COMPANY CONFIDENTIAL

E. E. Bowles

Monsanto

Anniston Plant

TECHNICAL SERVICES DEPARTMENT.

MONTHLY REPORT

Anniston

C. K. Eastman
A. J. Koenig
J. C. Landwehr
L. J. Boesch
G. W. Miller
W. B. Papageorge
W. F. Taffee
H. L. Williams

General Offices

H. C. Carder
D. E. Cayard
. Danna (5)
A. O. Hehner
P. B. Hodges
D. B. Hosmer (2)
W. A. Kuhn
C. F. Luecke
H. L. Payton
N. L. Sample
J. E. Smith
R. J. Stratmeyer
H. S. Trail

Other Locations

D. W. Jackson-WGK
T. M. Patrick-
So.2nd.St.

Summary

November , 1968

Cost Improvement Results For First Eleven Months

	Estimated Actual	Target	% of Target
Month	$11,545	$36,130	32%
YTD	$376,455	$460,500	81%

Organic Division

Increased demand for Solid Aroclor (50% above capacity for 1969) can only be met by making solids in liquids system plus successful demonstration of:

1. Yield increase by improved Santowax R composition and radiation instruments projects 3015 and 3016.
2. First sales lot of blended 4465 in early December.
3. Maintenance projects 2924 and 2942. Installed spare pump and SS circulating line on chlorinator.
4. Additional chlorine unloading dock-project 2342.

These items are in progress now and should be installed by the end of January 1969.

The No.1 Biphenyl Tubular Unit was down 2 weeks for revision and is now on stream after a smooth startup.

CED has taken over the project to purify biphenyl hydrogen for HB-40.

Production of Aroclor 5460, color <1 Gardner, can be accomplished using Santowax R which has been pretreated to remove color bodies.

Plant production of Aroclor 4465 by the blending process is scheduled to begin week of 12/1/68. Initial production of 20 M lbs. will be used for customer performance evaluation.

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AN-306 REV. 11/1/1968

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TOWOLDMON0044216

Organic Division (Continued)

Staley Grade HCl project approved 11/20/68. Long delivery items ordered. Design scheduled for 2/1/69 completion.

Agricultural Division

Sulfur recovery status reviewed with CED Project Engineer. Potential markets for recovered sulfur being evaluated as an alternate to use in P_2S_5. Tentative process will be issued for approval by 1/1/69.

Parathion recovery progress report issued. Project ($3,000 expense) submitted to inspect unit and determine cause of pluggage.

Design and Drafting

Santowax Still design and drawings completed and forwarded. Solid Aroclor work underway with top priority.

Utilities Cost Improvement

Collection of data for Plant Power Factor Improvement and Plant Central Compressed Air System was completed. Progress reports on these projects will be issued in December.

CED Liaison

Aroclor/Biphenyl flaking-bagging equipment being modified at months end as start-up reveals needs.

Personnel

Mr. J. T. Bell joined PR&D effective 12/1/68. Mr. Bell will be responsible for direction of the plant PR&D programs.

J. C. Landwehr
Technical Services Department

jw

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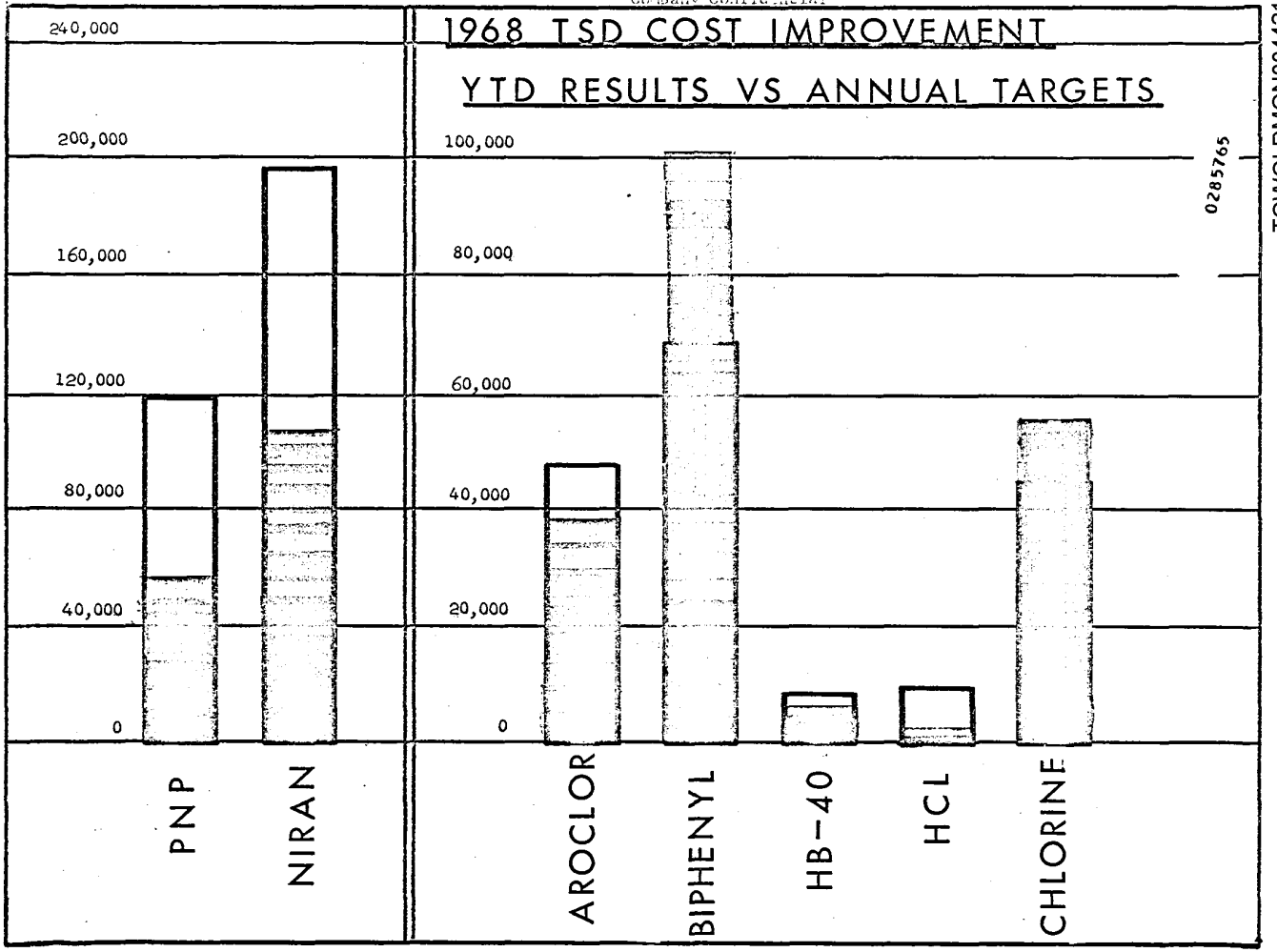
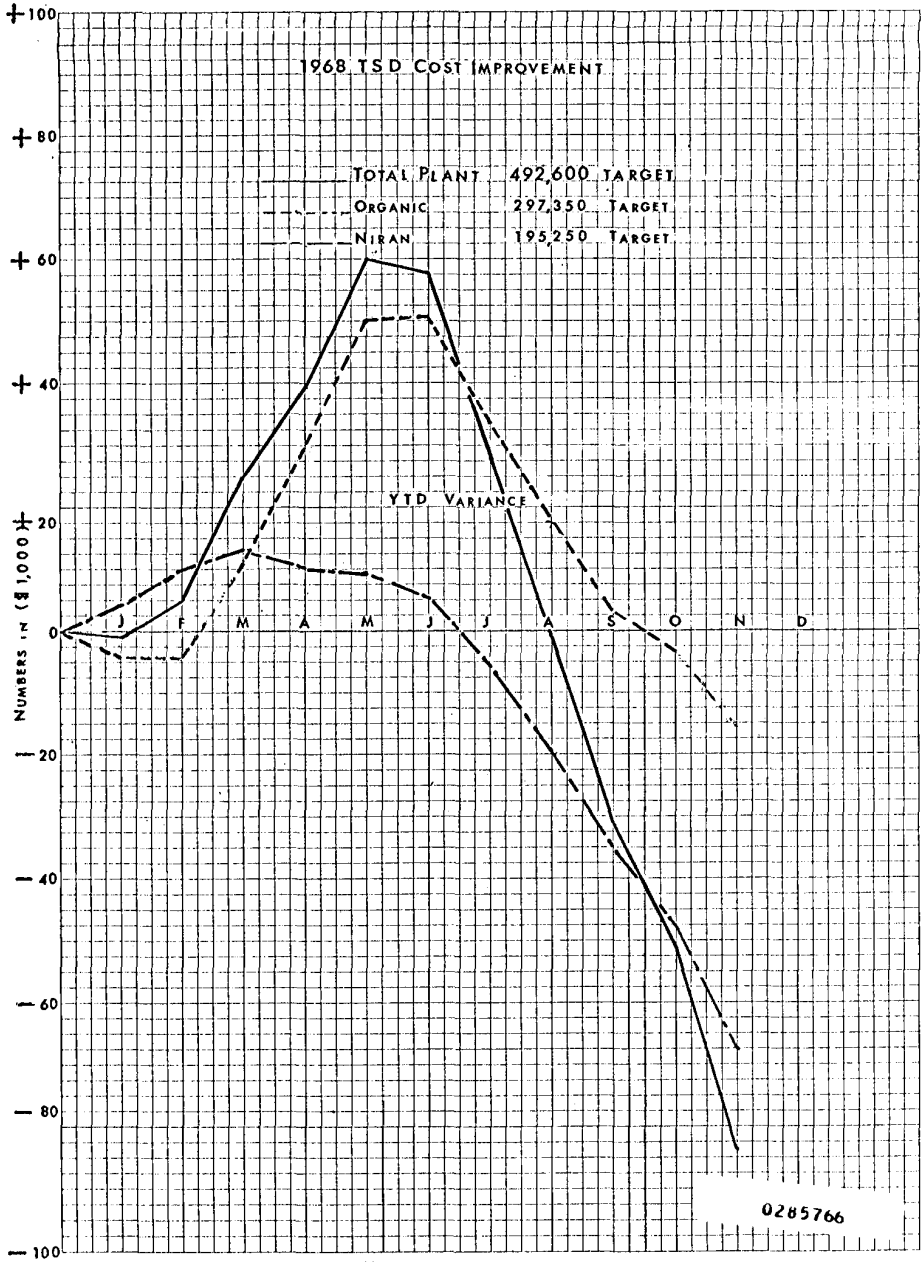
1968 TSD COST IMPROVEMENT

YTD RESULTS VS ANNUAL TARGETS





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NO. 340-B DIETZGEN GRAPH PAPER 8 X 8 PER INCH

AROCLOR E. E. Bowles, C. R. McIlwain, (V. R. Haupt)

Cost Improvement

	Month	YTD
Target	$4910	$52,310
Actual	$9800	$42,265

Evaluate Quaterphenyl-Polyphenyl Effects on Solid Aroclor Yields	1969 Savings $63,200 NFC $14,000	TSD Objective B-8 (a)

Radiation instruments for measuring densities and level received. Drafting underway. Submitted request to Alabama Department of Public Health for radioactive materials license.

Improve 5460 Color		TSD Objective 1969

Engineering evaluation began on PR&D method to improve the color of Aroclor 5460. The most promising method involves sodium treatment of the Santowax R raw material.

Solid Aroclor 4465 by Blending	Savings $12,000 NFC zero	TSD Objective 1969

Market testing began on the new blended Aroclor 4465. The first sales lot will be made in early December 1968.

Therminol System	Evaluation	TSD Objective 1969

TSD recommendations based on computer simulation and plant tests, are being prepared. Distribution is planned for early December.

Liquid Still Debottlenecking	Evaluation	TSD Objective 1969

Increased sales forecast for Solid Aroclors indicates the necessity of Solid production in the liquid system. This will drastically reduce Liquid Aroclor capacity unless present equipment capabilities can be maximized.

Engineering evaluation of the present system is in progress and a plan for improved operation is being formulated.

TOWOLDMON0044220

AROCLOR (Continued)

Installation of Entrainment Separator - No. 2 Liquid Aroclor Still	Capacity Increase NFC $4,500	TSD Job 868

Project 3093 was issued for approval 11/19/68. Engineering work is under way, drafting priority is being evaluated, and completion date targeted for July, 1969. This is part of overall plan to debottleneck the stills.

BIPHENYL-SANTOWAX W. G. Niemeyer, (V. R. Haupt)

Cost Improvement

	Month	YTD
Target	$3,335	$40,155
Actual	0	$100,330

Debottleneck Biphenyl Stills to 87.6 M lbs/yr.	Capacity Increase	TSD Objective B-7 (a)

CED has issued piping and structural drawings for work in the distillation area. Equipment installation scheduled for February 1969.

No. 1 Furnace Upgrade Liaison (CEA-1892)	Capacity Increase	TSD Objective B-7 (c)

Work in furnace area is essentially complete. Furnace was shutdown on November 9. Work started on November 10 for a scheduled two week shutdown to replace internal coils and connect piping to new preheaters. Field work was completed ahead of schedule. Hydrotest of new piping system was made on November 20. Followed by 48 hour brickwork "dry-out" period. Benzene feed was started about 2 PM on November 23 and reached normal operating temperature by 12 PM on November 23. Unit was shutdown on November 25 for about 6 hours to tighten flanges at reboilers. No. 1 Furnace continuing to run well after a smooth start-up.

Biphenyl-Santowax MIP	TSD Objective B-1 (a)

Biphenyl TSD manpower is tied up as Manufacturing Representative on No. 1 Tubular Unit revision and debottlenecking the stills plus the Santowax R column project. These projects will continue until February 1969. Therefore the Biphenyl MIP is not expected to be published until April 1969.

TOWOLDMON0044221

BIPHENYL-SANTOWAX (Continued)

Santowax R Distillation Column	Quality	TSD Objective B-7 (d)

Construction planning and scheduling is active on Phase I of the project. Phase I includes installation of column and new Montar-9 pump with manual controls. The column and pump are scheduled to be installed by the end of December.

HB-40 J. L. Brown (G. W. Miller)
V. R. Haupt

Alternate Hydrogen Supply	Project Scope	TSD Objective 1969

Progress reports summarizing complete PR&D evaluation are in typing, and will be issued in early December. CED has requested competative bids from Linde and other alternate vendors to Chemical Design. Plant manufacturing representative has maintained contacts with CED to follow progress.

Installation of 2nd Autoclave	Rate Increase up to 200,000 lbs/mo.	TSD Job AFE 3

CED supplied assistance by Walt Peterson for a design for immediate of a second HB-40 autoclave. The autoclave was obtained from WGK surplus and installation will start in the first week of December for completion before end of year. This clave will contribute a 20% increase in capacity by permitting start of second batch during last 15 minutes of previous batch when hydrogen is available but not being used.

CHLORINE D. W. Dudley (D. C. Malm)

Cost Improvement

	Month	YTD
Target	$2,750	$41,350
Actual	$ 425	$57,755

Reduce Mercury Usage To 0.75 lbs. Hg/Ton Cl_2	Savings $1,700	TSD Objective B-6 (b)

Project to install acid wash tank for recovering mercury is in construction. Completion is scheduled in December.

TOWOLDMON0044222

CHLORINE (Continued)

Brine Dechlorination	Savings $6,875	TSD Objective B-6 (c)

No change in status. Waiting for maintenance to detect and repair leaks in vacuum system.

Central Chlorine Unloading	Project Scope Details	TSD Job 860 CEA 1831

E. D. Sundstrom and R. J. Hood met with plant to map out details of CEA 1831 on November 25-27. Drawings of existing equipment layouts were forwarded to CED for design purposes.

HCl O. J. Norris, J. M. Jones, (D. C. Malm)

Cost Improvement

	Month	YTD
Target	$1,830	$7,910
Actual	$ 800	$4,200

Production of Staley Grade Acid	Increased Sales And $9,400 Savings	TSD Objective B-10 (c)

AFE number 3076 for $6,000 to install coalescer prior to carbon tower treatment was approved 11-20-68. Long delivery items have been placed on order. Project has been given high priority for drafting. Drafting expected to begin 1-1-69. Transmittal targeted for 2-1-69. Progress report was published 11-15-68.

Muriatic Acid Storage	Savings $21,200	TSD Job 497

Bid package has been submitted to Purchasing Department. Contract expected to be completed by 3-1-69. Foundation construction still in progress.

Revise HCl Long Range Plan	Manufacturing Improvement Plan	TSD Objective B-1 (b)

Work delayed 6 months due to high priority PNP debottlenecking. Revised target date 6/1/69.

TOWOLDMON0044223

PNP O. J. Norris, J. M. Jones, (D. C. Malm)

Cost Improvement

	Month	YTD
Target	$2,500	$116,500
Actual	0	$ 55,100

Debottleneck to 1.8 M #/mo.	Capacity	TSD Objective 1969

Project premise for preheating and pressurizing the charge tank issued. Approval being held until recommendations from maintenance engineering, on charge tank wall thickness loss to corrosion, are received. Mid November inspection showed carbon steel tank to be heavily pitted and ability to withstand pressurizing questionable.

Project for larger wash water pump transmitted to maintenance. Transmittal of project on new filter pump expected by 12/6.

Increase Reactor Temperature	Capacity Increase	TSD Objective B-9 (b)

Scheduled shut down in mid November for repairs prevented further studies on reaction time. Currently awaiting lab results on recycle composition in an effort to find variable causing poor letdowns.

Study of Molar Ratio NaOH/PNCB	EVOP	TSD Objective B-9 (c)

No action in November; programmed PNCB charge increases set-up. Will review job with production first week in December so tests may begin in field by 12/9.

Revise MIP	TSD Objective B-1 (g)

Typing revisions in progress. Work delayed due to high priority manpower planning for 1969.

NIRAN D. W. Dudley, K. G. Hale (D. C. Malm)

Cost Improvement

	Month	YTD
Target	$19,325	$176,090
Actual	0	$108,850

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TOWOLDMON0044224

NIRAN (Continued)

Solvent Addition	Savings $59,000	TSD Objective B-5 (a)

Savings of $50,600 have been obtained during the 1968 Methyl run versus a 1968 target of $50,500. An EVOP of Cl_2 and N_2 levels during the 1969 Methyl run is expected to yield additional savings in this area.

Sulfur Recovery from Residue	$500,000/yr. Savings, 40% Reduction in SO_2 in Air	TSD Objective B-5 (d)

The sulfur recovery process and project status were reviewed on 11/18-19 with the CED project manager. Future work for Anniston TSD and PR&D was reviewed along with CED plans. Potential markets for recovered sulfur are being evaluated as an alternate to sulfur use in P_2S_5. Tentative process by PR&D expected 12/68.

Demonstrate Parathion Recovery	Savings $70,000 and 10-15% Reduced COD Loading	TSD Objective B-5 (a)

Progress report summing work to date and proposed work plan was published 11/19/68. Project No. 3106 for $3,000 expense was forwarded for plant approval 11/26 to cover inspection of coalescer for cause of pluggage.

Submerged Pump for RI Control of Chlorination	Savings $1,500	TSD Objective B-5 (c)

No tests ran in November. Monel pipe has been installed and initial tests will begin in December.

Fume Collection System in Parathion Department	Reduce Corrosive Atmosphere	TSD Objective F-10

Wrap-up report will be issued in mid-December.

ENGINEERING DESIGN AND SERVICES

Mechanical/Electrical/Instrument Design and Drafting	J. C. Price, J. A. Veazey, R. L. Brewer, J. K. Rennie, (W. F. Taffee)

Highlights

Phase I of Santowax R column installation is underway and controls design package completed and critical instrumentation components for phase II on order. Work underway on Solid Aroclor chlorination and still controls to provide increased production.

TOWOLDMON0044225

ENGINEERING DESIGN AND SERVICES (Continued)

Highlights (Continued)

Acidic spring water sewer drafting delayed until December by Aroclor startup and Santowax column. Reviewed Aroclor freight elevator based on recommendations of latest safety audit. AFE covering changes recommended to provide safer operation will be forwarded for approval in January.

Procedure for Electrical Testing	Safety	TSD Objective A-6

TSD/Maintenance meeting rescheduled to December 6.

Design Responsiblity in Disaster Control Plan	Safety	TSD Objective A-7

Radio equipment specifications and complete design transmittal are scheduled for December.

Niran Interlocks	Safety	TSD Objective A-14 (b)

AFE, originally scheduled for 11/30 delayed by Santowax work. Will submit in December with design scheduled for last quarter of 1969.

UTILITIES ENGINEERING J. C. Price, L. O. Chambers (W. F. Taffee)

The projects for Installation of Gas Meter at Biphenyl and Changing Cooling Water on Trane Compressor to Tower Water were approved. These projects will be forwarded for drafting in December. At the request of W. E. Chandler, re-evaluation of the steam and water meter projects was started and is expected to be completed in December. Collection of required information to evaluate plant power factor improvement and plant central compressed air system was completed, preliminary estimates are being prepared and progress reports will be issued in December.

Project to protect the 20 inch city water main from corrosion was forwarded for typing and approval.

PLANT IMPROVEMENT G. C. Goodwin (W. F. Taffee)

Published 1968 Plant Improvement third quarter progress report.

AFE forwarded for solids incinerator at plant dump.

1969 Plant Improvement Program preliminary scope has been completed.

TOWOLDMON0044226

ASSIST OPERATIONS ON START-UP V. T. Langdon (W. F. Taffee)

CEA 1430 - Aroclor Expansion

Temporary drumming facilities installed and operating satisfactorily. Flaking and bagging equipment being modified as start-up uncovers needs. Therminol heating system started up satisfactorily.

POLLUTION CONTROL E. G. Wright (W. F. Taffee)

Reporting Spills and Other Non-Routine Operating Conditions in the Plant	Pollution Abatement	TSD Objective F-4

No air emission or spill reports were received during November.

Install Adequate Drainage at Soda Ash Slurry Tank	Pollution Abatement	TSD Job 729

Concrete pad installed during Niran turn-around. This pad has eliminated PNP and soda ash from getting into Snow's Creek from slurry tank.

Install Solids Removal Equipment at Waste Treatment Plant	Pollution Abatement	TSD Job 808

A revision to this project will be prepared as soon as firm quotes received from the electrical and piping contractors.

Special Activities

1. On 4 trips to Coosa River everything okay.
2. Visited City Treatment Plant Personnel and discussed solids problem with them. They agreed that problems are not as severe during winter months.
3. Completed pollution control objectives for 1969.

Waste Treatment

All wastes were effectively treated during November. Average values for Monsanto's effluent to City Treatment Plant in November are as follows:

	Average Daily	Specifications
PNP	1.0 ppm	<5 ppm
COD	51.0 ppm	<200 ppm
Parathion	.08 ppm	<1 ppm
BOD	3.6 ppm	<200 ppm

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TOWOLDMON0044227

PROCESS AND QUALITY ANALYSIS W. B. Dunlap

P_2S_5 Parathion Correlation Study	Potential $50,000 Savings	TSD Job 827

A Progress Report was issued summarizing a survey of viscosity-percent phosphorus relationships. Viscosity serves well as a day-to-day control of the reactor, but long term correlation is very poor. Variability is high, and must be reduced before optimization studies are made.

Identification of Parathion Variables	Potential $17,000 Savings	TSD Job 828

A Progress Report was issued summarizing the survey of variability in assay of chlorinated crude intermediate. The random error is two great for practical optimization studies. An experiment to isolate components of variability was outlined.

RIG Documents	Manpower Planning	TSD Objective 1969

Overall Process and Quality Analysis effort to contribute to the MIP's was defined. The manpower requirement for this effort was summarized; cost improvement potential was totalled. From the overview objectives were set up in terms of dollar savings and work accomplishment. RIG documents were written for P&QA Supervisor and Process Analysis Technician.

Quality

The RFT Index was 98.5 with 7 lots rejected out of 471; 6 out of 427 from the Organic Division. The Plant Quality Score was 90.5, down 0.2 from October, with YTD score of 95.0 against a target Of 93.0 minimum.

TOWOLDMON0044228

PLANT LABORATORIES G. W. Miller

PROCESS RESEARCH AND DEVELOPMENT J. T. Bell

Solid Aroclor G. L. Arnett

1. Aroclor 5460, color <1 Gardner, has been produced under laboratory conditions. Pretreatment of Santowax R with metallic sodium produces a raw material which under present Aroclor 5460 processing conditions yields Aroclor 5460 with a color level equal or superior to that of competition (Bayer and Kanekafuchi). Process development is scheduled for completion by 1-15-69.

2. Catalyst studies on Solid Aroclor production have been terminated. Based on the studies recently performed a 30% rate increase of chlorination can be expected by substituting either Aluminum metal or Aluminum chloride for the present ferric chloride catalyst. Only minor composition changes are detectable by infrared inspection of material produced with aluminum systems.

HB-40 - Biphenyl Hydrogen Purification J. L. Brown

1. Results of studies conducted to determine the allowable Carbon Monoxide concentration in the hydrogen feed stream for HB-40 production show that no detectable difference in hydrogenation cycle time is realized at CO levels of 50 ppm and below. However, cycle time penalties first appear somewhere between 50 and 100 ppm CO. Therefore, to insure that no cycle time increase is realized from hydrogen quality, 50 ppm CO has been accepted as the maximum tolerable level. The results are included in a report (Anniston 710-861, No. 3) to be issued on 12-3-68.

2. A study was completed to determine the actual hydrogen consumption rate curve in HB-40 manufacture. Based on scaled-up laboratory data determined at standard HB-40 operating conditions, the maximum consumption rate which occurs at the start of the hydrogenation is 78 lb./hr. This data is also included in Anniston 710-861, Report No. 3.

3. Tests were completed on the Heatless Solid Bed Adsorption Pilot Unit designed and constructed by Chemical Design, Inc. The unit was operated successfully with Biphenyl Hydrogen Off-Gas for over 700 hours with no major problems. Carbon Monoxide, which was present in the feed stream in amounts from 2.0 to 2.5% was removed to a level of 50 ppm and below with hydrogen recoveries reaching 75%. Optimum operating conditions meeting the 50 ppm CO specification limit gave a hydrogen recovery of 75%. The report (Anniston 710-861, Report No. 4) detailing the pilot operation will be issued on 12-4-68.

TOWOLDMON0044229

PROCESS RESEARCH AND DEVELOPMENT (continued)

Sulfur Recovery I. Ransaw, W. H. Howard

1. Major improvements in the process washing step were accomplished during November. By washing with solutions and altering ionic strength the organic content of sulfur can be reduced to 0.03-0.04%.

2. Final investigation of a hydrolysis procedure on washed sulfur shows that little or no benefit is realized from hydrolysis after an effective wash step. The minor reduction of carbon realized from hydrolysis is not significant enough to warrant the incorporation of a hydrolysis step.

ANALYTICAL AND QUALITY CONTROL

1. Analytical work load was below normal during November due to parathion turnaround.

2. Approval was received during November to purchase equipment recommended by R. A. Munch for improved Aroclor analytical testing. The new equipment and procedures are scheduled for use during the first quarter of 1969.

Complaint Report

Quality No.	Material	Customer	Reason
8-A-68	Aroclor 5460	Precision Cast Parts	Dark Color

YTD Quality Complaints/100 Shipments 0.11 : Target 0.20

Service

None

YTD Service Complaints/100 Shipments 0.16 : Target 0.20

Cost and Operational Indices

	October	1968 YTD Average	Target
(1) Manhours/Sample	0.51	0.41	0.40
(2) Dollars/Manhour	8.50	8.64	8.50
(3) Lab % Total Plant Cost	0.91	1.05	1.50
(4) Overtime %	3.5	4.49	5.00

TOWOLDMON0044230

COMMUNITY RELATIONS, PERSONNEL, RECRUITING, AND DEVELOPMENT

Personnel

1. Interviewed R. L. Russell for position of Senior Process Engineer.

2. J. T. Bell reported for assignment as Senior Process Chemist - Supervisor of PR&D. Mr. Bell is a MS chemist graduate of Mississippi State and has five years experience in teaching and industrial research.

3. J. O. Hopper joined the Lab 11/11 replacing M. E. Twigg who transferred to the Personnel Department.

Development

1. Gould's Pumps conducted two 4 hour seminars to plant engineers concerning centrifugal pumps.

2. J. C. Price, W. F. Taffee, J. A. Veazey, J. L. Brown, W. B. Dunlap, V. R. Haupt, and G. W. Miller attended Kepner-Tregoe Problem Analysis and Decision Making course held at Holiday Inn 11/18 thru 11/22.

3. G. C. Goodwin attended "Technical Writing" Seminar held by IEI in Atlanta 11/12.

4. E. G. Wright and Ed Bowles attended an IEI seminar on "Effective Oral Presentations" held in Atlanta 11/20.

5. R. L. Brewer visited CED and WGK during 11/12 thru 11/21 for a corporate corrosion seminar at CED and indoctrination in Materials Engineering and Inspection at the W. G. Krummrich Plant with O. W. Siebert's group.

6. J. C. Landwehr attended Associated Industries of Alabama meeting in Birmingham on November 4, concerned with presenting industries' testimony before the FWPCA National Estuarine Pollution Study hearing scheduled for Nov. 21 at Mobile, Ala.

Visitors

1. E. D. Sundstrom, R. J. Hood, CED engineers visited plant Nov. 25, 26, and 27 concerning Bulk Chlorine Handling project.

2. V. Schotte, CED, in plant 11/18 and 11/19 to review sulfur recovery process and project status.

3. Technical representative from Chemical Design Incorporated discussed final design of biphenyl hydrogen purification unit on Nov. 14. R. L. Slifer, process design representative for CED, participated in the meeting.

4. Walt Peterson of CED spent Nov. 19-27 at plant to develop design for installation of second autoclave in HB-40.

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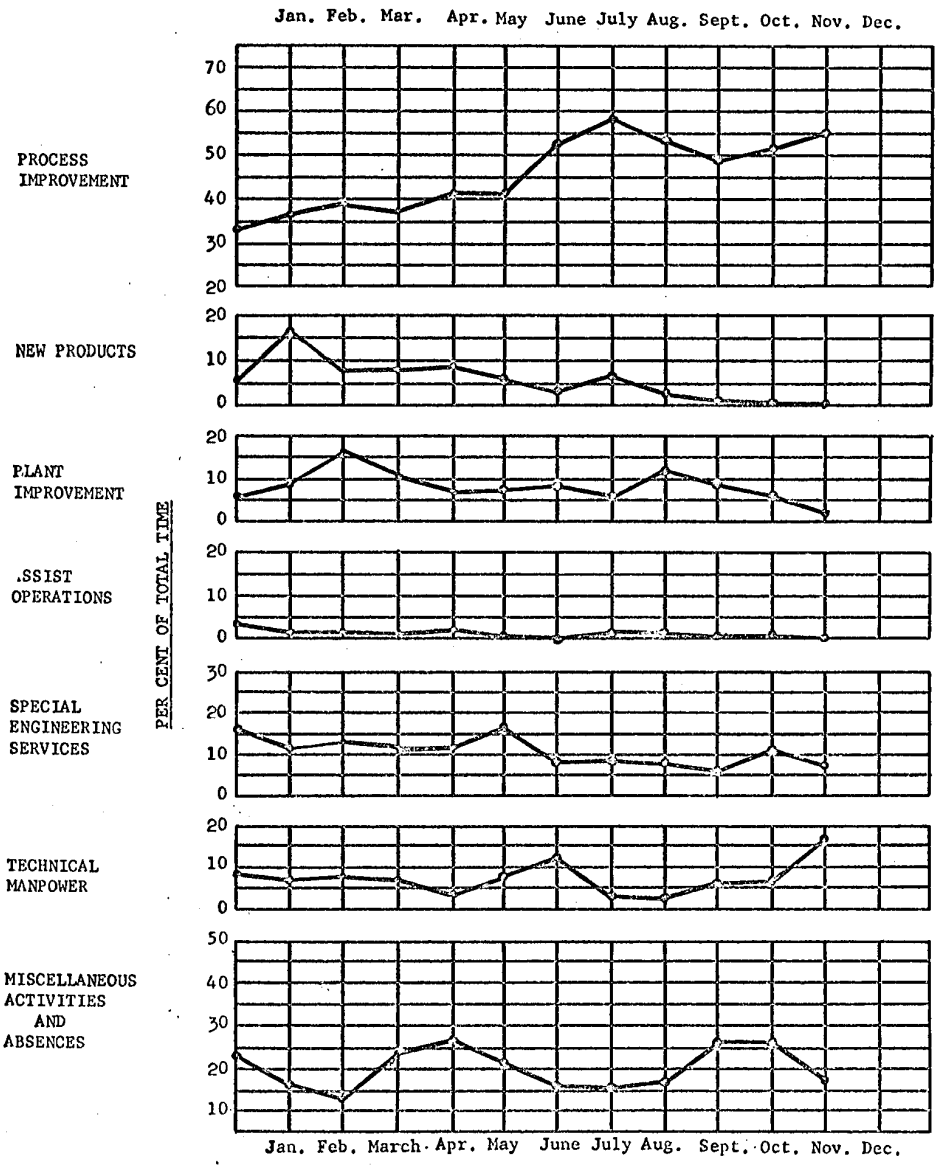
DISTRIBUTION OF TIME BY TECHNICAL SERVICE



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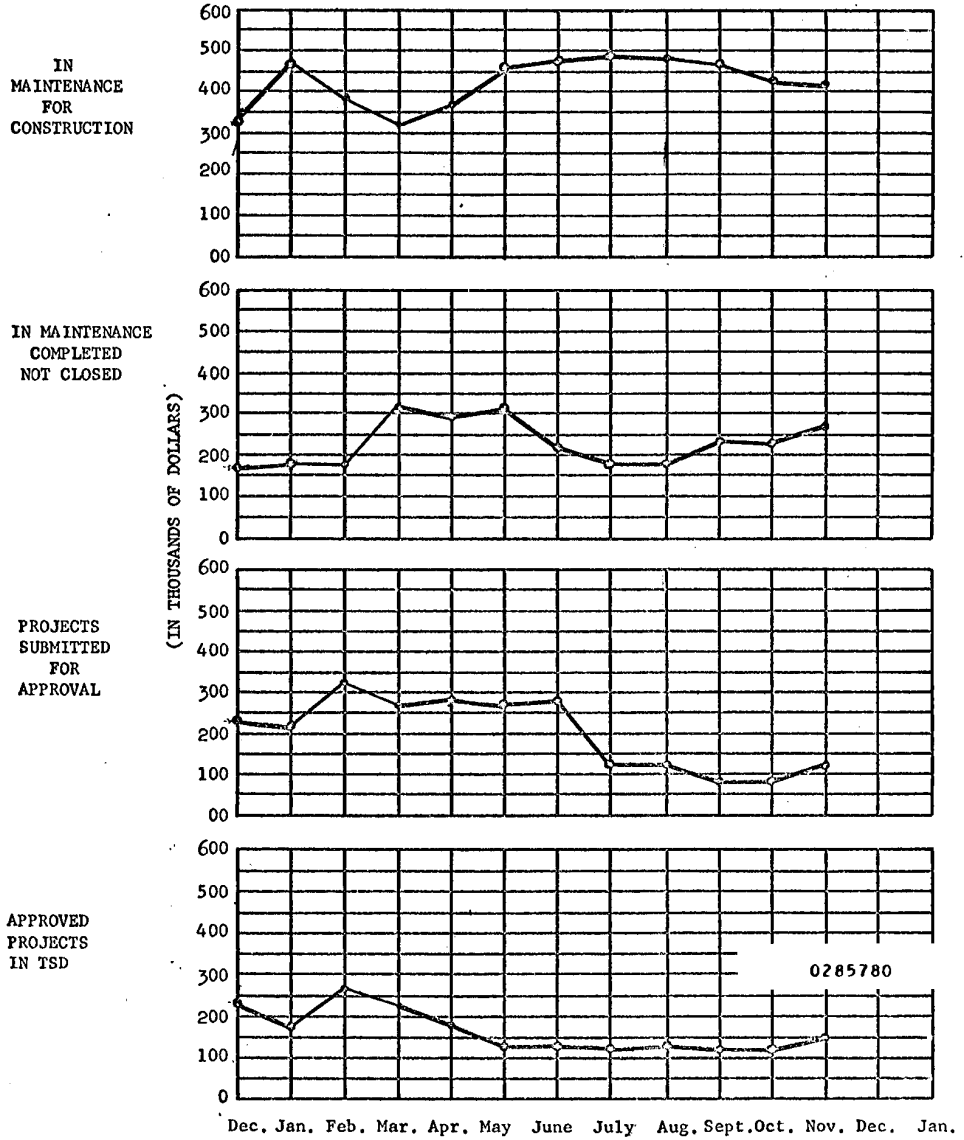
TSD PROJECT SUMMARY



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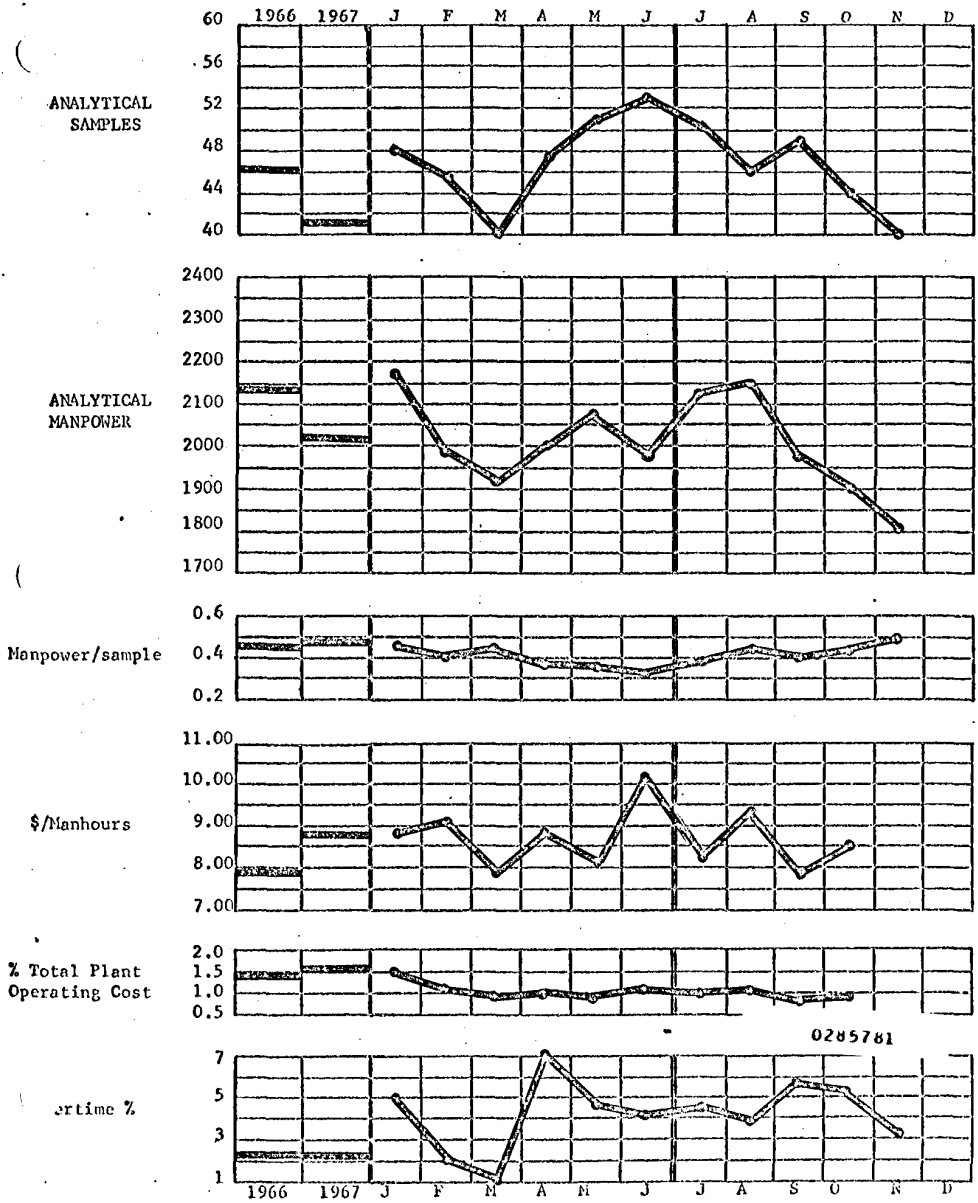

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