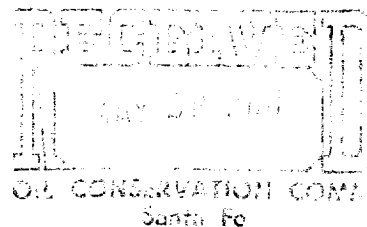


Bieberman replied and requested samples. - cu.

May 24, 1974



New Mexico State Bureau of Mines
Socorro, New Mexico 87801

Attention: Mr. Bob Bieberman

In re: Monument Energy Corp. No. 1 Sedberry, API
30-40-20008, 990' FN & 1650' FE Lines,
Section 25, T-17-N, R-16-E,
San Miguel County, New Mexico

Dear Mr. Bieberman:

I must apologize for the delay in writing this letter. Two burlap bags containing the cuttings from surface to 4000 feet were shipped to you from Las Vegas about two weeks ago, and the remainder, from 4000 feet to 4800 feet, T.D., were shipped to you from Midland last Saturday. As you will see, these samples were very poor above the depth of about 4350 feet. We began to mud up at 4300 feet.

Monument Energy Corp. has staked another test about one mile north and slightly east of subject well. Do you wish a full set of these also?

Very truly yours,

J. V. Hardwick

J. V. Hardwick

JVH:ic

cc: Mr. A. C. Holder
P. O. Box 1476
Lovington, New Mexico 88260

cc: Mr. Carl Ulvog
State Oil & Gas Conservation Commission
Santa Fe, New Mexico 87501

Hope you enjoyed the field conference. I might have gone if I had not had about all of Las Vegas that I could stand.
J.V.H.

1. The first part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation

$$f(x) = \int_0^x \frac{1}{1+t^2} dt, \quad (1)$$

where x is a real number. It is well known that the function $f(x)$ is increasing and concave down on the interval $(-\infty, \infty)$.

$$\begin{aligned} f'(x) &= \frac{1}{1+x^2} \\ f''(x) &= -\frac{2x}{(1+x^2)^2} \end{aligned}$$

It is easy to see that $f'(x) > 0$ for all x and $f''(x) < 0$ for all x .

$$\lim_{x \rightarrow -\infty} f(x) = -\frac{\pi}{2}, \quad \lim_{x \rightarrow \infty} f(x) = \frac{\pi}{2}.$$

The function $f(x)$ is called the arctangent function. It is the inverse of the tangent function $y = \tan x$ on the interval $(-\frac{\pi}{2}, \frac{\pi}{2})$. The graph of the function $f(x)$ is shown in Figure 1.

The function $f(x)$ has the following properties:

1. $f(x)$ is an odd function, i.e., $f(-x) = -f(x)$.
2. $f(x)$ is increasing on the interval $(-\infty, \infty)$.
3. $f(x)$ is concave down on the interval $(-\infty, \infty)$.
4. $f(x)$ has horizontal asymptotes at $y = \pm \frac{\pi}{2}$.
5. $f(x)$ has a vertical asymptote at $x = 0$.

The function $f(x)$ is the solution of the differential equation $y' = \frac{1}{1+x^2}$ with the initial condition $y(0) = 0$.

The function $f(x)$ is also the solution of the differential equation

$$y' = \frac{1}{1+x^2}, \quad y(0) = 0.$$

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The function $f(x)$ is also the solution of the differential equation $y' = \frac{1}{1+x^2}$ with the initial condition $y(0) = 0$.

$$f(x) = \int_0^x \frac{1}{1+t^2} dt.$$

The function $f(x)$ is also the solution of the differential equation

$$\begin{aligned} y' &= \frac{1}{1+x^2} \\ y(0) &= 0 \end{aligned}$$