MEMORANDUM

PLAINTIFF'S EXHIBIT

BIR-226

To Distribution

From Mr. O'Berg - BBH

Date March 9, 1981

Subject SEMI ANNUAL TESTING - UNFILLED AND FILLED COATING ASPHALTS

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The results of the accelerated weathering of unfilled and filled asphalt coatings for the Fall of 1979 Semi-Annual Weathering Program have been recorded. The test samples consist of 26 to 30 mil coatings applied to aluminum panels as described in ASTM D-1669-62. The samples were then placed into the Weather-O-Meters for accelerated weathering in accordance with ASTM D-529-62, Cycle A (see Table I).

Results:

Cycles to failure in Accelerated Weather Testers.

Unfilled Coating		Filled Coating	
FK	84	FK	117
FJ	77	FS	84
FF	63	FB	82
FB	61	FO	81
FC	61	FJ	77
FM	53	FM	75
FO	51	FF	67
FS	50	FC	56
FW	18	FW	23

Semi-Annual Testing - Unfilled and Filled Coating Asphalts - Cont.

Summary:

1. Both FK and FJ unfilled coating show once again, superior weatherability characteristics when compared with all the coating samples submitted from the nine roofing mills.

2. The addition of 53% FK filler to the coating sample from FK also shows a significant increase in weatherability.

3. No increase in weatherability is achieved by addition of 53% FJ filler to the coating sample from FJ (The weatherability results of this filled sample is drastically different from the results reported for the Spring of 1979 accelerated weathering tests).

4. The addition of 53% FF filler to the coating sample from FF shows only a slight increase in weatherability (this may be related to the coarse filler found in the sample submitted).

5. The asphalt from FC was found to be an average weathering asphalt. However the addition of 53% FC filler to the sample proves to be detrimental to the sample's weatherability characteristics.

6. FO and FS asphalts are poorer weathering asphalts of the nine samples submitted. The addition of 53% filler from these mills to the asphalts shows a significant increase in weatherability.

7. FW unfilled coating shows the poorest weatherability of the nine samples submitted. The addition of 53% FW filler shows only a slight increase in weatherability.

The Color of Ash Test was made on the nine asphalt coating samples that were submitted. With the exception of FF, all the samples show no change in source of asphalt. Further discussion with Mr. David Morris reveals that alternative supplies of asphalt were received at FF during this period of time when the asphalt sample was submitted to BBH. The Color of Ash shows this particular sample to be catalyzed.

The pH of filler extracts were determined on the nine filler samples received at BBH. The pH readings that were obtained on FO filler were high on the alkaline side. Further research was made of the filler showing unfavorable results. The pH of FO filler has since been changed for the better. (See Table III).

The new method for the Asphaltene Settling Rate was run on filled asphalt samples. Results show a close correlation between the Asphaltene Settling Rate and Accelerated Weather-O-Meter results. FK, FB, and FJ show good weatherability characteristics. FF and FC are considered to be average weathering asphalts. FO and FM asphalt would be considered less than average weathering

Semi-Annual Testing - Unfilled and Filled Coating Asphalts - Cont.

asphalt while FW asphalt would be considered a poor weathering asphalt (see Table II).

Corbett Analysis and Dispersability factors were determined on these semi-annual samples. Results do not show the same degree of correlation with Accelerated Weathering-O-Meter results but yield similar results. FB, FK, and FJ show good weatherability results. FC is considered an average asphalt. FO, FM and FF are considered less than average with FW having the poorest weatherability results (see Table II).

References:

O'Berg, G. Lab Notebook BBH 323, pgs. 47-50
" " " 359, pgs. 6-16
" " " 370, pgs. 6-8
" " " 396, pgs. 1-14, 23, 38

Gerry O'Berg

GO'B/ac

Attach.

TABLE I

Cycles to Failure in Accelerated Weather Testers

Source of Asphalt	SP(°F) (Unfilled - Filled)		Pen(@77°F) 0.1MM	Unfilled Sample #/Cycles	53% Filled Sample #/Cycles
Norwood Exxon (filler-FBW Dust)	229	253	16	160-1 62 -2 60	161-1 82 -2 82
Chicago Amoco-Mid Continent (Filler-Limestone)	231	259	19.5	162-1 61 -2 60	163-1 56 -2 56
Franklin Gulf (Filler-Armco-Limestone)	228	245	15.5	164-1 63 -2 63	165-1 69 -2 65
Perth Amboy Trumbull (Filler-GAF-B-65)	229	254	17	166-1 77 -2 77	167-1 76 -2 88
)arleston Exxon-Venezuelan (Filler-FKW Dust)	225	248	16	168-1 85 -2 82	169-1 117 -2 117
Martinez Alaskan-North Slope (filler-Rancho)	239	258	17	170-1 51 -2 55	171-1 74 -2 75
Portland Alaskan-North Slope (filler-Limestone)	243	254	16.5	172-1 51 -2 51	173-1 78 -2 84
Shreveport East Texas-Arkansas (filler-3M)	232	258	12.5	174-1 50 -2 50	175-1 82 -2 85
Wilmington Edgington (filler-3M)	236	263	17	176-1 19 -2 17	177-1 23 - 2 23

TABLE II

Corbett Analysis - Asphaltene Settling Rate

Plant	Fraction Percentage					D*= NA+PA / SAT	#ASR
	Asphaltene	Saturate	NA	PA-1	PA-2		
FK	32	15	27	23	3.2	3.5	-.08
FJ	30	16	27	20	8	3.4	-.10
FF	29.3	21.3	20.6	21.8	6.8	2.3	-.12
FB	32.2	14.6	26.9	22.5	3.8	3.6	-.08
FC	28.7	17.3	24.7	24.3	5.3	3.1	-.16
FM	33.3	18	23.3	24	1.3	2.7	-.22
FO	35	17.1	23.7	23.1	1.1	2.8	-.21
FW	36	22.1	19.4	22.4	1.3	2.0	-.41

* Dispersion Factor

Asphaltene Settling Rate (mls./minute)

TABLE III

pH of filler

FB	9.0
FC	9.0
FF	9.1
FJ	8.8
FK	9.1
FM	8.4
FO	9.5
FS	9.0
FW	8.0