgist. Pation Mines and Ent. Cons. Inc., Llallagua-Catavi, Bolivia.
2000 ton a day gravity concentration and flotation, tin mill.

1930-32- Junior Metallurgist. Andes Copper Mining Co., Potrerillos, Chile.
Investigation laboratory, leaching plant, purification plant, and foreman copper refinery.

1929-30- Junior Chemist and Shift Foreman, Bagdad Copper Corporation , Bagdad, Arizona.
Flotation, roasting, leaching and electrolytic pilot plant.

JOHN LOUIS PATTESON

American Citizen

Born August 9,1921 Nelson County Va.

Married 3children

Organization Affiliation

Elder Presbyterian Church
President Nelson County Chamber of Commerce
Ruritan National (Past local club President and Lt. Governor Woodrow Wilson District)
Industrial Management Club
Troop Commiteeman, BSA
Masonic Lodge

Education

High School Graduate
Completed two year course in industrial Supervison
International Correspondence Schools
Completed Course in industrial Psychology, Lynchburg College
Completed Course in Job Evolution, Time and Motion Study
University of Virginia, Extension Service

Personal Experience

1944 to present — Personel Supervisor, American Cyanamid Co. Piney River Plant,Va.

Responsible for hiring, placement of personel Administer emplotee benefit plans, employee relations and counceling, coordinate training program, supervise plant protection force, steno-clerk pool, communication center.

1942 - 1944 — Transportation supervisor

Acted as administrative assistant to personel manager and was responsible for transportation of employees by company ownedfleet of buses during World War II

1940 - 1942 — Employed by parent and self in grocery business

REFERENCE TO APPLICATION 5(d)

I, J.D.Hagan, residing at Dillwyn, Virginia, U. S. A. do hereby certify that I am a graduate Mining Engineer of McGill University, and that the following is an accurate record of my experience during the last14 years. I hereby declare that I have no financial interest in the properties of the Partnership of Craven, Shufflebarger and Patteson and that the facts contained in this application are based on my knowledge of the District.

1942 - 1945 Member of R. C. A. F. Pilot

1945 - 1949 McGill University

Summer 1946 Roy Ran Gold Fields Limited
Junior engineer with prospecting party in Chibougamau, Quebec. 2000 ft. diamond drilling

Summer 1947 Asbestos Corporation
Underground surveying and surface mapping of open cuts. 3000 ft. diamond drilling

Summer 1948 Bar Lan Gold Mines
Engineer in charge on prospect for gold 3000 ft. diamond drilling, geophysical and geological mapping.

1949 - 1950 QUEBEC SMELTING AND REFINING LTD.
Engineer at apatite mine Buckingham, Quebec Underground rock work, underground surveying 5000 ft. diamond drilling

1950 - 1952 KAYRAND MINING AND DEVELOPMENT CORPORATION
Resident engineer in Chibougamau, Quebec in charge of prospecting parties, property examination, geophysical surveying, 25000 ft. diamond drilling

1952 - 1953 TITANIUM DEVELOPMENT CORPORATION
10,000 ft. diamond drilling on ilmenite body at St Agath, Quebec. General field work and property examination in Noranda Area.

1953 - 1956 VIRGINIA MINING CORPORATION (Formally Belville Gold)
Resident engineer and consultant at dillwyn Va. Regional exploration for base metals, geophysical interpretation, about 60,000 ft. of diamond drilling, 13,000 ft. of which under D.M.E.A. participation.

John D. Hagan

ESTIMATE OF COSTS

PROPOSED SHARING OF COSTS

REFERENCE TO APPLICATION

6 (A) 6(B) 6(C) 7(A)

COPY OF LETTER FROM CUNNINGHAM CORE DRILLING AND GROUTING CORP.

October 23, 1956

Messrs, C.E.Craven, T.E.Shufflebarger, &
J.L.Patteson, Partners,
Roseland, Va.

Gentlemen,

We quote on soft ore drilling on the Greiner Property near Piney River, Virginia, on approximately 138 holes averaging 60 feet deep as follows:

1. Drilling, cleaning hole every 10 feet for sample $2.20 per ft.

2. Actual cost of any auger or drill heads lost in hole

3. Lost time waiting on drill hole location 20 hrs. $7.00 per Hr.

4. Should you wish to do any 36" auger hole drilling or checking small auger drilling or for any special reason, the cost will be $3.60 per foot.

If given this work we can put 3 drills in the field and complete the work in one month to 5 weeks.

Very Truly Yours,

CUNNINGHAM CORE DRILLING
AND GROUTING CORPORATION

Signed Sam J. Cunningham

COPY OF LETTER FROM SPRAGUE AND HENWOOD

August 3,1956

Mr T. E. Shufflebarger, Geologist,
3804 Apple Tree Drive,
Alexandria, Virginia.

Dear Sir:-

RE:- Drilling in the vicinity of
Piney River, Nelson County, Va.

We wish to acknowledge receipt of your letter of July 30 relative to a core drilling program, comprising of approximately 3000 feet of drilling through weathered rock or clay and 3000 feet of drilling in an anorthosite body. You request us to give you a rough estimate as to the costs of this work.

We assume there is a water supply within a reasonable distance of the locations of these holes, say, 1000 feet or 1500feet as this would be an easy distance for pumping water. However, should the water be a considerable distance and it is necessary to haul water, then the costs of drilling increases considerably.

For a rough estimate, for drilling AX holes recovering a core approximately 1-1/82 in diameter into an anorthosite body or driving 3" drive pipe and drilling BX a 1-5/8 core through the weathered rock or clay, the cost would be approximately $4.50 per foot.

The above is for rough work only and we prefer to have one of our pepresentatives look over this work before quoting you a definite figure.

The above prices do not include any assay work of sludges and cores nor a geological reportrelating to the orebody. We would furnish a log showing the material that we encountered when drilling.

Waiting to hear from you further, we are

Very Truly Yours,

SPRAGUE AND HENWOOD,INC.,

(Signed) Wm. J. Schank
Vice president

COPY OF LETTER FROM BRUCE-WILLIAMS LABORATORIES

Joplin Missouri.

Oct. 5, 1956

Mr S. J. Cunningham,
P.O. Box 513
Salem, Va.

Dear Mr. Cunningham,

Confirming our telephone conversation this morning, our charge for making the total titania assay is $2.50 per sample.

Figuring 504 churn samples and 168 core samples makes 672 at $2.50 is $1680.00

The charge for making all the determinations including separating the slimes from the sand making the sink float test, making the magnetic test and making the acidity test asour first report is $35.00 per test.

There will be no charge for the original work we did for you, and we appreciate the opportunity to become better acquainted with you and in your district and you can let anyone know there thatour laboratories are equipped for all kinds of analytical determinations as well as physical tests for ore beneficiation.

Very Truly Yoours

THE BRUCE WILLIAMS LABORATORIES

Signed Bruce Williams

COPY OF LETTER FROM BELL WHITE ANALYTICAL LABORATORIES
Haileybury, Ontario

June 13, 1956

Cunningham Core Drilling & Grouting Corp.,
Salem, Va.

Dear Sirs,

With reference to your letter of June 6th, we are enclosing herewith our schedule of assay fees. You will note therein the prices of the various elements on which you require determinations. These are basic Prices and we no discount whatsoever foe quantities,

Thank you.

Yours very truly,

Bell White Analytical Laboratories

Signed J. H..White

Note Cost of TiO_2 analyses is $5.00 per assay as shown in the included schedule of analyses.

ESTIMATE OF COSTS

I AUGER DRILLING

a) Contract Price 8280 feet @ $2.20 per foot	$18,216.00	
b) 20 hours lost time not due to contractor @ $7.00 per hour	140.00	$18,356.00

II SAMPLING

a) 3 samplers, one at each drill 8 weeks of 5 ten hour days @ $68.75	$1,650.00	
b) 1 laboratory man to dry, crush, split & send samples @ $82.50 /week	660.00	
c) 1 supervisor @ $500. per month	1,000.00	
	$3,310.00	
d) Protective insurance 10% Social Security 2% Unemployment Ins. 3% Compensation Ins. 5%	331.00	
e) Rental of sampling equipment	325.00	$3,966.00

III CONSULTANT

a) 2days per week at $50. per day	$800.00

IV ASSAYING

a) 828 samples @ 2.50 each	$2,070.00	
b) 28 samples for mill test @ $35.00	980.00	
c) 14 sample shipments @ $10.00 each Samples to be shipped every second day via air express	140.00	$3,190.00

V GRID LAYOUT AND SURVEYING

$500.00

$26,812.00

VI CONTINGENCIES

a) Allowance of 5% for unforeseen expenses such as transportation, clerical work, typing, preparation of monthly reports, prints of maps, postage etc.	$1,340.60
TOTAL ESTIMATED COSTS	$28,152.60

PROPOSED SHARING OF COSTS

All costs on the project as outlined in the estimate of costs will be shared by Defense Minerals Exploration Administratia and the Partnership of Craven, Shufflebarger and Patteson. Defense Minerals would absorb 75% of the costs and the Partnership 25% of the costs.

The Partnership proposes to pay all expenses and invoices as they fall due. A progress reportwill be submitted at the end of each month with a final rpport when each stage of the project is completed. The progress report will include plans and cross-sections to show the work done. It will also show the costs or expenses incurred and D. M. E. A. will reimburse the Partnership to the amount of 75% of the expenses shown on the progress peport. The Partnership proposes to complete the projectin about 2months and to adhere to the amount shown in the costs estimate included in this application.

MME Form 7
(10-58)

OFFICIAL FILE COPY

Date	Surname	Code
3/27	Anderson	600

600

March 26, 1959

Memorandum

To: Mr. Allen S. Dakan, Chief, Division of Operations Control and Statistics

From: Lawrence G. Houk, Chief, Division of Nonmetallic Minerals

Subject: Withdrawal of application -- Docket No. DMEA-4569 (Rutile)
Craven, Shufflebarger, and Patteson
Greiner Tract
Nelson County, Viriginia

By letter of March 10, 1959, the subject Applicants advised that they have decided to cancel the application on the Greiner Tract.

The subject application may be withdrawn from the pending category and placed in the withdrawn.

Walter C. Anderson

Walter C. Anderson

WCAnderson:gad 3/26/59
Copy to: Dir. R. File

43683

PINEY RIVER, VIRGINIA
MARCH 10TH, 1959

MR. FRANK E. JOHNSON, ACTING DIRECTOR
OFFICE OF MINERAL EXPLORATION
U. S. DEPARTMENT OF THE INTERIOR
WASHINGTON, 25, D. C.

RE: DOCKET NO. DMEA 4659 - RUTILE
CRAVEN, SHUFFLEBARGER AND PATTESON
GREINER TRACT
NELSON COUNTY, VIRGINIA

DEAR MR. JOHNSON;

THIS WILL ACKNOWLEDGE YOUR LETTER OF MARCH 6, 1959, WITH REGARD TO THE ABOVE APPLICATION.

AFTER MUCH CONSIDERATION WE HAVE DECIDED TO CANCEL THE APPLICATION ON THE GREINER TRACT. WE ARE NEGOTIATING A LEASE ON ANOTHER PROPERTY WHICH IS PERHAPS MORE PROMISING AND IF PRELIMINARY EXPLORATION IS FAVORABLE WE WILL PROBABLY MAKE APPLICATION FOR ASSISTANCE.

MANY THANKS FOR YOUR CO-OPERATION.

SINCERELY YOURS,

CRAVEN, SHUFFLEBAGER AND PATTESON

BY J. L. Patteson
J. L. PATTESON

OFFICIAL FILE COPY
O. M. E.
RECEIVED MAR 11 1959

DATE	INITIALS	CODE
3/11	C	220
3/12	Hook	600

JLP:MG

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
3/6	Houk	600
3/6	Selfridge	120
		110
3/6	C	220
		600

600

MAR 6 1959

Messrs. Craven, Shufflebarger
and Patteson
c/o Mr. John L. Patteson
Piney River, Virginia

Re: Docket No. DMEA-4569-Rutile
Craven, Shufflebarger, and
Patteson
Greiner Tract
Nelson County, Virginia

Gentlemen:

Reference is made to our letter of January 30, 1959, regarding action required to make your DMEA application eligible for consideration under the OME regulations.

We wish to cooperate with you in allowing ample time to complete such action, but, if we do not hear from you within 30 days from the date of this letter, we will assume that you are no longer interested in proceeding with your application, and we will consider it as having been withdrawn.

Sincerely yours,

(signed) FRANK E. JOHNSON

Acting Director

LGHouk:gad 3/5/59
Copy to: Dir. R. File
Region V
Mr. Kiilsgaard, USGS
Mr. Miller, 3415

8623

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
ROOM 2-B POST OFFICE BLDG.
KNOXVILLE 2, TENN.

February 12, 1959

OFFICIAL FILE COPY
O. M. E.
RECEIVED FEB 16 1959

DATE	INITIALS	CODE
2/16	C	220
2/20	2/B	130
2/20	C	220
2/20	[illegible]	600

Memorandum

To: Operating Committee, OME - Washington

From: Field Team, OME - Region V - Knoxville, Tenn.

Subject: DMEA-4569 (rutile) Craven, Shufflebarger and Patteson, Greiner Tract, Nelson County, Virginia

In reply to your letter of January 30, concerning the subject property. There are enclosed copies of a memorandum report by Field Examiners Burmeister and Nelson.

We agree with the recommendations contained in this report.

Robert A. Laurence

Robert A. Laurence
Executive Officer, Region V

V. J. Lynch

V. J. Lynch, Member
Bureau of Mines

Reviewed by
OME OPERATING COMMITTEE
2-20-59
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
REGION V
EASTERN
EXPERIMENT STATION
COLLEGE PARK, MARYLAND

OFFICIAL FILE COPY
O. M. E.
RECEIVED FEB 16 1959
TIME INITIALS CODE
NB 2/20 130

February 10, 1959

Carpco Engineering and Manufacturing Co.
P. O. Box 3272
Jacksonville, Florida

Gentlemen:

Under the expired DMEA program, the Government has participated in exploring for rutile. It is possible that under the succeeding, Office of Minerals Exploration, (OME), program, similar exploration may be undertaken.

In this event, it would be necessary to have tests run on both saprolite material and core drilled hard rock. The purpose of this letter is to find if your company does custom testing and if so get estimated costs of such tests as outlined below.

(1) Laboratory scale tests on samples weighing from 10 to 25 pounds, which would furnish the following data. Percent heavy minerals, total TiO_2 content, percent recovery of total TiO_2 and percentage each of rutile and ilmenite recoverable per ton of material.

(2) The same information would be required on larger composite samples in the range of 400 pounds to 800 pounds each.

A schedule of your regular or estimated charges for these tests will be appreciated.

Yours very truly,

Reviewed by
OME OPERATING COMMITTEE
2-20-59
(date)

H. L. Burmeister
Mine Examination and Exploration
Engineer

Copies: V. J. Lynch
R. A. Laurence
1. PMAmbrose 2. Sta. Files
Mining
OME
Reading

RECEIVED
FEB 12 1959
U. S. BUREAU OF MINES
DEF. MIN. ADM.
Knoxville, Tennessee

RECEIVED
FEB 12 1959
U. S. BUREAU OF MINES
DEF. MIN. ADM.
Knoxville, Tennessee

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
REGION V
EASTERN EXPERIMENT STATION

OFFICIAL FILE COPY
O. M. E.
RECEIVED FEB 10 1959

DATE	INITIALS	CODE
2/20	2/3	130
		220

COLLEGE PARK, MARYLAND

February 9, 1959

Memorandum

To: V. J. Lynch, Bureau Member, OME Field Team, Region V

From: Mine Examination & Exploration Engineer, College Park, Md.

Subject: DMEA 4569, Craven, Shufflebarger and Patteson, Greiner Tract, Nelson County, Va.

This is in reply to your memorandum of February 2, 1959, requesting recommendations from Mr. N. E. Nelson, U.S.G.S. and myself relative to further consideration of this application.

At the time of our last personal contact with the Operators in connection with the Bourne property, DMEA 4652, we both received a strong impression that the Operators did not wish to explore the subject Greiner Tract, whether or not the Bourne Tract was certified. It is understood that the Field Team has received no answer to either of two letters to the Operators regarding their wishes to continue or to abandon their application on the Greiner Tract.

The property rights of the applicant were not satisfactorily documented at the time of application. If the application is continued these rights should be further investigated.

Preparation of a new or revised estimate of costs cannot be made before the applicant has submitted bids for contract augering.

At the time of examination of both the Greiner and the Bourne Tracts, all available evidence indicated an increase in rutile and a decrease in ilmenite northward from the American Cyanamid operations. Exploration on the Bourne property was done first, largely because it lies some distance north of the Greiner Tract. Exploration on the Bourne and also information collected on the American Rutile property subsequent to examination of the subject application, indicate that the original estimate of aerial distribution of rutile and ilmenite probably is justified.

Of 28 holes augered on the Greiner Tract before application, 8 by virtue of TiO_2 content were placed in a so called, "mineralized zone." The weighted average total TiO_2 content of these 8 holes was 3.05 percent. Six of the 8 holes representing approximately 80% of

HLB/bb
cc: R. A. Laurence
Mining
OME

N. E. Nelson
1. PMAmbrose 2. Sta. Files
Reading

Reviewed by
OME OPERATING COMMITTEE
2-20-59
(date)

the indicated mineralized zone indicate a weighted average total TiO_2 content of 2.7 percent.

A pre-examination test made for the applicant returned an overall 65 percent recovery of total contained TiO_2. The 65 percent was made up of 29.2 percent as recoverable rutile and 35.9 percent as recoverable ilmenite. On this basis, there would be recovered 17.4 pounds of rutile per ton in place, valued at $1.17 and 19.4 pounds of ilmenite valued at $0.24, or a total recoverable value of $1.41 per ton of material in place.

The test indicates the extremely high ratio of rutile to ilmenite as being 0.81 to 1.00. Even on this basis the total recoverable value is $1.41 per ton as compared with $2.01 on the Bourne property. The above comparisons and evaluation was not possible before the Bourne exploration. One instance of this is our present belief that the 6 holes above sighted probably represent a fair average of the total TiO_2 content in the mineralized zone.

In view of the above, and if the applicant wishes to explore under this application, the Field Team representatives recommend that the application be denied.

Mr. Nelson has collaborated in this report and is in agreement.

H. L. Burmeister

N. E. Nelson
U. S. Geological Survey

H. L. Burmeister

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
Washington 25, D. C.

January 31, 1959

Memorandum for Docket

Subject: Withdrawal of Pending DMEA Applications

Effective this date, this pending DMEA application is considered withdrawn for statistical purposes.

If, at a later date, the applicant requests reconsideration under the OME program, all pertinent material in the DMEA file should be transferred to the new OME docket.

Frank E. Johnson
Frank E. Johnson
Acting Director

Rutile

Bonnie Mine rutile reserve 22,250 tons

U.S. Supply and consumption - 1957

Consumption	53,393	tons
U.S. production	10,644	tons
U.S. Imports (practically all from Australia)	84,837	tons
In stock	58,968	tons

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
1/29	Houk	600
1/30	[illegible]	130
"	[illegible]	110
2/5	C	220
		600

600

JAN 30 1959

Mr. Robert A. Laurence
Executive Officer, OME
Field Team, Region V
Room 2-B, Post Office Bldg.
Knoxville 2, Tennessee

Re: Docket No. DMEA-4569-Rutile
Craven, Shufflebarger, and Patteson
Greiner Tract
Nelson County, Virginia

Dear Mr. Laurence:

Reference is made to the on-site examination report which states that the work on the Greiner Tract depends upon the results obtained on the Bourne Tract.

Please provide this office with your recommendations concerning a contract based upon the results achieved at the Bourne Tract. Please submit a revised cost estimate and provisions for mill testing of a composite sample by Carpco if you deem it advisable.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (JB)

Approved:

C. T. BAROCH (JB)
Member, Bureau of Mines

N. E. Nelson (JB)
Member, Geological Survey

LGHouk:gad 1/29/59
Copy to: Dir. R. File
Operating Committee
Mr. Kiilsgaard
Mr. J. Miller, 3415
Mr. Houk

8623

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
1/30	Anderson	600
1/30	- Houk	600
1/30	Selfridge	120
		110
1/30	C	220
		600

600

JAN 30 1959

Messrs. Craven, Shufflebarger
and Patteson
c/o Mr. John L. Patteson
Piney River, Virginia

Re: Docket No. DMEA-4569-Rutile
Craven, Shufflebarger, and
Patteson
Greiner Tract
Nelson County, Virginia

Gentlemen:

Enclosed is a copy of the regulations for obtaining Federal assistance in financing mineral exploration under which the new Office of Minerals Exploration will operate.

If you wish that your partly-processed DMEA application be considered under the OME regulations, please complete and return four of the copies of the attached application, MME Form 40.

Your attention is called especially to the certification which when signed declares that you would not ordinarily undertake the proposed exploration under current conditions and circumstances at your sole expense, and to Item 1(a) -- and 1(c) if applicable -- which relates to information used to determine your financial eligibility under the new exploration program. Information that is included in your DMEA application need not be repeated in the OME application, but you can add new information if you so desire.

To continue with the processing of your application it will be necessary to submit a new set of bids for auger and diamond drilling from at least three reputable drilling companies. We are returning the Consents to Lien submitted with the original application, and enclosing 18 copies of the new Lien and Subordination Agreements, MME Form 52, for execution by the Lessors.

If you do not wish to participate in the OME program, we shall appreciate being so informed.

Sincerely yours,

(signed) FRANK E. JOHNSON

Acting Director

Enclosures

WCAnderson:gad 1/20/59

Copy to: Dir. R. File
Region V
Mr. Kiilsgaard
Mr. Miller, 3415
Mr. Houk

8623

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
9/19	Anderson	600
600	CBM	100
		225

Mr. John Louis Patteson
Piney River, Virginia

Re: Docket No. DMEA-4569-Rutile
Craven, Shufflebarger, and
Patteson
Greiner Tract
Nelson County, Virginia

Dear Mr. Patteson:

As you have an application for exploration aid pending in our office, perhaps you may wish to study the proposed OME regulations and comment on them before October 17 as provided in the first paragraph of the enclosed notice reprinted from the Federal Register of September 17, 1958.

Some time after October 17 when the final regulations become effective, we will send you the new application form so you may furnish any additional information necessary to process your application for aid under the new program.

Sincerely yours,

C. O. Mittendorf

ACTING Director

Enclosure

LGHouk/hb 9/19/58
Copy to: Dir. R. File
Mr. Houk
Region V

8623

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
7/17	Houk	600
7/18	Martin	130
7/18	Lamb	130
7/18	Nelson	130
"	Johnson	110
"	Mittendorf	100
		220

600

JUL 18 1958

Mr. C. E. Craven
Craven, Shufflebarger &
Patteson
Roseland, Virginia

Re: Docket No. DMEA-4569-Rutile
Craven, Shufflebarger &
Patteson
Greiner Tract
Nelson County, Virginia

Dear Mr. Craven:

Early in June we sent you the Department of the Interior Information Service Release dated June 6th which announced that no new Defense Minerals Exploration Administration contracts could be executed after June 30th because of the ending of the present program for exploration assistance.

We regret to inform you that your application, identified above, could not be completely processed before June 30th because the work at the nearby Bourne Tract had not been sufficiently advanced by that time to enable us to evaluate this proposal.

However, we will be glad to hold your application until the Congress acts on pending legislation to continue exploration aid. If the aid is continued, we will then ask you to state whether you wish us to consider your application under regulations established for the new program.

Sincerely yours,

C. O. Mittendorf (for)

Administrator

LGHouk:rsi 7/16/58
Copy to: Admr. R. File
Operating Committee
Field Team, Region V
Mr. Kiilsgaard, 5222
Mr. Dietrich, 3061
Mr. Houk

8623

DMEA-4569- Property Owners

C. T. Bowne
Mrs. P. L. Bowne } 1-1-1

Bernice E. Malone
Morris Malone } 1-1-1

Sue B. Hall
Olonie Hall } 1-1-1

Carl B. Bowne
Francis Bowne } 1-1-1

Mary Lewis Bowne - 1-1-1

P. B. Bowne
Lana Bowne
T. C. Bowne } 1-1-1

Grace B. Saunders
J. M. Saunders
Rose B. Stapler } 1-1-1

Henry Bourne
Mary C. Bourne } 1-1-1

CRAVEN, SHUFFLEBARGER AND PATTESON
ROSELAND, VIRGINIA
DMEA FILE NO. 4569 RUTILE

GREINER TRACT

5-20-57

	Estimated Costs	Unit Price	Estimated Total Cost
I.	Drilling with 4" earth auger (Jeep a Drill) Bagging of sample In Polyethylene Bags Drilling time 1 month 53 holes x 70 ft. average depth= 3710' (5280 feet - 88 holes) Drilling to be done by Sprague and Henwood as per letter May 24, 1957	1.25/ft.	4,637.50
II.	Sample preparation - sample to be split 3 times and 13½ sample to be dried in oven. Ground in Coffee Mill to minus 20 mesh Split using Tyler 16-1 sample riffee Rejects to be bagged in Polyethylene bags 1# sample in 1# paper bags Cost per sample -371 samples	$5.00 ~~500.00~~ each	1,855.00
III.	Heavy Mineral Separation Roll 1# sample and weigh out 200 grams. Place sample in agitator with aerosal and Na_2SiO_3 and agitate until slimes are dispersed decant slimes Dry and weigh sands make H. M. Separation with Bromoform weigh heavy minerals Cost per sample - 371 Samples	3.00 each	1,113.00
IV	Microscopic analysis grain counts Split heavy minerals using Micro splitter as weigh out 5 gm. sample Screen sample on 4 screens make grain count for Ilmenite and Rutile Calculate % of each Price per sample- 371 samples	15.00 each	5,565.00
	TiO_2 analysis Make composite of heavy minerals from each hole analyize for total TiO_2 using fusion method Price per sample	2.50 each	
	Postage per sample	.10	
	53 samples		132.50
	Postage 53 samples		5.30
	Transportation of samples 1 Bags	.25	92.75

CRAVEN, SHUFFLEBARGER AND PATTESON
ROSELAND, VIRGINIA
DMEA FILE NO. 4569 RUTILE

GREINER TRACT

	Estimated Costs	Unit Price	Estimated Total Cost
VII.	500# Mill test for economics to be run by Humphrey Gold Corp, Jacksonville, Fal.	200.00	$ 200.00
	Preparation of composite, grinidng bags, express charges etc.	100.00	100.00
VIII.	Surveying, Preparation of monthly reports, final reports, maps and cross sections, copies, typing etc	1000.00	1,000.00
	Total Cost	(16,882.11)	$ 14,701.05
	75% DMEA Participation		11,025.79
	25% to be paid by Partnership		3,675.26

CRAVEN, SHEFFLEBARGER AND PATTESON
ROSELAND, VIRGINIA
DMEA FILE NO. 4569 RUTILE

ESTIMATED COST FOR BOURNE AND GREINER TRACTS

BOURNE TRACT	$ 36,842.89
GREINER TRACT	14,201.00
GRAND TOTAL	51,043.89
75% DMEA PARTICIPATION	38,282.89
25% TO BE PAID BY PARTNERSHIP	12,760.96

COPY

SPRAGUE & HENWOOD, INC.
DIAMOND DRILLING
MINERAL EXPLORATION - SOIL SAMPLING - PRESSURE GROUTING

May 24, 1957

Craven, Patteson & Shufflebarger
Roseland, Virginia

Re: Auger Drilling in the vicinity
of Piney River, Nelson County, Va.

Gentlemen:-

For auger drilling size 4" holes varying in depth from 20 to 70 feet and located on 100 ft. centers, total estimated footage 7,000 ft., the price of ONE DOLLAR AND TWENTY FIVE CENTS ($1.25) per lineal foot. Samples are to be preserved in bags supplied by you.

Measurements to be made from land suffaee elevation at location of hole.

Payment for the above work will be made monthly. Our invoice will be issued on the first of each month covering the footage drilled the previous month. Payments to be made within fifteen (15) days after date of invoice.

We wish to thank you for the opportunity of quoting and would be pleased to receive your order for this work.

Very truly yours,

SPRAGUE & HENWOOD, INC.

Note:
90 days or less
Mr. Lincoln
8/31/57

S/ L. E. Mark
Contract Representative

LEM/lap
Sent in duplicate

COPY

SPRAGUE & KENWOOD, INC.
DIAMOND DRILLING
MINERAL EXPLORATION - SOIL SAMPLING - PRESSURE GROUTING

May 24, 1957

Craven, Patteson & Shufflebarger
Roseland, Virginia

Re: Letter dated May 5, 1957
from Mr. Carool E. Craven.

Gentlemen:

As per information received from Mr. Patteson and Mr. Shufflebarger when I visited the site of proposed drilling near Piney River, Nelson County, Virginia, and a telephone conversation with Mr. Craven at Rome, Georgia, and such additional information we have acquired on the area, we are pleased to submit the following proposal:-

ITEM 1 - For driving or drilling casing thru the soft material and overburden and diamond drilling in solid rock, recovering a size AX core, the price of FOUR DOLLARS AND SEVENTY-FIVE CENTS ($4.75) per lineal ft.

ITEM 2 - For drive samples recovered in the soft material, the price of TWO DOLLARS ($2.00) per sample.

We understand that there are ten (10) holes to be drilled on 45 degree angle to a proposed depth of 300 feet. We understand the holes are to be located by you on 100 to 200 ft. centers.

Measurements will be made from land surface elevation.

Payments for above work will be made monthly. Our invoice will be issued on the first of each month and will cover the footage drilled the provious month. Payments to be made within fifteen (15) days after date of invoice.

We wish to thank you for the opportunity of quoting and would be pleased to receive your order for this work.

Very truly yours,

SPRAGUE & HENWOOD, INC.

Note: 90 days or less-
Mr. Lincoln
5/31/57

S/ L. E. Mark
Contract Representative

LEM/lap
Sent in duplicate

OFFICIAL FILE COPY
DMEA
RECEIVED MAY 3 1957

DATE	INITIALS	CODE
5/3	C	220
5/6	WDA	600

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
Washington 25, D. C.

Date May 2, 1957

DMEA Docket No. 4569
DMEA Contract No.
Commodity Rutile
Name of applicant Craven, Shufflebarger & Patteson
Name of property Gremer Tract
Location of property Nelson County, Va.
Estimated cost of project $ 16,682.11

To: Lawrence Houk, Defense Minerals Exploration Administrator

From: Jesse A. Miller, Commodity Specialist, Branch of Light Metals JAM.

Subject: Review of Field Team Report
(Application, DMEA Field Report, etc.)

1. Date of application (see 1a): 4/16/57. 2. Date received by reviewer: 4/23/57.

3. Other reports on this property sent to reviewer: Yes ☐ No ☐

4. Other reports on nearby properties sent to reviewer: Yes ☐ No ☐

5. Information available on past production: Yes ☐ No ☐

6. Other pertinent factors sent to reviewer: Yes ☐ No ☐

7. Explain items marked yes above:

8. Factors meeting special consideration:
a. Location ☐
b. Ownership ☐
c. Evidence of mineralization ☐
d. Geology ☐
e. Proposed exploration method ☐
f. Alternate exploration method ☐
g. Costs ☐
h. _____ ☐

9. Action taken:
a. Obtain information from applicant ☐
b. Refer to Field Team ☐
c. Denial ☐
d. Agree with Field Team ☒
e. Disagree with Field Team ☐
f. Support alternate plan ☐
g. Request another consideration ☐
h. Approval ☐
i. Consult with Mr. _____ at _____ AEC office.

10. Remarks: (Use back of page if necessary) In view of the findings of the field team and of the changes made in the drill pattern and work to be performed, it is recommended that the revised project be approved.

Jesse A. Miller
Jesse A. Miller

OFFICIAL FILE COPY
DMEA
RECEIVED APR 29 1957

DATE	INITIALS	CODE
4/29	C	220
4/29	WCA	600

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

April 26, 1957
Re: DMEA 4569 (Rutile)
Greiner Tract
Nelson County, Virginia

~~Memorandum~~

To: L. G. Houk, Defense Minerals Exploration Administration

From: T. H. Kiilsgaard, U. S. Geological Survey

Subject: Review of Field Team Report

The applicant has proposed a 3-stage exploration program as follows:

Stage I, 138 auger drill holes at an estimated depth of 60 feet each, the total cost estimated at $28,152.60.

Stage II, a) continued auger drilling
b) 1,000 feet of core drilling
c) bucket drill some 36-inch holes

Stage III, 5,000 feet of diamond drilling

Following a field examination, the Field Team has recommended that Stages II and III, of the applicant's proposal be abandoned, and that Stage I be revised to include 88 vertical, 4-inch auger holes, each averaging 60 feet in depth. Total cost of the project is estimated at $16,682.11. They also recommend that DMEA exploration on the nearby Bourne Tract, to be done by the same Operator, be completed before work on the Greiner Tract is started.

The Field Team has based their recommendations on the fact that the Greiner Tract has been previously explored by 32 auger holes, of which 8 were "ore holes". Further, the property is near properties that have produced considerable amounts of rutile, and the proposed work will explore the projected trend of rutile mineralization mined in those properties.

I concur with the field examiners and recommend approval of the project as they have revised it.

T. H. Kiilsgaard

T. H. Kiilsgaard

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

April 16, 1957

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DATE	INITIALS	CODE
4/18	C	220
		130
4/23	C	220
4/23	wra	600

Memorandum

To: Operating Committee, DMEA - Washington, D. C.

From: DMEA Field Team, Region V - Knoxville, Tennessee

Subject: Field Examination Report, DMEA-4569 (Rutile), Craven, Shufflebarger and Patteson, Greiner Tract, Nelson County, Virginia.

Enclosed are four copies of the subject examination report, with four extra copies of the map showing a proposed revised drilling plan. The original drawing of this map is at the Bureau of Mines Office in College Park, and is available there if additional prints are needed.

We recommend approval of a contract as outlined in the report. Please note that both field examiners are in the Washington area and may be contacted by a local phone call if additional explanation of any items of the report is needed.

Robert A. Laurence
Robert A. Laurence
Executive Officer, DMEA

V. J. Lynch
V. J. Lynch, Member
Bureau of Mines

Reviewed by
DMEA OPERATING COMMITTEE
4-22-57
(date)

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DATE	INITIALS	CODE
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		220

FIELD TEAM REPORT on EXAMINATION of PROPERTY

by

H. L. Burmeister and N. E. Nelson [1]

DMEA Docket No. 4569 (rutile)
Applicant: Craven, Shufflebarger and Patteson, (a partnership).
Address: Mr. John L. Patteson, Piney River, Virginia

On-Site Exam Rpt

-- Summary --

This property was examined on March 5 and 6, 1957.

The Applicant states that a 25 year lease on the mineral rights dated in January 1957 was submitted to the Executive Officer in the same month. The Applicant also states that he expects to obtain in March 1957 a 25 year lease on the surface rights.

Within the past year the Applicant has drilled 32, 4-inch auger holes on this property. The 8 holes in the (zone) marked by the Applicant average 3.05 % total TiO_2 content. A mill test on low grade soft ore indicated that approximately 35 % of the total TiO_2 contained in the original sample is not recovered and that of the total TiO_2 in the sample, 29.24 % was recoverable rutile and 35.91 % was recoverable ilmenite.

Reviewed by
DMEA OPERATING COMMITTEE
4-22-57
(date)

1/ H. L. Burmeister, mining engineer, U. S. Bureau of Mines.
N. E. Nelson, geologist, U. S. Geological Survey.

The purpose of the proposed project is to explore the weathered zone material by auger drilling methods for a directional zone containing significant quantities of rutile.

The Applicant's proposal has been revised with his agreement, to exclude diamond drilling and has been modified in number of auger holes and costs.

-- Conclusions --

The exploration area has previously been explored to bedrock by the Applicant by widely scattered auger holes which did not delimit a zone of mineralization.

It is quite possible that on this property there is a zone containing a higher concentration of titanium minerals than is known at present. This can only be found by additional exploration such as outlined in this report. All obtainable evidence indicates that in general the values found in the "soft ore" are about the same as those found in the hard rock below. Indications are that the "soft ore" is not a concentration, but is practically the same in volume as the original rock it represents.

It is concluded that this exploration may localize an ilmenite, rutile ore body which could be a potential source of titanium. It is probable that any ore discovered would contain a higher percentage of ilmenite than of rutile.

-- Recommendations --

The examiners recommend that the Defense Minerals Exploration Administration participate in the auger drilling exploration program on the Greiner Tract outlined in this report.

It is believed that the purpose of exploring for titanium minerals in this region would be best served by conducting exploration on the Bourne Tract before doing so on the Greiner Tract. Justification of the Greiner Tract work may depend on results obtained on the Bourne Tract.

-- Time Spent on Property --

This examination was conducted on March 5 and 6, 1957. Seven hours were spent in the field on both the Greiner and the Bourne Tracts. Information to be gained from the surface is very limited. One day was spent in reviewing the application and in an effort to coordinate needed data.

The examiners were accompanied by Messrs. John D. Hagan, mining engineer and applicant's representative, W.L. Grinnan, prospector and assistant on previous auger drilling, W. C. Overstreet, U. S. Geological Survey and George Fish, Jr., U. S. Bureau of Mines. Mr. T. E. Shufflebarger, a partner, was present during discussions, but not in the field.

-- Location --

The Greiner Tract is located in Nelson County, Virginia and is reached from the village of Piney River by proceeding northward on Route 151 for a distance of 1 mile to gravel road No. 675 entering from the right or east. The center of the tract both N-S and E-W is reached by proceeding southeastward on gravel road No. 675 for a distance of 0.6 mile.

-- Competency of Applicant and Representative --

Of the partners, Mr. C. E. Craven is a metallurgical engineer employed by the American Cyanamid Company in the capacity of exploration engineer, Mr. J. L. Patteson is employed by the same company as personnel supervisor and Mr. T. E. Shufflebarger is geologist for the Southern Railroad. Mr. J. D. Hagan, the Applicant's representative and consultant, is a mining engineer and the one who prepared this application. Mr. Hagan is in charge of the highly successful exploration conducted by the Virginia Mining Company.

In spite of the fact that Mr. Hagan has had experience in preparing DMEA applications, this one is poorly coordinated and leaves much to be desired in clarity of data. The examiners were successful to only a limited degree in obtaining information which should have been readily available. It is however considered probable that good work and records would result under conditions imposed by DMEA.

The financial responsibility of the Applicant was not investigated but the positions held by the partners would indicate that they are responsible.

-- Property Rights --

The Greiner Tract consists of 207 1/16 acres.

The original application contained only an option expiring December 31, 1956 to lease mineral rights to J. L. Davidson. The option was transferred to the Applicant January 23, 1956. The applicant states that the option was excercised and the 25 year lease resulting

was sent to the Executive Officer in January 1957. "Consent to Lien" was executed on July 18, 1956 on the old farm which was superceded in June 1956. The applicant believes that it would be extremely difficult if not impossible to have new forms executed. Mr. Patteson states that he expects to be able to submit an option to purchase surface rights by March 20, 1957. This has not been done to March 29, 1957.

-- Description of Property --

The exploration area is located largely on gently rolling open farm land, which would present no difficulty in operating or moving drilling equipment in dry weather. Wet weather would without doubt hinder operations materially. A good gravel road (No. 675) about equidistant from the north and south boundaries, traverses the property from east to west.

There are no mine workings on the property but the open pit workings of the American Cyanamid Company are located less than 1/2 mile from the exploration area. These workings were not available for inspection. The Applicant has drilled 32 vertical 4-inch auger holes and 1 diamond core drill hole at his own expense.

A log of the single core drill hole mentioned in the application was not included and it is found that it cannot be supplied. A copy of the Applicant's assay data on auger drill holes follows. Upon inquiry to Mr. Shufflebarger and Mr. Hagan and also by calculation it is definitely determined that the actual assays were made on the sands only, after desliming the material as it came from the ground. The assay value recorded in the right hand column is the result of

calculation and represents the total TiO_2 content of the entire sample as taken from the ground.

DRILLING RESULTS

The following is the available data from the auger drilling on the Greiner Tract.

Hole No.	Depth	% Heavy Minerals in Dry Originals	% TiO_2 in Dry Originals	Average % TiO_2 in Hole
1	0-10	3.5	1.6	
	10-20	0.6	0.3	
	20-30	5.5	2.0	
	30-40	3.3	1.8	
	40-50	3.1	1.4	
	50-60	4.7	2.4	1.6 %
2	0-10	4.3	1.1	
	10-20	3.7	0.5	
	20-30	2.2	0.7	
	30-40	1.7	0.6	
	40-50	2.1	0.8	
	50-60	1.7	0.6	
	60-70	5.6	0.6	0.7 %
3	0-10	3.9	1.5	
	10-20	3.0	1.1	
	20-30	4.9	1.1	
	30-40	10.4	1.9	
	40-50	15.7	1.1	1.1 %
4	0-10	5.5	1.3	
	10-20	3.0	1.1	
	20-30	3.2	0.4	
	30-40	2.2	0.5	
	40-50	4.8	0.9	
	50-58	9.9	2.5	1.1 %
5	0-10	6.9	3.3	
	10-20	2.7	0.9	
	20-30	8.2	2.9	
	30-40	5.4	2.9	
	40-50	4.6	4.1	3.1 %

Hole No.	Depth	% Heavy Minerals in Dry Originals	% TiO_2 in Dry Originals	Average % TiO_2 in Hole
6	0-10	3.5	1.7	
	10-20	10.1	6.6	
	20-30	4.0	1.3	
	30-40	9.7	5.0	
	40-50	5.6	2.8	
	50-60	3.9	1.4	3.1 %
7	No Data Available			
8	0-40			0.5 %
9	0-40			0.5 %
10				0.8 %
11	0-60			0.8 %
12	0-70			1.2 %
13	0-10		3.0	
	10-20		0.6	
	20-30		1.1	
	30-40		0.5	
	40-50		0.6	
	50-60		1.2	1.1 %
14	0-10		1.7	
	10-20		3.0	
	20-30		3.0	
	30-40		2.5	2.5 %
15	Traces			
16	No Data			

Hole No.	Depth	% Heavy Minerals in Dry Originals	% TiO_2 in Dry Originals	Average % TiO_2 in Hole
17	No Data			
18	No Data			
19	0-10	3.5	0.60	
	10-20	1.97	0.46	
	20-27	1.20	0.35	0.47 %
21	No Data			
22	0-10		2.97	
	10-20		2.84	
	20-30		1.27	
	30-40		0.60	
	40-50		0.80	1.7 %
23	0-10		7.08	
	10-20		5.20	
	20-30		3.86	
	30-40		5.58	
	40-50		4.63	5.2 %
24	0-10		2.30	
	10-20		3.80	
	20-30		4.80	
	30-40		1.70	
	40-50		1.50	
	50-60		2.00	2.7 %
25	0-10		2.1	
	10-20		2.4	
	20-30		1.5	2.0 %
26	0-10		2.4	
	10-20		0.6	
	20-30		0.6	
	30-40		0.5	
	40-50		0.3	
	50-60		7.4	1.9 %

Hole No.	Depth	% Heavy Minerals in Dry Originals	% TiO_2 Dry Originals	Average % TiO_2 in Hole
27	0-10		4.3	
	10-20		3.1	
	20-30		2.6	
	30-40		2.6	
	40-50		2.4	
	50-60		3.0	3.0 %
28	60			1.6 %
29	60			2.8 %
30				0.5 %
31	No Data			
32	60			5.5 %

GEOLOGY

The tracts to be explored for rutile deposits are underlain by rocks of the Precambrian Roseland anorthosite body, a 13-mile long, roughly crescentic shaped intrusive mass. The body has a maximum width of about 3 miles, near the center. The average strike of the northeasterly arm is N 30° E and of the southwesterly arm, the strike is S 47° W.

Anorthosite encloses the dike form and is the gangue rock of the dissimainated type rutile and ilmenite deposits. All ore deposits of known importance and the proposed project tracts are found on the convex or southeasterly side and in the middle third of the intrusive mass.

The anorthosite intrudes Lovingston Gneiss, a variant rock of great areal extent. The anorthosite is cut, in turn, by numerous quartz veins, dikes rich in ferromagnesiam minerals and large lenticular and tabular bodies of apatite, ilmenite and/or rutile called nelsonite. One lenticular mass or dike of nelsonite is 65 feet wide and another has a length of more than 2000 feet.

Weathering

The Roseland anorthosite district lies in a region of deep weathering. The anorthosite has weathered more readily than the enclosing gneisses and as determined by open pit mining and auger drill holes the weathered rock or saprolite has a depth up to 70 feet or more.

The area underlain by anorthosite is characterized by a white clay soil derived from feldspar, whereas the cover of the surrounding

rock has a deep red color due primarily to iron set free as oxide by the decay of hornblende and biotite.

Because the first purpose of the proposed auger drilling is to determine the extent and TiO_2 content of the weathered rock, or saprolite, the matter of weathering is one of moment but of which, in the areas concerned much remains to be learned. Preliminary work on the Bourne Tract suggests the depth of the saprolite is, on average, less than that on the Greiner Tract, where two holes showed the depth to be 70 feet and several holes showed a depth of 60 feet. On the Bourne Tract one hole showed a depth of weathered rock of 60 feet, and one hole showed 50 feet. The inferred tonnage in the Bourne Tract is probably less than that of the Greiner Tract.

Bedrock

Of the three principal titanium mineral-bearing rocks, anorthosite, ilmenite nelsonite and rutile nelsonite, anorthosite probably underlies by far the larger part of the areas it is proposed to test, but such has not been established. Many dikes of nelsonite are known at other places in the district, but few, if any, are definitely known tobe in the Bourne and Greiner Tracts. A swarm of weathered ilmenite nelsonite dikes in the American Cyanimid pit left, as might be expected, a distinct streak of relatively high grade saprolitic ore. Nothing comparable to the 100 - 200 X 2600-foot, 10 - 14 % TiO_2 'Cyanamide' ore deposit has been found in the ilmenite-rutile district.

The American Rutile Company mined, in open pits, a large deposit of disseminated rutile-bearing anorthosite, the average grade of which is said to have been 4 - 5 % rutile with very little ilmenite. The gangue rock is granulated anorthosite, and rutile nelsonite, if present, appears not to have been important. Blue quartz is a prominent constituent of the anorthosite body.

The General Electric Company mined 2 ilmenite-rutile nelsonite dikes for their rutile content in underground workings. The country rock of the dikes is anorthosite. Blue quartz is common in the rutile nelsonite and the somewhat gneissic anorthosite but is less common to lacking in the ilmenite nelsonite. Little rutile and apatite are present in the anorthosite which encloses the 'General Electric' dikes. Pyrite and pyrrhotite are accessory minerals in the dikes and the enclosing anorthosite. The dikes, one of which is as much as 5 feet wide, strike east and west and north 71° east, strikes tending to parallel the trend of the convex or southeasterly border of the anorthosite body. One dike is proven for 1200 feet and workings on it extend to a depth of 100 feet. A rutile nelsonite oreshoot, 40 feet long was mined from the dike, but ilmenite nelsonite predominates in both dikes.

References

Thos. L. Watson and Stephen Taber, 1910, The Virginia rutile deposits. U. S. Geological Survey, Bull. 430.

_____, _____, 1913, Geology of the Titanium and Apatite Deposits of Virginia. Virginia Geological Survey, Bull. No. III-A.

Clarence S. Ross, 1941, Occurrence and origin of the titanium deposits of Nelson and Amberst Counties, Virginia, U.S. Geological Survey, Professional Paper 198.

The Greiner Tract

Preliminary work on the Greiner tract consists of 30 auger holes, 3 of them ranging in depth from 30 feet to 70 feet. (See table) No data are available concerning 7 holes, other than their locations. Of the 30 holes, 5 show, as depicted on a map which is a part of the application, a TiO_2 content of 3 % and above. The holes are widely separated but they have been assumed to indicate a curved pay streak which crosses the property from northeast to southwest. The supposition is not well sustained but it affords a frame on which to impose a drilling pattern.

A total of 9 holes fall within the inferred pay streak for 8 of which there are data. The 8 holes show, as noted, an average depth of saprolite of 55 feet and a TiO_2 content of 3.36 %.

The outlines of the pay streak as arbitrarily drawn inclose an area 20 acres in extent. If as indicated the saprolite averages 55 feet in thickness, the volume is 48,482,500 cubic feet weighing from 2,424,125 tons, at 20 cubic feet to the ton, to 2,685,000 tons at 18 cubic feet. The tonnage factor is estimated. As known, determinations have not been made.

-- Past Production --

No mining has been done on this property and no production has been made.

-- Availability of Manpower, Supplies, Power, etc. --

Manpower is easily available from the numerous nearby communities and farms. In addition, intermittant workers at the American Cyanimid plant form a backlog. Hourly wage scales in the

area as furnished by American Cyanimid Company personnel supervisor, are; labor $1.17, truck driver or bulldozer operator $1.25, mill operator $1.40, jackhammer operator $1.30. If core drilling was done, water would probably have to be hauled in tank trucks; it would not be needed for auger drilling. Water for milling could probably be obtained from the nearby Buffalo River.

Ordinary supplies and repairs could be easily obtained in nearby Charlottesville, Lynchburg or Roanoke. Electric power is available nearby and railway freight facilities are found within two miles of the property.

-- Applicant's Exploration Proposal --

The Applicant's exploration proposal is divided into three stages.

STAGE I -

Drill 138 vertical 4-inch auger holes to hard rock or an estimated average depth of 60 feet each through the soft ore zone at a drilling cost of $2.20 per foot and a total cost for Stage I of $28,152.60.

The total material recovered from each 10 foot section of each auger hole would be split and prepared in the field before delivery to an assayer for determination of total TiO_2 content. Following this the assayer's rejects from all pulps in 5 adjoining auger holes would be combined into 1 sample. This sample would be mill tested in the same assay laboratory to determine losses and recovery of titanium minerals and percentage content each of ilmenite and rutile.

The Applicant's outline of the proceedure on material containing 66.5 % slimes appears below. It is of interest to note that on 10 original analysis sheets made available at the time of examination, the percent of slimes in the total material from 10 auger holes averaged 73.4 %.

Following the outline is an excerpt from Mr. Nelson's review of the application before examination and relative to the example sited in the application as "mill test."

The following is a summary of a mill test by Bruce Williams Laboratories, Joplin, Missouri on a sample from 40 to 50 feet in hole No. 30.

	Wt in Grams	% TIO_2	Wt of TIO_2 Grams	% of TIO_2 Compared to Original Sample
Original Sample	100	0.66	0.66	100
Sand	33.48	1.44	0.48	
Slimes	66.52	0.27	0.18	27.27 (This is Lost)
	100.00		0.66	
SINK AND FLOAT TEST ON SANDS				
Float	32.07	0.16	0.05	7.58 (This is Lost)
Sink	1.41	30.57	0.43	
	33.48		0.48	
MAGNETIC TEST ON SINK MATERIAL				
Wt. of Magnetic	0.48	44.27	0.21	31.82 (This is Ilmenite)
Wt. of Non Magnetic	0.93	23.66	0.22	
			0.43	
SOLUBILITY TEST ON MAGNETIC MATERIAL				
Soluble Magnetic	0.48	43.20	0.21	
Non Soluble Magnetic	None	- -	- -	
SOLUBILITY TEST ON NON MAGNETIC MATERIAL				
Soluble Non Magnetic	0.25	1.06	0.027	4.09 (This is Ilmenite)
Non Soluble Non Magnetic	0.68	28.38	0.193	29.24
	0.93			

Of the 0.68 grams of non soluble non magnetic, 0.193 is rutile.

Recovery of rutile $= \frac{0.193}{0.66} =$ 29.24% of original TIO_2 content in sample.

CONCLUSION ON MILL TEST

1. % of TIO_2 in original sample that is lost - 27.27 plus 7.58 - 34.85 %

2. % of TIO_2 in original sample that is ilmenite - 31.82 plus 4.09 - 35.91 %

3. % of TIO_2 in original sample that is rutile - - 29.24 %

100.00 %

Therefore, of the original sample about 35 % of the TIO2 would be lost and about 65 % would be recovered.

% Rutile in concentrate - $\frac{29.24 \times 100}{65.15}$ - 45 %

(Exerpt from Mr. Nelson's Review)

A sample of 0.66 % TiO_2 material from an auger hole was "mill tested". Slimes lost contained 34.85 % of the TiO_2, and of the TiO_2 in the material saved, 54.5 % was ilmenite and 45.5 % was rutile. Of the TiO_2 in the sample, 29.24 % was recoverable rutile and 35.91 % recoverable ilmenite.

A rough estimate of the values involved (based on the results of one "mill tested" sample) in material of varying grades of TiO_2 would appear to be: -

Material % TiO_2	Recoverable rutile in TiO_2 material	Pounds rutile per ton	Value of rutile/pd.	Value per ton (gross)
1 %	29.24	5.85	10 - 13½ ¢	$ 58.5¢- $ .79
1½%	"	8.77	"	$ .88 - $1.18
2 %	"	11.70	"	$1.17 - $1.58
3 %	"	17.54	"	$1.75 - $2.36

At $16.00 - $20.00 per short ton (0.8 to 1 ¢ per pound) the gross value of the recoverable ilmenite in 3 % material

would be $0.16 to $0.21

Value of rutile 1.75 to 2.36

Total $1.91 to $2.57

Stage II -

The Applicant's proposal for this stage consists only of the following statements:

1. Continue auger drilling if warranted.
2. 1000 feet of core drilling to test hard rock below the zone of oxidation in 3 or 4 holes.
3. Bucket drill some 36 inch holes.

The above is the entire expression of proposed work in Stage II; no plans or cost appear.

Stage III -

The Applicant's proposal for this stage is completely contained in the statement; "5000 feet of diamond core drilling depending on the success of Stage II and to be layed out with the completion of Stage II."

Stage II and Stage III were abandoned after discussion with the Applicant, it being considered that diamond drilling would be used to much greater advantage on the Bourne property. A greater potential for rutile is probably offered in the Bourne Tract.

Items occurring in the Application which were revised include: (1) number and spacing of auger holes, (2) location of drilling sectional lines in relation to property boundaries, (3) costs, and (4) exclusion of Stages II and III.

-- Operator's Property Rights --

The 317.4 acres of land upon which the Operator holds a 25 year lease on the mining rights is described in the Operator's lease and is outlined on the property map accompanying the application. No portion of the 317.4 acres has been excluded as not subject to royalty payments to the Government. "Consent to Lien" executed on discontinued forms were executed July 18, 1956 when the property was held under an option to lease.

Docket DMEA 4652 contains a copy of a letter from Robert C. Goad, Commonwealth Attorney for Nelson County, Virginia to Mr. Lawrence Houk, expressing the opinion that it is not necessary to procure additional "Consent to Lien" after a lease was obtained under the option.

-- Exploration Project --

The application states that work would start within 30 days and be completed within 2 months of the date of a contract.

The examiners estimate that the field work as outlined in the revised program could be completed within 3.5 weeks after the date of a contract and the data assembled and final report prepared within 5 weeks after the date of the contract.

-- Description of Project --

During the examination the examiners conferred with partners Mr. Shufflebarger and Mr. Patteson and with Mr. Hagan, representative for the partnership in this application.

It was mutually agreed that auger drilling alone would fulfill the purpose of exploration at this time. All information

available indicates that in this locality, the titanium mineral content of the soft ore is practically the same as that found in the underlying hard rock anorthosite and possible nelsonite dike zones. Due to the fact that the original application map shows drill hole section line No. 100 as being less than 100 feet from the northern property line, it was decided to abandon section line No. 100 and move line No. 200 northeastward a distance of 100 feet. Each numerically successive section line inclusive of No. 900 will be moved 100 feet northeasterly. Spacing of hole locations along section lines was in most cases increased to 200 feet. A few holes remain at 100 foot intervals on a section line to possibly provide special data.

It is recommended that 88 vertical, 4-inch auger holes be drilled as indicated on the revised map, each averaging 60 feet in depth for a maximum total of 5,280 feet. It is also recommended that the total material taken from each 10 foot section of auger hole shall constitute an original sample which will be split down at the drill to about 14 pounds. This reduced sample is to be dried, ground to 20 mesh and split to result in two samples of $1\frac{1}{2}$ pounds each. One sample split is to be retained for future reference and one assayed for total TiO_2 content. This will make necessary a maximum of 528 assays. It will be necessary to determine by mill test the percentage of slimes, loss of TiO_2 in slimes, percentage content each of ilmenite and rutile in the ground and the possible recovery. It is recommended that the method of handling mill tests as outlined in the application be adopted. This requires that the

assayer make a composite of all his 10 foot sample rejects from 5 adjoining auger holes. The composite will then be mill tested to determine the percent of TiO_2 lost in slimes and float and the relative proportion of rutile to ilmenite. The average total TiO_2 content of each auger drill hole may then be corrected to show the percent of rutile and the percent of ilmenite contained. For 88 auger holes 18 mill tests will be required.

It is estimated that one auger rig will complete 100 feet of hole per 10 hour day. The three rigs to be used will produce a total of 300 feet per day or 1,500 feet per 5 day week. To complete 5,280 feet of hole will require 3.5 weeks. Allowing 1.5 weeks for possible delays and completion of final report, the project should be completed in 5 weeks.

-- Estimated Costs --

In estimating costs, the bid of the Cunningham Core Drilling and Grouting Company has been used for auger drilling and the bid of the Bruce Williams Laboratories for assay and mill tests. Sampling equipment will be built or purchased by the Operator and used on an amortization basis. The Applicant requests 10 % total payroll taxes. The Beers, Inc. Docket 4393 operated in Virginia on 5.45 % total payroll taxes. The amount of 5.45 % is being used in this report.

Independent Contracts

(Auger Drilling)

5280 feet, 4" auger holes, (each 10' to be a separate sample) - @ $2.20 per foot	$11,616.00	
Lost time not due to contractor 10 hours - @ $7.00 per hour	70.00	
Lost auger drill heads, estimated 3 - @ $20.00	60.00	
Total Auger drilling	$11,746.00	
(Grid Survey)		
5 days, Surveyor and helper - @ $50.00	$ 250.00	
Total Independent Contracts		$11,996.00

Labor, Supervision, Consultants

3 - samplers (1 at each drill), 4 weeks of 50 hours each, total 600 hours - @ $1.30	$ 780.00	
1 - lab. man (dry, split, crush and ship samples), 200 hours - @ $1.50 per hour	300.00	
1 - Supervisor, 5 weeks - @ $115.47	577.35	
1 - Consultant, 5 weeks, 2 days per week 10 days - @ $50.00	500.00	
1 - Typist, 7 days - @ $10.00	70.00	
Total Labor, Supervision, Consultant		$ 2,227.35

Operating Materials and Supplies

None

Operating Equipment

Purchased or built by Operator and furnished on a depreciation basis.

3 - sample splitters (2") - $270.00		
depreciate 26 weeks (3.5 weeks - @ $10.38)	$36.33	
1 - sample splitter (1/4") - $45.00		
depreciate 26 weeks (3.5 weeks - @ $1.73)	6.06	
1 - laboratory grinder and motor - @ $600.00		
depreciate 156 weeks (3.5 weeks - @ $3.85)	13.48	
Total Operating Equipment		$55.87

Rental

Building for office, sample preparation and storing samples. 5 weeks - @ $15.00	$75.00

Miscellaneous

Analyses and Mill Tests

528 analyses for total TiO_2 content - @ $2.50	$1,320.00
18 mill tests (as outlined) - @ $35.00	630.00
Total Analyses and Tests	$1,950.00

Shipment of Samples

9 - air express shipments (each shipment 60 samples of 1½ pounds each) - @ $10.00	$ 90.00

Payroll Taxes

Social Security	2 %	
Unemployment Ins.	3 %	
Compensation Ins.	0.45 %	
Total	5.45 % of $2,227.35	$ 121.39

Miscellaneous (cont'd.)

Office Expense (including final report)

Supplies for maps and reports	$ 30.00
Ozalid prints	20.00
Postage	4.00
Total Office Expense	$ 54.00

Transportation

25 days - @ 50 miles per day @ $0.09 per mile	$112.50

Total Miscellaneous	$ 2,327.89
Total cost of project	$16,682.11
Government cost - @ 75 %	$12,511.58

N. E. Nelson
Geologist
U.S. Geological Survey

H. L. Burmeister
Mine Exam. and Explor. Engineer
U.S. Bureau of Mines

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
2/11	Anderson	600
2/14	Houk	600
"	Mettenberg	100
2/15	C	220
		600

600

FEB 14 1957

Mr. C. E. Craven
Craven, Shufflebarger &
Patteson
Roseland, Virginia

Re: Docket No. DMEA-4569-Rutile
Craven, Shufflebarger &
Patteson
Greiner Tract
Nelson County, Virginia

Dear Mr. Craven:

Reference is made to your discussion with Mr. Anderson in this office on February 8, 1957, your letter of February 10, 1957, on the subject application, and filing a new application on the Bourne Tract.

We will be pleased to receive your new application on the Bourne Tract in Nelson County, Virginia. Be assured we will process your application as rapidly as possible.

Sincerely yours,

SIGNE

Lawrence G. Houk, Chief
Nonmetallic Minerals Division

WCAnderson:gad 2/14/57
Copy to: Admr. R. File
Field Team, Region V
Mr. Kiilsgaard, 5222
Mr. J. A. Miller, 3415
Mr. Houk

8623

CRAVEN, SHUFFLEBARGER & PATTERSON
Roseland, Virginia
February 10, 1957

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 12 1957

DATE	INITIALS	CODE
2-12	C	220
2-13	[illegible]	600

DMEA-4569-Rutile

Mr. Lawrence G. Houk, Chief
Non Metallic Minerals Division
Defense Minerals Exploration Administration
United States Department of the Interior
Washington 25, D.C.

Re: Craven, Shufflebarger
and Patterson
Bourne Tract
Nelson County, Virginia

Dear Mr. Houk,

On Friday, February 8, 1957, I visited your office and was sorry to hear that you were not able to be in your office due to illness. I do hope that you recover quickly and are able to resume your duties.

Mr. Anderson took very good care of me and answered all of my questions Re: Docket DMEA 4569-Rutile. I was pleased to find it had been forwarded to College Park. Mr. Millar made an examination of the areas involved in July, I believe, so that may speed up the processing of that particular phase of the examination.

We have another application that you should receive this week. After talking with Mr. Anderson, it was apparent that the two area known as the Hill property should be excluded from this application due to the short term of the options. We may get then extended and include them at a later date as an amendment, or drill them out without DMEA assistance.

Therefore, if you will consider only the Bourne property, which is covered by the same agreement as the Greiner Tract Docket No. DMEA-4569 Rutile we should have no delays with this application and they may be processed simultaneously.

We will appreciate anything you can do to expedite the conclusion of a contract on the Grenier and Bourne Tracts.

Thanking you very sincerely for your excellent cooperation, I remain

Very truly yours,
C. E. Craven
S. Warren
Craven, Shufflebarger
and Patterson

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
2-13	Anderson	600
2/13	Houk	600
2/13	Selfridge	130
"	Johnson	110
"	Matthews	100
		220

600

FEB 14 1957

Mr. Robert A. Lawrence
Executive Officer, DMEA
Field Team, Region V
Room 12, Post Office Bldg.
Knoxville 2, Tennessee

Re: Docket No. DMEA-4569-Rutile
Craven-Amsfielderger &
Patterson
Greiner Tract
Nelson County, Virginia

Dear Mr. Lawrence:

Please review the subject application and arrange for a field examination if you deem it necessary.

Copies of memoranda dated December 13 and 19, 1956, and February 7, 1957, by Mr. Jesse A. Miller, USBM, and Mr. N. E. Nelson, USGS, respectively, relating to the project are enclosed. There is also enclosed a copy of the application for the use of the Field Team.

The applicant's proposal to space holes about 100 feet apart along the range lines is, in our opinion, development drilling and if a project is recommended the minimum distance between any holes should be 200 feet.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (GCS)

Approved:

Frank D. Lamb (GCS)
Member, Bureau of Mines

N. E. Nelson (GCS)
Member, Geological Survey

WCAnderson:gad 2/13/57
Copy to: Admr. R. File
Operating Committee
Mr. Kiilsgaard, 5222
Mr. Jesse A. Miller, 3415
Mr. Houk

Enclosures 7

8623

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
2-13	Anderson	600
2/13	Houk	600
2/13	Selfridge	130
"	Johnson	110
"	Patterson	100
2/14		220

600

FEB 14 1957

Mr. J. L. Patteson
Craven, Shufflebarger &
Patteson
Piney River, Virginia

Re: Docket No. DMEA-4569-Rutile
Craven, Shufflebarger &
Patteson
Greiner Tract
Nelson County, Virginia

600
Lamb
Nelson

Dear Mr. Patteson:

Receipt is acknowledged of your letter of February 1, 1957, enclosing five copies of a lease, letter from Mr. Robert C. Goad, additional copies of bids for auger drilling, and a log of Hole No. 1. Your application is now being referred to Mr. Robert A. Laurence, Executive Officer, DMEA Field Team, Region V, Room 13, Post Office Building, Knoxville 2, Tennessee, for further consideration and possibly a field examination.

The Regional Office will contact you at an early date if an examination is to be made. Any assistance you may give the members of the Field Team during the examination will be appreciated.

Sincerely yours,

C. O. Mittendorf (for)

Administrator

WCAnderson:gad 2/13/57
Copy to: Admr. R. File
Operating Committee
Field Team, Region V
Mr. Kiilsgaard, 5222
Mr. Jesse A. Miller, 3415
Mr. Houk

8623

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 8 1957

DATE	INITIALS	CODE
2-8	C	220
2/11	Houk	600

February 7, 1957

Re: DMEA 4569
Craven, et al
Greiner Tract
Nelson County, Va.
$28,152.60 - Rutile

Memorandum

To: L. G. Houk, Defense Minerals Exploration Administration

From: N. E. Nelson, U. S. Geological Survey

Subject: Correction in review of application of December 19, 1956

See second page and change:

"At $16.00 - 20.00 per short ton (0.8 to 1¢ per pound) the gross value of the recoverable ilmenite in 3% material would be:

	0.162	to	0.215
Value rutile	1.75	to	2.36
Total	$ 1.91		2.57

Referral of the application to the Field Team is recommended.

N. E. Nelson

N. E. Nelson

February 6, 1957

Note for the file:

Docket No. DMEA-4569-Rutile
Craven, Shufflebarger and
Patteson
Greiner Tract
Nelson County, Virginia

Mr. W. C. Anderson talked with Mr. H. C. Rubin, Assistant Solicitor's Office, and the Consent to Lien and the lease are acceptable.

Per Mr. L. G. Houk

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 4 1957

DATE	INITIALS	CODE
2/4	C	220
2/4	gwa	600

ROSELAND, VIRGINIA
FEBRUARY 1, 1957

MR. LAWERENCE G. HOCK, CHIEF
NON METALLICS MINERALS DIVISION
DEFENSE MINERALS EXPLORATION ADMINISTRATION
U. S. DEPT. OF INTERIOR
WASHINGTON 25, D.C.

RE: DOCKET NO. DMEA 4569 - RUTILE
CRAVEN, SHUFFLEBARGER & PATTESON
GREINER TRACT
NELSON COUNTY, VIRGINIA

DEAR MR. HOCK,

WE ARE PLEASED TO SUBMIT TO YOU THE INFORMATION REQUESTED IN YOUR LETTER OF JANUARY 3, 1957.

1. THE FINAL LEASE HAS BEEN EXECUTED AND RECORDED AND FIVE COPIES ARE ENCLOSED.

A LETTER FROM MR. ROBERT C. GOAD, COMMONWEALTH ATTORNEY FOR NELSON COUNTY EXPLANNING THE LEGALITY OF THE CONSENT TO LEIN SUBMITTED WITH ORIGINAL APPLICATION, AS WELL AS OUR POSITION WITH REGARD TO SURFACE RIGHTS OF THE TRACT INVLOVED IS ALSO ENCLOSED.

2. ADDITIONAL COPIES OF BIDS FOR AUGER DRILLING ARE ENCLOSED.

3. A LOG OF THE HOLE NO. 1 IS ENCLOSED (5 COPIES)

WE REGRET THE DELAY IN OBTAINING THE FINAL LEASE BUT AS YOU KNOW IT TAKES A LOT OF TIME FOR LEGAL PAPERS TO MAKE THE ROUNDS OF SO MANY PEOPLE.

THERE SEEMS TO BE NO DOUBT ABOUT THE LEGALITY OF THE PRESENT "CONSENT TO LEIN" AND WE HATE TO BOTHER THE LESSORS UNDULY, BUT IN CASE OF ABSOLUTE NECESSITY WE WILL OF COURSE DO THE NECESSARY WORK INVOLVED OF GETTING NEW FORMS SIGNED BY THE NECESSARY HEIRS INVOLVED.

HOPING THAT THERE WILL BE NO ADDITIONAL DELAYS AND THAT WE SHALL HAVE THE PLEASURE OF HEARING FAVORABLY FROM YOU IN THE VERY NEAR FUTURE.

VERY TRULY YOURS,

CRAVEN, SHUFFLEBARGER AND PATTESON

BY J. L. PATTESON

ENCL:
JLP;MG

ESTABLISHED 1902

PUNXSUTAWNEY GROUNDHOG

HOFFMAN BROTHERS DRILLING COMPANY

Contractors and Manufacturers

BOX 426 • TIONA STREET
PUNXSUTAWNEY, PA.

W. H. HAMPTON *President*
S. J. HAMPTON *Vice President*
O. C. HOFFMAN, JR. *Secretary-Treasurer*
C. A. BUNDY *Auditor*

Our Specialty
TESTING COAL AND MINERAL PRODUCTS
DIAMOND CORE DRILLING
PERCUSSION DRILLING
PRE GROUTING
FOUNDATION TESTING
MANUFACTURERS OF THE
"ORIENTED CORE BIT"
DIAMOND DRILL TOOLS

January 7, 1957

C. E. Craven
T. E. Shufflebarger
J. L. Patteson, Partners
Roseland, Virginia

Gentlemen:

We quote on the Soft Ore Drilling on the Griner Property, near Tiny River, Virginia, as follows:

Approximately 138 auger holes averaging 60 feet each in depth as follows:

1. Drilling, cleaning holes every 10 ft. for samples at TWO DOLLARS AND SEVENTY-FIVE CENTS----------($2.75) per lineal foot.
2. Actual cost of any augers or drill heads lost in hole.
3. Lost time waiting on drill hole locations 20 hours at TEN DOLLARS----------($10.00) per hour.

Trusting we are the successful bidders, we are

Yours very truly,

HOFFMAN BROTHERS DRILLING CO.

W. H. Hampton

W. H. Hampton, President

WHH:mks

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 4 1957

DATE	INITIALS	CODE

ESTABLISHED 1906

HOFFMAN BROTHERS DRILLING COMPANY

Contractors and Manufacturers

BOX 490 · TIONA STREET

W. H. HAMPTON, President
S. J. HAMPTON, Vice President
S. C. HOFFMAN, JR., Secretary-Treasurer
C. A. BUNDY, Auditor

Our Specialty
PROSPECTING AND MINERAL PROPERTIES
DIAMOND CORE DRILLING
PERCUSSION DRILLING
ORE SAMPLING
FOUNDATION TESTING
MANUFACTURERS OF THE PATENTED CORE GIFT AND SMALL TOOLS

EXTRA COPY
DMEA
RECEIVED FEB 4 19

DATE	INITIALS	FILE

January 7, 1957

G. E. Craven
T. E. Shufflebarger
J. L. Patterson, Partners
Roseland, Virginia

Gentlemen:

We quote on the Soft Ore Drilling on the Griner Property, near Tiny River, Virginia, as follows:

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1. Drilling, cleaning holes every 10 ft. for samples at TWO DOLLARS AND SEVENTY-FIVE CENTS----------($2.75) per lineal foot.

2. Actual cost of any augers or drill heads lost in holes.

3. Lost time waiting on drill hole locations 20 hours at TEN DOLLARS----------($10.00) per hour.

Trusting we are the successful bidders, we are

Yours very truly,

HOFFMAN BROTHERS DRILLING CO.

W. H. Hampton, President

WHH:mks

ESTABLISHED 1904

HOFFMAN BROTHERS DRILLING COMPANY

Contractors and Manufacturers

BOX 420 • VIENA STREET

CHARLESTOWN, W. VA.

W. H. HAMPTON
President
R. A. HAMPTON
Vice President
R. C. HOFFMAN, JR.
Secretary-Treasurer
R. A. SWEET
Auditor

Our Specialty

Testing Coal and Mineral Properties
Diamond Core Drilling
Rotary Drilling
Air Operating
Foundation Testing
Manufacturers of the
Hoffman Diamond Core Bit
Hoffman Shell Tools

EXTRA COPY
D M E

RECEIVED FEB 4 1957

DATE	INITIALS	CODE

January 7, 1957

G. E. Craven
T. E. Shufflebarger
J. L. Patteson, Partners
Roseland, Virginia

Gentlemen:

We quote on the Soft Ore Drilling on the Grimes Property, near Tiny River, Virginia, as follows:

Approximately 138 auger holes averaging 60 feet each in depth as follows:

1. Drilling, cleaning holes every 10 ft. for samples at TWO DOLLARS AND SEVENTY-FIVE CENTS----------($2.75) per linsal foot.

2. Actual cost of any augers or drill heads lost in hole.

3. Lost time waiting on drill hole locations 20 hours at TEN DOLLARS----------($10.00) per hour.

Trusting we are the successful bidders, we are

Yours very truly,

HOFFMAN BROTHERS DRILLING CO.

W. H. Hampton, President

WHHmks

ESTABLISHED 1902

HOFFMAN BROTHERS DRILLING COMPANY

Contractors and Manufacturers

BOX 400 • TIONA STREET

MOUNTAIN BROOK, ALABAMA

W. H. Hampton, President
W. A. Hampton, Vice President
C. E. Hoffman, Jr., Secretary-Treasurer
H. Dunn, Auditor

Our Specialty
SHALLOW OIL AND GENERAL PROSPECTING
DIAMOND CORE DRILLING
PROSPECTING DRILLING
ROCK CRUSHING
FOUNDATION TESTING
MANUFACTURERS OF THE PATENTED CORE BIT
DIAMOND DRILL TOOLS

EXTRA COPY
DMEA
RECEIVED FEB 4 19

DATE	INITIALS	CODE

January 7, 1957

O. R. Craven
T. F. Shufflebarger
J. L. Patteson, Partners
Roseland, Virginia

Gentlemen:

We quote on the Soft Ore Drilling on the Griner Property, near Tiny River, Virginia, as follows:

Approximately 138 auger holes averaging 60 feet each in depth as follows:

1. Drilling, cleaning holes every 10 ft. for samples at TWO DOLLARS AND SEVENTY-FIVE CENTS----------($2.75) per lineal foot.
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Yours very truly,

HOFFMAN BROTHERS DRILLING CO.

W. H. Hampton, President

WHH:mks

ESTABLISHED 1902

HOFFMAN BROTHERS DRILLING COMPANY

Contractors and Manufacturers

BOX 426 · TIONA STREET

PUNXSUTAWNEY, PA.

W. H. HAMPTON
President
S. J. HAMPTON
Vice President
O. C. HOFFMAN, JR.
Secretary-Treasurer
C. A. BUNDY
Auditor

Our Specialty
TESTING COAL AND MINERAL PRODUCTS
DIAMOND CORE DRILLING
PERCUSSION DRILLING
PRE GROUTING
FOUNDATION TESTING
MANUFACTURERS OF THE "ORIENTED CORE BIT" DIAMOND DRILL TOOLS

EXTRA COPY
DMEA
RECEIVED FEB 4 1957

DATE	INITIALS	CODE

January 7, 1957

C. E. Craven
T. E. Shufflebarger
J. L. Patteson, Partners
Roseland, Virginia

Gentlemen:

We quote on the Soft Ore Drilling on the Griner Property, near Tiny River, Virginia, as follows:

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1. Drilling, cleaning holes every 10 ft. for samples at TWO DOLLARS AND SEVENTY-FIVE CENTS----------($2.75) per lineal foot.
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Yours very truly,

HOFFMAN BROTHERS DRILLING CO.

W. H. Hampton, President

WHH:mks

BLAIR A. MOTT
Vice President

B. H. MOTT
Pres. & Treas.

W. J. MOTT
Vice President

MOTT CORE DRILLING COMPANY

AIR, ELECTRIC, GASOLINE
LARGE DIAMOND CORED HOLES
HIGH PRESSURE GROUTING
CABLE AND CORED
DRAINAGE HOLES

CABLE ADDRESS
"MOTTDRILL"

DIAMOND CORE DRILLING CONTRACTORS
TESTING COAL, CLAYS, MINERALS, FOUNDATIONS

MAIN OFFICE AND SHOPS
826 TO 846 EIGHTH AVE.
HUNTINGTON, W. VA.
PHONE 7121

MANUFACTURERS
DIAMOND CORE DRILLS
SHOT DRILLS, SUPPLIES

HUNTINGTON 17, W. VA.

January 7, 1957

EXTRA COPY
DMEA
RECEIVED FEB 4 1957

DATE	INITIALS	CODE

Messrs. C.E.Craven, T.E.Shufflebarger
and J.L.Patteson, Partners,
Roseland, Virginia

Gentlemen:

We are pleased to quote on the soft ore drilling on Griner Property near Piney River, Virginia, as follows:

Item 1. Approximately 138 auger holes, averaging 60 ft deep drilling and cleaning hole every 10 feet for samples, price $2.50 per ft.

Item 2. Actual cost on any augers or drill heads left in holes.

Item 3. Lost time waiting on drill hole locations 20 hours - price $10.00 per hour.

Thanking you for the privilege of bidding, we are

Very truly yours,

MOTT CORE DRILLING COMPANY

BY W. J. Mott
W.J.Mott, Vice-President

WJM:am

BLAIR A. MOTT
Vice President

A. H. MOTT
Pres. & Treas.

W. J. MOTT
Vice President

MOTT CORE DRILLING COMPANY

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CABLE ADDRESS
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TESTING COAL, CLAYS, MINERALS, FOUNDATIONS

MAIN OFFICE AND SHOPS
836 TO 846 EIGHTH AVE.
HUNTINGTON, W. VA.
PHONE 7121

MANUFACTURERS
DIAMOND CORE DRILLS
SHOT DRILLS, SUPPLIES

HUNTINGTON 17, W. VA.

January 7,1957

EXTRA COPY
D M E A
RECEIVED FEB 4 1957

DATE	INITIALS	CODE

Messrs. C.E.Craven, T.E.Shufflebarger
& J.L.Patterson, Partners,
Roseland, Virginia

Gentlemen:

We are pleased to quote on the soft ore drilling on Grimer Property near Piney River, Virginia, as follows:

Item 1. Approximately 138 auger holes, averaging 60 ft deep drilling and cleaning hole every 10 feet for samples, price $2.50 per ft.

Item 2. Actual cost on any augers or drilling heads left in holes.

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Thanking you for the privilege of bidding, we are

Very truly yours,

MOTT CORE DRILLING COMPANY

BY _____
W.J.Mott, Vice-President

WJM;am

BLAIR A. MOTT
Vice President

S. H. MOTT
Pres. & Treas.

W. J. MOTT
Vice President

MOTT CORE DRILLING COMPANY

AIR, ELECTRIC, GASOLINE
LARGE DIAMOND CORED HOLES
HIGH PRESSURE GROUTING
CABLE AND CORED
DRAINAGE HOLES

CABLE ADDRESS
"MOTTDRILL"

DIAMOND CORE DRILLING CONTRACTORS
TESTING COAL, CLAYS, MINERALS, FOUNDATIONS

MAIN OFFICE AND SHOPS
626 TO 646 EIGHTH AVE.
HUNTINGTON, W. VA.
PHONE 7181

MANUFACTURERS
DIAMOND CORE DRILLS
SHOT DRILLS, SUPPLIES

HUNTINGTON 17, W. VA.

January 7,1957

EXTRA COPY
D M E A
RECEIVED FEB 4 1957

DATE	INITIALS	CODE

Messrs. C.E.Craven, T.E.Shufflebarger
& J.L.Patteson, Partners,
Roseland, Virginia

Gentlemen:

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Thanking you for the privilege of bidding, we are

Very truly yours,

MOTT CORE DRILLING COMPANY

BY
W.J.Mott, Vice-President

WJM;am

BLAIR A. MOTT
Vice President

E. H. MOTT
Pres. & Treas.

W. J. MOTT
Vice President

MOTT CORE DRILLING COMPANY

AIR, ELECTRIC, GASOLINE
LARGE DIAMOND CORED HOLES
HIGH PRESSURE GROUTING
CABLE AND CORED
DRAINAGE HOLES

CABLE ADDRESS
"MOTTDRILL"

DIAMOND CORE DRILLING CONTRACTORS
TESTING COAL, CLAYS, MINERALS, FOUNDATIONS

MAIN OFFICE AND SHOPS
626 TO 646 EIGHTH AVE.
HUNTINGTON, W. VA.
PHONE 7121

MANUFACTURERS
DIAMOND CORE DRILLS
SHOT DRILLS, SUPPLIES

HUNTINGTON 17, W. VA.

January 7,1957

EXTRA COPY
DMEA
RECEIVED FEB 4 1957

DATE	INITIALS	CODE

Messrs. C.E.Craven, T.E.Shufflebarger
& J.L.Patteson, Partners,
Roseland, Virginia

Gentlemen:

We are pleased to quote on the soft ore drilling on Griner Property near Piney River, Virginia, as follows:

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Thanking you for the privilege of bidding, we are

Very truly yours,

MOTT CORE DRILLING COMPANY

BY _____
W.J.Mott, Vice-President

WJM:as

BLAIR A. MOTT
Vice President

A. M. MOTT
Pres. & Treas.

W. J. MOTT
Vice-President

MOTT CORE DRILLING COMPANY

HAND, ELECTRIC, GASOLINE
DIAMOND CORED HOLES
HIGH PRESSURE GROUTING
CABLE AND CORED
DRAINAGE HOLES

CABLE ADDRESS
"MOTTDRILL"

DIAMOND CORE DRILLING CONTRACTORS
TESTING COAL, CLAYS, MINERALS, FOUNDATIONS

MAIN OFFICE AND SHOPS
636 TO 640 EIGHTH AVE.
HUNTINGTON, W. VA.
PHONE 7151

MANUFACTURERS
DIAMOND CORE DRILLS
SHOT DRILLS, SUPPLIES

HUNTINGTON 17, W. VA.

January 7,1957

EXTRA COPY
D M E A
RECEIVED FEB 4 1957

DATE	INITIALS	CODE

Messrs. C.E.Craven, T.E.Shufflebarger
& J.L.Pattesen, Partners,
Roseland, Virginia

Gentlemen:

We are pleased to quote on the soft ore drilling on Grimes Property near Piney River, Virginia, as follows:

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Thanking you for the privilege of bidding, we are

Very truly yours,

MOTT CORE DRILLING COMPANY

BY
W.J.Mott, Vice-President

WJM;em

LOG:
DIAMOND CORE HOLE # 1
GREINER PROPERTY

HOLE NO. 1. - 45 DEGREE ANGLE HOLE DIRECTED TO NW - TOTAL DEPTH 246' - 9".

1. SURFACE TO 39' - 5" SURFICIAL CLAYS.

2. 39' -5" TO 62' -8" BROKEN ZONE META-PYFOXENITE - FINE GRAINED DIABASIC INTRUSIVE ZONE AT 62'

3. 62' - 8" TO 135' - 0" BADLY BROKEN ZONE - ROCK COMPOSED OF:

PLAGIO FILDSPAR	70%
BLUE QUARTZ	20%
SECONDARY PLATYMINERAL	8%
RUTILE	2%

4. 135' - 0" TO 154' - 0" - ROCK COMPOSED OF:

PLAGIO FELDSPAR	50%
BLUE QUARTZ	25%
HORNBLENDE AND PYROXENE	25%

5. 154' - 0" TO 167' - 0" - SCHISTOSE ROCK COMPOSED OF:

PLAGIO FELDSPAR	50%
PYRIBOLES	30%
QUARTZ	15%
RUTILE	5%

6. 167' - 0" TO 178' - 8" SCHISTOSE ROCK COMPOSED OF:

PLAGIO FELDSPAR	55%
PYRIBOLES	30%
QUARTZ	15%

7. 178' - 2" TO 187' - 0" SAME AS NO. 5

8. 187' - 0" TO 204' - 8" - SAME AS NO. 5
VERY MINOR AMOUNT OF RUTILE

9. 204' - 8" TO 205' - 8" - DIABASIC INSTRUSIVE

10. 205' - 8" TO 246' - 9" - BROKEN SCHISTOSE OR GNEISSIC ROCK

FELDSPAR	40%
PYRIBOLE	40%
QUARTZ	20%

OFFICIAL FILE COPY
DMEA
RECEIVED FEB. 4 1957

DATE	INITIALS

T. W. SHUFFLEBARGER
GEOLOGIST
FEB. 1, 1957

LOG:
DIAMOND CORE HOLE # 1
GREINER PROPERTY

HOLE No. 1. - 45 DEGREE ANGLE HOLE DIRECTED TO NW - TOTAL DEPTH 246' - 9".

1. SURFACE TO 39' - 5" SURFICIAL CLAYS.

2. 39' -5" TO 62' -8" BROKEN ZONE META-PYROXENITE - FINE GRAINED DIABASIC INTRUSIVE ZONE AT 62'

3. 62' - 8" TO 135' - 0" BADLY BROKEN ZONE - ROCK COMPOSED OF:

PLAGIO FILDSPAR	70%
BLUE QUARTZ	20%
SECONDARY PLATY MINERAL	8%
RUTILE	2%

4. 135' - 0" TO 154' - 0" - ROCK COMPOSED OF:

PLAGIO FELDSPAR	50%
BLUE QUARTZ	25%
HORNBLENDE AND PYROXENE	25%

5. 154' - 0" TO 167' - 0" - SCHISTOSE ROCK COMPOSED OF:

PLAGIO FELDSPAR	50%
PYRIBOLE	30%
QUARTZ	15%
RUTILE	5%

6. 167' - 0" TO 178' - 8" SCHISTOSE ROCK COMPOSED OF:

PLAGIO FELDSPAR	55%
PYRIBOLES	30%
QUARTZ	15%

7. 178' - 2" TO 187' - 0" SAME AS No. 5

8. 187' - 0" TO 204' - 8" - SAME AS No. 5
VERY MINOR AMOUNT OF RUTILE

9. 204' - 8" TO 205' - 8" - DIABASIC INTRUSIVE

10. 205' - 8" TO 246' - 9" - BROKEN SCHISTOSE OR GNEISSIC ROCK

FELDSPAR	40%
PYRIBOLE	40%
QUARTZ	20%

EXTRA COPY
DMEA
RECEIVED FEB 4 1957
DATE | INITIALS

T. W. SHOFFLEBARGER
GEOLOGIST
FEB. 1, 1957

LOG:
DIAMOND CORE HOLE # 1
GREINER PROPERTY

[illegible] - [illegible] DEGREE ANGLE HOLE [illegible] - TOTAL DEPTH [illegible] - [illegible]

[illegible] SURFACE TO [illegible] - [illegible] OVERBURDEN [illegible]

[illegible] - [illegible] TO [illegible] - [illegible] BROWN [illegible] - [illegible] CRUSHED
[illegible] ZONE AT [illegible]

[illegible] - [illegible] TO [illegible] - [illegible] DARK [illegible] [illegible] OFF
PINKISH FELDSPAR [illegible]
BLUE QUARTZ [illegible]
SECONDARY PLAGIOCLASE [illegible]
RUTILE [illegible]

[illegible] - [illegible] TO [illegible] - [illegible] - [illegible] [illegible]
PINKISH FELDSPAR [illegible]
BLUE QUARTZ [illegible]
HORNBLENDE AND [illegible]
PYROXENE [illegible]

[illegible] - [illegible] TO 167' - [illegible] - [illegible] [illegible] OFF
[illegible] [illegible]
PYROXENE [illegible]
QUARTZ [illegible]
RUTILE [illegible]

[illegible] - [illegible] TO [illegible] - [illegible] SCHISTOSE [illegible] [illegible]
PINKISH FELDSPAR [illegible]
PYROXENE [illegible]
QUARTZ [illegible]

[illegible] - [illegible] TO [illegible] - [illegible] SAME AS HOLE [illegible]

[illegible] - [illegible] TO [illegible] - [illegible] - SAME AS HOLE [illegible]
[illegible] ABOUT [illegible]

[illegible] - [illegible] TO [illegible] - [illegible] - [illegible] [illegible]

[illegible] - [illegible] TO [illegible] - [illegible] - [illegible] [illegible] OR [illegible] [illegible]
FELDSPAR [illegible]
PYROXENE [illegible]
QUARTZ [illegible]

ENTER DATE
G M E A
RECEIVED FEB 4 1957
NOTES

[illegible]
[illegible]
[illegible] 1957

LOG:
DIAMOND CREEK MINE # 1
GREENLEE PROPERTY

[redacted]

[redacted]

[redacted]

LOG:
DIAMOND CORE HOLE # 1
GREINER PROPERTY

HOLE No. 1. - 45 DEGREE ANGLE HOLE DIRECTED TO NW - TOTAL DEPTH 246' - 9".

1. SURFACE TO 39' - 5" SURFICIAL [illegible].

2. 39' -5" TO 62' -8" BROKEN ZONE BETA-PYROXENITE - FINE GRAINED DIABASIC INTRUSIVE ZONE AT 62'

3. 62' - 8" TO 135' - 0" BADLY BROKEN ZONE - ROCK COMPOSED OF:

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BLUE QUARTZ	20%
SECONDARY PLATYMINERAL	8%
RUTILE	2%

4. 135' - 0" TO [illegible]' - 0" - ROCK COMPOSED OF:

PLAGIO FELDSPAR	50%
BLUE QUARTZ	25%
HORNBLENDE AND PYROXENE	25%

5. 154' - 0" TO 167' - 0" - SCHISTOSE ROCK COMPOSED OF:

PLAGIO FELDSPAR	50%
PYROXENE	30%
QUARTZ	15%
RUTILE	5%

6. 167' - 0" TO 178' - 8" SCHISTOSE ROCK COMPOSED OF:

PLAGIO FELDSPAR	55%
PYROXENE	30%
QUARTZ	15%

7. 178' - 8" TO 187' - 0" SAME AS No. 5

8. 187' - 0" TO 204' - 8" - SAME AS No. 6
VERY SMALL AMOUNT OF RUTILE

9. 204' - 8" TO 205' - 8" - DIABASIC INTRUSIVE

10. 205' - 8" TO 246' - 9" - BROKEN SCHISTOSE OR GNEISSIC ROCK

FELDSPAR	40%
PYROXENE	40%
QUARTZ	20%

[illegible] SUPERINTENDENT
[illegible]
[illegible] 1957

E[illegible] COPY
D[illegible] E A
RECEI[illegible]
DATE [illegible] 195
CODE

ROBERT C. GOAD
ATTORNEY AT LAW
LOVINGSTON, VA.

COMMONWEALTH'S ATTORNEY
FOR NELSON COUNTY

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 4 1957
DATE | INITIALS | CODE

January 31, 1957

Mr. Lawrence G. Houk, Chief
Nonmetallic Minerals Division
Division of Minerals Exploration Admin.
U. S. Department of Interior
Washington 25, D. C.

Dear Sir:

Re: Docket DMEA-4569 - Rutile - Greiner tract, Nelson Co., Va.

In reply to paragraph 1, of your letter of January 3rd, 1957, addressed to Messrs. Craven, Shufflebarger and Patteson, I wish to advise as follows:

Attached, you will find a copy of the lease, as requested.

We do not feel that it is necessary to furnish further lien consent agreements whidh have been previously furnished, properly executed by all of the owners of the mineral rights who signed the option agreement of November 3, 1955.

The lease enclosed, dated December 1st, 1956, has been executed by the owners of the mineral rights, pursuant to and in accordance with the terms of the above option agreement; and under paragraph 9 of the option agreement the owners agreed to execute all necessary papers which may be required by the United States Government in the event the Government agrees to lend financial assistance to the tenant in the exploration or development or exercise of the mineral rights. Therefore, in our opinion, the original option agreement and the lease should be read together as one continuing agreement, and the prior lien consents obtained are effective under the lease as well as under the option agreement.

The owners of the mineral rights in the Greiner tract are not the owners of the surface rights. Under Virginia law such owners of mineral rights have the right to do all things reasonable in the exercise of the mineral rights and, therefore, we do not feel that we should be required to have the owners of the surface rights in this tract sign the Consent to Lien agreement.

Yours very truly,

Robert C. Goad

RCG/vmc

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 18 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

CODE
WVA 600

January 9, 1957

Craven, Shufflebarger & Patteson
c/o Mr. John Louis Patteson
Piney River, Virginia

Re: DMEA-4569 - Rutile
Greiner Tract
Nelson County, Virginia

Attention: Mr. C. E. Craven

Gentlemen:

After Mr. Craven's telephone call on January 7, we requested Mr. L. G. Monk of the DMEA Washington office to explain why it is necessary to require your company to submit new Consent to Lien and Subordination Agreements in connection with your application for DMEA assistance. The reasons given by Mr. Monk are as follows:

1. The Agreement Concerning Mineral Rights dated November 3, 1955 submitted with your application expired on December 31, 1956. Therefore, a new Agreement or Lease will be required and it should extend for a period of at least 5 years.

2. After the new Agreement or lease is obtained, it will be necessary to have new Consent to Lien and Subordination Agreements executed in connection with the properties included in the new Agreement or lease.

Under the circumstances it will be to your advantage to submit the new Consent to Lien and Subordination Agreements as soon as possible after you get your lease.

Very truly yours,

V. J. Lynch
Acting Executive Officer
DMEA Field Team, Region V

VJL/mg
cc - Operating Committee (3)
Lynch
Laurence
Burwell

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
1-3-57	Anderson	600
1-3	Houk	600
1/3	Westbrook	100
1/4	Cwl	225
		600

600

JAN 1957

Messrs. Craven, Shufflebarger and Patteson
C/O Mr. John Louis Patteson
Piney River, Virginia

Re: Docket No. DMEA-4569-Rutile
Craven, Shufflebarger and Patteson
Greiner Tract
Nelson County, Virginia

Gentlemen:

Your application for exploration assistance is incomplete and we will need more information to evaluate your proposal:

1. Please submit a copy of your lease, and have the owners of the surface and mineral rights execute the enclosed copies of Consent to Lien and Subordination Agreement.
2. Three bids are required for both the auger drilling and the diamond drilling.
3. Please submit the log of Hole No. 1 with any assay data you may have.

We will defer processing until receipt of the requested information.

Sincerely yours,

SIGNED

Lawrence G. Houk, Chief
Nonmetallic Minerals Division

Enclosures 7

WCAnderson:gad 1/3/57
Copy to: Admr. R. File
Docket
Field Team, Region V
Mr. Kiilsgaard, 5222
Mr. Dietrich, 3061
Mr. Houk

8623

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
DEC 21 1956
D.M.E.A.

December 19, 1956
Re: DMEA 4569
Craven, et al
Greiner Tract
Nelson County, Virginia
$28,152.60 - Rutile

Memorandum

To: L. G. Houk, Defense Minerals Exploration Administration

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of application

The applicants request assistance in continuing exploration for rutile in saprolite and possibly the underlying bedrock.

Three maps and an aerial photograph are part of the application. No two agree, but the project tract probably has a common boundary with the property of American Cyanamid Co. The mine of the Company is some distance from the common boundary, and, due to the confused maps, the relationship of the mine to the area it is proposed to explore is not determinable.

Thirty-two auger holes have been put down, of which 8 appear to be 'ore' holes, and, by inference, they mark a pay streak in the saprolite 2,000 feet long and from 250 to 600 feet wide. The 'ore' holes show from $\frac{1.9\ \%}{60\ \text{ft.}}$ to $\frac{5.5\%}{60\ \text{ft.}}$ TiO_2. Lower grade material occurs in depth holes outside the inferred pay streak or channel.

A sample of 0.66% TiO_2 material from an auger hole was "mill tested". Slimes lost contained 34.85% of the TiO_2, and of the TiO_2 in the material saved, 54.5% was in ilmenite and 45.5% was in rutile. Of the TiO_2 in the sample, 29.24% was recoverable rutile and 35.91% recoverable ilmenite.

The proposed auger hole drilling would continue the exploration of the channel and fringe areas. If the proposed auger drilling should indicate a saprolite orebody, the rock beneath would be diamond drilled, Stages II & III, to determine whether or not rutile-apatite-bearing nelsonite dikes and/or rutile-bearing anorthosite occur below the weathered zone. No estimate of cost is made for the Stage II and III work.

The proposed work program consists of:-

Auger drilling	8,280 feet	$18,356.00
Sampling		3,966.00
Consultant		800.00
Assaying		3,190.00
Surveying		500.00
Contingencies		1,340.60
		$28,152.60

If the project area has not been investigated and the statistics of rutile-ilmenite-apatite production support the application, part of the proposed work may be warranted.

A rough estimate of the values involved (based on the results of one 'mill tested' sample) in material of varying grades of TiO_2 would appear to be:-

Material %TiO_2	Recoverable rutile in TiO_2 material	Pounds rutile per ton	Value of Rutile/pd.	Value per ton (Gross)
1%	29.24%	5.85	10-13½¢	58.5¢- 79¢
1½%	"	8.77	"	88¢- $1.18
2%	"	11.70	"	$1.17 - $1.58
3%	"	17.54	"	$1.75 - $2.36
	Ilmenite 35 gl	21.5	.8	

At $16.00 - 20.00 per short ton (0.8 to 1¢ per pound) the gross value of the recoverable ilmenite in 3% material would be $1.62 to $2.15 ← ? 17 - 23 ¢

Value rutile 1.75 to 2.36
$3.37 $4.51

Referral of the application to the Field Team is recommended.

N. E. Nelson

N. E. Nelson

Prospect 1961

A

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
Washington 25, D. C.

RECEIVED DEC 13 1956 D.M.E.A.

Date December 13, 1956

DMEA Docket No. 4569
DMEA Contract No.
Commodity Rutile
Name of applicant Craven, Shuffleburger & Patteson
Name of property Greiner Tract
Location of property Piney River, Virginia
Estimated cost of project $28,152.60

Memorandum

To: Lawrence Houk, Defense Minerals Exploration Administrator

From: Jesse A. Miller, Commodity Specialist, Branch of Light Metals

Subject: Review of Application
(Application, Field Team Report, etc.)

1. Date of subject document: 12/10/56. 2. Date received by reviewer: 12/11/56

3. Prior reports on this property known to reviewer: Yes [x], No [ ].

4. Prior reports on nearby properties known to reviewer: Yes [x], No [ ].

5. Information available on past production: Yes [ ], No [x].

6. Other pertinent factors known to reviewer: Yes [x], No [ ].

7. Explain items marked yes above: This property is close to the deposit at Roseland, Va., which produced rutile from about 1902 to 1949 when the low price of rutile and decreasing grade of ore caused it to close. It also adjoins the property of the American Cyanamid Co., which presently produces ilmenite. Metal and Thermit Co. is opening a rutile mine in Hanover County, Va., where the mineral is found under geologic conditions similar to those at Piney River.

8. Factors needing special consideration:
   a. Location [ ]
   b. Ownership [ ]
   c. Evidence of mineralization [ ]
   d. Geology [ ]
   e. Proposed exploration method [ ]
   f. Alternate exploration method [ ]
   g. Costs [ ]
   h. _____ [ ]

9. Action advised:
   a. Obtain information from applicant [ ]
   b. Refer to Field Team [x]
   c. Denial [ ]
   d. Agree with Field Team [ ]
   e. Disagree with Field Team [ ]
   f. Suggest alternate plan [ ]
   g. Request another examination [ ]
   h. Approval [ ]
   i. Consult with Mr. _____ at _____ AEC office.

10. Remarks: (Use back of page if necessary)

Jesse A. Miller

Jesse A. Miller

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

December 11, 1956

Subject: [illegible]-4509

Steven, Shufflebarger C. Patteson
c/o Mr. John Louis Patteson
Mage River, Virginia

Your application for exploration assistance, dated, (application undated) submitted to our office at Knoxville, has been assigned Docket Number [illegible]-4509 and referred to the Nonmetallic Minerals Division in the Washington office. Kindly identify all future correspondence relating to your application by this Docket Number.

Sincerely yours,

(Sgd) Allen S. Dakan

Allen S. Dakan, Director
Operations Control and
Statistics Division

Copy to:

Region V. Knoxville, Tennessee

Code 600

6416

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
ROOM 1 POST OFFICE BLDG.
KNOXVILLE 2, TENNESSEE

December 6, 1956

RECEIVED DEC 10 1956 D.M.E.A.

Memorandum

To: Operating Committee, DMEA - Washington

From : Executive Officer, DMEA - Region V - Knoxville, Tennessee

Subject: Application - Craven, Shufflebarger and Patteson, Piney River District, Virginia. Greiner Tract (rutile) Nelson County, Va.

Enclosed are the original and two copies of the subject application, received from the College Park office of the Bureau of Mines today.

One copy has been retained by this office.

V. J. Lynch

V. J. Lynch

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
ROOM 1 POST OFFICE BLDG.
KNOXVILLE 2, TENNESSEE

December 6, 1956

RECEIVED DEC 13 1956 DMEA

Memorandum

To: Operating Committee, DMEA - Washington

From : Executive Officer, DMEA - Region V - Knoxville, Tennessee

Subject: Application - Craven, Shufflebarger and Patteson, Piney River District, Virginia. Greiner Tract (rutile) Nelson County, Va.

Enclosed are the original and two copies of the subject application, received from the College Park office of the Bureau of Mines today.

One copy has been retained by this office.

V. J. Lynch

VJL/zm
cc
Lynch
Files

C O P Y

Dillwyn, Va.

RECEIVED
DEC 10 1956
D.M.E.A.

Mr. H. L. Burmeister
Defense Minerals Exploration Administration
Bureau of Mines
College Park
Maryland

Dear Mr. Burmeister,

I have forwarded five copies of the application for D.M.E.A. aid on the Greiner Tract. This application is being submitted as Pro osal No. 1 and Proposal No. 2 is being prepared at the present time to cover work on the second tract.

I am advised by Mr Patteson that the Partnership is exercising its right to option the property for a period of 50 years. A letter to this effect is being sent to me and I will forward it to you as soon as I receive it.

Many thanks for your kind cooperation and assistance,

Yours very truly,

(S) John Hagan

J. D. Hagan
Mining Engineer

Sec [illegible]
Virginia Mining Co.

AGREEMENT

BETWEEN

HOFFMAN BROTHERS DRILLING CO.

Punxsutawney, Pa.

AND

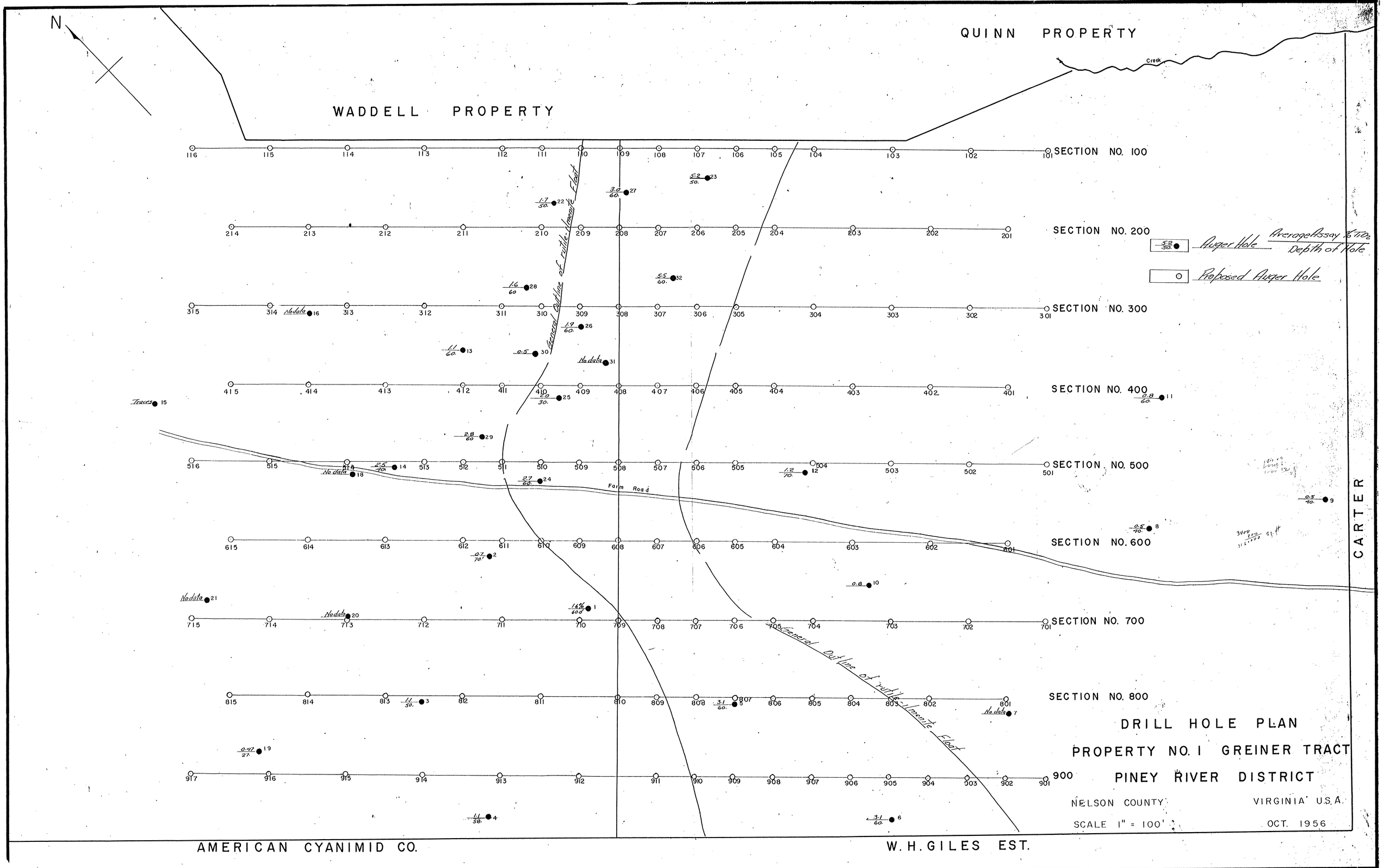
C. E. Craven,

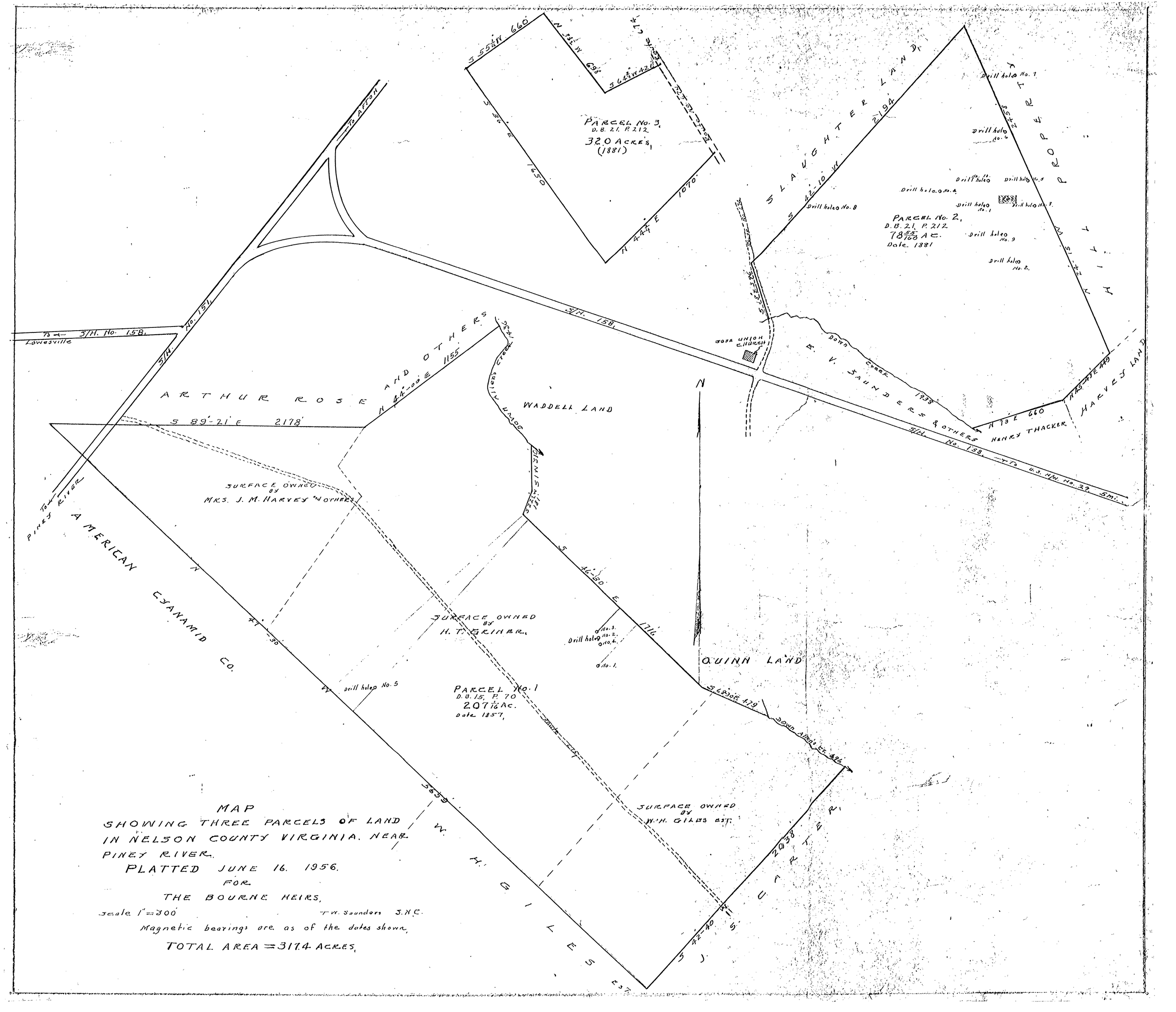
T.E. Shufflebarger, J.L. Patteson,
Partners
Roseland, Virginia

Jan. 7, 1957

HOFFMAN BROTHERS DRILLING CO.
DIAMOND CORE DRILLING
PUNXSUTAWNEY, PA.

FORM 103 200 1-56


N
QUINN PROPERTY
Creek
WADDELL PROPERTY
SECTION NO. 100
SECTION NO. 200
SECTION NO. 300
SECTION NO. 400
SECTION NO. 500
SECTION NO. 600
SECTION NO. 700
SECTION NO. 800
900
Farm Road
General Outline of rutile-ilmenite Float
Auger Hole
Average Assay % TiO2
Depth of Hole
Proposed Auger Hole
CARTER
DRILL HOLE PLAN
PROPERTY NO. 1 GREINER TRACT
PINEY RIVER DISTRICT
NELSON COUNTY
VIRGINIA U.S.A.
SCALE 1" = 100'
OCT. 1956
AMERICAN CYANIMID CO.
W. H. GILES EST.

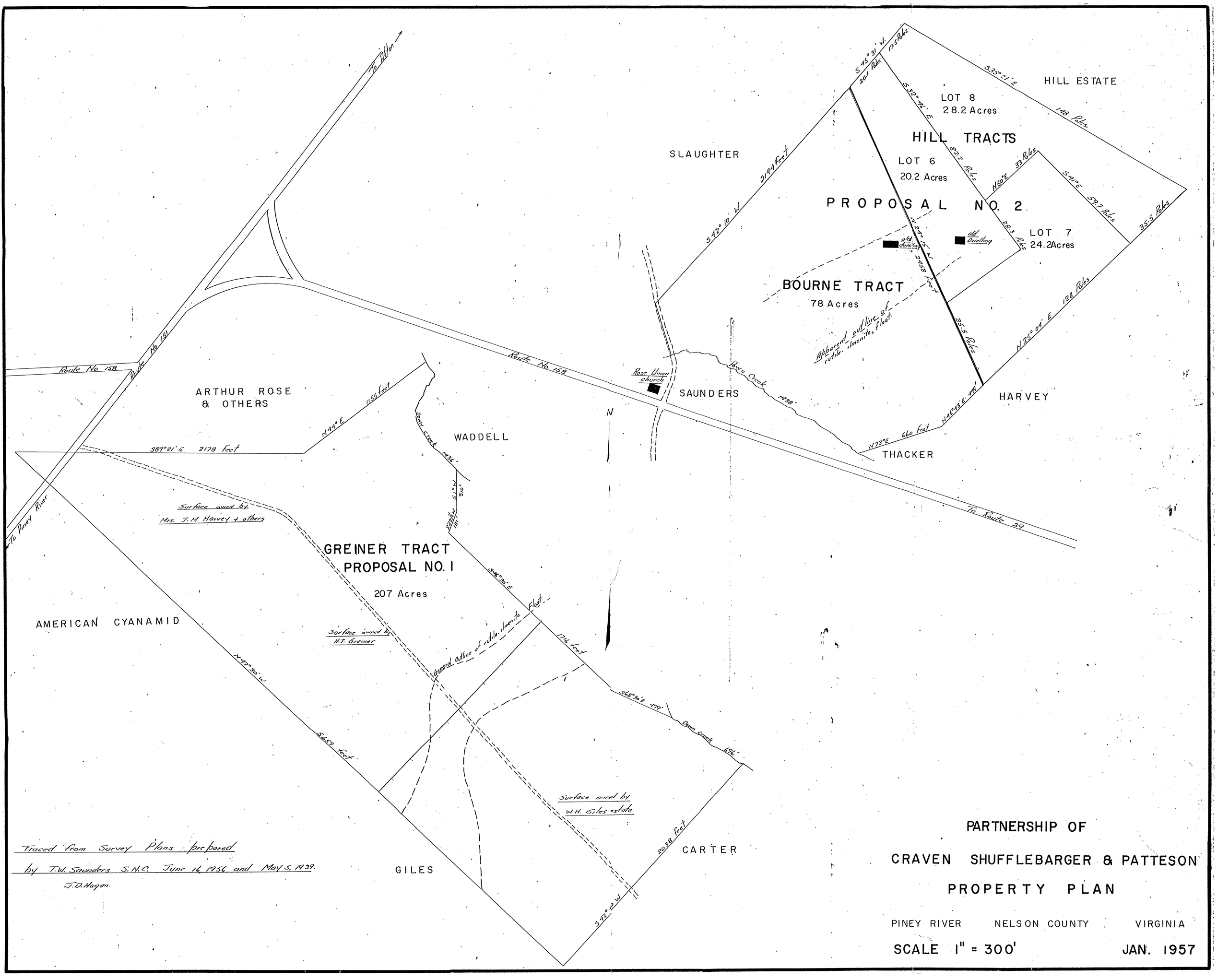


MAP
SHOWING THREE PARCELS OF LAND
IN NELSON COUNTY VIRGINIA. NEAR
PINEY RIVER.
PLATTED JUNE 16. 1956.
FOR
THE BOURNE HEIRS,

Scale 1" = 300' T.W. Saunders S.N.C.

Magnetic bearings are as of the dates shown.

TOTAL AREA = 317.4 ACRES.



PARTNERSHIP OF

CRAVEN SHUFFLEBARGER & PATTESON

PROPERTY PLAN

PINEY RIVER NELSON COUNTY VIRGINIA

SCALE 1" = 300' JAN. 1957