



MEMORANDUM

PLAINTIFF'S EXHIBIT

BIR-222

To Distribution

From Mr. O'Berg -BBH

Date February 1, 1982

Subject SEMI ANNUAL TESTING (Winter of 1980) UNFILLED & FILLED COATINGS

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Accelerated Weathering test results of unfilled and filled coatings, as part of the 1980 Winter Coordinated Weathering Program have been completed. The laboratory prepared samples consist of 26 to 30 mil unfilled or filled coatings applied to aluminum panels as described in ASTM D-166-62. The samples were then placed into the Atlas Weather-O-Meters for accelerated weathering in accordance with ASTM D-529-62, Cycle A. (Table I).

Results:

Accelerated Weather Testers - Cycles to Failure

<u>Unfilled</u>	<u>Coating</u>	<u>Filled</u>	<u>Coating</u>
FJ	55	FJ	101
FK	55	FK	91
FB	55	FB	86
FC	44	FM	71
FO	42	FO	58
FM	41	FS	55
FS	40	FC	46
FF	40	FF	44
FW	28	FW	37

Semi Annual Testing (Winter of 1980) Unfilled & Filled Coatings-Cont.

1. Both unfilled and filled coatings from FJ, FK & FB show the best weatherability characteristics for all the coatings samples tested, based on accelerated weathering results.
2. The unfilled asphalts from FC, FO, FM, FS and FF weathered about the same number of cycles in the Atlas Weather-O-Meters and are considered to be average to less than average weathering asphalts.
3. Both unfilled and 53% filled coating samples from FW show poor weathering results.
4. The addition of 53% filler to the samples from FF and FC showed little improvement over the unfilled samples from these roofing mills.
5. The results from this mill sampling (Winter of 1980) show a close correlation to the results from the Spring of 1980.

The Color of Ash Test was run on the nine asphalt samples submitted by the roofing mills for the Semi-Annual Testing Program. The appearance of a reddish brown color in the ash; which is an indication of the presence of the catalyst FeCl_3 ; was noticeable in the samples from FM, FO, FM, FB and FW. The addition of FeCl_3 to the new source of Exxon Mid-East at FB and FK has become apparent since the Spring of 1980 Semi-Annual Sampling.

The revised method of the asphaltene Settling Rate Tests was run on the nine unfilled asphalt samples. The degree of correlation between the results of this test and accelerated weathering tests was small. The presence of a catalyst in the asphalts may have a detrimental effect on the asphaltene Settling Rate Test. BBH is presently investigating this problem as well as researching new test procedures for this test. (Table II).

Corbett analysis and dispersability factor were determined on the unfilled asphalt samples. The degree of correlation between accelerated weathering results and the dispersability index was somewhat close (with the exceptions of FC and FF asphalt). (Table II).

The pH of the boiled water extract of rock filler from the nine roofing mills was determined. The pH results were acceptable on all the roofing mills with the exception of FO. The pH of the rock filler has decreased since the Spring of 1980 sampling but still is on the high side. (Table III).

References:

Joseph, B. Lab Notebook #383 pgs. 18, 19
 O'Berg, G. Lab Notebook #359 pgs. 27, 29, 31, 36-50
 " " " " #370 pgs. 1, 2, 7, 8

GO'B/ac

Gerry O'Berg

TABLE I
CYCLES TO FAILURE IN ACCELERATED WEATHER TESTERS

<u>Source of Asphalt</u>	<u>SP(°F)</u> <u>(Unfilled-Filled)</u>		<u>Pen</u> <u>(@ 77°F)</u> <u>(0.1MM)</u>	<u>Unfilled</u> <u>Samples</u> <u>#/cycles</u>		<u>53% Filled</u> <u>Samples</u> <u>#/cycles</u>	
Norwood	231	247	17	227-1	55	228-1	85
Exxon Mid-East (filler-FBW Dust)				2	55	-2	86
Chicago	217	234	20	229-1	44	230-1	46
Amco Mid-Continent (filler-Vulcan Limestone)				2	44	2	46
Franklin	234	248	12.5	231-1	38	232-1	44
Gulf Mid-Continent (filler Armco Limestone PCS)				2	42	2	44
Perth Amboy	218	239	18	233-1	55	234-1	100
Chevron, Exxon (filler GAF, B-65)				2	55	2	101
Charleston	233	256	15	235-1	55	236-1	94
Exxon, Mid-East (filler-Augusta & Monroe)				2	55	2	88
Martinez	240	255	18.5	237-1	44	238-1	71
Shell, Alaskan North Slope (filler Rancho Cordova)				2	38	2	71
Portland	241	256	14.5	240-1	41	239-1	56
Shell (filler-Portland Cement-Limestone)				2	43	2	60
Shreveport	232	247	14	241-1	40	242-1	55
East Texas-Arkansas (filler 3M)				2	40	2	55
Wilmington	222	248	18.5	243-1	37	244-1	51
Edgington Oil (filler 3M)				2	37	2	51

DATA TABLE II

CORBETT ANALYSIS - ASPHALTENE SETTLING RATEFraction Percentage

<u>Plant</u>	<u>Asphaltene</u>	<u>Saturate</u>	<u>Napthene Aromatics</u>	<u>Polar Aromatics I</u>	<u>Polar Aromatics II</u>	<u>*D=NA+PA SAI</u>	<u>#ASR</u>
FK	39	12	31	19	2	4.3	-.27
FJ	32	13	26	22	4	4.0	-.09
FF	35	14	29	23	1	3.8	-.14
FS	34	14	29	21	2	3.7	-.16
FB	36	14	28	21	1	3.6	-.27
F0	34	16	27	22	1	3.1	-.26
FM	37	16	26	22	2	3.1	-.25
FW	35	19	22	24	1	2.5	-.27
FC	33	20	24	21	1	2.3	-.11

* Dispersion Factor = (Napthene Aromatics + Polar Aromatics)/Saturate

Asphaltene Settling Rate

TABLE III

pH of Filler

FB	8.30
FC	8.45
FF	8.60
FJ	8.40
FK	8.95
FO	9.30
FS	8.50
FW	7.80
FM	7.60

pH of Boiled Distilled H₂O = 6.80