SAFETY - A. H. Sather

Occupational Injuries	July	1981 Year-To-Date	1981 Year-To-Date
First Aid	1	24	35
Medical Case	0	3	12
Restricted Workday Cases	0	0	1
Restricted Workdays	0	0	3
Lost Time	0	0	0
Injuries By Department			
Vinyl Operations	0	3	12
Compound Operations	0	6	11
Maintenance	1	15	21
Laboratory	0	1	3
Receiving and Warehouse	0	1	0
Office	0	1	1
Injuries By Type			
Cuts and Abrasions	1	13	23
Eye Injuries	0	2	4
Burns	0	10	5
Bruises	0	2	10
Strains and Sprains	0	2	4
Other	0	1	4

As of July 31, 1981, the plant operated 757 days or 992,978 manhours without a disabling injury.

Safety Meetings

The topic for July safety meetings was "Hand Injury Prevention". The slide and tape program "Think Before You Reach" was shown and discussed.

New Module Outage

A considerable amount of time was devoted to planning the shutdown checklist for the August 10, 1981 outage in the new module for expansion, maintenance and other engineering work.

Fire School

J. R. McCrimon -Compound Operations Superintendant attended the Texas A & M Industrial Fire School July 26-31, 1981.

SAFETY - (continued)

Phase III Firewater Project

John Elkins - CED was in plant July 23, 1981 to review final equipment locations for Phase III of the plant firewater expansion project.

Health

Activity for the reporting period included routine monitoring for VCM, lead antimony and total particulates and a report of additional monitoring work done on plasticizers, tin, phthalic anhydride, chlorine and mercury. The results and overexposure are explained below.

Chemical	PEL		PEL	
	Number	Percent	Number	Percent
VCM	94	97	3	3
Lead	5	100	0	0
Antimony	5	100	0	0
Total Particulates	3	100	0	0

Overexposures

Three exposures occurred to vinyl operating area personnel. One occurred to a vinyl supervisor during a VCM filter pack o-ring failure in the new module, one to a chief operator who was removing used VCM filters from the filter pack area and one to an "A" operator with no specific cause found. None of the above were wearing respirators.

Other Monitoring

Additional monitoring was done on several other chemicals which were noted above. DIDP and 610P area samples were taken in ten locations with nine of the samples indicating less than 0.3 mg/m^3 and one at 3.3 mg/m^3 (610-P). There is no established standard for these chemicals. The OSHA standard for di 2-ethyl hexl phthalate is 5 mg/m^3. Four area samples and seven personnel samples for tin stabilizers indicated less than the detection limits. Several area samples for phthalic anhydride were taken on the charge floor of the plasticizer building and the results found to be less than 0.01 mg/m^3. One phthalic anhydride personnel sample was taken on a yard operator during the unloading of a phthalic anhydride tank car. Several problems were encountered during the operation and the sample result indicated 0.7 mg/m^3. A total of 13 Drager tube samples were taken during slug feeding of chlorine to the plant cooling towers. All samples indicated non-detectable results. Drager tube samples were taken in two areas for Mercury. The old I & E shop indicated results less than the detector tube detection limits. Sampling in the current I & E shop indicated a result of 0.17 mg/m^3 mercury following a small spill. The spill was cleaned up and the area was resampled with nondetectable results.

VINYL - P. E. Markey

		Month	Year to Date
1.	Total Production, MM Lbs.	23.5	176.9
2.	Production Rate, M Lbs./C.D.	765	834
3.	Charges, Reactor Batches/C.D.	20.2	20.6
4.	Total Charges	628	4372
5.	Reactor Stream Factor, %	90.4	87.5
6.	Dryer Rate, Average Lbs./Hr.	5318	5700
7.	Dryer Stream Factor	85.5	86.2
8.	Accounting Days	31	212

Vinyl Department production for July was 23.5 MM pounds or 94% of budget.

Reactor and dryer stream factors were 90.4 and 85.5%, respectively.

Reactors

1. Major repair work on D-400 agitator gear box resulted in a 2.4% reactor stream factor penalty.

2. Recovery and dryer imbalances resulted in a 3.1% reactor stream factor penalty.

3. Cleaning the condenser on 741 reactor resulted in a 0.6% reactor stream factor penalty.

4. Pluggage of the VCM charge header in the old module resulted in a 0.6% reactor stream factor penalty.

5. Replacement of both VCM charge valves on 743 reactor resulted in a 0.6% reactor stream factor penalty.

6. A main breaker failure in the old module resulted in a 0.35% reactor stream factor penalty.

In order to better match sales and maximize operating costs efficiencies the production target for July was reduced from 27 MM pounds to 25 MM pounds. Two cost savings measures adopted were the use of a single rather than dual initiators in 5425 production and usage of a high productivity initiator in 5385.

Dryers

The vinyl unit was essentially reactor limited for the month as described above.

VINYL - (continued)

Resin Quality Summary

Resin Type	Prime Pounds	"BC" Grade	"H" Grade	% of Total Production	Budgeted Resin Product Slate, %
5305	4,381,474	29,250	9,750	18.8	3.9
5385	13,836,560	214,000	-	59.9	70.6
5425	4,998,941	100,950	11,250	21.8	22.2
5465	109,180	-	-	0.5	3.3
Sifter Overflow	-	-	(237,975)	(1.0)	N/A
TOTAL	23,326,155	344,200	(216,975)	100.0	100.0

Quality performance for July was 99.4% customer grade with 1.5% "BC" grade and (0.9%) "H" grade.

Variable Cost Performance

The variable cost variances for July totalled a favorable $709 M with $619 M due to price and $90 M due to efficient operation. The major price variance was $612 M due to below budget monomer pricing. VCM pricing for the month was 21.084 ¢/lb. versus the budgeted 23.636 ¢/lb.

The favorable $90 M efficiency variance is comprised of favorable variances of $44 M for processing additives, and $62 M in the off-grade category which resulted from intensive upgrading efforts. The favorable efficiency was partially off-set by a unfavorable efficiency of $19 M for VCM.

Monomer consumption for the month was 1.022% pounds VCM/pound PVC versus the 1.01936 standard. The 108 VCM railcars weighed from Lake Charles in July showed an average shortage of 700 pounds per car versus the 650 pounds per car shortfall determined in June. Year to date VCM efficiency is 1.02215 pounds VCM per pound PVC.

General

1. Packaging activities for the month totalled 1.7 MM pounds.

2. Resifting activities for profit improvement totalled 829 M pounds.

3. Operating problems associated with 5305 production using Chain Transfer Agents were resolved during the month with R&D technicial assistance. The problems appear to have been associated with residual AMS levels in the recovered monomer. A formula revision to solely fresh VCM has enhanced particle size control and no further problems have been encountered. Resolution of CTA problem and optimum uas of blend tank capacity resulted in 4.4 MM pounds of 5305 production. This represents the highest monthly production of this profitable resin on record.

VINYL - (continued)

General - (continued)

4. Trial production runs were successful in producing a 0.68 viscosity 5305 resin. This represents a key step in the development of improved fittings and bottle grade type resin.

5. Trial production runs were conducted with increased levels of calcium stearate in 5385 production. Batches were produced at 4 gallons, 8 gallons, and 16 gallons stearate levels. Samples were forwarded to PAL for testing. Further testing is planned for August.

6. An extended trial of the high productivity L-46 initiator was begun in July. Testing shows the L-46 initiator to be more active than L-223. However, reactor venting on L-46 is more severe than L-223 even at reduced initator loadings.

COMPOUND - J. R. McCrimon

Compound Production	Month	Per Day	Y.T.D.
Line I, M Pounds	1,487	49.6	8,740
Line V, M Pounds	43	43.3	1,981
Line III, M Pounds	3,012	97.2	20,643
Total, M Pounds	4,542	146.5	31,094
Accountings	31		212

Line I operated 30 days during July at an average rate of 49.6 M pounds per day. Major items affecting production efficiency were: product changes (45.3 hours), dicers (37.8 hours), blender conveyor (37.5 hours), bag charging resin (17.3 hours), quality control adjustments (8.0 hours), blender scales (5.9 hours), and blender conveyor clutch (5.5 hours).

Line V operated 1 day during July at an average rate of 43.3 M pounds per day. Major items affecting production efficiency were: screw change (2.6 hours) and Orbitran (2.3 hours).

Line III operated 31 days during July at an average rate of 97.2 M pounds per day. Line III production was affected by: product changes (40.3 hours), mill maintenance (9.0 hours), FCM (7.0 hours), dicers (6.6 hours), quality control (10.9 hours).

Quality performance for flexible compound was 3.5% off-grade of which 76.8% was due to mill scrap. "BC" production was -2.98% (135 M pounds reblended).

The raw material requirement for flexible compounds was 1.01037 pounds of raw material per pound of compound versus 1.01301 standard. (Y.T.D. is 1.00982)

The variable cost variance for compound was $18.8 M with $48.9 M due to price and ($30.1 M) due to efficiency. The variance due to product mix was ($1.5 M), and the variance due to off-grade was ($35.2 M).

There were no major efficience variances or price variances for the month.

Dry Blend	Month	Per Day	Y.T.D.
Production, M Pounds	3,791	158.0	28,447
Accounting Days	31		212

Dry Blend operated 24 days during July at an average rate of 158 M pounds per day. Production included 80273G, 80174, 90171, 80274, and RP-100 BW. Dry blend production was affected by: quality control (47.3 hours), product changes (21.8 hours), Brabender repairs (19.1 hours), and out of resin (5.7 hours). RP-100 BW and 90171 production to boxes also contributed to reduced rates.

Quality performance for the month was 99.98% customer grade.

COMPOUND - (continued)

Dry Blend - (continued)

The raw material requirement for dry blend was 1.00618 pounds of raw material per pound of dry blend versus a standard of 1.00576. (Y.T.D. is 1.01114)

The variable cost variance for dry blend was $32.3 M with $24.8 M due to price and $7.4 M due to efficiency. The variance due to product mix was $21.9 M. There were no major efficiency variances and only one major price variance $11.4 M for titanium dioxide.

Plasticizer	Month	Per Day	Y.T.D.
Production, M Pounds	805	50.3	7,205
Accounting Days	31		212

Plasticizer operated 16 days during July at an average rate of 50.3 M pounds per day. Production included: DOP, DIDP, and 610P.

VRP production totaled 72.9 M pounds (9.1%). Production was limited by: R-2 stub shaft repairs, R-2 vacuum valve replacement, R-4 safety disc replacement, and R-4 instrument repairs. Two other major factors limited plasticizer production: steam allocation due to boiler repairs and out of ALFOL 610 due to rejected shipment for high moisture.

The raw material requirement for plasticizer was 1.06691 pounds of raw materials per pound of plasticizer versus a 1.10500 standard. (Y.T.D. is 1.11320)

The variable cost for plasticizer was $9.1 M with $9.14 M due to price and ($0.04 M) due to efficiency. The only major price variance was $11.3 M phthalic anhydride and the only major efficiency variance was ($12.7 M) for phthalic anhydride.

The variance due to product mix was ($1.7 M).

General

Total customer grade compound inventory increased from 8.9 to 10.1 MM pounds during July.

Line 1 Banbury repairs are scheduled for August in order to reduce the mill scrap production rate.

Two new compounds were produced for Belden during July.

MAINTENANCE - S. J. Vincent

Vinyl

There were no reactor seal failures in this period. One reactor condenser was cleaned and one gearbox experienced a failure. The condenser cleaned was on the 741 reactor in the new module. The gearbox failed on the D-400 reactor. The gearbox and seal housing had to be removed from D 400 reactor. The seal housing was sent out for sleeving and the gearbox was overhauled. The motor was also removed for a service check. The safety valves were tested and the safety discs were changed on both the D-300 and D-400 reactors in the old module. The VCM charge header in the old module from the filters to the charge meters was removed for cleaning.

The VCM turbine meters were pulled and cleaned twice. There were five major valves replaced in this period. In the old module the inlet valve to the north VCM filter and the VCM charge valve on D-400 reactor were replaced. In the new module the slurry dump valve and the recovery valve were replaced on 741 reactor and the vent valve on 742 reactor.

In the old module the south recovered VCM receiver was opened for cleaning and the south recovery condenser. The flow controller for "B" recovery compressor was replaced. The level control for D-300 and D-400 cooling tower was calibrated.

There were fourteen repairs to pumps and compressors in the vinyl production area in this period. In the old module the recovered VCM charge pump and rinse pump were overhauled and then the spare "A" vacuum pump was installed. Seals were replaced in the east and west VCM return pumps, east and west VCM charge pumps, "A" compressor outboard seal, "A" vacuum pump inboard and outboard seals, 705 emission recovery compressor outboard seal and the 703 emission recovery vacuum pump outboard seal. In the new module the third recovery compressor was reinstalled and the seal replaced on the west chem-wash pump.

Repairs to the vinyl drying equipment were to change out the #6 centrifuge and gearbox twice, and the #5 centrifuge and gearbox once. The repairs were the result of plugging and resulting plastic accumulation in the conveyor section. The drum drive gearbox on #2 dryer was overhauled with the drive sprocket and chain being replaced. Several blend tank level transmitters were checked.

A major problem developed with the use of the Conoco HD calcium grease. Several bearing failures were directly attributed to the breakdown of this grease. Information has been received that indicates there may have been a blending problem with the HD calcium. Due to the recommendations of our equipment suppliers and the bearing failures experienced, an alternative grease has replaced the Conoco HD calcium and we are currently completing our stock changeover.

MAINTENANCE - (continued)

Compound, Dry Blend, Plasticizer and Resin Storage

The major repairs in the compound area were to replace the FCM seals, rotary joints, the conveyor belt to the mill and the mill rotary joints on line three. The bucket clutch and flex line to the mill rotary joint were replaced on line one. Line I blender conveyor bucket continues to drop from its chain and cause problems. Dicer blades continue to be a major maintenance cost item for both compound lines. Two dicer motors were repaired.

The dry blend unit was shut down to replace the #2 bowl and to repair the #1 Welex bowl. The switchgear was also serviced. The mixer blades were replaced in both Welex units and the screen was replaced in the south Kason screener. Several blender and feeder valves were repacked. Repairs to the plasticizer unit were to replace seals in the PA charge pump, tank 109 pump and to overhaul 110 tank pump. The safety disc was replaced on R-4 reactor.

Utilities and Service

There were six repairs to the plant air system compressors during this period. Valves were repaired twice in the #2 and #3 compressors and once in the #1 and #6 compressor. The plant breathing air system revisions were completed in this period. The #1 and #3 boilers were shut down for inspection and repair. All boiler tubes were hydro-blasted, followed by chemical cleaning. There were two tubes plugged in #1 boiler and eight tubes plugged in #3 boiler. The refractory was repaired in both boilers.

The tool room mechanics completed bench testing of the new safety valves for the relief valve modification and expansion projects. The plant machinest and air conditioning mechanics were very productive this month, machining parts and maintaining the plant air conditioning systems.

Planner

There were 78 work orders planned and estimated in this period.

There were 22 registers closed and 23 new registers issued.

Material was ordered for 26 projects.

The planner worked with Tom Knuckles from MED on planning the upcoming new module shutdown.

Miscellaneous

Four mechanics were given training in the operation of the plant crane.

New columns have been installed in our plant gas chromatographs. The conduit and cable have been installed to add amp meters in the old module recovery system. The installation of the instrumentation for the spare inert vent incinerator has been started. New level controls were also installed in the dry blend use bins.

MECHANICAL ENGINEERING - J. A. Dixon

AFE's Submitted, Approved, and Closed

The following AFE's were submitted and approved during July:

AFE No.	Title	Authorized
9671	New VCM Railspur	$194,000
9681	Miscellaneous Projects Under $10,000	145,000
9691	Reactor Agitator Two Speed Motors	40,000
9701	Miscellaneous Energy Savings Projects Under $10,000	25,000
9711	Plasticizer Spill Containment	42,000
9721	Emergency Cooling for Reactors	190,000

The following AFE's were closed to field charges during July:

AFE No.	Title	Authorized
9639	Revisions to Emission Recovery System	$100,000
9719	Aberdeen PVC Resin Expansion	850,000
9590	Critical Spare Equipment	59,000
9521	New VCM Railspur	11,000

A completion report was issued for the following AFE:

AFE No.	Title	Authorized
9751	Centrifugal Air Compressor Repair	$ 45,000

Design

Design work is in progress on the following projects:

Resin Reclaim System
Emergency AMS Kill System
Modifications to Make Profile Dry Blend
Compound Line III Debottlenecking
Fire Protection Improvements - Phase III
V-10 Centrate Heat Recovery
Vinyl Initiator Charge Pots
Reactor Seal Access Platform
Slurry Delumper
New Storage Track
Plasticizer Irritant Control
Centrate Heat Recovery

AFE Activity

1. AFE 9729 - Fire Protection Improvements - Phase III - M. Ingle & J. P. McKee

   Construction of the pump house is complete. The jockey pump has been installed. Piping and electrical are 95% complete.

MECHANICAL ENGINEERING - (Cont.)

AFE Activity - (Cont.)

2. AFE 9570 - Replace T-101 P. A. Tank - J. P. Windham

   Drafting and purchasing is complete. Construction bids have been requested.

3. AFE 9600 - Calcium Stearate Addition System - M. S. Richards

   The storage tank and agitator are on order. Tie-ins are planned for the shut down in the new module. Electrical design is in progress.

4. AFE 9630 - Water Stripping (Air) - M. Ingle & J. L. White

   This project is operational. Minor modifications are in progress.

5. AFE 9680 - Fixed Point Monitor Data Computer and Warning Lights - R. B. Harned

   Construction is progress. There was a delay in shipment of the computer from Ponca City. The delay should not affect project completion.

6. AFE 9710 - Fire Protection Improvements - Phase III - J. B. Elkins & W. J. Modica

   Engineering is approximately 70% complete and drafting is 50% complete.

7. AFE 9730 - Compound Line III Debottlenecking - J. J. Tomek

   Structural design is in progress. Request for quotes were sent out for all major equipment. Planning data is being prepared to evaluate the alternate silo locations.

8. AFE 9760 - Emergency AMS Kill System - J. L. White

   Piping drawings for the new reactor area are being checked. Instrumentation drafting is in progress.

9. AFE 9770 - Reactor Pressure Relief Modifications - J. L. White

   All material has been been received. Installation of relief valves and reactor studding outlets are scheduled for August.

10. AFE 9790 - Resin Reclaim System - P. H. Meiers & M. S. Richards

    Design is approximately 50% complete. Piping approval drawing are read for review and comments. Equipment purchasing is proceeding.

11. AFE 9800 - Plasticizer Irritant Control (Air) - R. Milner & R. B. Harned

    Design work is complete for installation of the pond aerators. Bid packages have been prepared and bids are due in August.

MECHANICAL ENGINEERING - (Cont.)

12. AFE 9531 - Vinyl Initiator Charge Pots - S. Jones & J. P. Mckee

Piping drawings are being revised per approval comments. Instrumentation engineering is 50% complete and drafting has just begun.

13. AFE 9541 - VCM Tank Farm Modifications - R. B. Harned

The contract has been let for the mechanical installation. The electrical and instrumentation bid packages have been issued and bids are due in August. Piping tie-ins will be installed during the august shutdown.

14. AFE 80-895 - Interplant Communication - Phase II - R. B. Harned

The Gaitronics stations have been received. The installation of conduit for the additional stations is nearly complete.

15. AFE 9551 - V-10 Centrate Heat Recovery (Energy) - S. Jones & J. P. Mckee

Foundation drawings are complete and mechanical drawings are being checked. Instrumentation engineering is 45% complete and electrical engineering is 25% complete.

16. AFE 9561 - Cooling Tower Fan Controls - R. B. Harned

Specifications for control sequences and thermowells were finalized. Control units are scheduled to ship in August.

17. AFE 9581 - Dryer Building Ventilation - J. P. Windham

Installation of the fans in the dryer buildings is in progress. Electrical installation is scheduled for early August.

18. AFE 9591 - Sifter Overflow Reclaim System - J. P. Windham & R. E. Milner

The control system design has been revised and completed. Equipment specifications are being prepared. Purchasing of instrumentation is in progress.

19. AFE 9641 - Slurry Delumper - M. S. Richards

The mechanical design is 65% complete. The electrical design is in progress. The piping tie-in will be installed during the August shut down.

20. AFE 9671 - New VCM Railspur - Herzog-Hart & J. A. Dixon

The constract was let in July. Construction is scheduled for August and September. Completion is scheduled for the first week in October.

MECHANICAL ENGINEERING - (Cont.)

Construction - G. A. Morgan

The following projects were completed in July:

1. No. 2 Pond Bypass.
2. Fire Protection Jockey Pump
3. Demolition work - Batch Water Stripping
4. Curbing of Fire Training Ground and Plasticizer Tank Farm Fuel Storage Areas.
5. Air Conditioning of Warehouse Ladies Rest Room.
6. Noise Abatement Projects
7. V-11 Dryer Building Walkways
8. Clean out of API Separator
9. Painting of 281-677 Silo Walkway
10. Miscellaneous roof leaks
11. Breathing Air Modifications

The following contracts were issued during July:

1. New VCM Railspur
2. NPD No. 2 Pond Bypass
3. Revise Main Restroom Ventilation
4. Installation of Piping, Equipment and Structural for VCM Tank Farm Revisions.
5. Installation of Relief Valves, Piping and Structural for New Module Relief Valve Modifications.

Forty register tickets were issued during July.

(2) Thru July, 1981

ABERDEEN AUTHORIZATIONS REPORT

AUTH. NO.	CAPITAL DESCRIPTION	DATE APPROVED	AUTH. AFE AMT.	(1) EXPENDED TO DATE	(2) COMMITTED TO DATE	FINAL TOTAL EST. COST COMP.	UNDER (OVER) AUTH. AMT.	EST. COMP. DATE	EST. CLOS. DATE	REMARKS
9609	Reactor Inert Vent System	6/28/79	90,000	14,541	14,541	90,000	0	12/81	3/82	Project on hold.
9629	Air Compressor	7/9/79	340,000	302,079	307,808	308,000	32,000	6/81	9/81	Closed to field charges.
9639	Revisions to Emission Recovery Sys.	7/12/79	100,000	80,260	96,849	100,000	0	7/81	10/81	Closed to field charges.
9689	Diking of Sphere & Curbing of Drum Storage Areas	9/15/79	170,000	137,578	159,078	170,000	0	9/81	12/81	Revisions in progress.
9699	Plant Dryer Debottlenecking	9/15/79	80,000	47,670	74,950	80,000	0	12/81	3/82	Construction in progress.
9709	Facilities for Multiple Grade Resin	9/20/79	870,000	496,690	660,625	725,000	145,000	12/81	3/82	Construction in progress.
9719	Aberdeen PVC Resin Expansion	9/10/79	850,000	887,200	887,200	887,200	(37,200)	7/81	10/81	Closed to field charges.
9729	Fire Protection Improvements - Phase II	10/1/79	490,000	353,624	381,828	490,000	0	9/81	12/81	Construction in progress.
9759	Aberdeen PVC Resin Expansion	12/10/79	11,150,000	6,737,800	9,542,300	10,450,000	700,000	12/81	3/82	Construction in progress.
9530	Spare Incinerator	1/23/80	650,000	394,203	450,225	550,000	100,000	10/81	1/82	Construction in progress.
9550	P.A. Handling Improvements	3/3/80	63,000	32,470	32,574	63,000	0	12/81	3/82	Engineering in progress.
9560	Safety Equipment	3/12/80	25,000	26,575	29,288	29,288	(4,288)	5/81	8/81	Closed to field charges.
9570	Replace T-101 P.A. Tank	3/27/80	119,000	64,699	70,590	119,000	0	12/81	3/82	Bids requested.
9590	Critical Spare Equipment	3/26/80	59,000	11,431	60,406	60,406	(1,406)	7/81	10/81	Closed to field charges.
9600	Calcium Stearate Addition System	4/2/80	84,000	12,929	18,726	84,000	0	12/81	3/82	Engineering in progress.
9630	Water Stripping	4/30/80	810,000	382,294	389,261	510,000	300,000	10/81	1/82	Revisions in progress.
9660	Hot Water Charge Tank Replacement	6/4/80	160,000	141,632	141,948	160,000	0	6/81	9/81	Closed to field charges.
9670	Laboratory Equipment	7/9/80	32,000	30,334	31,034	31,034	966	12/80	9/81	Closed to field charges.
9680	Fixed Point Monitor Data Computer and Warning Lights	9/4/80	113,000	40,870	79,870	113,000	0	9/81	12/81	Construction in progress.
9690	Breathing Air Modification	9/9/80	21,000	9,394	15,144	21,000	0	8/81	11/81	Project operational.
9700	Compound Fines & Streamers Removal	10/1/80	95,000	0	29,524	95,000	0	10/81	1/82	Engineering scheduled.
9710	Fire Protection - Phase III	10/14/80	385,000	1,707	1,707	385,000	0	10/81	1/82	Engineering in progress CED.
9720	Reactor Agitator Replacement	10/14/80	420,000	191,623	191,753	420,000	0	10/81	1/82	Agitators received
9730	Compound Line III Debottlenecking	10/16/80	1,350,000	17	69,517	1,350,000	0	6/82	9/82	FCM barrel to ship 10/81.
9740	Modifications to Make Profile Dry Blend	10/27/80	200,000	16,969	55,460	200,000	0	10/81	1/82	Engineering in progress.
9750	Rotary Dryer Insulation (Energy)	11/10/80	22,000	20,000	27,391	27,391	(5,391)	8/81	11/81	80% complete.
9760	Emergency AMS Kill System	11/15/80	335,000	66,996	94,367	335,000	0	10/81	1/82	Engineering in progress.
9770	Reactor Pressure Relief Mod.	11/25/80	560,000	98,333	338,849	460,000	100,000	12/81	3/82	Construction in progress.
9780	Centrate Heat Recovery	12/8/80	300,000	23,967	61,528	300,000	0	3/82	6/82	Engineering in progres..
9790	Resin Reclaim System	12/14/80	727,000	123,133	234,610	727,000	0	3/82	6/82	Engineering in progress; CED
9800	Plasticizer Irritant Control (Air)	12/15/80	80,000	28,557	31,810	80,000	0	9/81	12/81	Engineering in progress.
9810	Replacement Gearbox for Farrel Mixer	12/18/80	73,000	0	69,400	73,000	0	10/81	12/81	Gearbox to ship 10/81.
9511	Miscellaneous Projects Under $10,000	1/9/81	170,000	115,798	187,820	170,000	0	12/31	2/82	Sixty-two projects approved.
9521	New VCM Railspur	1/30/81	11,000	17,612	17,612	17,612	(6,612)	7/81	10/81	Closed to field charges.
9531	Vinyl Initiator Charge Pots	1/21/81	165,000	5,534	39,505	165,000	0	11/81	2/82	Engineering in progress; CED
9541	VCM Tank Farm Modifications	1/21/81	90,000	26,676	49,154	90,000	0	1/82	4/82	Construction in progress.
80-895	Interplant Communication-Phase II	1/22/81	55,000	0	31,755	55,000	0	9/81	12/81	Revisions in progress.
9551	V-10 Centrate Heat Recovery (Energy)	2/17/81	125,000	7,641	23,739	125,000	0	5/82	8/82	Engineering in progress; CED
9561	Cooling Tower Fan Controls (Energy)	2/17/81	40,000	0	19,840	40,000	0	11/81	2/82	Equipment on order.
9581	Dryer Building Ventilation	3/20/81	23,000	1,101	15,149	23,000	0	9/81	12/81	Construction in progress.
9591	Sifter Overflow Reclaim System	3/20/81	200,000	0	14,877	200,000	0	3/82	6/82	Engineering in progress.
9601	Compliance with EPA VCM Standard (Air)	3/25/81	72,000	0	12,434	72,000	0	12/81	3/82	Engineering in progress.
9611	Recovery System Revisions	3/25/81	30,000	7,415	14,110	30,000	0	12/81	3/82	Revisions in progress.
9621	Laboratory Equipment	3/25/81	42,000	31,400	38,516	42,000	0	8/81	11/81	Equipment on order.
9631	Ground Water Monitoring (Solid)	3/24/81	30,000	467	17,071	30,000	0	10/81	1/82	Contract let.
9641	Slurry Delumper	5/14/81	35,000	0	20,746	35,000	0	2/82	5/82	Engineering in progress.
9651	Safety Equipment	6/8/81	106,000	0	0	106,000	0	6/82	9/82	Engineering scheduled.
9661	Waste Water Treatment Rev. (Water)	6/19/81	560,000	0	0	560,000	0	9/82	12/82	Engineering scheduled.
9671	New VCM Railspur	6/30/81	194,000	0	189,512	194,000	0	12/81	3/82	Construction in progress.
9681	Miscellaneous Projects Under $10,000	7/31/81	145,000	0	2,478	145,000	0	12/81	3/82	Five projects approved.
9691	Reactor Agitator Two Speed Motors	7/2/81	40,000	0	0	40,000	0	4/82	7/82	Updated quotes requested.
9701	Misc. Energy Savings Proj. Under $10,000	7/13/81	25,000	0	0	25,000	0	12/81	3/82	Engineering scheduled.
9711	Plasticizer Spill Containment	7/27/81	42,000	0	0	42,000	0	1/82	4/82	Engineering scheduled.
9721	Emergency Cooling for Reactors	7/30/81	190,000	0	0	190,000	0	4/82	7/82	Engineering scheduled.
	EXPENSE									
9020	Repairs to Line I Compounder	11/24/80	38,000	0	0	38,000	0	11/81	2/82	Parts ordered in January.

PERSONNEL - R. A. MILLER

EMPLOYMENT

Romona Faulkner - Steno Clerk

TO/FROM LEAVE OF ABSENCE

None.

TRANSFER/PROMOTION

John Sutton transferred from the Compound Department as a Compound Operator to the Warehouse Department as a Warehouse Worker "B".

Bernard Garth transferred from the Service Warehouse Department to Transportation Warehouse.

RETIREMENT

None.

TERMINATION

Frank Brewer, Casual Labor
Cleveland Brown, Jr., Casual Labor
David Volz, Casual Labor

OTHER

During July there were 15 casual labor employees on payroll. Total hours worked were 2583.75.

CONOCO CHEMICALS
Aberdeen, Mississippi

July 1981
MONTHLY PERSONNEL REPORT

Salaried Employees	87		Minority Employees	#	%
Hourly Employees	161		Salaried	6	7%
Total Employees	248*		Hourly	59	37%
Employees (Hourly)			Total	65	26%
New Employees	0		Hourly Min. Hired	0	
			% Min. Hired	0	
Terminations	0		Hourly Min. Term.	0	
			% Min. Term.	0	

DEPARTMENTS	PAR	# EMPLOYEES	MIN. EMP.	% MIN.	NEW HIRES	YTD	TERM.	YTD	TURNOVER	YTD
Warehouse	11	9	1	11	0	0	0	0	0	0
Gen. Plant	11	13	5	38%	0	10	0	0	0	0
Maintenance	52	48	8	17%	0	0	0	1**	0	0
Laboratory	22	20	4	20%	0	0	0	0	0	0
Compound	37	35	26	74%	0	0	0	0	0	0
Vinyl	40	32	13	40%	0	0	0	0	0	0
Plasticizer	4	4	2	50%	0	0	0	0	0	0

Number of Applicants:

Month 0 Year to Date 103

APPLICANT BREAKDOWN:

Minority 0 % Minority 0

Female 0 % Female 0

Hires (Hourly) :

Month 0 Year to Date 10

Terminations (Hourly) :

Month 0 Year to Date 1**

Overall Turnover 0

Projected Annual Turnover 0

*Includes eight (8) temporary employees.
**Includes one (1) retirement. Retirements are not included in turnover rates.

DTH 000021765

OVERTIME AND ABSENTEEISM

July 1981

Department	Straight Time Hours Worked	Overtime Hours Worked		Overtime as Of Straight Time	Absence Hours Lost	Absence as a % of Straight Time			
		Controllable(1)	Non-Controllable(2)			Sickness	Other	Total	Year to Date
Warehouse	1731.75	124.75	24.00	8.6%	128	100%	0	7%	5%
Maintenance	6878.25	669.00	16.00	10%	552	88%	12%	8%	5%
Laboratory	3817.50	371.00	84.00	12%	16	50%	50%	.4%	1%
Compound	7599.25	790.25	212.00	13%	32	100%	0	.4%	2%
Vinyl	7026.00	870.75	180.00	15%	144	100%	0	2%	3%
Plasticizer	652.75	56.75	0	8.5%	8	0	100%	1%	9%
Utility Boiler House	756.50	122.50	24.00	19%	0	0	0	0	0
General Plant	1024.75	51.25	0	5%	8	0	100%	.8%	4%
Total	29486.75	3056.25	540.00	12%	888	90%	10%	3%	3.7%

NOTE:

(1) Controllable Overtime - all overtime excluding overtime due to working regular hours on a holiday and working the sixth day in operations.

(2) Non-Controllable Overtime - that overtime due to working regular hours on a holiday and working regular hours on the sixth day in operations.

PROCESS ENGINEERING - R. A. Frohreich

A. Expansion

Work is continuing in all areas of this project. Tie-ins in the new module reactor area will be made during the scheduled shutdown of the area in early August. Also utility tie-ins will be made at this time. A meeting was held with PED to review the initial issue of the Fluid Bed Dryer operating manual. The plant is preparing the operating procedures for the other areas. Change orders for spare cooling water supply pumps, a deaerator for the boilers, a boiler feedwater pump, a spare rotating assembly for the centrifuges, an additional product silo, and a reactor seal access platform were approved. Engineering on these projects will begin in August.

B. Emergency Reactor Cooling System

The class "A" design to provide emergency cooling and backup instrument air was issued and the AFE request for the project was submitted.

C. Dryer Area Vacuum Clean-Up System

The class "A" process design to provide a vacuum cleaning system for the dryer areas is being prepared.

D. Reactor Venting Problem

Work has began to determine the composition and source of the inerts which build up in the reactors during polymerization.

E. Normal Kill Solution Addition System

The class "A" design to provide mixing, storage, and metering the normal kill solution was issued. This design consists of a tank, a drum pump, a transfer pump, a filter, and piping to the reactor injection pots in both reactor modules.

F. 10-8 Plasticizer Production

The class "A" design to provide 10-8 alcohol and 10-8 plasticizer storage and transfer facilities is being prepared.

G. Glycerin Make-Up System

The class "A" design to revise the glycerin make up system is being prepared.

H. Dryer Optimization Study

Several tests were conducted on rotary dryer number 1 in which drying air flow rates were reduced. Preliminary results indicate that energy savings may be realized without adversely affecting dryer resin rates. Further tests will be conducted to assure that drying rates are not reduced at the lower air rates.

PROCESS ENGINEERING (Cont.)

I. Batch Water Strippers

Process engineering continued to provide support for the operation of the batch water strippers. A process design to install an automatic flush for the new module transfer line was issued.

J. 1982 Capital Budget

Work continued on preparation of the 1982 Capital Budget. The second issue of the budget was issued.

ENVIRONMENTAL - V. E. Messick

Particulates

Two dryer exhausts were sampled for particulates and were within allowable limits.

Water

All parameters were within NPDES limitations in July.

The quarterly NPDES discharge monitoring report was submitted to the state of Mississippi.

The API separator was cleaned out in July. The material removed from the API was placed in drums and prepared for disposal at Chemical Waste Management.

VCM

The compliance test for the batch water strippers was conducted on July 29. Stripping results were well below the 10 ppm VCM process waste water limit. The test report is being prepared.

Hazardous Waste Management

A total of 320 drums of hazardous waste were shipped to Chemical Waste Management's Alabama site for disposal. Manifests have been received for two of the four shipments.

TABLE I

WATER COMPLIANCE WITH

NPDES PERMIT PARAMETERS

	Flow	BOD		COD		Sus. Solids		Diss.	
	GPM	PPM	LB./DY.	PPM	LB./DY.	PPM	LB./DY.	O^2	ph
Jan. - Ave.	1069	39	504	69	888	7	93	8.5-10.4	7.4-7.8
Max.	1297	57	887	106	1650	9	114		
Feb. - Ave.	757	11	95	43	382	7	65	8.9-9.8	7.5-7.9
Max.	819	18	154	56	479	10	86		
Mar. - Ave.	753	10	90	36	330	11	93	8.3-8.9	7.6-7.7
Max.	790	11	103	51	466	17	139		
Apr. - Ave.	946	10	118	31	360	13	151	8.2-8.9	6.9-8.1
Max.	1200	20	253	41	519	19	240		
May - Ave.	846	12	125	43	470	13	138	7.4-8.4	7.3-8.0
Max.	1200	14	163	54	629	17	198		
June - Ave.	739	20	183	56	502	18	157	6.2-8.2	7.6-7.9
Max.	917	34	314	79	729	27	249		
July - Ave.	746	12	107	39	339	22	190	6.2-7.5	7.7-8.0
Max.	922	16	130	53	420	28	209		
Aug. - Ave.									
Max.									
Sept. - Ave.									
Max.									
Oct. - Ave.									
Max.									
Nov. - Ave.									
Max.									
Dec. - Ave.									
Max.									
NPDES - Ave.	-	32	431	-	1462	-	674	6.0	6.0-8.5
Max.	-	43	800	-	2713	-	1396		

ENERGY CONSERVATION - J. F. Perez-Velasco

I. Plant Operations

Total energy consumption for July was 104.037 MMM BTU's. The energy consumption per pound of product increased to 3188 BTU/lb. as compared with 3088 BTU/lb. for June.

II. Plant Energy Conservation Program

Steam Leaks

Twenty-one (21) steam leaks were repaired in July.

Boiler

Boiler #1 and #3 were shut down for repairs during July. Opportunity was taken at that time to acid clean the tubes and make visual check of boiler #3 economizer.

Energy Reporting

Second quarter report was prepared during July. A CMA adjusted energy savings of 38.8% was obtained for the three month period versus 1972 equivalent energy usage.

ENERGY CONSERVATION DATA

ITEM	1981	1980
Control Period	July	July
Production, MM Lbs.		
Resin	23.4	17.0
Dry Blend	3.8	2.2
Compound	4.5	3.4
Plasticizer	0.9	0.9
TOTAL	32.6	23.5
Natural Gas		
Consumption, MSCF	49354	33298
Conversion, BTU/SCF	1020	1020
Energy Consumption, MMM BTU	50.341	33.964
Electricity		
Consumption, MM KWH	5.3696	4.2555
Conversion, BTU/KWH	10000	10000
Energy Consumption, MMM BTU	53.696	42.555
Propane		
Consumption, M Gal.	0	0
Conversion, BTU/Gal.	92000	92000
Energy Consumption, MMM BTU	0	0
Total		
Energy Consumption, MMM BTU	104.037	76.519
Energy Consumption , BTU/Lb.	3188	3256

Boiler Operating Data

	Avg. Stack Temp.		Avg. % Excess Air	
	1981	1980	1981	1980
No. 1	360	367	52	25
No. 2	328	415	31	27
No. 3	293	413	38	23

LABORATORY - R. D. Jackson

CUSTOMER COMPLAINTS

Customer	Products	Complaint	Report By
L. B. Plastics, Inc.	80273G	Wet Dry Blend	RDJ

WAIVERS

Date	Identification	Product	Customer	Reason	Waived By
7-6	CONX 45258	80273G	Kebco	Equilibrium Torque	CJM
7-7	CONX 45755	5385-3	World of Plastics	Particle Size	RDJ
7-20	PLCX 43707	5385-3	World of Plastics	Bulk Density	ELK
7-20	CONX 45713	5385-3	Charlotte Pipe	Particle Size	ELK
7-24	CONX 45797	80273G	Northern Waterworks	Equilibrium Torque	CJM
7-24	CONX 45768	80273G	Kebco	Equilibrium Torque	CJM
7-28	PTLX 41835	5385-3	World of Plastics	Particle Size	ELK
7-28	CONX 45718	5385-3	Charlotte Pipe	Particle Size	ELK
7-29	T2811	5305	Celanese Pipe	Viscosity	RDJ

PRODUCT SERVICE & DEVELOPMENT

Sample Shipments

Ship Date	Product	Amount (Lbs.)	Customer	Requested By
7-1	16851 CL BL 50	25	Americhem Inc.	KJQ
7-1	5425-OG	20	Carlon	NBB
7-1	35851 Nat.	50	Interstate Wire Corp.	KJQ
7-2	5385	10	Conoco, Ponca City	RBM
7-3	5385-1	10	Stauffer Chemical Co.	DLG
	5425	10		
	5465	10		
7-8	38631 Nat.	50	Taylor Cable Co.	MFM
7-10	34711 Grey	100	Atco-Flex Inc.	JFN
7-14	38551 Nat.	100	Taylor Cable Co.	MFM
7-14	16851 CL BL 50	100	Advanved Plastic Corp.	MFM
7-17	5305-1	4,500	Conoco , Ponca City	COEDS
7-27	RP 100 DB	20	Jim Walter Research Corp.	CJM
7-28	5305	2,000	Conoco, Ponca City	COEDS
7-29	5385-1	10	Fritz Airfreight	JPM
7-30	80273G DB	220	Mitsui & Co. Inc.	COEDS
7-31	5425 OG	4,500	Bristol Products	COEDS
7-31	5385-3	150	Petrolite Corp.	COEDS
7-31	16851 CL BL 50	50	Therma Tru	DD

LABORATORY - (continued)

COMPOUND DEVELOPMENT AND SERVICE

Special Compound Testing

Specification tests were run on five (5) production lots of Western Electric compounds - 1 lot each of 34861 Gray 546, 34862 Gray 546, and 36862 Natural and 2 lots of 36861 Natural. Plasticizer content and flammability were tested on eleven (11) shipment samples.

Testing is partially complete on the first production lots of 48651 and 48961 for Belden.

Compound Property Verification

Property testing is complete on twenty (20) active compounds.

Dry Blend Development

Quality control standards were prepared for 80174, 80273G and 90171 dry blends.

QUALITY CONTROL TESTING

Resin

Regular Samples = 442
Bag Samples = 41
Other In-Process Samples = 3092
Bulk Shipment = 181 (Railcars = 99; Trucks = 82)

Dry Blend

Blenders Produced = 410
Blenders Tested = 408
Blenders Adjusted = 17.8%
Other In-Process Samples = 558
Bulk Shipments = 36 (Railcars = 15; Trucks = 21)

Compound

Blenders Produced = 720
Blenders Adjusted = 2.5%
Line 5 Production = 33 skids
Other In-Process Samples = 223
Bulk Shipments = 16 (Railcars = 13; Trucks = 3)

LABORATORY - (continued)

QUALITY CONTROL TESTING (continued)

Resin Heat Stability

Oven heat stability tests were run on fifty-eight (58) blends of resin. All the samples were acceptable, and 5305 and 5465 resins continue to average a little better stability than 5385 and 5425.

Raw Material Testing

Eighty (80) lots of plant raw materials were tested and accepted. Several lots of Ongard 2 flame retardent would have been rejected for poor dispersion if the supplier had been able to supply better materials. They insist that better dispersing Ongard 2 will be available soon.

Two samples of Halthal EP lead stabilizer have been tested and compared with Cyastab 988 and Dythal XL. The Halthal EP disperses easily but does not stabilize quite as well as Cyastab 988 or Dythal XL.

Americhem 2013-T1 gray color concentrate has been tested and approved as a substitute for Wilson 32-GY-18 in making Western Electric 34861 Gray 546.

Americhem 1943-T2 gray color concentrate was tested and approved as a substitute for Wilson 32-GY-16 gray. We are replacing Wilson products with other materials due to Wilson's deteriorating quality and poor response to our complaints.

RVCM of Shipment Samples

The following shipment samples were tested.

Product	# Samples	Average RVCM, ppm
5305	120	1.1
5385	48	0.4
5425	15	0.1
5465	3	0.1
Dry Blend	11	0.4

MISCELLANEOUS PROJECTS

Volume Resistivity Testing

Samples of 5425 and 5465 resin were tested for volume resistivity (VR) and all values were good. Twenty-seven (27) specimens from Ponca City were tested for VR and reported. Their resistance testing equipment was out for repair.

LABORATORY - (continued)

MISCELLANEOUS PROJECTS - (continued)

RVCM Of In Process Samples

The following in process samples were tested for residual vinyl chloride (RVCM).

Sample Type	# Samples	Average RVCM, ppm
Reactor slurrys	624	165
Batch Water Stripper	47	6.4
5305 Drier Samples	124	2.2

None of the reactor daily averages exceeded 400 ppm.

Viscosity

A total of 751 dilute solution viscosity measurements were made on resin in July.

Special

A total of 110 special samples were tested in July. Most of these were the waste water samples for COD analysis.

Dosimetry

A total of 111 personal dosimetry samples were tested for VCM content in July.

Computer

New programs were prepared for the lab computer to permit L & N particle size data to be entered and stored inplace of screen data.

TRANSPORTATION - J. E. Stark

Shipment By Product - M Lbs.	July	Year to Date
Resin	15,617	137,754
Plasticizer	76	672
Dry Blend	3,220	27,092
Compound	3,557	27,111
TOTAL	22,470	192,629

Number of Shipments by Mode

		R/C	O.T. Bulk	O.T. Van	C.O.T.	C.C.	TOFC	CPU	TOTAL
Resin	- Bulk	77	49						126
	- Package			7		2		9	18
	- Export		8	35					43
Plasticizer								2	2
Dry Blend	- Bulk	18						21	39
	- Package			7					7
	- Export			3					3
Compound	- Bulk	9	3						12
	- Package			28		5		15	48
TOTAL		104	60	80	0	7	0	47	298
Backhauls for July				27		3			30

Number of Shipments by Month - Year to Date

	R/C	Bulk	Van	C.O.T.	C.C.	TOFC	CPU	Total
January	91	48	200	2	91	0	55	487
February	91	55	172	0	40	0	58	416
March	132	65	208	6	54	0	74	539
April	96	38	181	0	11	0	69	395
May	111	49	120	0	3	0	68	351
June	123	55	74	0	5	0	50	307
July	104	60	80	0	7	0	47	298

Material Handling Report

	M/Lbs.	T/L
Packaged Resin from Production	2,228	55
Packaged Compound, Dry Blend from Prod.	3,119	77
Transferred from Main to Prairie	2,349	58
Transferred from Prairie to Prairie	81	2
Reverse Transfer Resin to Plant	810	20
Reverse Transfer Cmpd. to Plant	243	6
Shipment from Warehouses	1,903	47
Special Packaging	1,539	38
Transferred from Prairie to Main	1,580	39
TOTAL	13,851	342

TRANSPORTATION - (continued)

Off-Grade In Storage

Material	M/Lbs.	T/L
Sifter Overflow	598	15
Resin "BC"	3,487	86
Resin "H"	544	13
Mill Scraps	74	2
Compound "B"	1,284	32
Compound "H"	16	0
Dry Blend "O.G."	602	15
TOTAL	6,605	163

CONOCO TRANSPORTATION

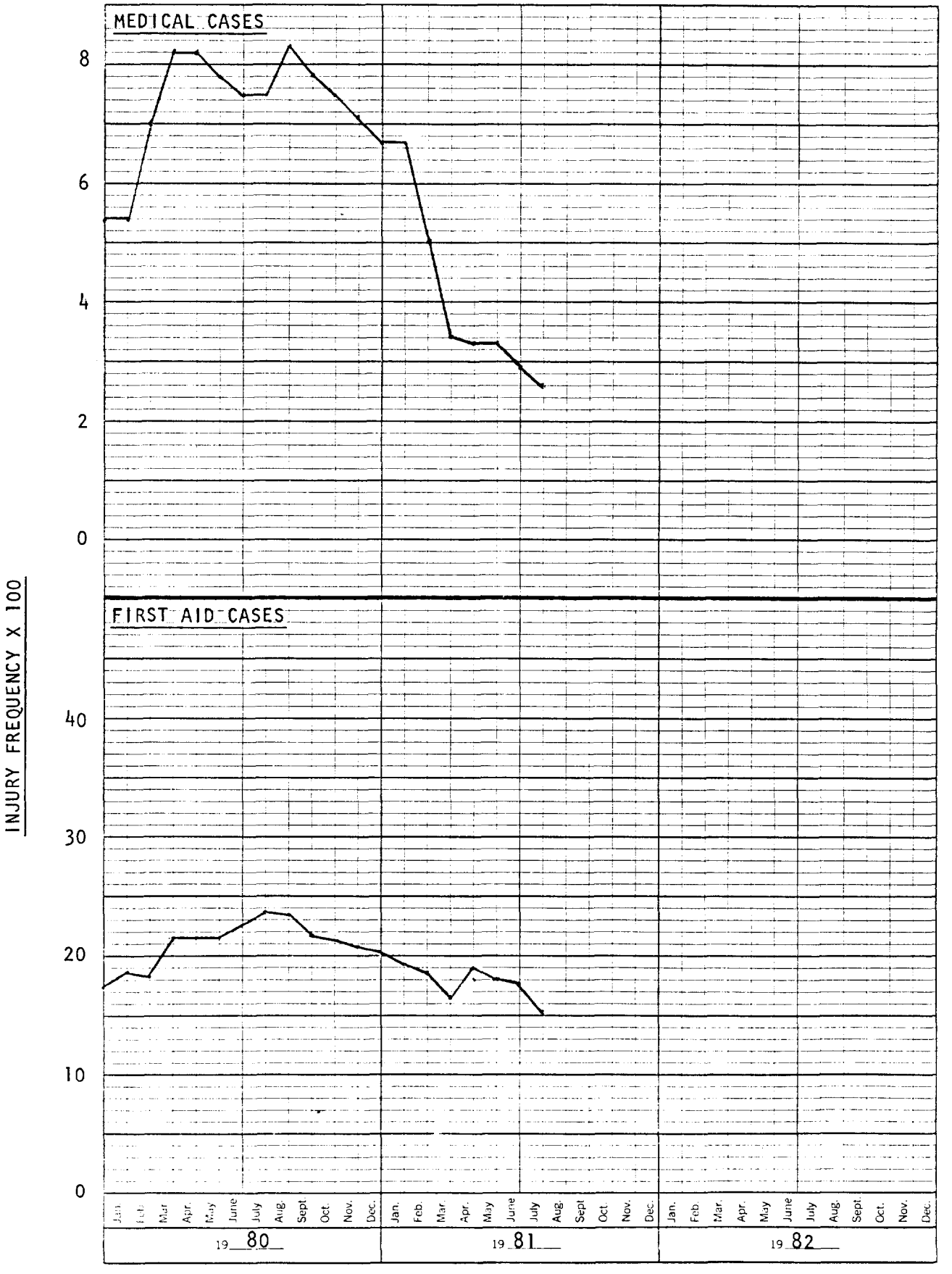
July 31, 1981

ABERDEEN WAREHOUSE

LOCATION	TOTAL M SQ. FT.	CONTENTS		ESTIMATED MM POUND ON FLOOR	OPEN TO
MAIN-East	48	Compounds	6.0		
		Dry Blend	.3		
		Export Resin	.4		
		Conoco Resin	.	6.7 3.3	10.0
Prairie 12-1	12	HDPE	.4		
		Dry Blend	.1	.5 1.0	1.5
12-2	22	Conoco Resin	2.4	2.4 1.1	3.5
12-3	21	Conoco	.3		
		Export Resin	.8	1.1 2.4	3.5
12-4	22	Conoco Resin	4.4		
		Resin O.G.	.	* 4.4 .	3.5
12-5	21	Mill Scraps	.1		
		Cmpd O.G.	.8		
		Dry Blend O.G.	.5		
		Sifter Overflow	.3		
		Resin O.G.	.2	1.9 .6	2.5
12-6	21	Compound	.1		
		Resin	2.8		
		Raw Material	.2	3.1 .4	3.5
12-7	21	Resin O.G.	3.3	3.3 .2	3.5
12-8	21	Conoco Resin	4.0	* 4.0 .	3.5
12-9	21	Conoco Resin	.6	.6 2.9	3.5
12-12	21	Dry Blend O.G.	.1		
		S.O.	.3		
		Comp. O.G.	.4		
		Mill Scarp	.1	.9 2.6	3.5
		Sub-Total			42.0
		(Plug-Aisles)			1.4
Total	251	Total Conoco		28.9 14.5	43.4

ABERDEEN CHEMICAL PLANT

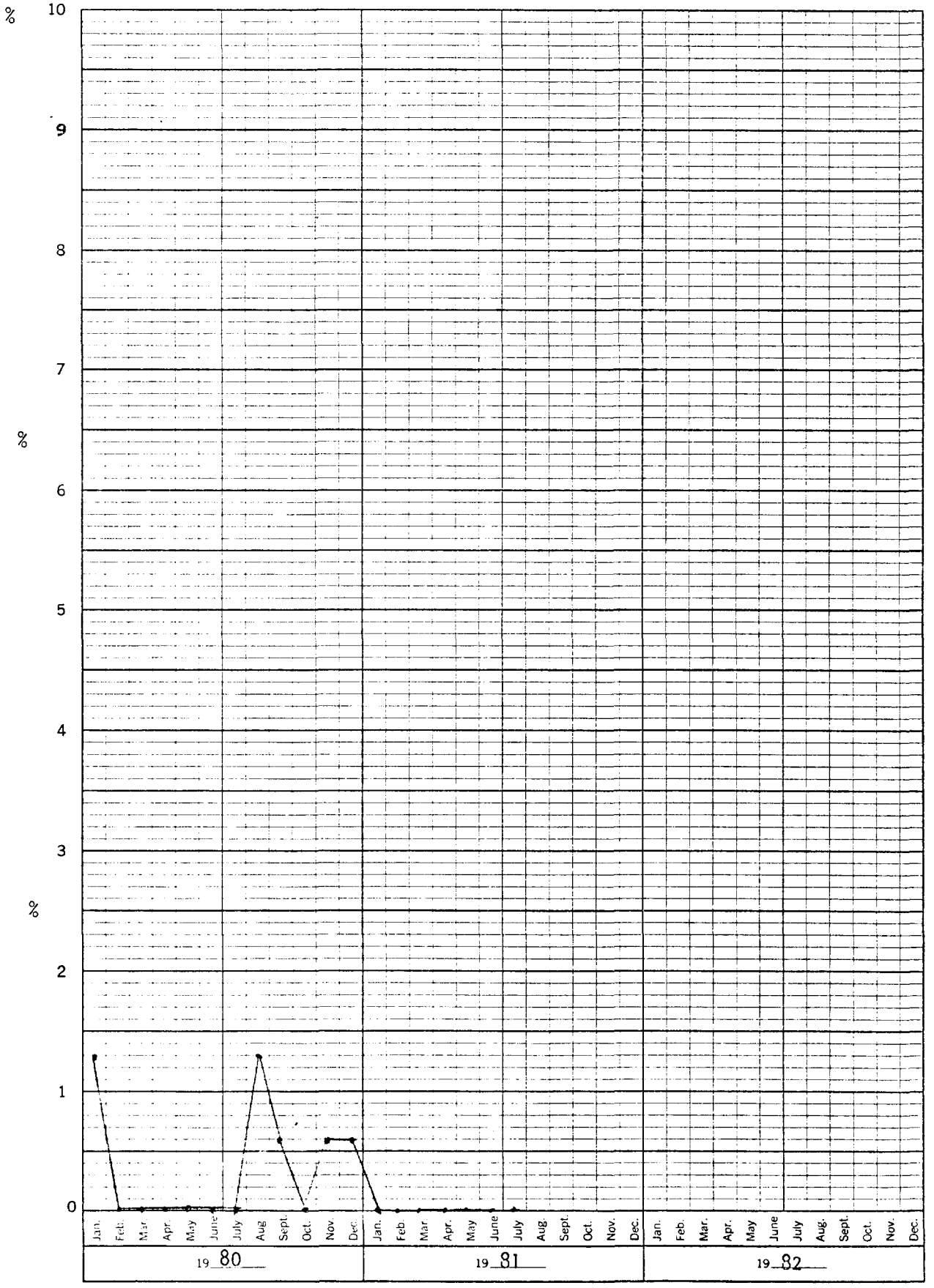
INJURY PERFORMANCE



$$\text{FREQUENCY} = \frac{\text{TOTAL INJURIES (FA OR MC) X 12}}{\text{TOTAL EMPLOYEES}}$$

DTH 000021780

MONTHLY HOURLY TURNOVER

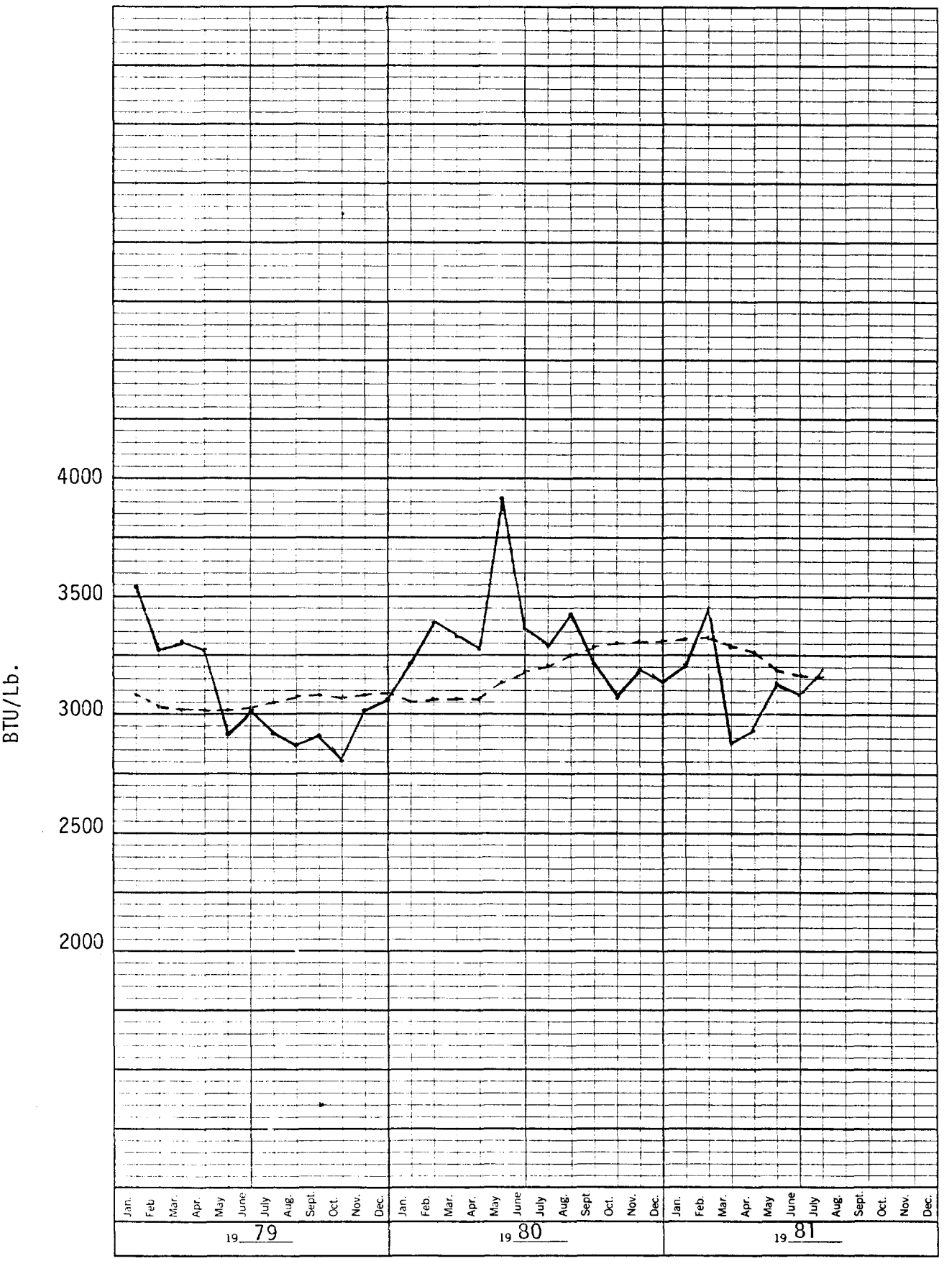


46 3290

K+E 3 YEARS BY MONTHS X 100 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

DTH 000021781

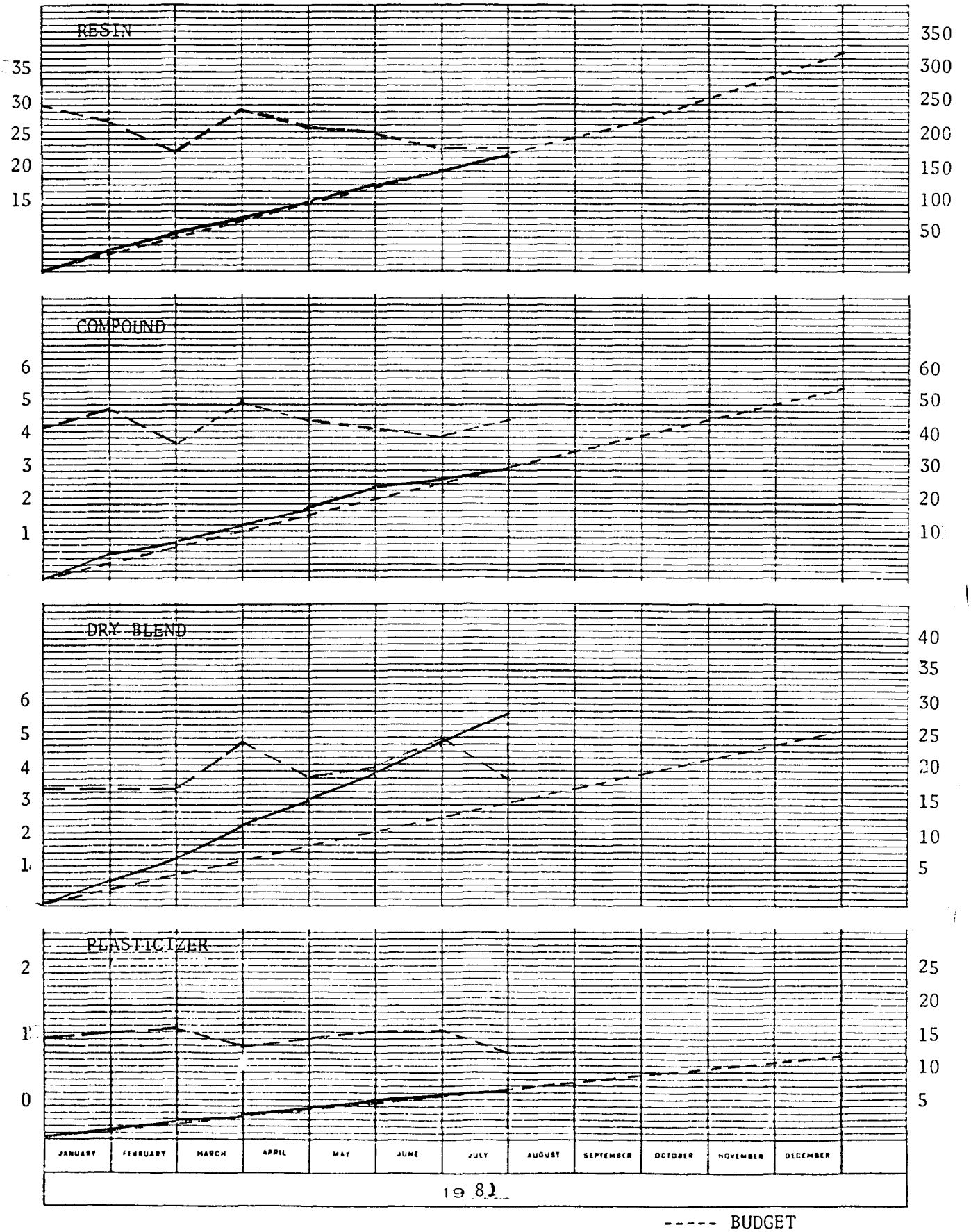
ENERGY USAGE



_____ Monthly
---------- 12 Month Moving Average

ABERDEEN PLANT PRODUCTION

1981



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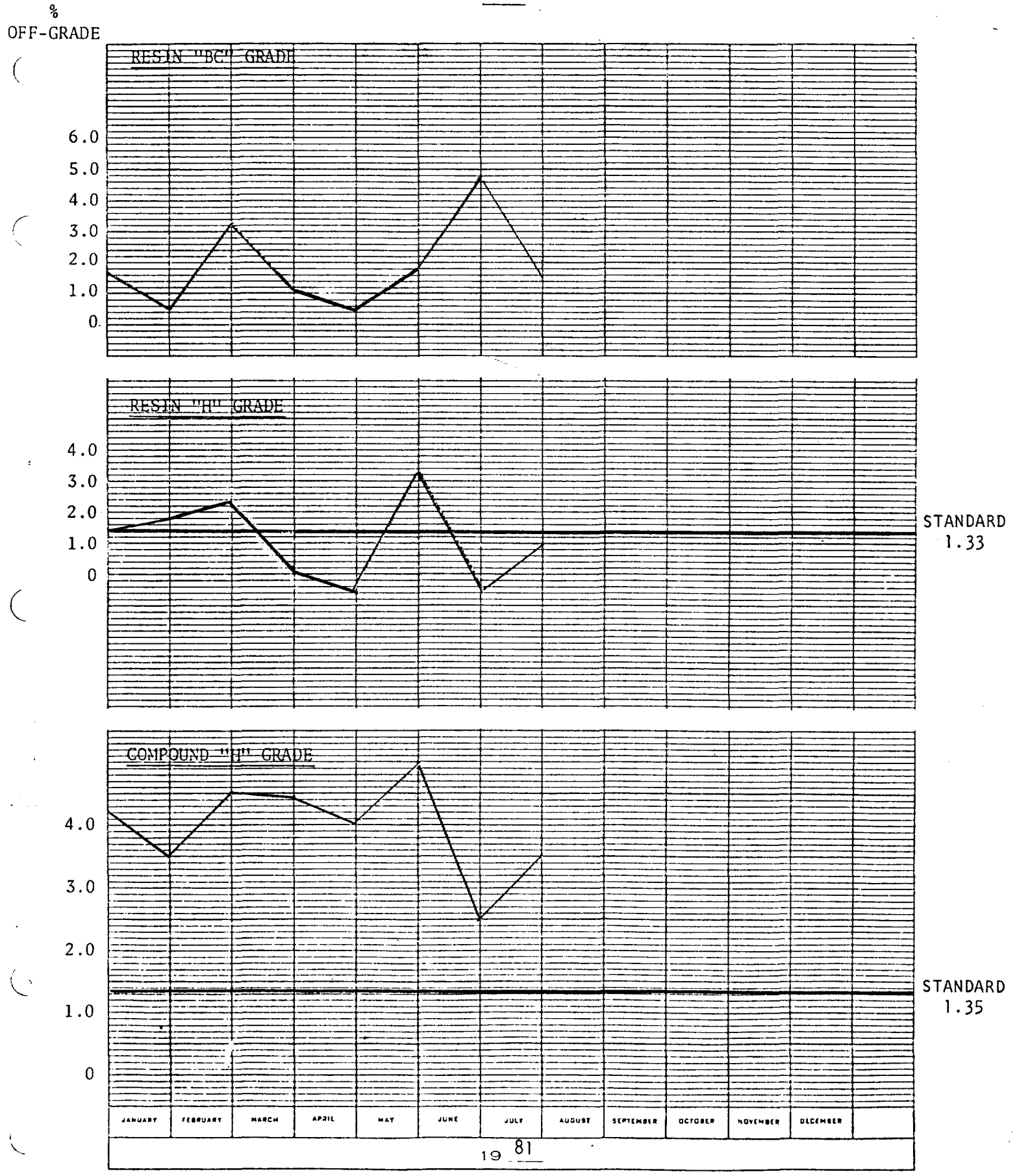
ABERDEEN PLANT QUALITY PERFORMANCE

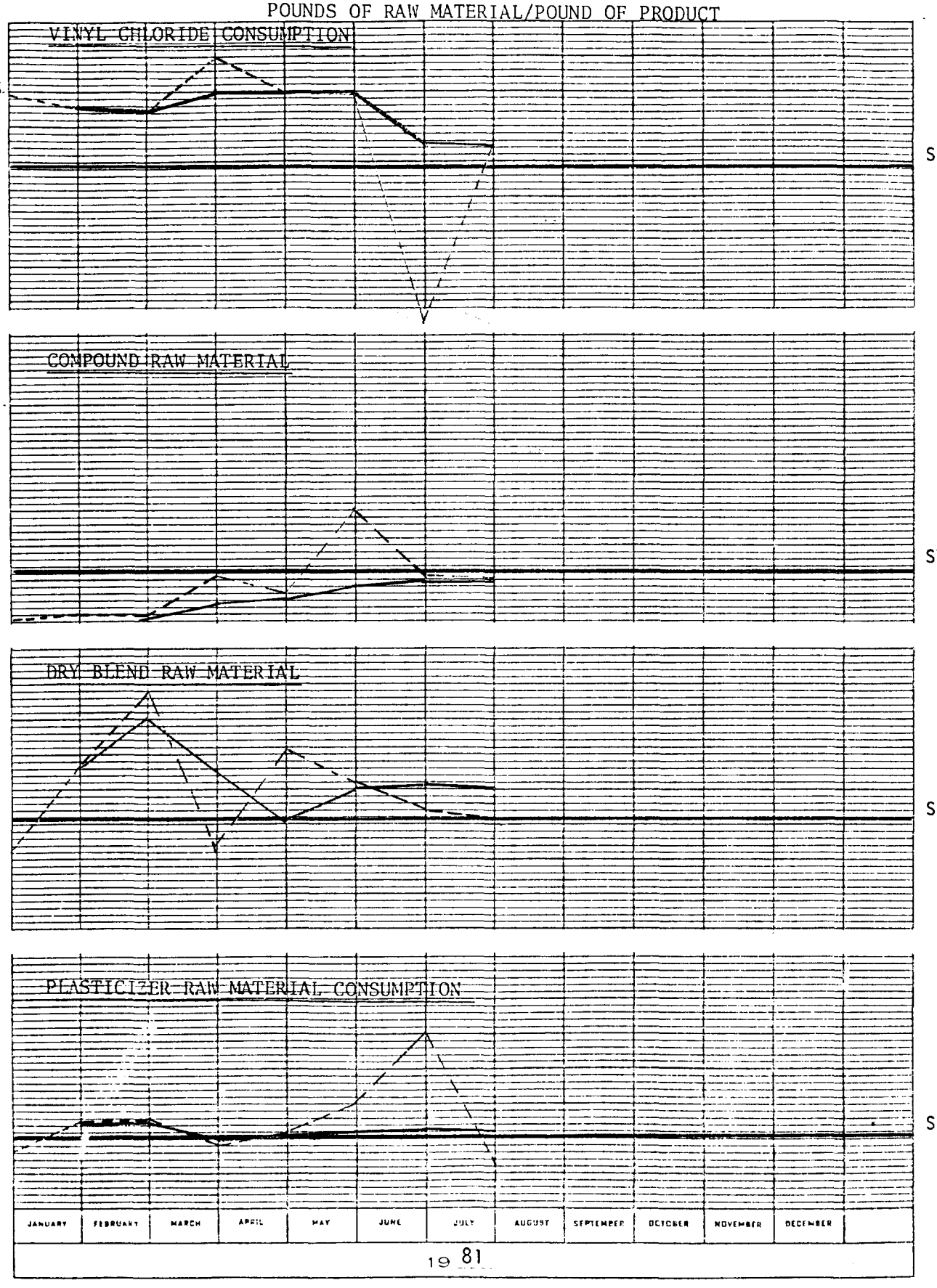
1981



ABERDEEN PLANT EFFICIENCY

1981

POUNDS OF RAW MATERIAL/POUND OF PRODUCT



-------- MONTHLY

_____ CUMULATIVE

DTH 000021785

ABERDEEN PLANT INVENTORIES

1981