[redacted]

16 October 1975

MEMORANDUM FOR: Chief, Contracts Staff/OD&E

SUBJECT : Ansco (GAF) Film Testing in the CORONA Program

1. Per our discussion of a month or so ago, I attempted to track down actual data on the testing of Ansco (GAF) film during the early phases of the CORONA Program. I was not totally successful, but sufficient information was obtained to enable positive determinations that such testing was conducted, and to a certain extent the limits of that testing.

2. The history, as I recall it, is as follows. The CORONA Program badly needed a film made on a polyester base. The tri-acetate bases that were the start-of-the-art in 1959 simply were not adequate for space use. The emulsion tended to fall off, and the film base itself became very brittle and tended to shatter. EK claimed that it would be "several months" before any experimental film on a polyester base would be available. This was of serious concern from the standpoint of having a successful and timely program.

3. I believe it was the CIA (OSA specifically) who went to either [redacted] (or both) and arranged to have Ansco emulsion coated on DuPont polyester (Cronar or Mylar) base. This film was known as EF-100. I remember and EF-100, 100A, 100B and 100C but my research does not locate any proof that there was a distinction between EF-100 and EF-100A. At the time, I was a junior engineer at Itek involved with testing these films. The various versions (A, B, C) were further attempts by the manufacturer to develop and demonstrate a product with the desired characteristics. All of this testing was documented in test reports which, unfortunately, were destroyed by Itek some months ago as part of a general house-keeping. The attached list, however, is from Itek's master Photo Department report listing, and shows some of the specific reports on the tests of the EF-100 series. Others of the reports probably have to do with EF-100 as well, but if their

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HANDLE VIA [redacted] CONTROL SYSTEM ONLY

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title does not so indicate, it is impossible to determine without the report itself. The attached list indicated that the testing covered approximately five months, extending from October 1959 to March 1960.

4. Shortly after EF-100 was obtained, EK came out with SO-188 (The several months turned into several weeks, if I remember correctly). This was EK's version of a film on polyester base (ESTAR), I believe EK obtained the base from DuPont also. To make a long story short, the EK product was determined superior to the Ansco product (mostly due to image quality and speed characteristics) and further testing of the EF-100 series was discontinued.

5. In the midst of this effort, EK came out with the first really high resolution aerial film (neither SO-188 or EF-100 were really high resolution) called SO-213. By this point, it was clear to us that EK had a significant advantage over Ansco in the ability to make high resolution films with the required speed and consistency and coated on polyester base.

6. To my knowledge, no further work was ever undertaken in support of [redacted] programs at [redacted]

[redacted]

CCB/OD&E

Attachment as Stated

[redacted]

Log No.	Date	Author(s)	Project No.	Title or Description
43	10/12/59	[redacted]		September Progress Report--Applied
44	10/12/59		[redacted]	Color Film Handbook Proposal
45	10/13/59			The Physical Properties of Cronar Film
46	10/14/59			September Progress Report--Photo Research Section
47	10/13/59		[redacted]	Sensitometric Properties of EF-100 under Ambient Conditions, Normal Processing in D-19
48	10/16/59		[redacted]	Sensitometric Properties of EF-100 Film under Ambient Conditions Processed in Permadol
49	10/17/59			Sensitometric Properties of SO-188 under Ambient Conditions in D-19
50	10/19/59			Curl Behavior of SO-188 and EF-100 under Vacuum
51	10/20/59		[redacted]	Filter Factors
52	10/20/59			Filter Factors for EF-100 Film and SO-188
53	10/21/59		[redacted]	Sensitometric Tests on the Effects of Exposing before and after "Vacuum" on SO-188 and EF-100
54	10/21/59		[redacted]	Sensitometric Tests on the Effects of Exposing before and after "Vacuum" on SO-188
55	10/23/59			Observations on Behavior and EF-100 when returned to 50% RH, 75°F, Normal Pressure after Vacuum Soak at 10^{-3} for 1 hour
56	10/23/59		[redacted]	Effect of Vacuum on Sensitometric Behavior of EF-100 at Ambient Temperature
57	10/24/59		[redacted]	Sensitometry of EF-100 at High Temperature and Low Pressure
58	10/25/59		[redacted]	Tear Resistance--EF-100 and SO-188
59	10/26/59		[redacted]	Loss of Volatile Matter from EF-100 Film Which Was Equilibrated for At Least 24 Hours at 57% RH± 1.5% and 67-69°F (19.4-20.6°C)

Log No.	Date	Author(s)	Project No.	Title or Description
60	10/26/59	[redacted]	[redacted]	Effect of Vacuum and Temperature on Sensitometric Characteristics of EF-100 Film
61	10/27/59		[redacted]	First Run of Dynamic Film Tensile Tester
62	10/30/59			October Progress Report
63	11/3/59		[redacted]	High Acuity Reproduction Study
64	12/23/59			Diazo Coating Data
65	11/3/59		[redacted]	Tear Test in Dry Air and Hot Dry Air
66	11/10/59		[redacted]	Folding Endurance of Films in Moisture Free Atmosphere
67	11/10/59		[redacted]	Mechanical Transport Pressure Marking
68	11/12/59			October Progress Report--Photo Technology Section
69	11/12/59			October Progress Report--Applied Photography Section
70	11/12/59		[redacted]	Rate of Moisture Loss under Vacuum
71	11/13/59			October Progress Report--Photo Research Section
72	11/13/59		[redacted]	Folding Endurance Tests of SO-188 Film Under Controlled Temperature and Humidity
73	11/13/59		[redacted]	Photo-Sensitivity of Film to Pressure, Static, and Related Dynamic Effects in a High-Vacuum Atmosphere
74	11/14/59		[redacted]	Moisture Loss in SO-188 Film and EF-10
75	11/18/59		[redacted]	Moisture Loss in 0% RH
76	11/21/59		[redacted]	Photo-Sensitivity of Filmko Pressure, Static and Related Dynamic Effects in a High-Vacuum Atmosphere
77	11/23/59		[redacted]	Shrinkage of SO-188 in Moisture-Free Atmosphere
78	11/23/59		[redacted]	Shrinkage of SO-188 Film in Vacuum
79	12/1/59		[redacted]	Effect of Temperature on SO-188 Film While in Vacuum

Log No.	Date	Author(s)	Project No.	Title or Description
80	12/8/59	[redacted]		November Progress Report-- Applied Photography Section
81	12/10/59		[redacted]	November Photostat Research Progress Report
82	12/11/59		[redacted]	November Progress Report--Research Section
83	12/24/59			November Progress Report--Photo Technology Section
84	12/16/59		[redacted]	Shrinkage of EF-100-B Material from Various RH's to Moisture-Free Conditio
85	2/17/59		[redacted]	Shrinkage of EF-100-B Material from Various RH's to Moisture-Free Conditio
86	12/29/59			Rollacopy
87	12/30/59		[redacted]	Tear Resistance (1) Moisture (2) 50% R
88	12/30/59		[redacted]	Moisture Loss
89	12/30/59		[redacted]	Shrinkage of .004" Polyester Base Film from Various Humidities to Moisture-Fr Conditions
90	1/4/69		[redacted]	Shrinkage of .0025" Polyester Film fro Various RH's to a 175 Micron Vacuum
91	1/7/60		[redacted]	Dynamic Transport of 70mm Film at High Tensions over Beaded Roller at Skew Angle
92	1/12/60		[redacted]	Dynamic Tensile Strength
93	1/13/60			December Progress Report--Photo Technology Section
94	1/14/60			December Progress Report--Photo Resear Section
95	1/13/60			Dynamic Transport of 70mm Film at High Tensions over Helical Roller at Skew Angle
96	1/14/60		[redacted]	Tear Testing of SO-188 TA-5 Film
97	1/15/60		[redacted]	Film Folding Endurance Test at 50% RH
98	1/15/60		[redacted]	Moisture Loss Test

Log No.	Date	Author(s)	Project No.	Title or Description
99	1/18/60	[redacted]		December Progress Report--Applied Photography Section
100	1/18/60		[redacted]	Dynamic Transport of 70mm Film at High Tensions over Beaded Roller at Skew Angle
101	1/18/60		[redacted]	Shrinkage of .005" Triacetate Base Film (P-9) from Various Relative Humidities to a 175 Micron Vacuum
102	1/18/60		[redacted]	Sensitometry
103	1/28/60			Quarterly Summary of Research Projects and Technology Activities
104	1/29/60		[redacted]	Resolution Capabilities of Ozalid Actifilm
105	2/1/60			Quarterly State of the Art Review
106	2/1/60			Folding Endurance Test of SO-213 Film at 50% RH ± 10%, Temperature 70-75°F
107	2/2/60			Tear Resistance at 70°F ± 10°, 50% RH ± 10% Atmosphere
108	2/2/60			Filter Factor Tests
109	2/5/60			Sensitometric Curves
110	2/17/60			January Progress Report--Photo Technology Section
111	2/17/60			January Progress Report--Photo Research Section
112	2/18/60			January Progress Report--Applied Photography Section
113	2/18/60		[redacted]	Filter Factor Determination
114	2/18/60		[redacted]	Alternate Gas Test
115	2/19/60		[redacted]	White Glove Laboratory Proposal
116	2/22/60		[redacted]	Photo-Sensitivity of Film to Pressure, Static, and Related Dynamic Effects in A High-Vacuum Atmosphere
117	2/22/60		[redacted]	Determination of Effects of Temperature on Sensitometry of EF-100C Film
118	2/23/60		[redacted]	Acutance Study

Log No.	Date	Author(s)	Project No.	Title or Description
119	2/23/60	[redacted]		Determination of Effect of Temperature on Sensitometry of SO-213 and SO-245 Films
120	2/23/60		[redacted]	Determination of Dimensional Changes of EF-100C Film Under Various Ambient RH's
121	2/24/60		[redacted]	3, 6, 9, 12 and 15 Minute D-Log E curves of EF-100C Film Developed in both D-19 and Dektol 1:1
122	2/25/60		[redacted]	Vacuum Sensitometric Tests on EF-100C
123	3/7/60		[redacted]	Sensitometric Evaluation of Film Dessicated for 4 Weeks
124	3/7/60		[redacted]	Resolution of EF-100C Film
125	3/8/60		[redacted]	Comparison of 3 Aerial Films by Means of Distant Scene Recording through Wratten No. 21 Filter
126	3/8/60			Sine Wave Response Data
127	3/9/60			Alternate Gas Tests--1 Week Immersion
128	3/11/60		[redacted]	Sensitometry of EF-100C Film in D-19 at 90°F
129	3/12/60		[redacted]	Photo-Sensitivity of Film to Static under Both Ambient and Vacuum Conditions
130	3/14/60		[redacted]	February Photostat Research Progress Report
131	3/16/60			February Progress Report--Photo Technology Section
132	3/16/60			Statistical Analysis of Resolution Data to Obtain Mean, Variance, and Confidence Limits of 2:1 Contrast Resolution
133	3/29/60			Film Resolution as f/contrast
134	4/4/60			March Progress Report
135	4/8/60		[redacted]	Mobile Film Processing Facility Proposal
136	4/15/60			March Progress Report--Photo Technology Section
137	4/15/60			March Progress Report--Applied Photo Section