BUSINESS CONFIDENTIAL MEMORANDUM

OIL PRODUCTION CHEMICALS

SILANE TREATED ASBESTOS IN OIL BASE DRILLING MUDS

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DATE: October 5, 1977

PROJECT NO.: 126C05

FILE NO.: 24193

SUMMARY Silane modified asbestos based on UCC RG-244 is a more efficient thickener for oil base drilling fluids than the reference silane asbestos product from Dresser Industries. Thermal stability of the UCC material after heating 80 hours at 300°F is equivalent to the Dresser product when compared at equal apparent viscosity. The UCC experimental product can be prepared in existing facilities and avoids the troublesome acid leaching pretreatment of the asbestos, thus it should have significantly lower manufacturing cost than the Dresser product. It is recommended that additional samples be prepared in a pelletized form to overcome OSHA/EPA restrictions which might impede the commercialization of the improved product in its present form.

INTRODUCTION Following an inquiry from Dresser Industries several years ago, work to develop a silane modified asbestos for use as an oil based drilling additive was initiated in the laboratories of the Mining and Metals Division at Niagara Falls and Chemicals and Plastics/Silicones at Tarrytown. Products from this study have been submitted to this laboratory periodically for evaluation. Recently two samples based on silane treatment of UCC RG-244 (a silica modified asbestos) prepared by Dr. S. Ramachandran of M and M were transmitted for evaluation (1). The process by which these products was made reportedly eliminates the acid leach pre-treatment of the asbestos, which is necessary to make the silane treated asbestos presently being touted by Dresser. Results of our evaluation of these two samples, Lots 2190-75-1 and 2190-75-2, as thickeners for oil-based drilling muds are the subject of this Memorandum.

RESULTS AND DISCUSSION Both samples were evaluated at 3, 5 and 7 lbs/bbl in the standard oil base drilling mud system of 332.5 ml #2 diesel oil and 17.5 ml fresh water as the discontinuous phase. The oil and water were mixed at high speed on a Waring blender for two minutes prior to the addition of the asbestos sample. Stirring was then continued for 10 minutes

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also at high speed, after which time the sample was removed to a Fann viscometer, cooled to 115°F and the viscosities and gel strengths determined. The aging was done in a standard Baroid high pressure cell in a Baroid roller oven at 300°F for 80 hours. Each sample was then stirred for two minutes at high speed on the Waring blender, transferred to the Fann, heated to 115°F, and the same parameters were redetermined. The apparent viscosity (AV) values shown in Table I are steady state values, having been taken after about 20 minutes at 115°F.

The tests at 3 and 5 lbs/bbl concentrations presented no handling problems with either sample. However, both samples were difficult to mix at 7 lbs/bbl, where the liquid mixture turned to mush about a minute after addition of the asbestos. The higher efficiency of the M and M samples recommends their use at lower concentrations than needed for the Dresser Industries product, and at 7 lbs/bbl the M and M samples are too thick to handle properly in the laboratory blender. After 80 hours at 300°F all samples were a mobile liquid and uniform in appearance.

All measurements on the M and M products and the Dresser material are presented in Table I and shown graphically in Figures 1 and 2. The data points for Dresser are plotted on Figure 1, while only the line through these points is shown in Figure 2. At the lower concentrations the apparent viscosity of the M and M asbestos is equal to or greater than Dresser's product in all cases; only at 7 lbs/bbl concentration was there appreciable loss of viscosity after the heat treatment. As pointed out, this may be attributable to the poor mixing of the M and M samples during its initial preparation at the high concentration.

A very disconcerting note on this project is sounded in the ROC (2) by D. F. Braun concerning the asbestos fiber concentration in the atmosphere. OSHA/EPA has set 0.5 as the maximum allowable limit. This means some effort must be expended towards reducing the dusting of the present product. The addition of a binder to the asbestos may alter the rheological properties and any pelletized or other modified product should be re-submitted to this laboratory for evaluation prior to external sampling.

CONCLUSION AND RECOMMENDATIONS

Of the two lots of M and M silane asbestos, Lot 2190-75-1 is superior. However, both of M and M samples have significantly higher thickening efficiency in the diesel oil base fluid than the reference product from Dresser Industries. Furthermore, the thermal stability after heating 80 hours at 300°F is as good for the two M and M samples as for the Dresser product when compared at the same apparent viscosity. Because of OSHA/EPA restrictions affecting the handling of fibrous asbestos, it is recommended that a

pelletized or other suitable non-fibrillating form of the product be developed by M and M, evaluated internally, and samples for evaluation at Dresser as soon as steps can be taken to assure UCC protection.

REFERENCES

1. Ramachandran, S., Letter to R. Raines, "Silane Treated RG-244", June 28, 1977.
2. Braun, D. F., ROC, Dresser Ind., July 6, 1977.

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Attachments:

1 Table
2 Figures

Manuscript date: September 22, 1977
Date Typed: September 28, 1977

TABLE I

SILANE TREATED ASBESTOS FROM M AND M
IN OIL BASE DRILLING MUDS
THERMAL STABILITY STUDIES AT 300°F FOR 80 HOURS

		ORIGINAL VALUES					AFTER HEAT TREATING					
Sample No.	Concentration lbs/bbl	AV	PV	YP	Gel Strength 10 sec.	10 min.	AV	PV	YP	Gel Strength 10 sec.	10 min.	Visc. Loss, Percent
2190-75-1	3	8.5	3	11	6	7	11.5	4.8	13.5	18	24	0.0
	3	12.5	3	19	10	9	14	6	16	7	7	0.0
	5	24	3	42	17	15	23.5	8.5	30	14	15	2.1
	5	25.5	5	41	17	15	26.5	5	43	14	13	0.0
	7	62.5	10	105	17	27	44	12	64	21	19	29.6
	7	77.5	11	133	53	40	47.5	10	75	20	19	38.7
2190-75-2	3	9	3	12	5	6	8.5	4	9	14	16	5.5
	3	8	4	8	5	5	10	4	12	5	6	0.0
	5	17.5	5	25	10	10	14.75	5.5	19.5	23	24	15.7
	5	19.5	4	31	10	11	16	5	22	9	9	17.9
	7	67.5	6	123	27	24	37	8	58	17	18	45.2
	7	52	3	98	19	19	30	10	40	13	14	42.3
Dresser	2	5.75	3.5	4.5	3	5	6.5	4	5	5	4	0.0
	2	5.75	3.5	4.5	3.5	4	6	3.5	5	3.5	3.5	0.0
	4	10.75	5	11.5	8	7	10.25	4.5	11.5	7	7	4.7
	4	11.25	4.5	13.5	7	7	11	5	12	8	8	2.2
	6	15.75	4.5	22.5	13.5	14	15.25	4.5	21.5	12	11.5	3.2
	6	17.5	6	23	12	13	15	4.5	21	12	12	14.3
	7	18.5	4	29	10	9	17.5	4.5	26	11	9	5.4
	7	20	3	34	10	10	16.75	4.5	24.5	11	8	16.3

FIGURE 1

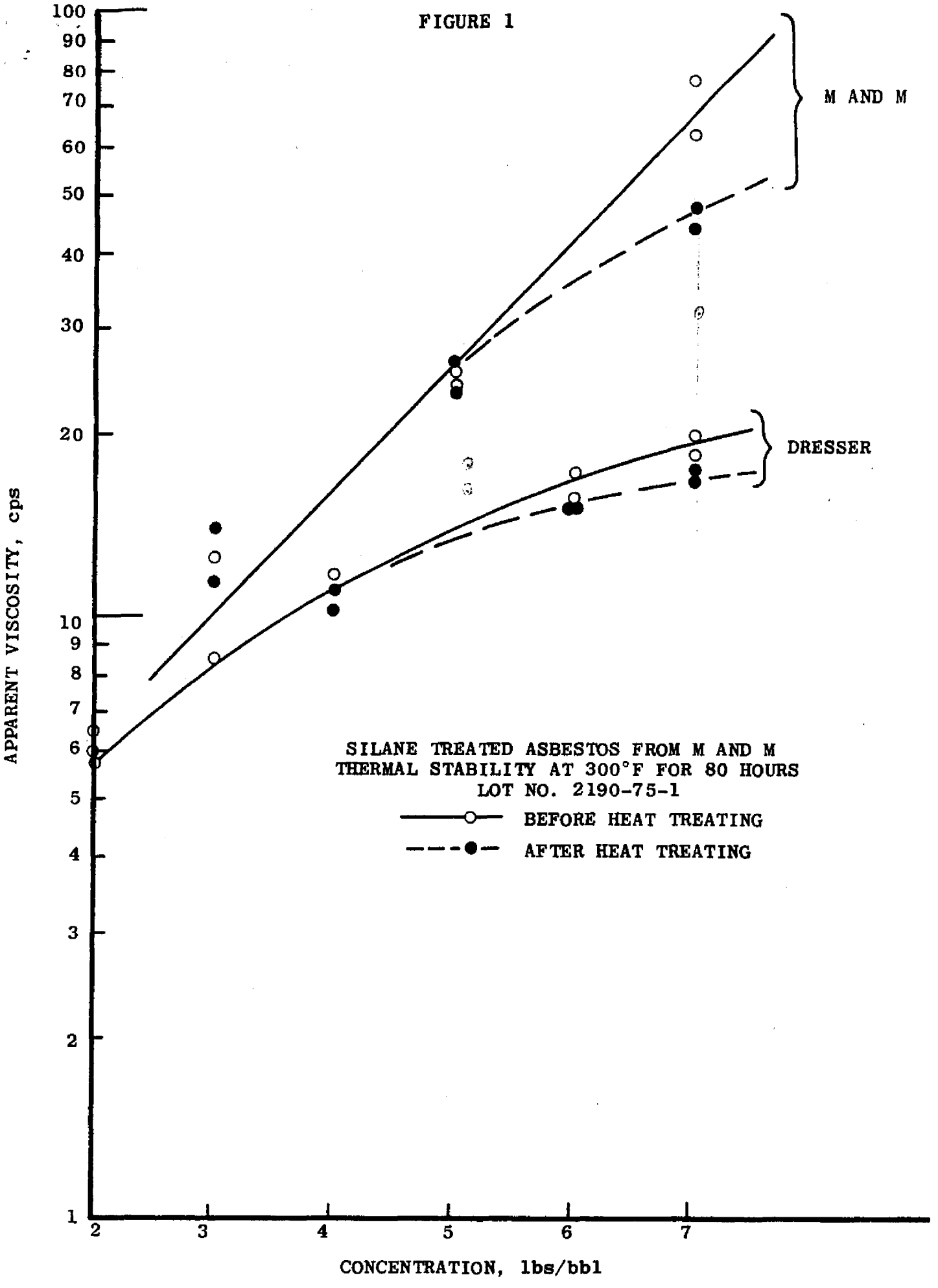
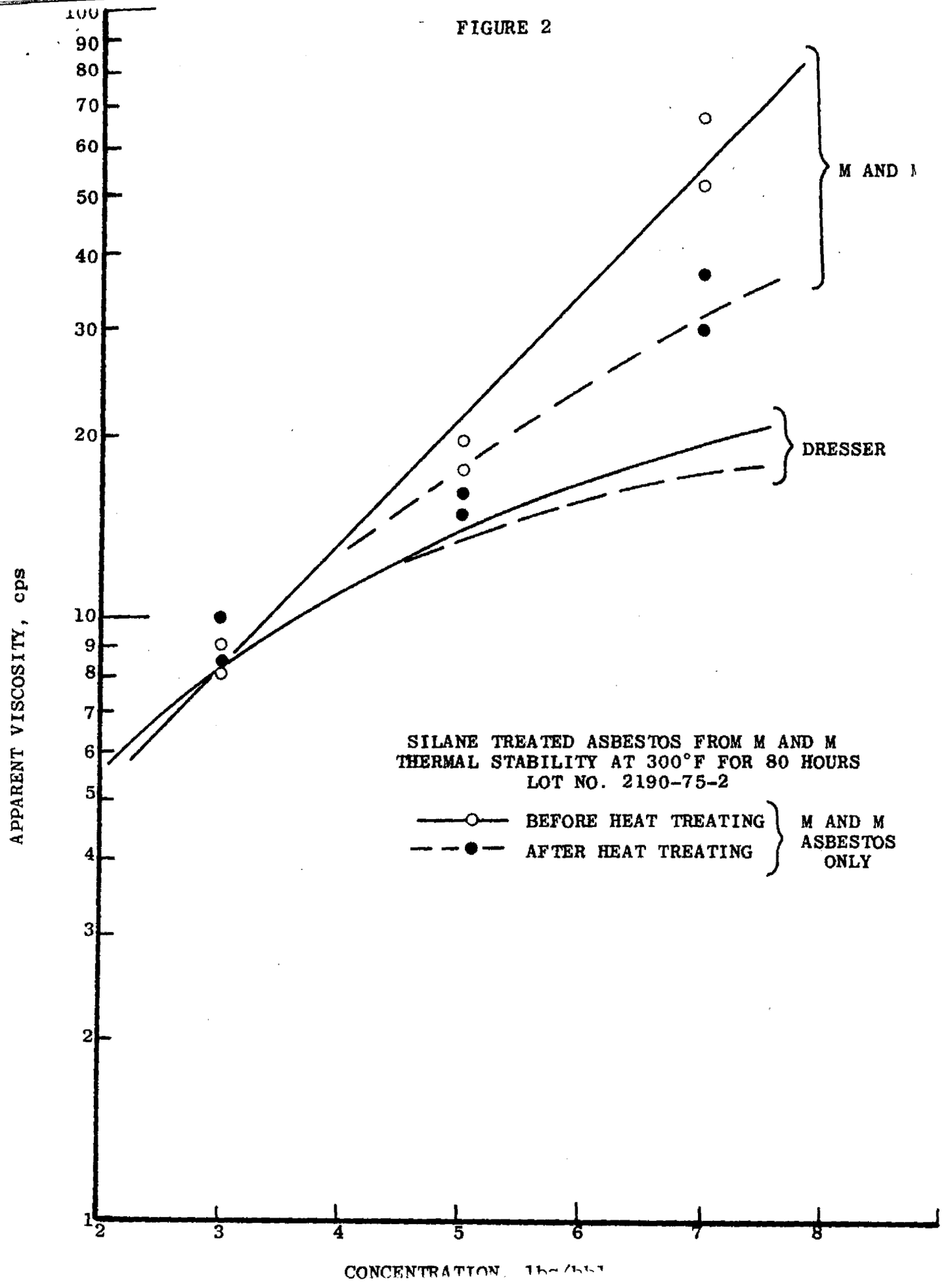

APPARENT VISCOSITY, cps
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1
2
3
4
5
6
7
CONCENTRATION, lbs/bbl
M AND M
DRESSER
SILANE TREATED ASBESTOS FROM M AND M
THERMAL STABILITY AT 300°F FOR 80 HOURS
LOT NO. 2190-75-1
BEFORE HEAT TREATING
AFTER HEAT TREATING

FIGURE 2


APPARENT VISCOSITY, cps
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1
2
3
4
5
6
7
8
CONCENTRATION, lbs/bbl
M AND M
DRESSER
SILANE TREATED ASBESTOS FROM M AND M
THERMAL STABILITY AT 300°F FOR 80 HOURS
LOT NO. 2190-75-2
BEFORE HEAT TREATING
AFTER HEAT TREATING
M AND M ASBESTOS ONLY