Simulated Extraction of Oil from Oil Shale

by

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Simulated Extraction of Oil from Oil Shale Using a Bench Scale Retort

A series of tests were conducted on the Kansas oil shales utilizing a minature simulated in-situ combustion process to extract the oil. The simulated in-situ process was developed by the U.S. Bureau of Mines for tests on Wyoming oil shales. (1) (2) Figure 1 shows the bench scale test equipment used. The retort consisted of a 4" x 12" steel pipe fitted with a stainless steel screen at the bottom.

The cylinder was charged with the shale and the fan started. The charge was ignited with a natural gas burner at the top and after a short ignition period the top was closed, air turned on and the fan shut down. Air was admitted to the charge until the hot zone had moved from the top to the bottom of the charge.

Oil was condensed and/or collected in a graduated cylinder. In some cases the escaping gas was recycled back into the charge along with the air. Where sufficient oil was present in the shale there was no problem in maintaining combustion by blowing air only through the charge.

Table 1 shows the results of several tests conducted on Little Osage Shale. No difficulty was experienced in maintaining a burning zone with air blowing through the ignited charge.

(1) Oil Shale Retorting in a 150 Ton Batch-Type Pilot Plant.
Harak, Arnold E.
U.S. Bureau of Mines Report of Investigations
RI 7995
U.S. Dept. of Interior, Washington, D. C.

(2) Some Results from the Operation of a 150-Ton Oil Shale Retort,

Harak, Arnold E.

Technical Progress Report 30

U.S. Bureau of Mines, Department of Interior, Washington, D. C.

Table 1 Results of Retorting Oil Shales.

Date	Comments	Time	Temp °F	Air Flow CFM	
1/10/77	Little Osage Shale 1200 gm batch	1:00	640	11	
	-3/4"; 5 minute ignition time	1:15	800	"	
		1:30	940	"	
	No oil collected	1:45	1000	"	
		2:00	1020	"	
		2:15	1020	"	
		2:30	990	"	
		2:45	960	"	
		3:00	950	"	
		3:15	900	"	
		3:30	810	"	OFF
1/13/77	Little Osage Shale 1200 gm batch				
	-1/4"; 10 minute ignition time	10:30am	Lighted		
		10:45	1000	26	
	No oil collected	11:00	1330	"	
		11:15	1380	"	
		11:30	1200	"	
		11:45	1000	"	
		12:00	750	"	
		12:15	570	"	
		1:00	300	"	OFF
1/18/77	Little Osage Shale 1200 gm batch	10:10	Lighted		
	-1/4"; 5 minute ignition time	10:15		26	
		10:30	475	"	
	Collected 15 cc oil	10:45	1000	"	
		11:00	1250	"	
		11:15	1600	"	
		11:30	1400	"	
		11:45	1025	"	
		12:00	850	"	
		12:30	350	"	
		1:00	100	"	OFF
2/11/77	Little Osage Shale 1200 gm batch	9:55a	Lighted		
	-1/4"; 10 minute ignition time	10:00	160	Fan	
		10:15	1300	22	
		10:30	1640	22	
	Recirculation started at 10:15	10:45	1360	23	
		11:00	1130	26	
	No oil collected	11:15	980	24	
		11:30	800	24	
		11:45	720	26	
		12:00	650	24	
		1:00	440	24	
		1:30	340	24	OFF

Table 1 Continued

Date	Comments	Time	Temp °F	Air Flow CFM	
3/18/77	Little Osage Shale minus 3/4"				
	Charge--1200 gms				
	Started using fan	8:43			
	Change to air blowing, fan off	8:55	460	24	
		9:00	840	24	
	No oil collected	9:15	1400	24	
		9:30	1080	26	
		9:45	800	24	
		10:00	620	24	
		11:10	200	24	OFF

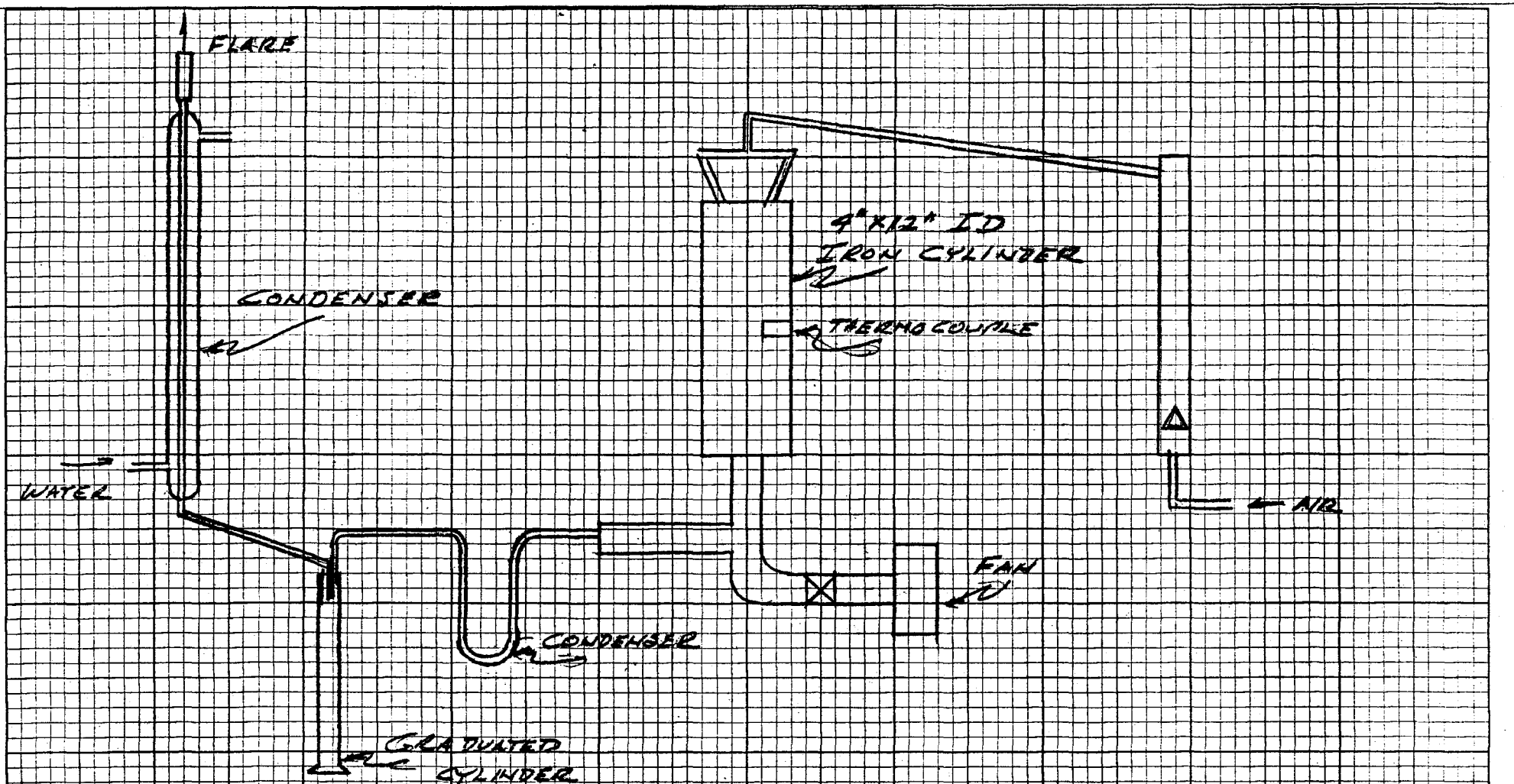

FIG 1 - BENCH SCALE OIL SHALE DISTILLATION SYSTEM