CENTRAL ENGINEERING DEPARTMENT

SECTION REPORT

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Month	October
Date	November 4, 1968

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Monsanto

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OCTOBER, 1968

HIGHLIGHTS

Additional alternates for the Seattle VANILLIN expansion are being developed and evaluated for comparison with the project as visualized in September to minimize downtime and expense work.

CED received pre-approval to proceed with limited definitive engineering for the GENERAL PURPOSE ESTER and the DELAWARE RIVER UTILITIES projects.

Additional economic evaluations for alternate MALEIC ANHYDRIDE projects were developed and reviewed with the Division. No positive program has been formulated to date.

Work was started on definition of an OIL ADDITIVES project for SOUTH AFRICA which will result in sale of technology and intermediates.

An evaluation of new CHLORINE manufacturing technology is underway for our facilities at Krummrich and Pt. Comfort.

Evaluations were completed and issued on SACCHARIN, BENZOIC ACID, PCPI, PHOSGARDS, MALEIC ANHYDRIDE, and MBT.

The heavy project definition work load continued and shows signs of increasing.

Project definition and scope preparation activities continued on SALICYLIC ACID-JFQ, VANILLIN-SEATTLE, ADIPIC ACID-LULING, GENERAL PURPOSE PHTHALATE ESTERS, MALEIC ANHYDRIDE-JFQ, LACTIC ACID, BENZYL CHLORIDE-DR, MONOCHLOROBENZENE-WGK, SOLID AROCLORS, PHTHALIC ANHYDRIDE #3, SANTOCURE NS, and DICHLOROBENZENE RESOLUTION-WGK.

Liaison continued or was started with Research and TSD groups on SALICYLIC ACID, p-NITROANILINE, OXO ALCOHOLS, GENERAL PURPOSE PHTHALATE ESTERS, DICHLOROBENZENES, ADIPIC ACID, POLLUTION REDUCTION-JFQ, BENZYL CHLORIDE, PNCB, SANTOCURE NS, and BENZOIC ACID.

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FOOD AND FLAVOR CHEMICALS

Saccharin - Air Oxidation Process - CEA 0415

Research work on air oxidation of o-toluenesulfonamide to saccharin was reviewed. Order-of-magnitude estimates of economics for the process were developed based on the results of exploratory experiments. A comparison with present bichromate oxidation shows that manufacturing costs would be, at best, equivalent. Higher conversion costs offset any raw material savings realized with the air oxidation process. It was concluded that no further process work was justified.

Vanillin - Seattle - CEA 2029

The proposed vanillin expansion, as set forth in the Objective and Philosophy memo of September 23, 1968, was reviewed at the Seattle Plant on October 16-18.

This plan for expansion has several drawbacks including extensive production downtime and high expense costs for relocations and temporary piping. For these reasons, the originally proposed expansion cannot be recommended by CED. Accordingly, CED is developing layouts and estimated capital, expense, and downtime for the following alternate plans:

Case I — Project as proposed on September 23.

Case II — Involves the same expansion concept as Case I, but with all new additions separated from the existing unit to minimize some of the drawbacks encountered with Case I.

Case III — A new 3M lb/yr facility to be located in the open area to the east of the present crude unit with:

A. Relocations of selected existing expensive equipment.

B. All new equipment.

These alternates will be developed to the point where they will be ready for a comparison review the week of November 11.

Lactic Acid - Expansion to 15M lbs/yr - CEA 2097

A preliminary review of equipment required for this expansion was made in late October with Texas City personnel. A project scope will be written when manpower availability permits and when certain problem areas are more completely defined by the plant personnel.

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FINE CHEMICALS

Benzoic Acid - JFQ - CEA 0416

A preliminary evaluation of the JFQ-TSD proposed changes to Benzoic Acid refining and consolidation of Benzoic Acid, Sodium Benzoate, and Benthal operations was prepared. The results were reported in Progress Report No. 1, issued 10/16/68.

The report and recommendations will be reviewed with the business group in November.

TCC - Mobay PCPI - CEA 0416

Previous estimates of Mobay's PCPI economics were revised to include current PCA usage and the conversion fee they offered during contract negotiations. The conversion proposal of Mobay was also compared with self-manufacture of PCPI. The data developed will be used by the business group in future contract discussions.

Salicylic Acid - Steam Stripping - CEA 1373

Project development work on the proposed phenol steam stripping project was resumed. During review meetings with J. F. Queeny TSD, Manufacturing, Research, and CED, several revisions were requested. CED evaluated the economics of alternate schemes proposed and is making revisions to the project where economically justified.

CED will complete the scope report revisions, revise the capital estimate as required, issue the project scope report, and transmit the capital estimate to the Division in November.

HEAVY CHEMICALS

Chlorine-DSA Evaluation - CEA 2109

An evaluation of expanding the chlorine manufacturing facilities using the new DSA technology at Krummrich and/or Pt. Comfort was started. Engineering Sales will develop capital and manufacturing cost estimates for several alternates at Pt. Comfort, and CED will develop similar data for Krummrich. CED will use these numbers in an overall evaluation of expanding the company chlorine manufacturing capacity.

Leonard Construction Company will assist CED by developing preliminary capital estimates for the alternates at WGK. The necessary data for the study has been forwarded to Leonard.

The target date for the study is mid-January.

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INTERMEDIATES

p-Nitroaniline - WGK - CEA 1238

CED continued liaison with Krummrich PR&D on the new PNA process development. Research pilot plant work on the continuous crystallization has been completed, but some additional lab work on the filtration and drying steps is still in progress. The tentative process is being prepared.

An evaluation of alternate dryers for the new process is in progress, and a recommendation will be made early in November.

Benzyl Chloride Expansion - CEA 2026

The benzyl chloride evaluation report, issued in September, was reviewed by Manufacturing, Research, and Engineering. The recommendations in the report to expand Delaware River to 60M lbs/yr and maintain Krummrich at 10M lbs/yr were approved and project definition and scope report preparation were started for the Delaware River expansion.

Project definition and the AR Data Transmittal are targeted for late December.

Dichlorobenzene Resolution - WGK - CEA 2027

The Division business group reviewed the economics of the dichlorobenzene isomer resolution project and requested that CED proceed with project definition and submission.

A meeting of CED, Research, and WGK PR&D personnel was held October 23 to review the process status and risks and define responsibilities and timing for completion of the process definition.

WGK PR&D will prepare the tentative process draft by November 22. This document will serve as a basis for the scope report to be developed by CED. The AR capital transmittal is scheduled for mid-December providing adequate manpower can be assigned to the project.

p-Nitrochlorobenzene Expansion - CEA 2060

A preliminary evaluation of alternates for providing long-range PNCB/ONCB requirements was prepared. Expansion of PNCB and consolidation of ONCB/PNCB production at WGK was compared with a case for adding PNCB capacity at Anniston, expanding the ONCB recovery at JFQ, and continuing WGK operations without major additions. A progress report presenting the results will be issued early in November.

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Monochlorobenzene - Expansion to 150M lbs/yr - CEA 2066

The plant capacity tests planned for October will now take place the week of November 4. Full scope definition and transmittal of AR data are now expected by mid-December.

Most of the work to date indicates that the plan for expansion in the original 100M lb project in 1965 is still valid.

Steps taken to improve chlorine flow have made it possible to run the existing plant at 110 or 115M lb/yr rates except during summer.

OIL ADDITIVES

Oil Additives - South Africa - CEA 9175

A scope report is being prepared for a proposed oil additive unit for The Synthetic Rubber Company of South Africa. Facilities will be provided to manufacture Santolubes 493, 900, and 290 as well as a blending facility.

It is planned that SRC will develop their own capital estimate, submit, and obtain approval of the project. Monsanto (CED) will then develop a process design package for SRC. Monsanto will receive royalties for sale of technology and realize increased sales of intermediates to the South African market.

PLASTICIZERS

General Purpose Phthalate Esters - CEA 1592

Approval for CED to proceed with definitive engineering was received.

A pilot plant scale filtration test has been scheduled for the week of December 9, at the Everett Plant. Preparations are well underway.

A plan to self-manufacture the catalyst for the high temperature esterification process will be evaluated to determine if Research should proceed with further study.

Oxo Alcohols - CEA 1765

A preliminary evaluation was made of Union Oil's process for oxo alcohols. Their process does not appear attractive enough to pursue further.

CED is working with Organic Research to resolve the discrepancies uncovered in literature physical constants data. In some cases, it has been necessary to obtain measured data.

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An evaluation was prepared for various sites for location of the ester complex.

CED is working on a preliminary schedule to arrive at an expected completion data for the oxo alcohol unit.

Solid Aroclor Expansion - Anniston - CEA 2080

Process flow diagrams, an equipment information summary, scope of work, and equipment arrangement studies have been completed for a new 12M lb/yr expansion of solid Aroclors. This information has been sent to Division personnel for review and comment. A preliminary cost estimate has been prepared.

We expect to transmit appropriation request data to the Division late November or early December.

Phosphate Esters - Phenol Extraction - CEA 2098

An Engineering Authority was issued for project development work on a process for extraction of phenol from waste waters from the J. F. Queeny Phosphate Ester Department. The process status was reviewed in a meeting with JFQ-TSD, PR&D, Research, and CED. The work to date on phenol extraction has demonstrated feasibility, but considerably more data and demonstrations are needed to have a developed process suitable for engineering design.

Additional requirements are being assessed so that PR&D, TSD, and Research assignments can be made for development of the necessary data and process demonstrations.

RESINS

Phosgards - Relocation to Multi-Purpose - CEA 0420

An evaluation report considering moving Phosgard manufacture from the "W" Building to the Multi-Purpose (Skylube) Plant was completed and was issued. The fit for this move appears good, and such a move was recommended.

A review by the Technical Production Manager has resulted in a request for CED to proceed with this project and also include relocation of Santolites from the "W" Building and Santicizers 3, 8, and 1-H from the "T" Building. Activity on this project will be started as soon as manpower is available.

Maleic Anhydride Expansion - JFQ - CEA 1792

Preliminary estimates of battery limits capital and manufacturing cost were prepared for three additional cases involving expansion or replacement of the J. F. Queeny maleic facilities to provide 105M lbs/yr total molten maleic anhydride capacity.

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Case I Provide 105M lbs/yr total capacity at JFQ by adding 60M lbs of SD reactor capacity and replacing the refinery.

Case II Replace JFQ facilities with a 30M lbs/yr plant on the West Coast and 75M lbs/yr plant on the East Coast.

Case III Replace JFQ facilities with a 105M lbs/yr plant on the East Coast.

Case II was subsequently ruled out due to poor overall economics. Capital and manufacturing costs for the large single plant Cases I and III are being reviewed in more detail for incorporating in a revised economic analysis by the Division.

Adipic Acid Operations Improvement - CEA 1883

The Project Scope Report was typed and published for approval. All approvals are expected by November 6. The estimating section completed and published a capital estimate for internal review.

The required reviews within CED will be held and the AR Data transmitted to the Division about mid-November.

Work continues on the Scope Addendum describing cyclohexanol storage and handling.

Phthalic Anhydride #3 - CEA 2022

A bid proposal is being prepared for a 100M lb/yr phthalic anhydride plant. The bid specification package will be sent to several engineering-contractors to obtain competitive bids for plants using BASF and Von Heyden technologies.

RUBBER CHEMICALS

Santoflex Blending - WGK - CEA 1972

There has been no CED activity on this job due to higher priority projects.

Santoflex 13/36/77 - Japan - CEA 2003

Work continued on preparation of a process design package.

Santoflex Flaking - WGK - CEA 2018

CED work was deferred in favor of higher priority projects.

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MBT Expansion - Nitro - CEA 2041

An evaluation report was issued comparing alternate crude and refining process schemes for an MBT expansion at Nitro.

The recommended process combination was short-cycle batch autoclave operation for crude coupled with solvent refining of the aqueous NaMBT solution.

Further CED work on development of the specific expansion project has been deferred to allow evaluation and definition of the more urgently needed Santocure NS expansion project.

Santocure NS Expansion - Nitro - CEA 2089

Preliminary capital and manufacturing costs have been developed for six alternate cases for a Santocure NS expansion considering plant size, technology, and plant location. The evaluation report will be issued in November.

In addition, an evaluation was made for a proposal to complete the portion of a new 45M lb plant, from the filter on, on a crash basis to free up the existing Building 45 Santocure facilities for the new PVI-NS operations and eliminate installation of the tail end of the PVI project now in design.

The evaluation showed that the disadvantages of the proposal outweighed the advantages, and the proposal has been dropped from further consideration.

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