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EUREKA ENERGY COMPANY

A SUBSIDIARY OF PACIFIC GAS AND ELECTRIC COMPANY

1010 KEARNS BUILDING • 136 SOUTH MAIN STREET • SALT LAKE CITY, UTAH 84101 • (801) 359-3811

June 19, 1980

RECEIVED
JUN 20 1980

Dr. F. R. Hauck
President
AERC
588 West 800 South
Bountiful, Utah 84010

DIVISION OF
OIL, GAS & MINING

Dear Dr. Hauck:

I am submitting a map of Eureka Energy's Sage Point-Dugout Canyon Permit Area showing areas in which a maximum potential subsidence is predicted to be greater than three feet. Also included within these areas shown on the enclosed map, is a buffer zone or perimeter around the area of subsidence of at least 250'.

It is Eureka's understanding from our meeting with yourselves, SHPO, OSM, BLM and DOGM on March 14, 1980, that the enclosed delineated area must receive a biased location - specific survey of 8%. Please submit a cost estimate to perform such an archeological field investigation on the areas shown on the enclosed map. Upon receipt of your estimate, we anticipate authorization for the work to be completed at your earliest convenience.

For your information, I have also enclosed a brief description of how the subsidence calculations were done.

Sincerely,

EUREKA ENERGY COMPANY

Paul B. Anderson

Paul B. Anderson
District Geologist

PBA:hy

cc: Judy Shafer, OSM, Denver w/encl's.
M. A. Wright, DOGM, S.L.C. w/encl's.
P. B. Benzler, S.F., CA w/ encls.

PREDICTION OF MAXIMUM SUBSIDENCE
FOR SAGE POINT-DUGOUT CANYON

This report with attached maps, graphs and table is to establish the area where subsidence is predicted to be three feet or larger.

It should be noted that this calculated subsidence didn't take into consideration the technical methods we will apply during operation to minimize surface subsidence. The number of acreage subsidence shown in this report is the maximum, the actual acres will be much smaller after the coal has been extracted.

The total area which is shown on this report of three feet or larger subsidence is 827 acres. Because our seams are in very deep cover and the mining system will be mostly longwall, the surfaces will not be damaged or fractured, but will lower uniformly. Also the timing of the final profile of subsidence will take many years, since we are mining three coal seams columnized with each other.

METHODS OF CALCULATING THE SUBSIDENCE

To calculate the maximum subsidence of Sage Point-Dugout Canyon, we established in projection maps, monuments, located on the surface in the middle of each seam panel. Because the panels per each seam are columnized, the subsidence of each monument was calculated as many times by how many coal seams will be extracted under them. To arrive with a maximum subsidence per each monument, the calculated subsidence per each seam at each monument was added together (see table 1).

Example: Monument No. 3 will have a subsidence of 1.39 feet by extracted Sunnyside Seam, and 0.92 feet by extracted Rock Canyon Seam and 1.01 feet by extracted Gilson Seam. The maximum subsidence of this monument will be 3.32 feet which is the result of adding the combined subsidence figures. The subsidence timing will start in 1996 (Sunnyside extracted) to 2001 (Rock Canyon extracted) and end in 2006 (Gilson extracted).

To establish the vertical subsidence per each monument the following methods have been used:

For longwall methods use graph shown on Fig. 1. This graph came from Subsidence Engineers Handbook, National Coal Board. In the United Kingdom and other advanced mining countries, empirical data was collected in relation to the ratio W/D (width-depth) with S/t (subsidence-thickness) in order to plot the curve shown in Fig. 1.

For room and pillar systems (recovery 90% or less) the actual curve created from the Somerset Mine in Colorado was used, which has conditions similar to our Sage Point-Dugout Project.

For the short panels apply the correction graph as shown on Fig. No. 2.

Table No. 1 shows the actual vertical subsidence per each monument. The attached three maps are the projection maps per each seam and show the location of each monument on the surface. The Gilson map shows where actual subsidence of three feet or larger will take place.

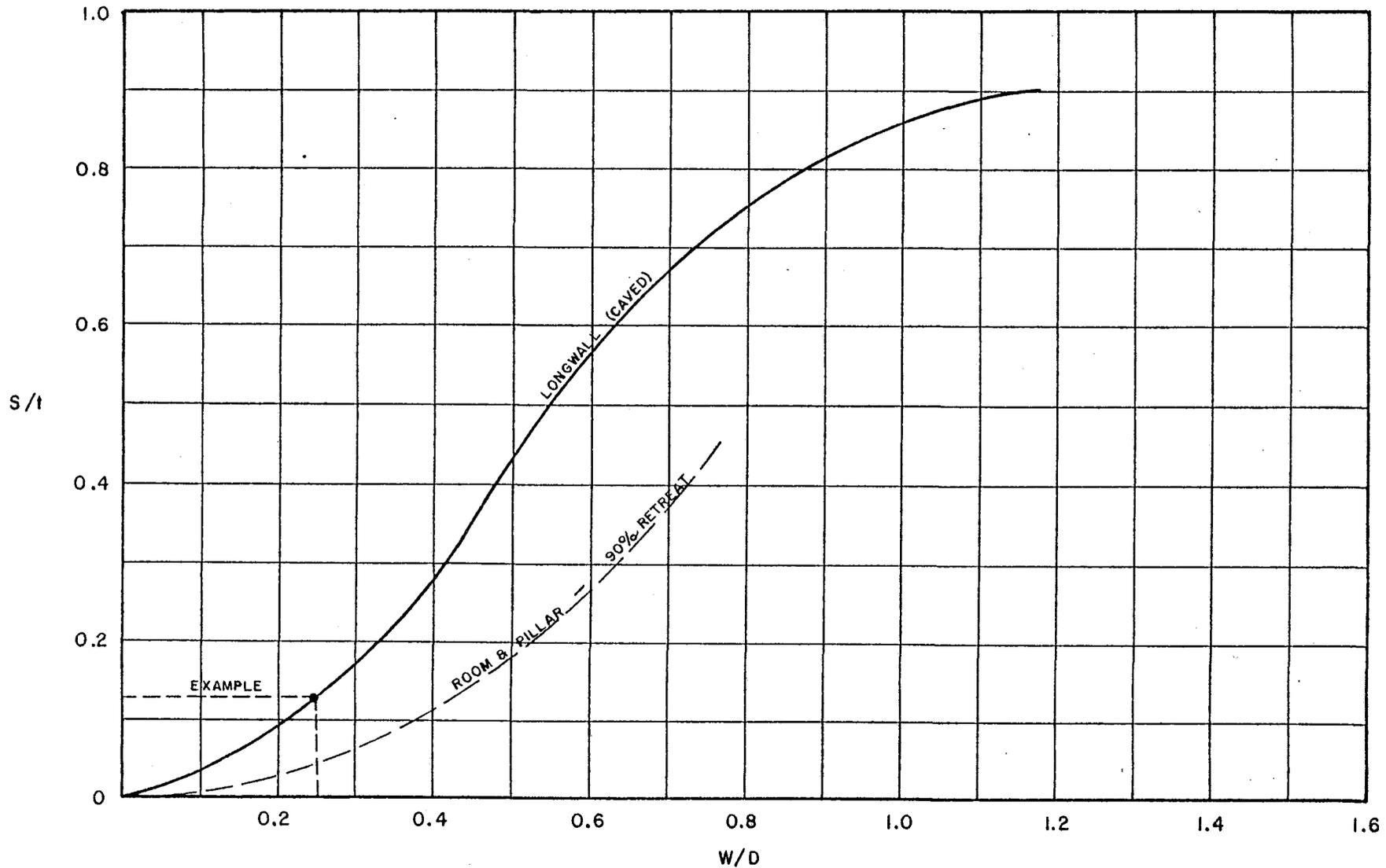
The width of the area of three feet plus subsidence, has been calculated by knowing the subsidence profile at S_{max} and the point where subsidence is zero. All the above calculations are applicable in seams dipping 15° or less. No seam in the Sage Point-Dugout Canyon Project dips more than 8° .

Where monuments 52 thru 56, 83 thru 85, and 100 thru 103 are located, the amount of subsidence can be reduced to zero, by changing the mining method to a room and pillar system with 50% coal extraction. This will be subject to the approval of the United States Geological Survey.

Alex Stillo
ALEX T. STILLO
Chief Mining Engineer

cc: PBAnderson

FIG. 1



EXAMPLE

GIVEN:

$W = 500'$

$D = 2000'$

$t = 8.0'$

FIND S :

$W/D = .25$

$S/t = .129$

$S/8 = .129$

$S = 1.03'$

(FOR LONGWALL)

LEGEND

W = WIDTH

D = DEPTH

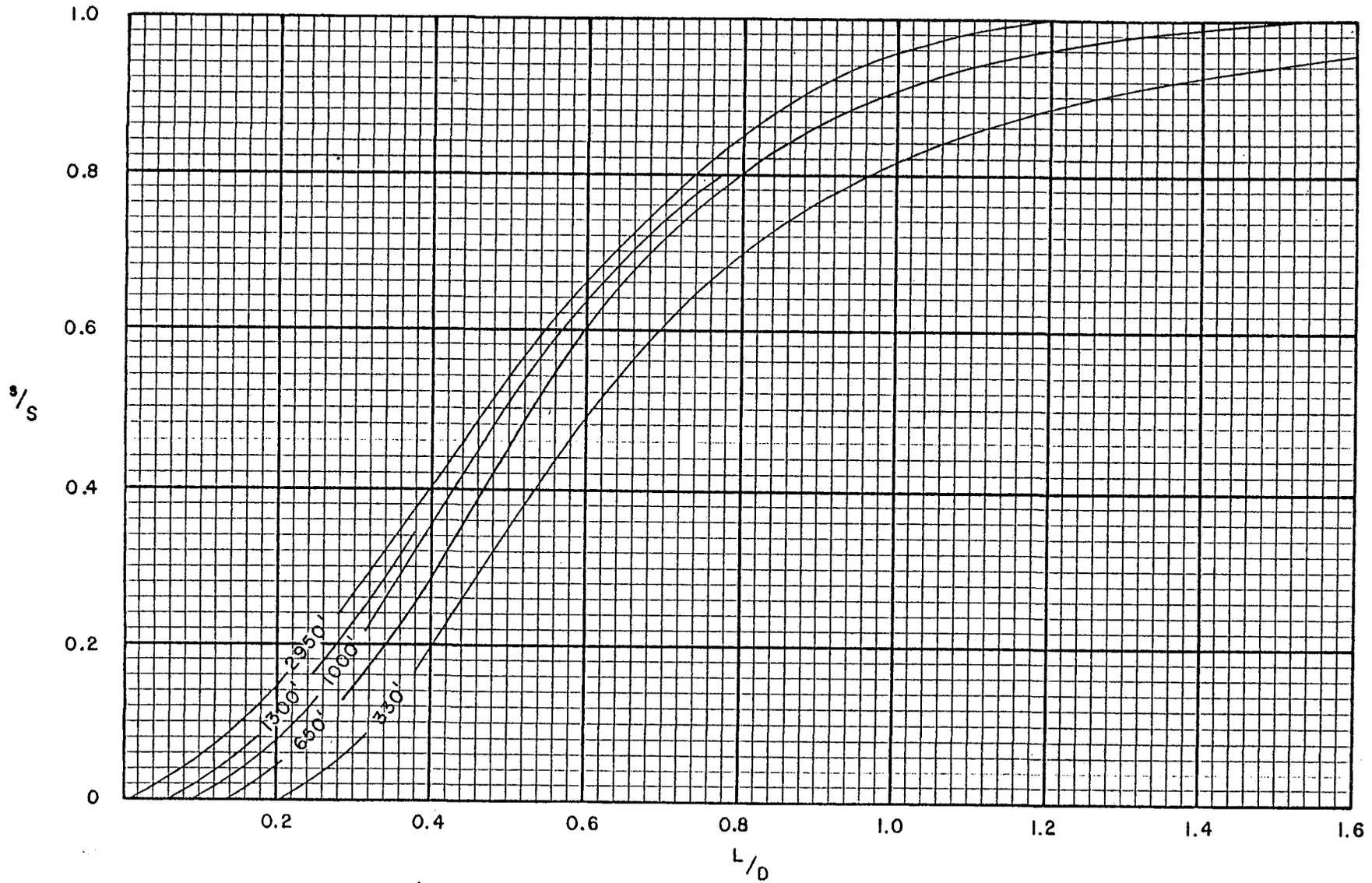
t = SEAM THICKNESS

S = SUBSIDENCE

SUBSIDENCE PREDICTION

AS A FUNCTION OF THE EXTRACTION WIDTH/SEAM DEPTH RATIO

FIG. 2



LEGEND

S = MAX. SUBSIDENCE

s = CORRECTED SUBSIDENCE

L = EXTRACT LENGTH

D = DEPTH

CORRECTION GRAPH
FOR LIMITED FACE ADVANCE