

CELANESE PLASTIC MATERIALS COMPANY
Chemcel Plant
Bishop, Texas

TO: P. M. Sykes

FROM: R. L. Bunkley RLB-35-79 June 12, 1979

Quality Control Monthly Report
May, 1979

cc: Dr. R. A. Daniel - Chatham
Mr. J. W. Beltz
Mr. W. A. Flaherty
Mr. R. W. Murphy
Mr. F. M. O'Neill
Dr. M. L. Druin (6) - Summit
Mr. C. Gottfried
Dr. M. Meisters
Mr. F. B. McAndrew
Mr. W. L. Shearer
Mr. M. M. Wilson
Mr. D. Zimmerman
Summit Data Files

Mr. A. C. Abshier - Bishop
Mr. W. S. Allen
Mr. C. A. Amond
Mr. G. Artripe
Dr. J. D. Bennett
Dr. H. L. Davis
Mr. J. C. Doedyns
Mr. D. L. Dotson
Mr. R. D. Fuchs
Mr. D. E. Guthland
Mr. C. L. Hammond
Ms. A. R. Hancock
Mr. L. N. Harvey
Mr. H. P. Hohon
Mr. J. L. Merian
Mr. W. H. Meyer
Mr. A. B. Milam
Ms. P. J. Moede
Mr. E. Munoz
Mr. J. A. Remlinger
Mr. K. A. Rose
Mr. R. G. Rothenberg
Mr. J. D. Saladino
Mr. A. G. Salinas
Mr. P. N. Thomas
Mr. E. D. Wendler
Mr. K. A. Wolf
File: 3.017
301.014
501.009
Central Files (3) - CCCTC

GENERAL SUMMARY:

Celcon® product waivers for May totalled 16.1% of the month's production total (6.6MM lbs.). Major quality waivers in Natural Finishing were the result of out of specification melt index and black speck content. Special Products waivers were due mainly to melt index and natural color (on glass filled materials) being out of specification limits.

Celanex® quality waivers amounted to only 0.5% of the month's total production of 1.8MM lbs. The major quality waiver was the result of out of specification ash content.

Nylon product waivers totalled 39.4% of the month's production of 3.14MM lbs. Major quality variances were out of specification R.V. and volatiles.

Extensive support was provided for the start-up of the modified SH-1 unit. While the bulk density of the product flake was, as expected, low, polymer quality appears good.

The long awaited relocation of the Color Lab to the new laboratory building took place during the month. The move was accomplished without interruption of essential lab services.

I. CELCON®

A. Customer Complaints - Dotson/Tijerina/Hernandez

1. Capitol Records entered complaint P-5470 stating excessive gassing occurred with the use of Celcon C-143 natural from lot 8122654. The material was released on waiver for high MI (29.8) and slightly high kd (.021). The higher than normal kd was not considered significant enough to cause the gassing problems experienced. RTS was requested to investigate the customer's molding and processing procedures. (DLD-87-79)

2. A complaint (P-5469) was entered by Henlopen Mfg. Co., Inc. citing feeding problems due to "stringers" in lot 8121806 of C-143 black. The lot in question was free of strings and strands as released. Evaluation of an unopened return bag confirmed the original release analysis on this lot. (DLD-88-79 & DLD-98-79)

3. El Mar Plastics Inc. complained (P-5471) that molding difficulties occurred with the use of C-244 natural from lot 8102606. Samples of their problem molded parts were sent to Summit. The material in question was released as specification material. RTS was requested to evaluate the complaint at the customer's site. (DLD-90-79)

4. Hardie Trading Ltd. of Australia entered a precautionary complaint (P-5499) over the non-uniformity of color from pellet to pellet in a shipment of GC-25A natural from lot 8101004. In addition, the complaint indicated there were a few burnt pellets in this lot. Release records indicated some pellet to pellet color variability did exist but the molded test chips were uniform in color and well within natural color specification. The possibility of slight pellet to pellet color variability in all natural GC-25A lots was pointed out to prevent future customer concern over product quality. (DLD-100-79)

5. BASF, Wyandotte Corp., entered complaint P-5518 stating that C-143 natural from lot 8122756 molded with excessive gassing. The material met all Quality Control parameters on release. APD was requested to investigate the problem as normal Q.C. tests did not indicate any reason for the problem. (DLD-106-79)

6. A complaint (P-5506) was entered by Shape, Symmetry and Sun, Inc. stating that C-143 natural from lot 8122851 produced excessive out gassing and mold deposit. A 50 lb. unopened bag was returned to the plant for evaluation.

   Plant release records indicated the material met specifications upon release. Evaluation of the return sample confirmed the original analyses. APD was requested to evaluate this material to determine the probable causes for the customer's problems. (DLD-107-79)

B. Manufacturing Support

1. SH-1 Start-Up Support

Technical support was provided for the start-up of the modified SH-1 unit. Problems were encountered with equipment failures, polymer plugging, and maintaining proper solvent composition and temperatures during the first five start-up attempts. The sixth start-up attempt (5/30) was successful. Approximately 600,000 pounds of M-90 flake were produced during the six day run. The quality of this material was acceptable and improving when flake tank problems shut the unit down on 6/5. The average bulk density of this flake was low, 12 #/cu. ft., as was expected from the operating

conditions employed. When the unit comes on stream, additional support will be provided. (DEG-10-79)

2. Solids in V-1656 - Moede

Recurring solids build-up in the trioxane reactor result in lost production and increased energy consumption in TO-2. To resolve this problem, work has begun to identify the causes. Two possible causes of paraforming are: metal impurities and pH effects. A procedure for analyzing sodium and iron in the unit's 50% formaldehyde feed by the Spec Lab on a daily basis has been submitted for review and monitoring of pH effects in V-1656 has begun in the unit laboratory.

3. TO-1, TO-2 Analytical Support - Moede

Analytical schedules for the unit laboratories and the Spec Lab were reviewed. Recommendations have been made in order to (1) discontinue unnecessary analyses, (2) reduce the gas chromatograph analysis load in TO-1 and (3) improve the analytical methods and techniques used in the unit laboratories. A report is pending publication.

4. Evaluation of Chroma Black Concentrate - Remlinger

An evaluation of Chroma Corporation's 20% carbon black concentrate was made (JAR-23-79). This was Chroma's second attempt to qualify this Celcon black concentrate. Color lab testing showed this concentrate to be inferior to Bishop's and was, therefore, not recommended as an alternate to Bishop's current Celcon carbon black concentrate.

C. Analytical Development

1. Irganox 259 in Celcon - Saladino

A letter was published (JDS-6-79) describing the development and verification of a procedure for analyzing Irganox 259 stabilizer in Celcon by U.V. spectrophotometry. This method (CL 1-61) was revised and is being used by the Spec Lab for routine analysis.

2. Water Analysis by Fisher Titrimeter - Saladino

A method for standardizing and operating the Fisher water titrimeter was developed and published. A report was published (JDS-5-79) comparing the Fisher titrimeter to the Aquatest analyzer. The Fisher titrimeter is the preferred instrument, due to its greater accuracy and range.

D. Routine Analytical - Salinas

Sample count, overtime hours, holiday overtime hours, and formaldehyde feed concentrations for May are summarized in Table I. The sample count for May was 5031 compared to 5364 in April. The overtime hours for May were 324 compared to 295 in April.

Special analytical support was provided to the following projects:

1. Color laboratory - Irganox and Cao-5 comparison study in SH-1 and MH-2 polymer.

2. W.E. Dentler - Light Ends Rate Trial Evaluation (WED-15-79).

3. K. H. Patel - PBT High IV Trial Batch No. 5 (KHP-6-79).

4. FDA Testing - Eight finished lots were tested this month.

5. SH-1 Start-Up Support - David Guthland.

II. CELANEX®

A. Customer Complaints - Dotson/Tijerina/Hernandez

1. A complaint (P-5486) was entered by ICC Comercio E. Industria Ltd., Brazil, stating that a 2750 lb. shipment of Celanex 3210 black (lot 8102243) was contaminated with gray pellets. A small sample of the gray pellet contamination was received with the complaint.

   Plant records indicate this lot was released as specification material. Inspection of the shipping retain confirmed the original findings on the lot as released. (DLD-91-79)

2. Hardie Trading LTD, in Australia, complained (P-5500) that an excessive amount of "strings" was causing feed problems with the use of Celanex 2012 natural lot 8081441. A small bag of the "strings" was returned for identification.

   The return sample was found to be composed of Celanex "line skins". Our plant release records indicated this lot of material had an abnormal amount of line skins present, but these were waived by Marketing and the lot released. It was pointed out that some line skins are inherent in this product. (DLD-99-79)

B. Analytical Development

Determination of Antimony Trioxide in Celanex - Saladino/Allen

An atomic absorption method for the determination of antimony trioxide (Sb_2O_3) in Celanex has been developed and is being evaluated. It appears that the method will be suitable for use in determining the Sb_2O_3 content of Celanex products and will therefore be a useful tool to identify and resolve production problems. A precision study on the method will be performed by the Specification Lab.

III. NYLON

A. Customer Complaints - Dotson/Tijerina/Hernandez

1. A precautionary complaint (P-5488) was entered by Nypro Inc. stating excessive black speck contamination was found in Nylon 1310-2 natural from lots 9010981 and 9012581. A small bag of pellets illustrating the black specks was returned with the complaint. Plant records indicated both lots to meet all quality release parameters including pellet quality prior to shipment. Lack of an unopened 50 lb. return sample precluded any further evaluation or plant comment. (DLD-89-79)

2. Reynolds Metals Company complained (P-5495) that film made from N-186 lot 8231231 contained excessive gels. A sample of the resin was returned for evaluation. Quality records show the lot to be specification material.

   Testing at Deer Park showed the lot to meet quality specifications for gels. Additional samples of the lot were also being evaluated by Summit for gel formation and quantity. Summit's results will be reported as they become available.

3. Nypro Inc. entered a precautionary complaint (P-5504) stating that N-249 precompounded white from lot 8100311 had too high a level of black specks. Samples of molded parts and an unopened 50 lb. bag were returned for evaluation. Evaluation of a return sample indicated that the complaint is valid. (DLD-102-79)

4. A precautionary complaint (P-5502) was entered by Monofilaments Inc. citing poor seals on bags of Nylon 1200-1 natural from lots 9021321 and 9021521. Insufficient information as to which seal (factory or plant made) was defective and the lack of a bag for examination prevented any further evaluation by the plant. Plant personnel, however, were made aware of the complaint.

5. Hardie Trading LTD of Australia entered precautionary complaint P-5501 which stated that a shipment of Nylon 1310-2 natural from lot 7131204 had bags with poor seals. Three bags illustrating the problem were returned to the plant for inspection.

   Inspection of the bags supported the customer claim. The manufacturer's seal (bottom corner) of the bags was defective. The seal problem, however, is believed to be due to the age of the bagged material (December, 1977). The seals therefore could have been damaged through repeated handling considering the time span from production to actual usage. Plant personnel have, however, been made aware of this complaint.

B. Manufacturing Support

1. Nylon RV Problems - Allen

   Off spec RV continues to be a problem with 1503 nylon. This problem appears to be related to the type of fiberglass used, with PPG glass filled nylon consistently having a higher RV than OCF glass filled nylon. During recent production (March - May, 1979) the mean RV of 1503 nylon produced with OCF P277B was 53.3 whereas PPG 353 glass gave a mean RV of 60.2. Work will continue to identify the reasons for the RV differences between PPG and OCF glass filled product. A preliminary report (WSA-13-79) has been issued.

2. Nylon Unit Lab Salt Analysis - Allen

   Bausch & Lomb refractometers were set up in the nylon unit labs. These instruments will be used to determine the concentration of nylon salt in solutions from the salt area and the salt evaporator. This procedure is less time consuming than the previous procedure CL 1-90, which determines salt concentrations by viscosity.

3. Contamination of Chemetron Nylon Black Concentrate - Remlinger

   Metal contamination in PPG's Chemetron nylon black concentrate remains a problem (JAR-22-79). Since March, PPG has been unsuccessful in three attempts to provide metal free concentrate. PPG's latest shipment (5/21/79) of concentrate was inspected and found to contain low levels of metal specks. The level of metal contamination was the lowest found to date. The vendor has again been contacted regarding this problem. In addition, samples of the concentrate

were sent to Summit to determine the composition of the carrier resin. With this information, the search for an alternate supplier will be undertaken.

4. Nylon Packaging Studies - Remlinger

The results of the moisture uptake studies of nylon in several package constructions has been published. (JAR-24-79)

The following conclusions were drawn:

a) A savings of ~$90,000 can be achieved if it is possible to convert our present nylon bags and box liners from a 0.0005 in. Al foil/surlyn laminate moisture barrier to a 0.00035 in. Al foil/PE laminate barrier.

b) A comparison of nylon box liners showed that after eight weeks there was no difference in moisture uptake of resin packaged in a 0.0005 in. foil liner or in a 0.00035 in. foil liner.

c) Comparison of our present Celanex bag (0.00035 in. foil/PE) with the Polyplastics tube type bag (0.00035 in. foil/saran) shows them to be the same in moisture uptake inhibition after 14 weeks.

d) The foilless Saranex bag (PE/saran/PE) is not acceptable for use with nylon resins.

The following recommendations were made:

a) Saranex should not be used as a foil substitute in nylon bag construction.

b) The Polyplastics tube bag should not be considered as an alternative for our domestic nylon bag.

c) A new study should be implemented to investigate the difference in the moisture uptake rate of nylon packaged in 0.0005 in. foil/surlyn laminate bags and in 0.00035 in. foil/PE laminate bags.

5. Nylon Nucleant Production - Allen/Salinas

The inventory status of nylon nucleant is summarized below:

Inventory 5/1/79	6 drums
Inventory 5/31/79	10 drums
Nucleant Produced in May	25 drums
Nucleant in Process	14 drums

C. Analytical Development

Analysis of Iodine in 1003 Nylon - Allen

Analysis of 1003 nylon at Bishop has consistently given high levels of iodine. This has been traced to an error in the analytical procedure. This error has been corrected and the revised procedure is in use. Twelve lots analyzed before this revision had an average iodine concentration of 1830 ppm whereas the 12 lots analyzed after the revision had an average of 1374 ppm iodine. The target addition rate in the unit is 1400 ppm iodine. A report will be issued.

IV. INDUSTRIAL HYGIENE - Hancock, Grey, Pritchard, Soliz

A. Formaldehyde Surveys

A formaldehyde survey in the TO2/SH2 unit was completed. The survey was requested to determine if the exposure levels had decreased and remained low since the repair of the latent heat line. Exposure levels were all below the 1.85 mg/m^3 action level. A report is in progress.

Formaldehyde personal samples were taken in Special Products during a GC-25A run to complete the formaldehyde survey in that unit. No formaldehyde exposure problems exist under normal conditions. Only one employee has been found to be exposed to formaldehyde above the 1.85 mg/m^3 (1.5 ppm) action level. No other over exposures have been found.

B. Dust Sampling

The survey for nuisance dust in the Natural Finishing unit will require more sampling of the pellet blender operators. Unit down time has delayed monitoring. Ceiling concentration samples taken on the pellet blender operators show exposures (80-250 mg/m^3) above the suggested 20 mg/m^3 ceiling level. It is suspected that most of the dust exposure comes when disposing of the "stabilizer" bags after a blend is made. The survey will continue to better document the exposure levels.

The nuisance dust survey in Special Products is scheduled for completion by June 15. No apparent dust problems exist.

C. Miscellaneous

Employees in the SH1/TO1 unit were monitored for benzene exposures while unloading benzene trucks. Personal samples ranged from 44 - 89 mg/m^3. These were short term samples for ceiling level concentrations. Respirators were worn. A report will be issued.

D. Analytical Load

The OSHA/environmental analytical load, to date, is summarized below.

	Month		YTD	
	OSHA	Environmental	OSHA	Environmental
SH1/TO1	5	0	40	1
SH2/TO2	95	0	222	0
MH2	18	0	99	1
Nat. Finishing	106	0	222	2
Spec. Prod.	63	0	242	2
Celanex	3	0	22	1
Nylon	0	0	24	1
Chemical Co.	0	0	0	3
	290		871	11

V. COLOR SERVICE - Artripe, Rothenberg, Harvey

General Summary:

Color Service developed 28 color matches this month. The distribution of color match work for each marketing group was 11 Nylon, 7 Celanex, and 3 Celcon matches; of this 5 Celcon and 2 Nylon were reworked from existing formulations.

253 pounds of products were extruded and shipped.

A total of 229 chips were sent out in the process of filling 15 sample requests for chips only.

We have scheduled 23 color matches for June, leaving the backlog of unscheduled work at 38. This backlog is for reformulation of existing formulas. Reformulation is necessary due to pigment obsolescence or chip replenishment. There are no new marketing requests on backlog.

Work is now underway to determine if a new computerized color matching system (Applied Color Systems, Inc.) can be justified on a cost reduction basis.

Extensive work is being done to reformulate Chrysler Red CS 32114 (S.O. JRJ-79-026). There is a potential Fade-Ometer exposure problem with existing pigments. We are currently evaluating several new red pigments which may resolve the problem.

1. Blanket Approval for Bishop Colorants - Rothenberg

Report RGR-30-79, Blanket Approval for Listed Colorants at Bishop, was issued. This report requesting blanket approval for pigments currently in use for Celanese Celcon, Celanex and Nylon color formulations is in compliance with guidelines agreed upon with Dr. G. W. Halek. Each pigment used at Bishop is listed with pertinent data pertaining to that pigment (Color Index Generic Name, Chemical Identification, Potential Uses, etc.), along with Material Safety Data Sheets (MSDS). In addition, typical additives for Celcon, Celanex and Nylon are included in the report. (Reference: RGR-15-79).

2. Fade-Ometer Test Procedure - Rothenberg

Test Method CL 2-26, Accelerated Exposure to Sunlight Using the Atlas Type FDAR Fade-Ometer, was issued (RGR-41-79). This method describes a procedure primarily to check and compare color stability (light-fastness and fading) of a plastic when exposed in a light (sunlight) and water-exposure apparatus (carbon-arc type). Also covered are the preparation of test specimens, test conditions, and the evaluation of test results.

A general care and maintenance checklist for the Fade-Ometer (RGR-43-79) was developed. The checklist will be followed as closely as possible to insure satisfactory use and long life of the Fade-Ometer.

3. R3-866 Pigment Availability - Rothenberg

R3-866, C.P. Cadmium Golden Yellow 1487 (Harshaw Chemical Co.), a standard pigment for Celcon, Celanex and Nylon color formulations, was discontinued by the manufacturer. We have been informed that R3-866 can be purchased on a special request basis consisting of 1500-1800 pound lots. (RGR-42-79)

4. Pigment Evaluation - Rothenberg

Seven (7) new pigments have been received during this time period. Final evaluations on these colorants will be completed shortly.

VI. STATUS OF LAB BUILDING CONSTRUCTION - Rose

The Color Lab moved in and all lab equipment is operational. Several problems have been experienced with the thermolator/chilled water system, but at present it is functioning satisfactorily.

The two-story hood is still incomplete. The exhaust blowers have not been put in place, and a steam valve in the hood needs repair. Two sections of chilled water line still need insulating.

Many leaks in the roof were "discovered" during recent rains. Significant repair will be needed to make watertight.

About half of the larger sized exhaust blowers have been installed. The remainder are repainted and ready to install. All hoods will need balancing to achieve 150 ft/min face velocity.

A broken steam vent pipe above the ASTM room has not been repaired. Condensate forms in this vent pipe and leaks out through the break and drips into the ASTM room during cold weather. This must be repaired before next fall.

Backs for the island bench sink units have not been received or installed.

R. L. Bunkley

RLB:slh

Attachments

SAMPLE COUNT MONTH May, 1979

TABLE I

Area	No. Sples. Celcon® Routine	No. Sples. Celcon® Non-Routine	No. Sples. Celcon® Total	No. Sples. Celanex® Routine	No. Sples. Celanex® Non-Routine	No. Sples. Celanex® Total	No. Sples. Nylon Routine	No. Sples. Nylon Non-Routine	No. Sples. Nylon Total	Total (All Types)	% of Total (All Types)
)-1	324	10	334							334	6.6
)-2	551	29	580							580	11.5
H-1	281	63	344							344	6.8
H-2	298	4	302							302	6.0
H-2	507	42	549							549	10.9
atural Finishing	477	6	483							483	9.6
pecial Products	540	0	540							540	10.7
elanex				326	22	348				348	6.9
ilot Plant	0	0	0							0	0.0
aw Materials	130	0	130							130	2.7
C	255	0	255							255	5.1
ylon							1151	15	1166	1166	23.2
thers	0	0	0								0.0
TOTALS	3363	154	3517	326	22	348	1151	15	1166	5031	100.0%

Overtime:

	Month	YTD
Regular	324	1374
Holiday	0	216
TOTAL	324	1590

® Reg. T.M.

HCHO Feed Ave. Conc.	50.05
Hi	51.29
Low	40.11
HCHO Feed Ave. HCOOH	0.071
Hi	0.122
Low	0.049
HCHO Feed Avg. MeOH	0.47
Hi	0.85
Low	0.24

Total Samples (All Types) 5031

Routine	4840	96.2
Non-Routine	191	3.8

Total Sples YTD 24,277

003884

TABLE II

Celcon Quality Summary

	MAY		Year to Date	
	M Lbs	Percentage	M Lbs	Percentage
Gross Production	6,671.1	100.0	33,500.1	100.0
Total Packaged Off Specification	1,057.1	15.8	8,460.6	25.2
Quality Waivers	1,073.5	16.1	7,037.6	21.0

TABLE III

Celcon Experimental Products

Product	Production	Releases
C234A	48,000	48,000
C240A	192,555	192,555
C244	657,000	657,000
C300	270,400	270,400

TABLE IV

Analysis of Celcon Packaged Off Specification

Natural Finishing	MAY					
Defect	Lots	Quantity M Lbs.	% of Total Natural	Lots	Quantity M Lbs.	% of Total Natural
Melt Index	3	420.6	7.7	40	3493.8	13.8
Discolored Pellets	1	97.6	1.8	9	408.5	1.6
Black Specks	3	476.7	8.8	23	1776.2	7.0
Stabilizer Content	0	0	0	10	560.8	2.2
Ash Content	0	0	0	1	28.3	0.1
Natural Color	0	0	0	3	523.5	2.0
Ext. HCHO	0	0	0	4	108.8	0.4
10X Melt Index	0	0	0	1	19.1	0.1
Kd	0	0	0	3	362.5	1.4
Volatiles	0	0	0	1	44.5	0.2

Special Products	MAY					
Defect	Lots	Quantity M Lbs.	% of Total S.P.	Lots	Quantity M Lbs.	% of Total S.P.
Melt Index	6	94.8	7.6	42	583.1	7.1
Discolored Pellets	0	0	0	5	44.5	0.5
Color Match	1	5.1	0.4	11	67.0	0.8
Off Size Pellets	3	18.3	1.5	32	446.6	5.5
Colored Pellets (Contamination)	0	0	0	5	22.4	0.3
Volatiles	1	1.8	0.1	6	90.2	1.1
Stabilizer Content	0	0	0	11	366.5	4.5
Kd	0	0	0	6	55.2	0.7
Black Specks	0	0	0	1	9.4	0.1
Tensile Strength	1	12.9	1.0	2	25.6	0.3
Natural Color (Glass Filled)	3	44.4	3.6	13	163.3	2.0

TABLE V

Celcon Releases

Formulation	Releases Quantity (M Lbs) MAY	Releases Quantity (M Lbs) YTD	Releases Lots MAY	Releases Lots YTD	Quality Waivers Quantity (M Lbs) MAY	Quality Waivers Quantity (M Lbs) YTD	Quality Waivers Lots MAY	Quality Waivers Lots YTD
M9000 Flake	0	16.3	0	2				
M9001 Flake	234.2	781.3	19	65				
M27000 Flake	24.9	24.9	2	2				
M2501 Natural	0	673.8	0	15		313.2		8
M2504 Natural	125.6	814.2	2	17	97.6	480.2	1	10
M2514 Natural	0	25.7	0	1				
M9004 Natural	3466.7	14009.9	33	103	750.5	3319.5	7	23
M9014 Natural	529.0	1778.4	4	13	43.7	615.8	1	5
M90210 Natural	0	30.2	0	1		30.2		1
M14014 Natural	0	49.6	0	1				
C143 Natural	414.0	1812.8	3	23		195.2		2
M27004 Natural	170.5	1459.0	1	12		68.4		1
M27014 Natural	0	913.5	0	20		225.1		6
U1011 Natural	0	144.3	0	6		67.4		3
M2501 Color	0	21.8	0	2				
M9004 Color	225.6	999.2	20	98	14.7	189.1	1	18
M9014 Color	3.2	3.2	2	2	1.9	1.9	1	1
M9008 Color	0	98.3	0	9				
M9008 Natural	19.2	186.2	2	12		14.2		1
M9034 Color	100.9	205.9	6	11	54.2	98.1	3	5
M14014 Color	0	38.8	0	3				
C143 Color	0	19.9	0	4		5.6		2
M27004 Color	0	107.1	0	10		2.6		1
M27008 Color	24.7	131.0	3	12		48.9		3
M2504 Black	11.6	107.1	2	13		39.9		1
M9004 Black	460.6	1873.2	12	56	42.0	294.3	1	8
M9014 Black	35.9	342.7	3	18	3.1	160.6	1	7
C143 Black	35.2	118.7	2	6				
M27004 Black	79.5	207.3	2	8				
U1011 Black	20.9	20.9	4	4				
GC25A Natural	77.8	395.0	6	32	57.4	114.8	4	9
GC25A Black	0	1296.2	0	53		12.7		1
M9007 Color	38.3	199.9	10	49				
M9007 Black	4.3	122.6	1	6				
Salt & Pepper	80.4	754.7	6	55				
C155	0	124.7	0	5		85.3		3
C234A	48.0	735.1	2	26	8.4	99.8	1	4
C240A	192.5	371.6	1	3		93.8		1
C241	0	64.7	0	4		18.2		1
C243	0	224.1	0	5				
C244	657.0	2160.9	6	24		309.6		4
C251	0	211.2	0	6		133.2		3
C252	0	176.4	0	2				
C254	0	12.6	0	1				
C255	0	5.0	0	1				
C257	0	12.0	0	1				
C300	270.4	635.8	2	6				
C301	0	267.5	0	3				
TOTALS	7350.9	34785.2	156	834	1073.5	7037.6	21	132

	Month	YTD
% COLOR	5.08	5.21
BLACK	9.41	9.79
OTHER	4.61	4.53
GLASS FILLED	1.06	4.86
NATURAL	79.27	74.68
CONCENTRATES	0.57	0.93

QUALITY WAIVERS

MONTH	YTD
14.6	20.2

TABLE VI

Celanex Quality Summary

	MAY		Year to Date	
	M Lbs	Percentage	M Lbs	Percentage
Gross Production	1,882.2	100.0	10,310.4	100.0
Total Packaged Off Specification	45.4	2.4	717.5	6.9
Quality Waivers	8.7	0.5	596.6	5.8

TABLE VII

Celanex Experimental Products

Product	Production	Releases
J225	9700	9700
J226	7500	7500
J227	12950	12950
J228	13050	13050

TABLE VIII

Analysis of Celanex Packaged Off Specification

	MAY			Year to Date		
Defect	Lots	M Lbs	% of Production	Lots	M Lbs	% of Production
Flammability	0	0	0	3	119.3	1.2
Discolored Pellets	4	36.7		5	52.3	0.5
Ash Content	1	8.7	1.9	20	410.1	3.9
Off Size Pellets	0	0	0	1	45.0	0.4
Volatiles	0	0	0	1	39.4	0.4
Colored Pellets (Contamination)	0	0	0	2	51.2	0.5

TABLE IX

Celanex Releases

Formulation	Releases				Quality Waivers			
	Quantity (M Lbs)		Lots		Quantity (M Lbs)		Lots	
	MAY	YTD	MAY	YTD	MAY	YTD	MAY	YTD
2000 Natural	0	25.9	0	2				
2000-2 Natural	0	209.6	0	25				
2012 Natural	0	86.3	0	7				
2012-2 Natural	0	76.1	0	8				
3200-2 Natural	0	38.9	0	1				
3210 Natural	0	694.0	0	46		30.4		2
3210-2 Natural	0	217.8	0	13				
3211-2 Natural	39.5	39.5	1	1				
3300 Natural	803.5	2914.1	36	102	8.7	251.0	1	7
3300-2 Natural	47.1	47.1	1	1				
3310 Natural	0	1152.9	0	59		91.3		6
3310-2 Natural	39.0	370.5	1	17				
3311 Natural	15.0	15.0	1	1				
3311-2 Natural	47.0	47.0	1	1				
3200 Black	124.1	265.3	3	8				
3210 Black	0	101.5	0	5		19.5		1
3210-2 Black	0	45.2	0	2		25.5		1
3300 Black	587.4	2595.3	8	37		123.8		3
3300-2 Black	0	19.1	0	1				
3310 Black	79.3	309.1	4	18		34.7		2
3310-2 Black	0	100.8	0	6		20.4		1
3311-2 Black	54.4	54.4	2	2				
3300 Color	0	122.7	0	9				
3310 Color	53.7	122.7	3	8				
3311-2 Color	53.7	53.7	4	4				
J225	9.7	9.7	1	1				
J226	7.5	7.5	1	1				
J227	13.0	13.0	1	1				
J228	13.0	13.0	1	1				
TOTALS	1986.9	9767.7	75	394	8.7	596.6	1	23

QUALITY WAIVERS

0.4	6.1
Month	YTD

TABLE X

Nylon Quality Summary

	MAY		Year to Date	
	M Lbs	Percentage	M Lbs	Percentage
Gross Production	3,146.3	100.0	12,871.4	100.0
Total Packaged Off Specification	1,389.9	44.2	4,522.4	35.1
Quality Waivers	1,238.7	39.4	3,903.7	30.3

TABLE XI

Nylon Experimental Products

Product	Production	Releases
N181	20,400	20,400
N184	18,000	18,000
N224	414,700	414,700
N355	197,410	197,410

TABLE XII

Analysis of Nylon Packaged Off Specification

	MAY			Year to Date		
Defect	Lots	M Lbs	% of Production	Lots	M Lbs	% of Production
Relative Viscosity	24	737.7	23.4	105	2544.4	19.8
Volatiles	23	610.6	19.4	73	1670.5	13.0
Ash Content	1	8.9	0.3	8	138.8	1.1
Discolored Pellets	0	0	0	5	30.9	0.2
Off Size Pellets	1	22.2	0.7	3	81.0	0.6
Natural Color	9	289.9	9.2	12	320.2	2.5
Izod Impact	2	81.1	2.6	14	316.9	2.5
Uncleant	0	0	0	9	173.7	1.3
Copper	2	42.5	1.3	2	42.5	0.3

TABLE XIII

Nylon Releases

Formulation	Releases Quantity (M Lbs) MAY	Releases Quantity (M Lbs) YTD	Releases Lots MAY	Releases Lots YTD	Quality Waivers Quantity (M Lbs) MAY	Quality Waivers Quantity (M Lbs) YTD	Quality Waivers Lots MAY	Quality Waivers Lots YTD
1000-1 Natural	199.1	354.4	10	18		41.3		2
1000-2 Natural	484.5	1239.0	24	62	49.6	224.7	3	12
1000-4 Natural	169.9	611.1	8	31	58.7	116.4	3	6
1003-1 Natural	118.0	177.9	6	9				
1003-2 Natural	257.1	907.0	13	46	62.8	142.5	3	7
1200-1 Natural	0	221.4	0	21		117.7		11
1300-1 Natural	0	58.0	0	3				
1310-2 Natural	0	617.5	0	32		78.3		4
1310-4 Natural	0	331.3	0	16		97.4		5
1400-2 Natural	0	63.0	0	3				
1403-2 Natural	0	32.9	0	1				
1500-2 Natural	136.9	264.9	4	8	69.5	130.7	2	4
1503-1 Natural	164.7	284.3	5	9	164.7	252.2	5	7
1503-2 Natural	614.4	904.2	19	28	614.4	826.8	19	25
1600-2 Natural	42.7	103.0	2	4	33.8	74.7	1	2
1603-2 Natural	0	24.9	0	1				
1000-2 Black	0	195.9	0	6		134.3		4
1003-2 Black	0	241.5	0	10		213.6		7
1310-2 Black	185.2	246.4	5	7	185.2	185.2	5	5
1503-1 Black	0	39.2	0	1		39.2		1
1503-2 Black	222.0	1283.9	7	37		603.7		16
1603-2 Black	0	51.7	0	2		23.0		1
1503-2 Color	0	72.6	0	6				
1603-1 Color	130.9	209.4	11	18				
1603-2 Color	0	12.6	0	1		12.6		1
N181	20.4	408.4	1	20				
N184	18.0	18.0	1	1				
N186	0	116.0	0	13		9.0		1
N198	0	41.2	0	2				
N224	414.7	1209.4	19	60		63.7		3
N243	0	627.6	0	32		250.7		13
N245	118.4	175.6	6	9				
N269	0	342.0	0	18				
N270	0	148.1	0	7				
N273	0	147.5	0	7				
N355	197.4	804.9	10	42		227.6		12
N357	31.2	315.6	1	5		38.4		1
TOTALS	3525.7	12902.3	152	597	1238.7	3903.7	41	150

QUALITY WAIVERS

35.1	30.2
Month	YTD