

CONOCO

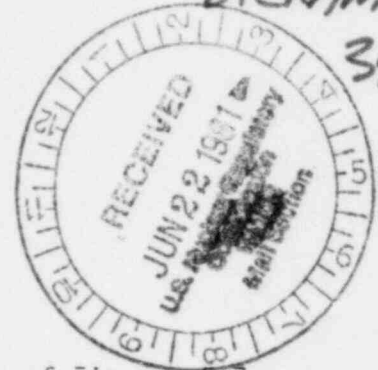
Docket
47-8743

T. W. Quigley
Environmental Project Leader
Sand Rock Mill
Minerals Department

Conoco Inc.
555 Seventeenth Street
Denver, CO 80202
(303) 575-6069



PDR
RETURN
D. CRAMER
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June 15, 1981

Mr. Thomas E. Fleming
Project Manager
U.S. Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Spring, Maryland 20910

Re: Hydro-Engineering Materials Relating to Correction of Figures 5.7
and 5.9 of the Sand Rock Mill ER - NRC Docket No. 40-8743

Dear Mr. Fleming:

The enclosed material relates to our discussion of June 8, 1981 in a conference call with Ott Water Engineers. Item 1 presents a corrected data table relating to Figure 5.7. An original communication (dated May 26, 1981) was forwarded to you on June 2, 1981 concerning Figure 5.7. Item 2 relates to a modification of Figure 5.9

Both Figure 5.7 and 5.9 were the topic of an inquiry sent to you June 1, 1981 from Mary T. Cervera of Ott Water Engineers. Under separate cover, the Hydro-Engineering letters (both dated June 9, 1981) are being sent to Ms. Cervera.

If you have any questions regarding this material, please contact me.

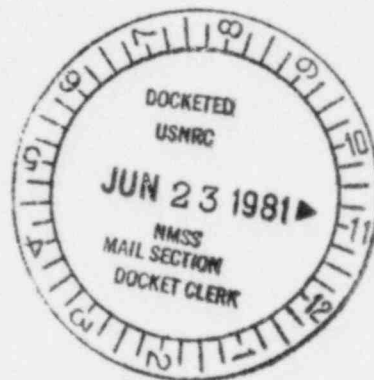
Sincerely,

T. W. Quigley
T. W. Quigley

kr

Enclosure

cc: J. E. Cearley
D. W. Bollig
M. Cervera - Ott

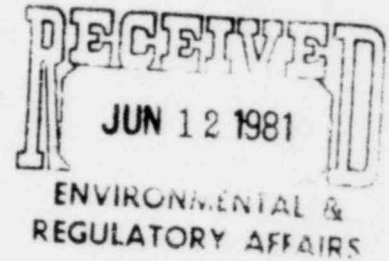


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June 9, 1981

CONOCO, INCORPORATED
555 17th. St.
Denver, CO 80202
ATTN: Mr. T.W. Quigley

Dear Terry:

Enclosed is the corrected calculation sheet which was page 2 of our May 26, 1981 letter to you. These adjustments did not change our predictions as presented in the figure with the May 26 letter. The change of the word phase to stage was done to conform with the seepage theory terminology.

Sincerely,

A handwritten signature in cursive script that reads "George L. Hoffman".

George L. Hoffman

GLH/1h

Encs.

CALCULATION SHEET FOR SEEPAGE

Site: Evaporation Pond

Conditions: With cutoff trench and no liner (all seepage must go through mudstone)

Parameters: $y = 20 \text{ ft}$, $D_s = D_t = D_l = 0.00000001 \text{ ft}^2$,
 $K_s = K_t = K_l = 0.1 \text{ ft/yr}$, $D_m = 15 \text{ ft}$, $K_m = 10 \text{ ft/yr}$,
 $n-\theta_i = 0.15$, $R^2 = 1.6 \times 10^6 \text{ ft}^2$, $h_d = -13 \text{ ft}$
 $\lambda = 2$, $H_m = 20 \text{ ft}$

Stage I: @ $L = 15 \text{ ft}$ (distance of front below tailings)
 $q = 33 \text{ ft/yr}$ (seepage at end of Stage I)
 $t = 0.038 \text{ yr}$ (time at end of Stage I) (goes directly to Stage III)

STAGE III CALCULATIONS

SEEPAGE RATE (ft/yr)	STAGE III TIME (yrs)	TIME SINCE START OF SEEPAGE (yrs)	SEEPAGE RATE* (gpm)
0.5	0.018	0.056	36
0.3	0.050	0.088	21
0.2	0.11	0.15	14
0.1	0.46	0.50	7.1
0.08	0.72	0.76	5.7
0.06	1.31	1.34	4.3
0.05	1.90	1.94	3.6
0.04	3.03	3.07	2.8
0.03	5.54	5.58	2.1
0.02	13.2	13.3	1.4

* SEEPAGE RATE(gpm) = $\frac{\text{Seepage rate (ft/yr) Pond Area (ft}^2\text{)} (7.48 \text{ gal/ft}^3\text{)}}{(365 \text{ day/yr}) (1440 \text{ min/day})}$



June 9, 1981

Mr. Terry Quigley
Minerals Dept.
Conoco, Inc.
555 17th St.
Denver, CO 80202

Dear Terry:

The enclosed calculation sheet and figure present the seepage results for the 35 N tailings pit with a compacted liner and without effective drains. The original R^2 values in these calculations have been adjusted to equal area divided by π . This figure should replace Figure 5-9 of our report. The seepage rate before the start of Phase IV would be less with effective drains. Please give me a call if you have a question on this update.

Sincerely,

George L. Hoffman

GLH/1h

Enc.

CALCULATION SHEET FOR SEEPAGE

SITE: 35N PIT

CONDITIONS: SEEPAGE THROUGH THE BOTTOM OF THE PIT WITH A COMPACTED
LINER AND WITHOUT EFFECTIVE DRAINS

PARAMETERS: $Y = 0$ ft, D_t varied @ top of tailings,
 $D_s = 0.000000001$ ft, $D_l = 3$ ft, $K_t = 200$ ft/yr,
 $K_s = 0.1$ ft/yr, $K_l = 0.14$ ft/yr, $D_f = 50$ ft,
 $K_f = 10.3$ ft/yr, $n - \theta_i = 0.15$, $h_d = -10$ ft
 $\lambda = 2$ ft, $H_a = 20$ ft

	Project YRS	Phase II	Phase III	Phase IV	Phase V
R^2		95,541 ft ²	221,019	467,507	817,096
Rate of D_t Increase	3-4	62 ft/yr for 1 yr			
	4-5.4	19 ft/yr	39 ft/yr		
	5.4-7.1	6.5	6.5	27	
	7.1-	6.5	6.5	6.5	6.5

CALCULATION SHEET (CONT'D)

SEEPAGE TIME (YR)	PROJECT YEAR	D _t (FT)	SEEPAGE RATE (FT/YR)	SEEPAGE RATE (GPM)	@ AREA WEIGHTED AVERAGE
STAGE I					
0.125	3.125	7.8	1.1	4.8	
0.5	3.5	31	2.1	9.1	
1.0	4.0	62	3.5	15	
1.5	4.5	42@	2.6	26	
2.1	5.1	60@	3.4	34	STAGE II t = .004 YRS
STAGE III					
2.2	5.2	-	2	20	
2.4	5.4	-	1.5	15	
PHASE IV					
			1.0	22	
2.5	5.5	-	0.80	17	
2.7	5.7	-	0.70	15	
3.0	6.0	-	0.60	12	
3.5	6.5	-	0.50	10	
4.0	7.1	-	0.44	9.2	
PHASE V					
			0.33	12	
7.9	11	-	0.20	7.3	
13.5	16.5	-	0.15	5.5	

NOTE:

AREAS WERE INCREASED AT THE ADDITION OF EACH PHASE. ESTIMATES OF SEEPAGE WITH DRAINS WOULD BE VERY SIMILAR FOR LATE TIME VALUES BUT WOULD BE CONSIDERABLY LESS FOR EARLIER ESTIMATES (ESTIMATES BEFORE THE START OF STAGE III)

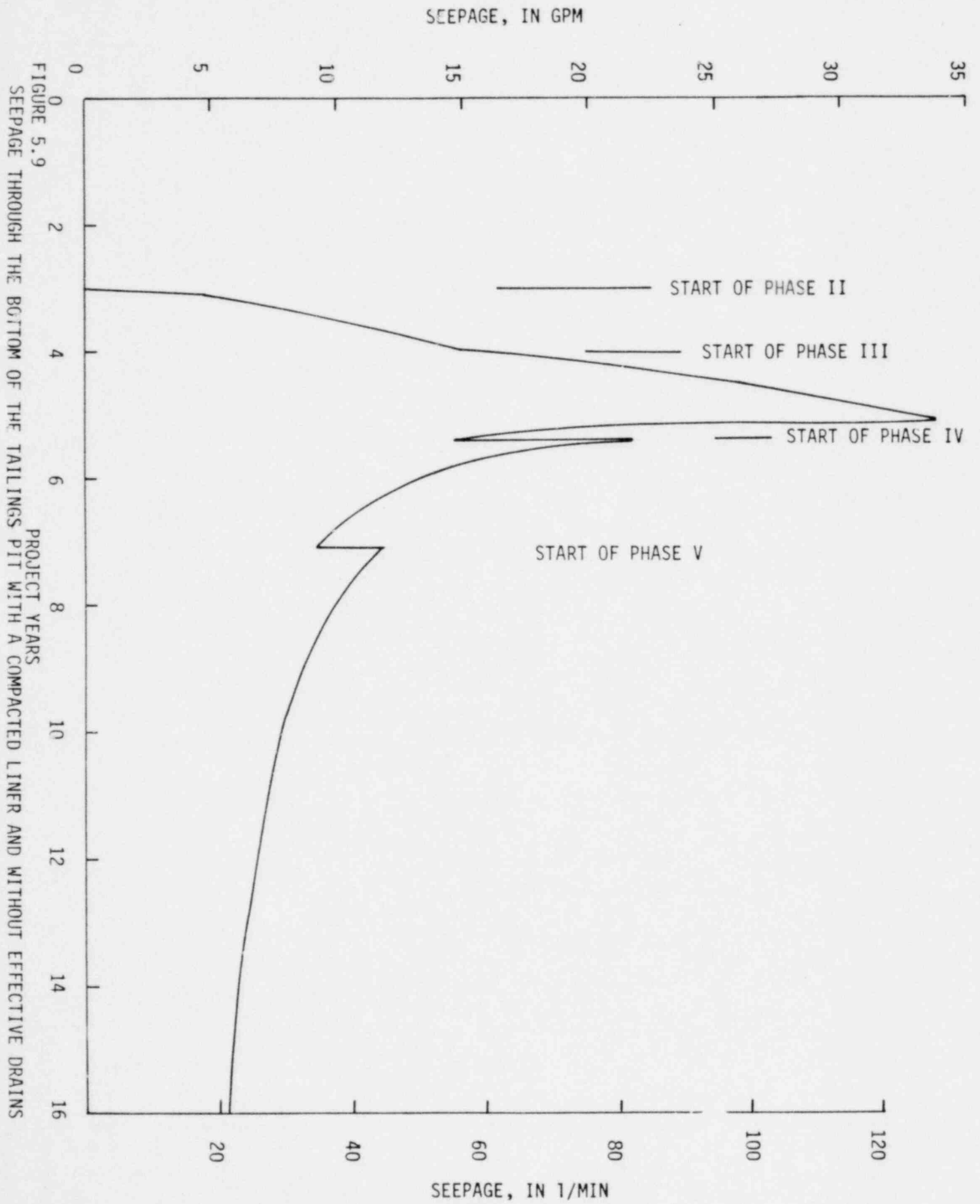


FIGURE 5.9