

BIRD & SON, inc.
CENTRAL ENGINEERING DEPARTMENT
OVERVIEW

BIRD & SON, Inc.

CENTRAL ENGINEERING DEPARTMENT

OVERVIEW

For

Mr. John Arnold

Prepared by

Mr. George L. Dusty

GDusty 12/3/80

December 1, 1980

Purpose of Overview

In order to smoothly accommodate the recent reporting channel change, this overview has been developed to update you on the Central Engineering Department as it has been organized and operated in the past.

ROLE

Present Charter
Discussion

MANNING

Present Arrangement
Discussion

WORKLOAD

Discussion
Work Lists

UNRESOLVED SUBJECTSSUBJECTS FOR FUTURE CONSIDERATION

Role of Central Engineering

Present Charter

Presently Central Engineering provides support on request to the operating divisions in five major areas.

1. Maintenance.
2. Construction.
3. Process.
4. Research and Development.
5. Environmental.

For the most part the Department acts as a consultant to each of the operating divisions and top management. The exceptions to this policy are:

1. Environmental (James Guzelian)

Environmental studies can be initiated by the Department without being requested by the operating divisions (previous approval by Mr. Heim).

2. Power and Steam (Paul Barra)

Efficiency and maintenance studies of the operating divisions power and steam generating equipment can be initiated by the Department without being requested (previous approval by Mr. Heim).

3. Energy (Joe Hratko)

Energy studies can be initiated at the operating divisions without being requested by the divisions (previous approval by Mr. Heim).

4. Electrical Safety (John Joy)

Electrical safety investigations can be conducted at the operating divisions without being requested by the divisions (previous approval by Mr. Heim).

Discussion

1. Maintenance Support

This has primarily occurred in the electrical and power and steam sections.

I believe we can satisfy the needs in these areas. We stand able to provide more comprehensive maintenance support if called upon.

2. Construction Support

The Department has provided construction support without the advantage of having an architectural or civil engineering discipline in-house.

Construction projects have come too infrequently to justify this in-house capability. We usually have to include engineering consultant money in the project estimate to cover hiring the civil engineering support; however, we are able to provide all the remaining functional services. I believe this is the way we should continue to operate. Since this type support does not usually have a high priority, we tend to postpone or defer it when more important work comes along.

3. Process Support

This is our weakest area. Since appointing a Roofing Engineer we have improved our capability in this area, but with the latest changes we have regressed. We still have no one in the felt process area that is fully experienced or skilled to respond to operating level needs. Paul Knight always felt that this service should be hired when required.

Due to past transfers (Mr. Hardy, Mr. Maloof, Mr. Moody and yourself) we are not as heavy in experience as we have been in the past. I have replaced these people with three entry level people, which I have subsequently lost due to job and manning changes.

Role of Central Engineering
(continued)

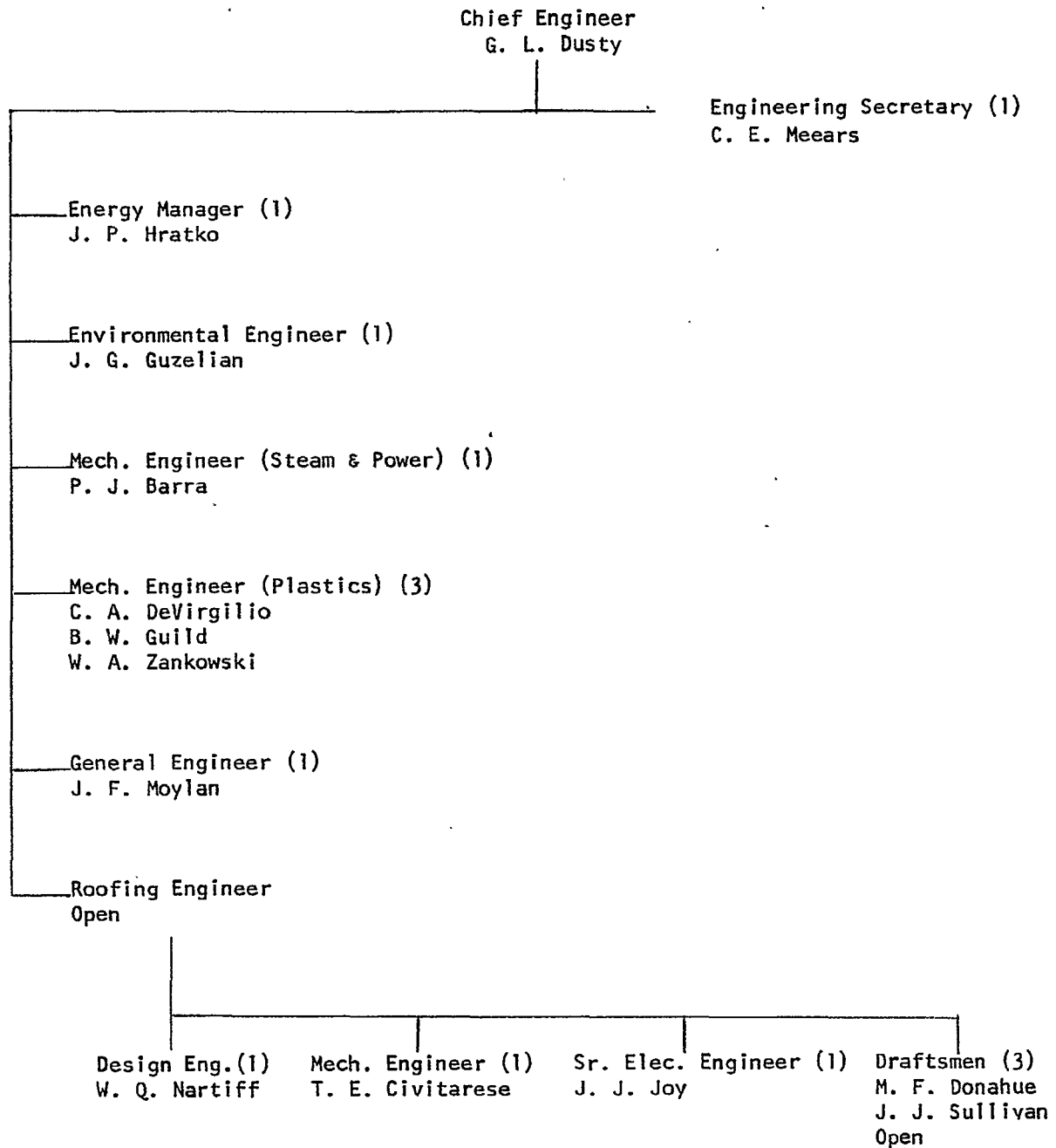
4. Research and Development

We are probably strongest in this area. All of our plastics people are oriented towards application development at the present. I believe that it is justified, since our competitors in the plastics field have shown that considerable effort and progress is being made to keep each of them on top of changing technology.

5. Environmental Support

The environmental support section consists of manning for one person. Mr. Guzelian holds the position. Mr. Guzelian is a recent transfer from the Paperboard Division. Though his academic training is biology, his experience is in paper and thus somewhat appropriate to the position. I made the transfer because I needed to fill the job immediately plus Mr. Guzelian had some of the skills required. I also wanted to see Bird & Son do what it could to place those people being laid-off by the termination of the operation. We mutually agreed to review our satisfactions or lack thereof with the job in six months.

December 1980



Central Engineering Department Manning
(continued)

Discussion

1. The Department manning was increased from 8 in 1973 to 21 in 1979. This year we had a five man cutback. Needless to say since Capital Budget cutbacks have occurred, very little work is being done in roofing. In plastics not only do we have three assigned people, but we have the remaining four engineers working full time in this area. I am busier than ever since the cutback. I presently have no capability to take on any new workload.
2. Eventually I would like to have an Assistant Chief Engineer to assist me in managing the Department. I hope to use the position of Roofing Engineer as an interim job to train and select this assistant. Though most technical people with reasonable management skills could fill the job of Chief Engineer, I believe it would be more desirable to have a knowledgeable Roofing Process Engineer as your candidate.
3. A close look at the manning chart will show you that I have only one engineer that is not a specialist. Presently Mr. Civitarese is an entry-level engineer that needs much more experience. In fact he may be too weak for us.
4. Mr. Moylan, in the General Engineer's position, does all sorts of miscellaneous department support type projects such as surveying, piping process work, map work, and sometimes simple drafting. He is most effective when used to break in young engineers. Though he fulfills a necessary function, he will never approach the creative abilities of some of my other engineers.
5. Eventually the Plastic Engineering section might justify a section leader, but at this time I prefer to supervise each man myself.

6. Generally speaking I have a well motivated staff. Seven or eight people are over-achievers; whereas, five or six do average work and one or two are under-achievers.

I have included a project list reflecting work status as of November 1, 1980. I don't normally prepare a periodic work list; however, I thought this might give you a little feeling for the work load backlog as well as the diversity of projects. This list does not reflect the many individual things that I am doing or the studies that Mr. Hratko and Mr. Guzelian are doing. Mr. Guzelian's field of interest is pretty much covered in the Environmental Status Report which you receive. I shall cover Mr. Hratko's work later in this report.

Electrical Projects

This seems to be a large backlog of work; however, many of the projects are not needed immediately. In the event of a high priority project, we can hire outside assistance temporarily.

Mechanical Projects

Presently all of our plastic and mechanical engineers are working on the accessory conversion to powder. We have seven people committed to this work. Needless to say our other projects must wait until the conversion is complete.

Plastic Projects

Exclusive of the accessory conversion, we have two major plastic projects of a continuing nature. Three years ago Mr. Heim approved three projects, namely:

1. Computer Assisted Design and Manufacture of Dies
2. Die Development Program
3. Automatic Process Control of Extruders

Project #1 - Computer Assisted Design and Manufacture of Dies

This project allowed us to bring in-house the design and fabrication of dies. The move saved us considerable money in the Bardstown conversion to powder. It will continue to allow us to save die fabrication expense as Bardstown products change.

Workload Discussion
(continued)

Project #2 - Die Development Program

This project is the continuation of our die development program which was temporarily put aside when the Bardstown construction started. The objectives of the die development program are to:

1. Better understand the technology of extrusion die design, maintenance and manufacture,
2. Enhance our knowledge of how best to build die systems with close repeatability, and
3. Raise production capability to extrude siding and accessories at rates of 400#/hour and 250#/hour respectively.

This work is all mechanical and in no way conflicts with the material research being conducted by BBH. Bardstown, in their endeavor to meet production needs, would not have the time or specific skill to do this work alone. Since our plastic people were fully occupied with the accessory program this year, we were unable to do any work on this project. I had resubmitted my budget request of \$32,000 expense and \$10,000 capital for 1980; however, it was not approved.

Project #3 - Automatic Process Control of Extruders

This project is a two year research program which looks into computer control of an extrusion line. The complexity of the interaction of extrusion process parameters makes optimization of output extremely difficult by manual operation.

Estimated research cost for initial investigation on one extrusion line at Bardstown is \$108,000 over a period of two years. Potential savings in the order of \$500,000 per annum could be achieved.

Workload Discussion
(continued)

Project #3 (continued)

The large number of interdependence of extrusion process parameters makes it extremely difficult to manually optimize extruder output. Because of the complexity, manual methods of extrusion control rarely enable optimum output rates to be achieved consistently throughout a production facility.

In the extrusion process, upstream polymer conditioning has major impact on the quality and quantity of the output. For example, predictable and controllable melt temperature is extremely important to the Die Designer since it is directly related to viscosity. If viscosity fluctuates, die output will also change. The melt temperature profile across the extrudate cross-section is also critical to die performance because large variations (20-30°F) will cause flow problems across the lips. Similar types of arguments are applicable to other process variables such as melt pressure, gauge, width and gloss.

This program will be conducted in its entirety at Bardstown in order to take advantage of the continuous production environment. It is not necessarily proposed that the operator be eliminated but it is hoped that many of the operating decisions will be taken away from him. Other anticipated benefits are:

- Tighter sigma deviation control on output and higher output/line/shift
- Tighter control of weight/square
- Quicker start-up and improved conversion efficiency
- Automatic fault detection of instrumentation
- Lower level of operator skill requirement
- Real-time data review
- M.I.S. information/record keeping, etc.

Project #3 (continued)

The estimated cost and equipment components for the research investigation on one line is shown below:

<u>Equipment</u>	<u>Cash Flow \$</u>			
	<u>Capital</u>	<u>1980</u> <u>Expense</u>	<u>Capital</u>	<u>1981</u> <u>Expense</u>
TDC2000 Controller	65,000			
Omyson Controller			13,000	
Sensors		5,000		5,000
Installation	5,000		2,000	
Software				5,000
Contingency	5,000		3,000	
Totals	75,000	5,000	18,000	10,000

As in Project #2, we had no time to implement the project this year; however, I have resubmitted a capital request in 1980 and have included \$5,000 in my expense budget for 1980. This also was not approved.

Both projects were reviewed and endorsed by Mr. Frazier, Mr. Hines and Dr. Schnizer at the outset. Had these two studies been completed prior to the Bardstown conversion to powder, I believe a far simpler and straight-toward conversion would have occurred. Auto-Process Control is not a new idea. It has been used for years in the plastics industry but not on profiles. I believe this type of control knowledge will be mandatory for the successful plastic converter in the future. Manny Veral's idea is not new, in fact it represents just the top of the iceberg as far as what we want to do and should be done.

Mechanical Projects

<u>Location</u>	<u>Description</u>	<u>Assigned</u>	<u>Eng. Time</u>	<u>Status</u>
BBH	Splitting Shingles			Future
FB	Air Knives - Talc Control		2 months	Future
DM	Paperboard Mill Shutdown	G. Dusty		In Progress
All	Land Changes	G. Dusty		In Progress
FS	New DSM Screens	G. Dusty		In Progress
FF	New Water Pollution			Future
FS	Mixer Filler Control	G. Dusty		In Progress
FS	Architect 80 Development		50 weeks	
FF	Talc Control	B. Guild	6 weeks	
FV	Ventilation Study			In Progress
FB	Storm Water Collection	J. Moylan	4 weeks	Future
All	Energy Studies	J. Hratko	Continuous	In Progress
FF	Granule Handling System	G. Dusty		In Progress

Plastic Projects

<u>Location</u>	<u>Description</u>	<u>Assigned</u>	<u>Eng. Time</u>	<u>Status</u>
FV	Die Development	J. Arnold	100 weeks	Future
FV	Accessory Dies	J. Arnold T. Civitarese B. Guild	20 weeks	In Progress
FV	Wire EDM Equipment	J. Arnold	2 weeks	Awaiting quotes
FV	Computer Process Control	J. Arnold	150 weeks	
FV	Accessory Sizers	J. Arnold C. DeVirgilio	10 weeks	In Progress
FV	Co-extrusion			Future
FV	Hi-Speed Stands	C. DeVirgilio	6 weeks	In Progress
FV	Hi-Speed Upper Lock Lifts	C. DeVirgilio	4 weeks	Future
FV	Many other projects			

Priority Legend

1. Underway or planned installation during next six months.
2. Engineering design required to assure installation within next fiscal year.
3. Projects for which funding requests are planned (future).

Electrical Projects

<u>Location</u>	<u>Description</u>	<u>Assigned</u>	<u>Eng. Time</u>	<u>Priority</u>	<u>Status</u>
DC	D.C. Drive for Felt Rewind	Unassigned	14 weeks	3	Study and proposal required 1980 appropriation
DC	Motor Control Center #5 and Related Changes to Switchboard	J. Joy	12 weeks	2	Design State - 1980 appropriation
FC	New Controls and Wiring of Roofing Machine	J. Joy	24 weeks	2	Study and proposal underwat 1980 appropriation
FC	Update 208v distribution system with new panels and feeders	Unassigned	16 weeks	2	Study and proposal required
FF	New Granule & Talc Conveying Systems and HEAF Units		2 weeks	1	In Progress
FF	Replace oil cutout switches with new switchgear	Unassigned	25 weeks	3	Study and proposal required
FF	New Drive for Felt Machine	Unassigned	20 weeks	3	Study and proposal required
FG	New Service Switchgear	Unassigned	14 weeks	3	Temporary switchgear at FS requested for this plant
FJ	Update plant distribution System	Unassigned	15 weeks	2	Study and proposal required
FJ	Study for New Drive on Roofing Machine	Unassigned	12 weeks	3	Study and proposal required
DP	New Tower for Incoming Service Lines	Unassigned	10 weeks	2	Required design - 1980 appropriation

Electrical Projects
(continued)

<u>Location</u>	<u>Description</u>	<u>Assigned</u>	<u>Eng. Time</u>	<u>Priority</u>	<u>Status</u>
DP	Upgrading of Undervoltage Protection for Induced Draft Fan	J. Joy	6 weeks	2	Equipment on order
F0	New Electrical Drive System for Roofing Machine	J. Joy	4 weeks	1	Presently being installed
F0	New Switchboard and Distribution System	Unassigned	4 weeks	2	Study and proposal required
FS	New MCC for Shreveport Roofing	Unassigned	10 weeks	3	Study and proposal required
FW	Study to Propose New Electrical Drive System for Roofing Machine	Unassigned	10 weeks	3	Study and proposal required

Power and Steam Projects

<u>Location</u>	<u>Description</u>	<u>Assigned</u>	<u>Eng. Time</u>	<u>Status</u>
DP	#6 High Sulfur Fuel Oil Usage	P. Barra	8 weeks	Initial study stage
DP	Economizer for #3 Boiler	P. Barra	4 weeks	Proposed for 1980 Budget
DP	Alternate Means of Supplying 60 psi Steam to Mill in case of Turbine Failure	P. Barra	2 weeks	Recommended
FS	#6 Fuel Oil Conversion	P. Barra	2 weeks (6 Additional if converted)	Study on-going
FS	Economizers for Boilers	P. Barra	2 weeks (4 additional if installed)	Study on-going
F0	Heating System For Roofing and Felt Mills	P. Barra	4 weeks if installed	On 1980 Budget
F0	Improvements to Steam Distribution and Condensate Return Systems	P. Barra	6 weeks	On-going
FM	Boiler Room Evaluation	P. Barra	2 weeks	On-going
FM	Improvements to Steam and Condensate Systems	P. Barra	4 weeks	On-going
	All Plants Equipment Evaluation and Operating Procedure for Heating Applications	P. Barra		

Unresolved Subjects

1. Solid Waste Incineration Program

Paul Barra has been developing the program for about three years. It was initiated because we were disposing of large volumes of junk material that had considerable energy value in it and we felt that some attempt should be made to recycle it.

Several years ago BBH tried to remove the asphalt and granules through a chemical-mechanical treatment system; however, the process proved not economically feasible. Our new approach was to incinerate the material using today's improved boiler technology, thus replacing conventional fuels. This idea had been explored in the past, but waste disintegration was an insurmountable problem. Today's equipment now makes this possible.

Our first step was to contact those firms that would put together a guaranteed system for us. With Dr. Schnizer's vendor recommendations, we settled on Combustion Power Company as the leader in the field at that time. The second step was to run a pilot burn test of our waste to determine if the waste was amenable to the CPC system and also to assess the air pollution control problems. The results were sufficiently successful such that CPC was willing to put together a guaranteed proposal. This proposal contained no development risks since all of the equipment proposed is presently being used in the field on other applications.

The burn test also showed that not only could we incinerate all roofing mill waste products and thereby greatly reduce the amount of petroleum products required, but we could also recycle granules. Another bonus would be reduced roofing mill landfill requirements.

The basic study has been completed. Economic evaluations show a fairly long payback (5 to 6 years). It was for this reason that we asked the Department of Energy for a subsidiary grant to build this first installation in our industry. Stone & Webster (an eminent engineering firm) has evaluated the feasibility of the CPC proposal.

I selected Norwood as the site for the first installation because it was a fairly large boiler using considerable oil. In addition this boiler was initially installed to incinerate waste products before air pollution laws were adopted and as such boiler efficiency was not held in the high regard it has today. This first installation could be installed anywhere that waste generation levels are high enough to justify the investment. In fact Charleston needs a new boiler to replace the two obsolete units it now has. In any event, the decision as to where it should best be located is secondary to the issue of whether you want to proceed with the consideration of an installation.

The Department of Energy has turned us down on any cost sharing program. We have also stopped working on the project since it has a four to five year payback period. It is still an excellent energy saver and can essentially eliminate the need to buy fuel at Norwood if we choose to reevaluate it in the future.

3. Energy Conservation Program - Shreveport

About five years ago Joe Hratko was hired to man a comprehensive energy conservation program at the company. He did so in a very aggressive-energetic manner. It took over one year to make the study at the Norwood Roofing Plant. This seemingly long period of time was taken because

it was necessary to develop by sampling irrefutable proof for the skeptical mill management that Mr. Hratko's conclusions were based on fact not speculation. FB has initiated a program of gradual implementation which is still going on.

The next study started at the East Walpole Paper Mill but several smaller studies took priority. One of the studies involved FS and by the time the small study was completed it was decided to complete a comprehensive study there. This study was completed in July 1978 and stated that if all of the recommendations were adopted some \$1,126,000 could be saved annually at an estimated cost of \$1,500,000; however, Mr. Hratko's Phase One recommendations (Appendix 1) shows that an \$860,000 savings can be made with an investment of \$554,000. Interestingly enough, not one question has been asked about the report since then. In an effort to see if we could get FS to support implementation of any of the recommendations. Mr. Hratko talked with Mr. Burris. Frank admitted that until such time that the plant had time to manage implementation of any of the projects they would continue to expend their efforts on improving productivity.

Mr. Heim was unsatisfied with the FS progress on this matter and held two meetings with Mr. Wood, Mr. Hixon, Mr. Hratko and myself to see what steps could be taken. He decided to assign responsibilities for implementation. Engineering was asked to handle the two projects involving #2 fuel conversion and the installation of economizers on the boilers. This would require us to prepare all of the engineering for implementation. On completion of this work we would present the proposal to FS to secure approval after any modifications were applied.

Unresolved Subjects
(continued)

Mr. Wood was asked to handle certain other projects - some of which were simply maintenance oriented.

Candidly I don't believe FS will move on any of the projects unless Mr. Jenkins supports the program. To date he hasn't. I believe FS is fully occupied with their day-to-day production problems without giving time or interest to the energy conservation. All of these items can be engineered and installed by Central Engineering if we were given the go-ahead.

An interesting observation regarding Shreveport's use of energy is the comparison of Norwood requiring 1,553,788 BTU's to produce a ton of product; whereas, Shreveport requires 2,293,386 BTU's. This means that Shreveport needs 47.6% more energy to produce a ton of roofing in spite of the fact that Shreveport enjoys a higher annual average ambient temperature. These figures only apply to roofing, thus the granule plants and felt mills have been excluded.

Do you want Central Engineering to continue the work on the two FS projects mentioned?

Subjects for Future Consideration

1. The Central Engineering Department has grown in several ways since it was organized in 1963. The manning has gone from 7 to 21, though now back to 16. The space requirements have increased from 1,000 square feet to the present 7,000 square feet. Most importantly the level of service has been expanded. Staffing prior to the cutback provided the department with general technical knowledge in the various engineering specialties covering our operations. In executing our support functions, staff members become involved with projects at all of our facilities. As a result, individual members continue to augment their basic technical knowledge expertise unique to our industry. It is for this reason that the department serves as a source of personnel available for filling higher-level management positions. I believe this capability should be expanded to include an engineer-in-training for the specific purpose of eventual transfer to a plant engineering position.

We now have the capability to manage any conceivable engineering project associated with our facilities. I consider this to be an important capability inasmuch as our company-wide level of expertise is decreasing. With the exception of Jim Huffman at Charleston, we have plant engineers with only limited experience in our industry. With the exceptions of Portland, Martinez, and Perth Amboy our plant superintendents have had only a few years experience in their present positions. All of Frank Wood's time is required to keep our building material facilities operating.

As I see it, Central Engineering not only could be, but should be, that reserve of technical expertise that will permit the company to continue to grow unhindered by the inevitable personnel changes.

Subjects for Future Consideration
(continued)

2. As previously stated, there are several areas in which the department can initiate work or studies without plant approval. Recognizing that our plant operating policy is based on decentralized control, I believe there is room for an expanded level of engineering support to the plants. The following is cited as an example (Appendix 2). In 1979 the Energy Manager was routinely reviewing the purchases of asphalt at each roofing mill. As a result it was learned that Franklin was purchasing about 50% of its asphalt in the form of a refined product (saturant) at a delivered cost of \$131.80 per ton rather than purchasing raw flux at a cost of \$94.31 per ton. Franklin came to us with an 80% complete new blowing facility. Evidently the justification for completing the installation was not warranted based on a one shift operation; however, since the advent of two shifts, it would be mandatory to complete the installation or refined product must be purchased. In any event, based on the month of September 1979, annualized premium costs would approach \$1,000,000 unless Franklin changed their purchasing habits or completed the new blowing still facility.

The point to be made is that Central Engineering, because of its unique knowledge of each facility, should be assigned a more active role in determining capital expenditure priorities at the plants. May I have your comments on the role engineering management should play in the company.

3. I've talked about the Energy Manager's role at Bird & Son and you can see, it's pretty much oriented toward cost reduction. Mr. Hratko likes his job but he is frequently frustrated and disappointed by the seemingly

Subjects for Future Consideration
(continued)

complete lack of movement in the areas he has studied and made recommendations. This is not because he is wrong, but rather that Bird & Son is still not energy minded. I believe Energy Management should have an expanded role at Bird & Son. Certainly Mr. Hratko can handle a much broader responsibility. I further believe that in his intimate contact with the plant operating people, he is even more familiar with certain operations than mill management. I believe he also has a better view of long-range fuel availability coupled with federal regulations than does the Purchasing Department.

In any event, I am certain energy management will plan an expanded role at Bird & Son eventually. I believe the sooner the better. I have enclosed two newspaper clips that you might find interesting (Appendix 3).

Not only does Mr. Hratko's attached memo tell you what he is doing, but it reflects his writing skills, planned ability, and his foresight (Appendix 4). May we talk about this sometime soon?

MEMORANDUM



To Distribution

From J. P. Hratko - BE

Date 16 August 1979

Subject SHREVEPORT ROOFING AND FELT MILL - PROPOSED PHASE I OF AN ENERGY CONSERVATION PROGRAM

Reference (a) SHREVEPORT ENERGY CONSERVATION SURVEY - REPORT DATED 24 JULY 1978

(b) INCREMENTAL PRICING OF NATURAL GAS UNDER THE PROVISIONS OF TITLE II OF THE NATURAL GAS POLICY ACT OF 1978 - AN EVALUATION OF THE EFFECT ON COST OF ENERGY AT SHREVEPORT AND FRANKLIN - REPORT DATED 30 JULY 1979

1. SHREVEPORT ENERGY CONSERVATION SURVEY:

Reference (a) documents the results of the energy conservation survey covering the Shreveport Roofing and Felt Mill. This survey was conducted during the period 30 July 1977 through 24 July 1978.

The detailed recommendations for reducing the cost of energy at Shreveport are set forth in Section 4 of reference (a). It was calculated that implementation of all the recommendations in reference (a) would effect a 33.15% reduction in the total heat energy consumed at Shreveport (refer to 2.1 of reference (a)).

2. PROPOSED PHASE I OF AN ENERGY CONSERVATION PROGRAM FOR THE SHREVEPORT ROOFING AND FELT MILL:

Implementing all the recommendations developed in reference (a) can best be achieved through a program extending over a period of three to four years.

A review of reference (a) indicates that it would be advisable to concentrate the first part of this program on implementing those recommendations pertaining to: (1) the steam generating plant, (2) the operation of the dryer section of DSPM-1, and (3) the operation of the roofing mill steam system.

Enclosure (1), SUGGESTED RECOMMENDATIONS FOR IMPLEMENTATION DURING PHASE I OF THE ENERGY CONSERVATION PROGRAM AT THE SHREVEPORT ROOFING AND FELT MILL, extracts from reference (a) recommendations covering the specific areas referred to above.

16 August 1979

- 2 -

3. PROPOSED PROGRAM FOR IMPLEMENTING ALL THE RECOMMENDATIONS IN REFERENCE (a)

A three-phase program should be considered for implementing all the recommendations in reference (a). Planning for one phase of a program can be carried out simultaneously with the execution of the previous phase of the program.

Phase 1 should be completed at the end of the second year of the program and Phase 3 should be completed at the end of the fourth year of the program. This approach will provide for the orderly planning, budgeting, and execution of the energy conservation program.

4. ENERGY CONSUMED AT SHREVEPORT AS A FRACTION OF TOTAL ENERGY CONSUMED BY BIRD & SON, inc. DURING 1978:

Enclosure (2), TOTAL ENERGY CONSUMED BY BIRD & SON, inc. DURING 1978 - LESS BIRD MACHINE COMPANY, was developed using data extracted from computer printout APO-550-30, dated 3 January 1979. APO-550-30 tabulates purchases of fuels and electrical power.

For a twelve-month period, it is considered that purchases will be very close to actual consumption. The entry in column 22 on line 6 of Enclosure (2) indicates that the Shreveport Roofing and Felt Mill consumed 20.41% of the total energy supplied by fuels purchased during 1978. It may be interesting to note that Shreveport consumed 19.85% of all the electrical power generated and purchased during 1978 by all the plants of Bird & Son, inc.

If all the recommendations developed in reference (a) were implemented, Bird & Son, inc. would achieve a 6.77% ($20.41 \times .3315$) annual reduction in fuel consumption - based on 1978 operating data. This calculation indicates the magnitude of the potential for energy conservation that exists at Shreveport - the largest energy-consuming plant operated by Bird & Son, inc., and for which a comprehensive energy conservation survey has been completed.

5. INCREMENTAL PRICING OF NATURAL GAS UNDER THE PROVISIONS OF TITLE II OF THE NATURAL GAS POLICY ACT OF 1978:

Reference (b) sets forth an analysis of the incremental pricing program which goes into effect on 1 January 1980 in regard to natural gas consumed as boiler fuel.

Reference (b) develops an estimate of the maximum reduction in the surcharge imposed on natural gas usage that can be realized if the boilers and rommcos at Shreveport can be provided with the technical capability and legal right to burn low sulfur No.6 fuel oil as an alternate to natural gas in lieu of No.2 fuel oil.

SHREVEPORT ROOFING AND FELT MILL - PROPOSED PHASE I OF AN ENERGY CONSERVATION PROGRAM

16 August 1979

- 3 -

Reference (b) provides additional justification for equipping the boilers and rommcos with the technical capability of burning No.6 fuel oil and for installing a system that will supply properly conditioned No.6 fuel oil to the boilers and rommcos.

6. INDUSTRIAL ENERGY CONSERVATION PROGRAM:

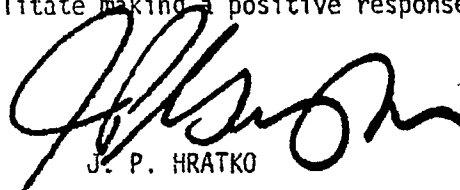
Title VI of the National Energy Conservation Policy Act (Public Law 95-619) establishes an industrial energy efficiency reporting program. The proposed regulations titled "INDUSTRIAL ENERGY CONSERVATION PROGRAM INCLUDING PROPOSED VOLUNTARY RECOVERED MATERIALS UTILIZATION TARGETS" were published in the Federal Register on Friday, 8 June 1979.

The energy conservation program applies to Bird & Son, inc. inasmuch as corporate-wide energy consumption exceeds 1 trillion btus per year. The recovered materials utilization program also applies to Bird & Son, inc. inasmuch as the corporate-wide energy consumption exceeds 1 trillion btus per year for manufacturing operations under SIC-26. The proposed reporting forms for this program were published in Federal Register/Vol. 44, No.128/Tuesday, 17 July 1979.

Detailed forms have been proposed on which each plant is required to submit to its corporate headquarters data on the efficiency with which energy has been utilized during the reporting period. The statute (PL 95-619) mandates that each plant submit the report to its corporate headquarters. Detailed forms have been proposed on which a corporation, using data submitted on the prescribed plant reporting forms, submits a comprehensive report on the corporate-wide efficiency of energy utilization.

There are no penalties provided by the statute for failure to meet the specified targets; in this respect the program is voluntary. However, submitting the required reports is mandatory. The first report must be submitted by Bird & Son, inc. during 1980 covering energy efficiency improvement during 1979.

Implementation of energy conserving recommendations that yield an attractive return on investment should facilitate making a positive response to this voluntary program.



J. P. HRATKO

JPH/dv

Distribution: G. L. Dusty - BE
R. E. Heim - B

J. A. Hixon - BB
F. W. Wood - BBR

ENCLOSURE (1) SUGGESTED RECOMMENDATIONS FOR IMPLEMENTATION DURING PHASE I OF ,
ENERGY CONSERVATION PROGRAM AT THE SHREVEPORT ROOFING AND FELT MI

(2) TOTAL ENERGY CONSUMED BY BIRD & SON, inc. DURING 1978 - LESS
BIRD MACHINE COMPANY

BIRD 011109

SUGGESTED RECOMMENDATIONS FOR IMPLEMENTATION DURING PHASE I OF THE ENERGY CONSERVATION PROGRAM
AT THE SHREVEPORT ROOFING AND FELT MILL

RECOMMEN- DATION NUMBER IN SHREVEPORT ENERGY CONSERVA- TION SURVEY REPORT DATED 24 JULY 1978	GENERAL RECOMMENDATION	ANNUAL REDUCTION IN COST OF ENERGY THAT CAN BE REALIZED AS RECORDED IN SHREVEPORT ENERGY CONSERVATION SURVEY REPORT DATED 24 JULY 1978	ESTIMATED COST OF IMPLEMENTING THE RECOMMENDATION	REMARKS
1	2	3	4	5
4.1	RECOMMENDATION TO SHIFT FROM NO.2 FUEL OIL TO NO.6 FUEL OIL AS BOILER FUEL	\$270132.84	\$175000.00	INVOICES ON FILE AT CORPORATE HEADQUARTERS INDICATE THAT THE SHREVEPORT MILL BEGAN RECEIVING NO.4 FUEL OIL DURING OCTOBER 1978. ACCORDING TO THE INVOICE FILE, BOTH NO.2 FUEL OIL AND NO.4 FUEL OIL HAVE BEEN RECEIVED AT SHREVEPORT DURING THE PERIOD OCTOBER 1978 THROUGH JUNE 1979. A REVIEW OF THE INVOICES INDICATES THAT SOME DELIVERIES OF NO.2 FUEL OIL ARE CODED INCORRECTLY AND APPEAR ON THE MONTHLY COMPUTER PRINTOUT (APO-550-30) AS NO.4 FUEL OIL DELIVERIES. OTHER INVOICES INDICATE CONSECUTIVE DELIVERIES OF NO.2 FUEL OIL AND NO.4 FUEL OIL AT THE SAME PRICE - A PRICE CORRESPONDING TO THAT OF NO.2 FUEL OIL. THUS, IT APPEARS FROM THE INVOICES THAT SOME DELIVERIES HAVE BEEN INVOICED AS NO.4 FUEL OIL, BUT PRICED AS NO.2 FUEL OIL. THE INVOICES INDICATE THAT THE SHREVEPORT MILL HAS BEEN BURNING A MIXTURE OF NO.4 FUEL OIL AND NO.2 FUEL OIL SINCE OCTOBER 1978. WITH THE INVOICES INDICATING A SUBSTANTIAL COMPONENT OF NO.2 FUEL OIL IN THIS MIXTURE. NO.4 FUEL OIL IS USED IN SMALL VOLUMES THROUGHOUT THE UNITED STATES AND APPARENTLY WAS NOT ALWAYS AVAILABLE IN THE SHREVEPORT AREA. A BONA FIDE TECHNICAL CAPABILITY TO BURN NO.6 FUEL OIL WOULD MAKE IT POSSIBLE TO BURN THIS LOW COST AND AVAILABLE FUEL WHEN NATURAL GAS SERVICE IS CURTAILED. THE SHREVEPORT MILL SHOULD BE EQUIPPED WITH THE TECHNICAL CAPABILITY TO BURN NO.6 FUEL OIL, AND ACTION SHOULD BE INITIATED TO ACQUIRE THE LEGAL ENTITLEMENT TO BURN NO.6 FUEL OIL. THIS WILL PROVIDE THE ADDITIONAL BENEFIT OF BEING SURCHARGED AT A LOWER RATE FOR NATURAL GAS IN THE BOILERS WHEN PHASE I OF THE INCREMENTAL PRICING PROGRAM UNDER TITLE II OF THE NATURAL GAS POLICY ACT OF 1978 GOES INTO EFFECT ON 1 JANUARY 1980.
4.5	RECOMMENDATION TO INSTALL ECONOMIZERS ON NO.1, NO.2, AND NO.3 BOILERS	\$82095.54	\$100000.00	

SUGGESTED RECOMMENDATIONS FOR IMPLEMENTATION DURING PHASE I OF THE ENERGY CONSERVATION PROGRAM
AT THE SHREVEPORT ROOFING AND FELT MILL

RECOMMEN- DATION NUMBER IN SHREVEPORT ENERGY CONSERVA- TION SURVEY REPORT DATED 24 JULY 1978	GENERAL RECOMMENDATION	ANNUAL REDUCTION IN COST OF ENERGY THAT CAN BE REALIZED AS RECORDED IN SHREVEPORT ENERGY CONSERVATION SURVEY REPORT DATED 24 JULY 1978	ESTIMATED (U.S.) IN IMPLEMENTING THE RECOMMENDATION	REMARKS
1	2	3	4	5
4.3	RECOMMENDATION TO REDUCE STEAM CONSUMPTION BY THE ROOFING MILL TO A LEVEL EQUAL TO THAT FOR COMPARABLE LOADS AT THE MORWOOD ROOFING PLANT DURING 1975	\$147735.48	\$20000.00 (initial cost) \$20000.00 (annual maintenance cost)	
4.4	RECOMMENDATION COVERING THE INSTALLATION OF EQUIPMENT FOR THE CONTINUOUS INDICATING AND RECORDING OF STACK GAS CONSTITUENTS FOR NO.1, NO.2, AND NO.3 BOILERS AND FOR THE PRECISE CONTROL OF AIR SUPPLIED TO BOILERS	\$147705.23	\$75000.00	
4.7	RECOMMENDATION TO TERMINATE OPERATION OF THE GAS-FIRED VAPOR ABSORPTION SYSTEM HOT AIR HEATER FOR DSPM-1 AND RECIRCULATE THE AIR EXHAUSTED FROM NO.3 AND NO.4 EXHAUST STACKS OF DSPM-1 TO THE VAPOR ABSORPTION SYSTEM OF DSPM-1	\$72036.61	\$50000.00	
4.8	RECOMMENDATION COVERING THE INSTALLATION OF A HEAT RECOVERY UNIT ON NO.1 EXHAUST STACK OF DSPM-1 FOR USE IN HEATING BOILER MAKE-UP FEED WATER	\$33749.94	\$50000.00	
4.9	RECOMMENDATION COVERING THE INSTALLATION OF A HEAT RECOVERY UNIT ON NO.2 EXHAUST STACK OF DSPM-1 FOR USE IN PREHEATING COMBUSTION AIR FOR NO.1, NO.2, AND NO.3 BOILERS	\$31856.95 136,200	\$60000.00	
PART OF 4.2	INSTALL LINES NECESSARY FOR RETURNING CONDENSATE FROM FSPM-10, FSPM-13, AND THE ASPHALT STORAGE AND PROCESSING AREA TO THE BOILER ROOM	\$33656.52 (line 71 of para 5.2 of report dated 24 July 1978)	\$30000.00	CONDENSATE IS RETURNED TO THE BOILER ROOM FROM THE ROOFING MACHINES AND ASPHALT STORAGE - PROCESSING AREA AT THE MORWOOD ROOFING MILL AND AT THE SHREVEPORT ROOFING AND FELT MILL
SHREVEPORT FELT MILL REPORT DATED 28 APR 1979	INSTALL RECIPROCATING VALVES IN EACH OF THE THREE (3) DEFIBRATOR BLOW LINES AND MODIFY THE THREE (3) QUENCH CYCLONES AS NECESSARY TO MAINTAIN A FIXED STOCK LEVEL IN EACH CYCLONE	\$43136.49 (line 100 of Encl.(1) to report dated 28 April 1979)	\$54000.00	RECIPROCATING VALVES ARE INSTALLED ON THE DEFIBRATOR BLOW LINES FOR ALL THE DEFIBRATORS INSTALLED AT PHILLIPSDALE AND FRANKLIN, RESULTING IN A SIGNIFICANT REDUCTION IN THE VOLUME OF STEAM VENTED TO ATMOSPHERE FROM THE SYSTEM

TOTAL ENERGY CONSUMED BY BIRD & SON, INC. DURING 1978 - LESS BIRD MACHINE CO.

LINE NO.	PLANT LOCATION	NO. 6 FUEL OIL		NO. 4 FUEL OIL		NO. 2 FUEL OIL		DIESEL OIL	
		TOTAL CONSUMED	TOTAL BTUS	TOTAL CONSUMED	TOTAL BTUS	TOTAL CONSUMED	TOTAL BTUS	TOTAL CONSUMED	TOTAL BTUS
		GALS	Col. 3 x 146500 MMBTUS	GALS	Col. 5 x 140000 MMBTUS	GALS	Col. 6 x 136856 MMBTUS	GALS	Col. 9 x 136856 MMBTUS
1	2	3	4	5	6	7	8	9	10
1	CORPORATE HEADQUARTERS	19583	2875						
2	NORWOOD	2181540	320250			613922	84019		
3	PHILLIPSDALE	6875114	1009267						
4	PERTH AMBOY	1024968	150465			41761	5715		
5	CHARLESTON	270434	39700			138813	18997		
6	SHREVEPORT			177837	24897	3040685	416136	500	68
7	GLENWOOD					21157	2895	1800	246
8	ST. MATTHEWS					480964	65823		
9	FRANKLIN					2639306	361205		
10	CHICAGO FELT	1919033	281714						
11	CHICAGO ROOFING					20079	2748		
12	BARDSTOWN								
13	PORTLAND	54180	7954			91152	12475		
14	MARTINEZ					52328	7161		
15	RANCHO CORDOVA								
16	WILMINGTON								
17	EAST WALPOLE	8062191	1183530						
18									
19	LAWRENCE							21945	3004
20	LEWISTON					4716	645	11653	1595
21	HILL DIVISION							223124	30536
22	ALL OTHER								
23	TOTAL	20407043	2995755	177837	24897	7144883	977819	259076	35449

TOTAL ENERGY CONSUMED BY BIRD & SON, INC. DURING 1978 - LESS BIRD MACHINE CO.

LINE NO.	PLANT LOCATION	GASOLINE		KEROSENE		NATURAL GAS		PROPANE	
		TOTAL CONSUMED	TOTAL BTUS Col. 11 x 124952	TOTAL CONSUMED	TOTAL BTUS Col. 13 x 135000	TOTAL CONSUMED	TOTAL BTUS Col. 15 x (1000) x (1031)	TOTAL CONSUMED	TOTAL BTUS Col. 17 x 91614
		GALS	MMBTUS	GALS	MMBTUS	MCF	MMBTUS	GALS	MMBTUS
1	2	11	12	13	14	15	16	17	18
1	CORPORATE HEADQUARTERS								
2	NORWOOD	2937	367			8042	8291	81792	7493
3	PHILLIPSDALE	7335	917					27389	2509
4	PERTH AMBOY	1496	187			8154	8407	25480	2334
5	CHARLESTON	6045	755			227174	234216	43586	3993
6	SHREVEPORT	10579	1322	172122	23236	716542	738755	107704	9867
7	GLENWOOD	3000	375			12168	12545	2500	229
8	ST. MATTHEWS					22216	22905	3808	349
9	FRANKLIN	7918	989	520	70	202171	208438	35958	3294
10	CHICAGO FELT					27657	28514	14027	1285
11	CHICAGO ROOFING					70219	72396	15523	1422
12	BARDSTOWN					20276	20905	3024	277
13	PORTLAND	1797	225	650	88	186656	192442	25358	2323
14	MARTINEZ					139451	143774	27923	2558
15	RANCHO CORDOVA							123305	11296
16	WILMINGTON					26823	27655	26414	2420
17	EAST WALPOLE	1351	169					14473	1326
18	SHOE CARTON					1007	1038	6423	588
19	LAWRENCE					5465	5634		
20	LEWISTON								
21	HILL DIVISION								
22	ALL OTHER	18190	2273			8644	8912	16391	1502
23	TOTAL	60648	7779	173292	23394	1682665	1734827	601078	55065

TOTAL ENERGY CONSUMED BY BIRD & SON, INC. DURING 1978 - LESS BIRD MACHINE CO.

LINE NO.	PLANT LOCATION	PURCHASED STEAM		TOTAL ENERGY CONSUMED IN FORM OF HEAT		TOTAL ENERGY CONSUMED IN FORM OF ELECTRICAL POWER			
		TOTAL CONSUMED	TOTAL BTUS FROM FUEL	TOTAL BTUS IN FORM OF HEAT	FRACTION OF TOTAL BIRD & SON inc. BTUS IN FORM OF HEAT	TOTAL PURCHASED ELECTRICAL POWER	ESTIMATED BTUS THAT MUST BE SUPPLIED BY BIRD & SON TO GENERATE PURCHASED ELECTRICAL POWER	TOTAL BIRD & SON inc. GENERATED POWER CONSUMED	TOTAL ELECTRICAL POWER CONSUMED
		LBS	MMBTUS	MMBTUS	Col. 21 ÷ Col. 21	KWH	MMBTUS	KWH	KWH
1	2	19	20	21	22	23	24	25	26
1	CORPORATE HEADQUARTERS			2875	.00048			2496000 (INCL. BBH)	2496000
2	NORWOOD			420420	.07070			9362000	9362000
3	PHILLIPSDALE			1012693	.17031	14205000	142050	18729000	32934000
4	PERTH AMBOY	61403462	81871	249159	.04190	4167200	41672		4167200
5	CHARLESTON			297661	.05006	6576000	65760		6576000
6	SHREVEPORT			1214281	.20421	33635450	336354.5		33635450
7	GLENWOOD			16290	.00274	1334160	13341.6		1334160
8	ST. THEWS			89077	.01498	3014400	30144		3014400
9	FRANKLIN			573996	.09653	12576699	125767		12576699
10	CHICAGO FELT			311513	.05239	7748280	77482.8		7748280
11	CHICAGO ROOFING			76566	.01288	1423822	14238.2		1423822
12	BARDSTOWN			21182	.00356	10038000	100380		10038000
13	PORTLAND			215507	.03624	5349000	53490		5349000
14	MARTINEZ			153493	.02581	2856960	28569.6		2856960
15	RANCHO CORDOVA			11296	.00190	345983	3459.8		345983
16	WILMINGTON	7020000	9360	39435	.00663	2215602	22156		2215602
17	EAST WALPOLE			1185025	.19929	1304606	13046	29513000 (INCL. PWR PLANT)	30817606
18	SHOE CARTON			1626	.00027	21282	212.8	1627000	21282
19	LAWRENCE			8638	.00145	462600	4626		462600
20	LEWISTON			2240	.00038	46990	469.9		46990
21	HILL DIVISION			30536	.00514				
22	AL. MILLER			12607	.00212	376140	3761.5		376140
23	TOTAL	68473462	11761	5946136	.09900	107693182	1076931.2	61727000	169425182



MEMORANDUM

To R. W. Hawkins - FF
From J. P. Hratko - BE
Date 23 October 1979
Subject RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLS AT FRANKLIN DURING PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

1. **PURPOSE:** The purpose of this report is to set forth recommendations covering two (2) operating modes for deployment of the horizontal blowing stills at Franklin during periods when FFPM-10 and FFPM-11 are both in a two-shift operating configuration, so as to reduce or eliminate the need to purchase high-priced refined asphalt in lieu of low-cost raw flux.

2. **SUMMARY:** The blowing stills at Franklin are a valuable resource that should be deployed so as to realize maximum utilization (i.e., on schedules that will permit production of all requirements for the more expensive refined asphalt products from lower-priced raw flux).

The extent to which the blowing stills approach maximum possible productive utilization is a function of the level of close supervision allocated to the management of the asphalt blowing facilities. The two (2) recommended operating modes differ essentially in the level of management supervision required for successful operation.

The calculated reduction in monthly cost of asphalt that can be realized by implementing either of the two (2) recommendations, based on September 1979 operating data and computed at September-October 1979 asphalt prices in the Franklin area, is set forth below:

Number of sub-paragraph in which recommendations are set forth	Comparative level of management supervision required for successful implementation	Monthly reduction in cost of asphalt that can be realized - based on Sept 1979 operations	Annual reduction in cost of asphalt that can be realized - based on Sept 1979 operations	Reduction in cost per ton of roofing produced \$/TON
5.a	Lower	\$55,197.60	\$662,371.20	\$5.22
6.a	Higher	\$81,059.26	\$972,711.12	\$7.67

The recommendations that must be implemented to realize these substantial cost reductions do not require any capital investment. It is only necessary to institute changes in operating procedures.

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLS AT FRANKLIN DURING PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 2 -

The recommendations were developed on the basis of an analysis of the considerable volume of data collected on the asphalt storage and processing installation and on an assessment of the operating skills of the still men at Franklin.

The recommended operating procedures are considered to be realistic and practical. The operating skills required for successful implementation are well within the demonstrated capability of the still men. All that is required is that a decision be made to implement the recommendations and that the requisite level of supervisory management effort be applied on a continuing basis.

It is considered that the reduction in costs that can be realized in implementing the recommended operating procedures is of a magnitude that more than justifies the extra effort required.

3. BACKGROUND: A review of computer printout APO-550-30 dated 2 October 1979, covering materials purchased during September 1979, indicated a large volume of saturant asphalt was purchased at Franklin during September 1979. Further inquiry revealed that the volume of saturant asphalt purchased during September 1979 was considerably larger than that indicated on APO-550-30.

Both the shingle machine (FFPM-10) and roll machine (FFPM-11) were operated simultaneously for two (2) shifts on twenty (20) days during September 1979. Due to this two-machine, two-shift operating schedule, which continues in effect now and is projected to continue into the future, it was apparently decided to dedicate all three (3) horizontal blowing stills to blowing raw flux to coating, with all requirements for saturant to be met by purchase of this refined product.

This resulted in an increase of \$81,509.26 in the cost of asphalt purchased during September 1979 over the cost that would have been incurred if raw flux had been purchased and all refined products had been produced on the premises.

4. THE ASPHALT BLOWING FACILITIES AT FRANKLIN: The following brief description of the asphalt blowing facilities and comments regarding the operating characteristics of this equipment is based on data collected as part of the on-site energy survey work conducted during the periods 3-14 May 1979 and 22 June-2 July 1979:

- a. Blowing Stills. Each of the three (3) horizontal blowing stills is eleven (11) feet in diameter and seventeen (17) feet in length. The volume of each still, if filled to 100% of capacity, is approximately 12,000 gallons.

The volume of flux charged per still does not exceed 6,700 gallons in order to minimize carryover of flux into the fume duct. A limited number of tests conducted during June 1979 indicated that the flux charge volume could only be increased by a small amount before witnessing the adverse effects of flux carryover into the fume incineration system.

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLs AT FRANKLIN DURING PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 3 -

The temperature of the charge is held to approximately 500°-510°F during the latter part of the blowing cycle by introducing cooling water into the still via a hose inserted in the cover installed over the top access opening.

- b. Blower. A Hoffman centrifugal compressor supplies blowing air to the three (3) horizontal blowing stills. The output of this compressor can be adjusted by manually positioning a damper to throttle the inlet to a level determined by the number of charges being blown. This compressor has the capacity to blow charges simultaneously in all three (3) horizontal stills.
- c. Fume Incinerator. A fume incinerator - without heat recovery - is employed to incinerate fumes from the three (3) horizontal blowing stills. Based on tests conducted on Sunday, 6 May 1979, the fuel (natural gas) input rate to the fume incinerator was calculated to be approximately 4,000,000 btus per hour.
- d. Coating Storage Tank. A single horizontal tank, eleven (11) feet in diameter and thirty (30) feet in length, is provided for coating storage. This tank can hold 21,237 gallons when filled to 100% capacity. An immersion tube heater, fitted with a Maxon Series 78 burner sized to supply 1,100,000 btus/hour, maintains the circulated coating at a temperature of between 480°F and 500°F.
- e. Shingle Saturant Storage Tank. This tank is exactly the same as the coating storage tank described above.
- f. Asphalt Flux Working Storage Tank. A 50,000 gallon capacity vertical storage tank equipped with an immersion tube heater is employed for high temperature working storage of raw flux. The immersion tube is fitted with a Maxon Series 78 burner sized to provide heat input at the rate of 1,900,000 btus per hour.
- g. Reserve Asphalt Storage Tanks. There are three (3) steam-heated vertical storage tanks, each of 100,000 gallons capacity, for the reserve storage of flux. (One of these storage tanks is used for the storage of the lightly-blown saturant used by the roll machine, FFPM-11.)
- h. Softening Point Tests. There are no laboratory test facilities at the Still House. The Stills Operator does not conduct softening point tests. A technician from the Quality Control Laboratory draws the test sample and performs the softening point at the Quality Control Laboratory. Multiple tests are not conducted near the end of the blowing cycle.

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLS AT FRANKLIN DURING
PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 4 -

5. DEPLOYMENT OF THE THREE (3) HORIZONTAL BLOWING STILLS AT FRANKLIN IN AN
OPERATING MODE REQUIRING A LOWER LEVEL OF SUPERVISORY EFFORT DURING PERIODS
WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION:

a. RECOMMENDATIONS

<u>Action Recommended</u>	<u>Supporting Comments</u>
1) Dedicate two (2) blowing stills to the production of coating asphalt on operating days.	This deployment of facilities will <u>easily</u> permit the production of 80% of the coating asphalt consumed on operating days when both roofing machines are operating two (2) shifts.
2) Dedicate one (1) blowing still to the production of saturant on operating days.	This will easily permit the production of <u>all</u> the saturant consumed on operating days when both roofing machines are operating two (2) shifts.
3) Blow coating and saturant on non-operating days to the level required such that the coating and saturant <u>operating</u> storage tanks and all blowing stills are topped off at the start of the next operating day.	This already is the standard operating procedure at Franklin, and is included only to describe completely the recommended operating procedure for deploying the blowing facilities.
4) Purchase coating as necessary to make up shortfall in the capability for producing all coating required.	At a <u>maximum</u> , this would have required the purchase of twenty-one (21) loads of coating (or 501.27 tons) during September 1979.
5) Install facilities in the Still House for use by the Stills Operator in measuring softening point. Train the Stills Operator in the procedure for measuring softening point.	This will permit making more frequent measurements of softening point at the end of the blowing cycle so that the blowing operation can be terminated <u>precisely</u> at the proper time. This will reduce blowing time by avoiding blowing to a higher softening point than is necessary. This is the procedure followed at Norwood, Charleston, and Shreveport - the three (3) other Bird & Son, inc. facilities at which asphalt is blown.

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILL AT FRANKLIN DURING
PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 5 -

- 6) Set up a program for closely monitoring inventory levels of finished product so that orders for coating can be placed for timely delivery. This is necessary in order to maximize use of the blowing stills and to permit rapid turn-around of the tanker delivering coating.

b. ARGUMENT IN SUPPORT OF RECOMMENDATIONS COVERING DEPLOYMENT OF THE
EXISTING BLOWING FACILITIES

- 1) Blowing Still Operating Parameters Calculated Through an Analysis of the Daily Asphalt Oxidation Reports for April 1979. The data from the daily oxidation reports for April 1979 was transferred to a daily form ruled for 48 intervals of 1/2 hour per interval. This form allowed the data from the daily oxidation forms to be displayed in such a manner as to visually indicate the degree to which the blowing still facility was productively employed; productively employed is defined to include pump-in time, blowing time, and pump-out time.

Enclosures (1) through (3) are an abstract of the daily statistics covering the operation of No. 1, 2, and 3 blowing stills, respectively during the month of April 1979.

Enclosure (4), SUMMARY OF OPERATING DATA COVERING THE BLOWING STILL AT THE FRANKLIN ROOFING MILL DURING APRIL 1979, yields the following data supporting the recommendations set forth in sub-paragraph 5.a. above:

- | | | |
|----|---|--------------|
| a) | Total number of charges of flux blown to coating | 76 |
| b) | Total number of charges of flux blown to saturant | 70 |
| c) | Total number of charges of flux blown | 146 |
| d) | Total flux blown to coating (23.87) x (76) | 1814.12 Tons |
| e) | Total flux blown to saturant (23.87) x (70) | 1670.9 Tons |
| f) | Total flux blown to refined products | 3485 Tons |
| g) | Average still time required to blow a charge of flux to coating (including pump-in and pump-out time) | 11.057 Hrs |

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLS AT FRANKLIN DURING
PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 6 -

- h) Average still time required to blow a charge of flux to saturant (including pump-in and pump-out time) 4.438 Hrs
- i) Total productive operating time realized by the three (3) blowing stills 1150.98 Hrs
- j) Maximum available blowing still time during April 1979 $(3) \times (30) \times (24)$ 2160 Hrs
- k) Fraction of maximum available blowing still time in which blowing stills were productively employed $(1150.98) \div (2160)$.5329

- 2) Asphalt Department Operating Data for September 1979. The following data, extracted from Enclosure (5), CALCULATED REDUCTION IN COST OF ASPHALT THAT COULD HAVE BEEN REALIZED AT THE FRANKLIN ROOFING AND FELT MILL DURING SEPTEMBER 1979 IF TWO (2) BLOWING STILLS HAD BEEN DEDICATED TO BLOWING COATING WITH THE THIRD BLOWING STILL DEDICATED TO BLOWING SATURANT AND AN AVERAGE OF ONE (1) LOAD OF COATING HAD BEEN PURCHASED PER OPERATING DAY, is compared to that outlined in sub-paragraph 5.b.1) above:

<u>Item</u>	<u>Enclosure (4) data covering April 1979 operations</u>	<u>Enclosure (5) data covering September 1979 operations</u>
a) Total number of charges of flux blown to coating	76	110
b) Total number of charges of flux blown to saturant	70	3
c) Total number of charges of flux blown	146	113
d) Total flux blown to coating	1814.12 Tons	2625.7 Tons
e) Total flux blown to saturant	1670.9 Tons	71.61 Tons
f) Total flux blown to refined products	3485.0 Tons	2697.3 Tons

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLS AT FRANKLIN DURING PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 7 -

g)	Average still time required to blow a charge of flux to coating (including pump-in and pump-out time)	11.057 Hrs	11.057 Hrs (assumed to be the same as for April 1979)
h)	Average still time required to blow a charge of flux to saturant (including pump-in and pump-out time)	4.438 Hrs	4.438 Hrs (assumed to be the same as for April 1979)
i)	Total productive operating time realized by the three (3) blowing stills	1150.98 Hrs	1229.58 Hrs (110 x 11.057) plus (3 x 4.438)
j)	Maximum available blowing time during April/September 1979	2160 Hrs	2160 Hrs
k)	Fraction of maximum available blowing still time in which the blowing stills were productively employed	.5329	.5693

During September 1979, there was only a 6.83% increase in the time the blowing stills were productively employed over the figure for April 1979, however, there was a 22.6% reduction in tonnage of raw flux blown during September 1979 when compared to the tonnage of raw flux blown during April 1979.

- 3) Estimated Blowing Still Production Data During September 1979 if the Operating Procedures Recommended in Sub-Paragraph 5.a Had Been in Effect. Enclosure (6), CALCULATION OF DAILY PURCHASES OF COATING ASPHALT THAT WOULD HAVE BEEN REQUIRED AT THE FRANKLIN ROOFING AND FELT MILL DURING SEPTEMBER 1979 IF TWO (2) BLOWING STILLS HAD BEEN DEDICATED TO BLOWING FLUX TO COATING AND THE THIRD BLOWING STILL HAD BEEN DEDICATED TO BLOWING FLUX TO SATURANT, demonstrates that:

All requirements for saturant could have been satisfied.

Assuming (conservatively) that no more than four (4) charges of flux would be blown to coating per operating day, it would have been necessary to purchase only 501.27 tons of coating during September 1979.

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLS AT FRANKLIN DURING PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 8 -

- c. CALCULATED REDUCTION IN COST OF ASPHALT PURCHASED AT FRANKLIN THAT COULD HAVE BEEN REALIZED IF THE OPERATING PROCEDURES RECOMMENDED IN SUB-PARAGRAPH 5.a HAD BEEN IN EFFECT DURING SEPTEMBER 1979. According to the calculations developed in lines 50 through 56 of Enclosure (5), the total decrease in cost of asphalt that could have been realized during September 1979 if the recommended operating procedures had been in effect was calculated at \$55,197.60. On an annual basis, this computes to \$662,371.20 per year.
- d. IMPLEMENTATION OF THE RECOMMENDATIONS SET FORTH IN SUB-PARAGRAPH 5.a. The recommendations set forth in sub-paragraph 5.a cover operating procedures which:
- 1) Do not require any capital investment.
 - 2) Can be implemented immediately.
 - 3) Are well within the capability of operating personnel.
 - 4) Require only a modest level of supervisory effort by management personnel.
 - 5) Do not have any impact on the decisions to be ultimately made with regard to the uncompleted new asphalt blowing facilities at Franklin.

6. DEPLOYMENT OF THE THREE (3) HORIZONTAL BLOWING STILLS AT FRANKLIN IN AN OPERATING MODE REQUIRING A HIGHER LEVEL OF SUPERVISORY EFFORT DURING PERIODS WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION:

a. RECOMMENDATIONS

<u>Action Recommended</u>	<u>Supporting Comments</u>
1) Dedicate a minimum of two (2) blowing stills to the production of coating asphalt on operating days.	This deployment of facilities will easily permit the production of 80% of the coating asphalt consumed on operating days when both roofing machines are operating two (2) shifts. Enclosure (7) displays the status of each blowing still over a 24-hour, two (2) shift operating day under this operating mode.
2) Dedicate one (1) blowing still to the production of saturant on selected operating days.	This will easily permit the production of all the saturant consumed on operating days when both roofing machines are operating two (2) shifts. Enclosure (7) displays the status of each blowing still over a 24-hour, two (2) shift operating day under this operating mode.

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLs AT FRANKLIN DURING
PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 9 -

- 3) Dedicate one (1) of the steam-heated 100,000 gallon capacity asphalt storage tanks as a reserve saturant storage tank.

This will permit productive utilization of the blowing stills during an "off-peak" period. On operating days, saturant can be withdrawn from storage, reducing the requirement for blowing saturant on operating days. This will provide more blowing still time on operating days for the production of coating (which has a much longer blowing interval and for which reserve storage facilities are not available). Enclosure (8) displays the status of each blowing still over a 24-hour period on non-operating days when all blowing stills are dedicated to blowing saturant.
- 4) Dedicate 2 1/2 blowing stills to the production of coating on selected operating days.

On such selected days, only two (2) charges of flux can be blown to saturant. The remaining requirement of 2 or 3 charges can be withdrawn from the reserve saturant storage tank. Enclosure (9) displays a typical weekly production schedule for the blowing stills deployed in accordance with the recommendations in this paragraph.
- 5) Blow coating and saturant on non-operating days to the level required such that the coating and saturant operating storage tanks and all blowing stills are topped off at the start of the next operating day.

This already is the standard operating procedure at Franklin, and is included only to describe completely the recommended operating procedure for deploying the blowing facilities.
- 6) Install facilities in the Still House for use by the Stills Operator in measuring softening point. Train the Still Operator in the procedure for measuring softening point.

This will permit making more frequent measurements of softening point at the end of the blowing cycle so that the blowing operation can be terminated precisely at the proper time. This will reduce blowing time by avoiding blowing to a higher softening point than is necessary. This is the procedure followed at Norwood, Charleston, and Shreveport - the three (3) other Bird & Son, inc. facilities at which asphalt is blown.

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLs AT FRANKLIN DURING
PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 10 -

b. ARGUMENT IN SUPPORT OF RECOMMENDATIONS COVERING DEPLOYMENT OF
BLOWING STILLs

- 1) Blowing Still Capacity Utilization. The operating schedule displayed in Enclosure (9) will produce from raw flux all the refined asphalt products required to support operation of both roofing machines for twenty (20) hours per day over a five (5) consecutive operating day interval.
- 2) Reserve Saturant Storage Tank. The conversion of twelve (12) charges of raw flux into saturant in accordance with the recommendations in 6.a.3) will produce 286.44 tons (23.87×12) of saturant. One of the 100,000 gallon steam-heated storage tanks will be of adequate capacity for deployment as a reserve saturant storage tank.

The operating schedule developed in Enclosure (8) takes into consideration the fact that a common line is used to charge flux into the blowing stills and to pump saturant out of the blowing stills and into the reserve saturant storage tank. Pumping delays resulting from this piping configuration have been incorporated into the schedule in Enclosure (8).

- 3) Maintenance Time. The schedule developed in Enclosure (8) allows for an average of sixteen (16) hours per week per blowing still for maintenance. This should be more than sufficient time for normal cleaning and maintenance.
- 4) Supervisory Effort Required. The operating mode recommended in sub-paragraph 6.a requires a higher level of supervisory effort than that for the operating mode recommended in sub-paragraph 5.a. However, the level of supervisory effort required is reasonable.

The reduction in cost of asphalt that can be realized as a result of the additional attention devoted to the asphalt blowing facility is well-worth the modest additional effort.

- c. CALCULATED REDUCTION IN COST OF ASPHALT PURCHASED AT FRANKLIN THAT COULD HAVE BEEN REALIZED IF THE OPERATING PROCEDURES RECOMMENDED IN SUB-PARAGRAPH 6.a HAD BEEN IN EFFECT DURING SEPTEMBER 1979. According to the calculations developed in Enclosure (5), the total decrease in cost of asphalt that could have been realized during September 1979 if the recommended operating procedures had been in effect was calculated at \$81,059.26 (line 56). On an annual basis, this computes to \$972,711.11. The reduction in cost of asphalt is equal to approximately \$7.71 per ton of roofing produced.

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLS AT FRANKLIN DURING
PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 11 -

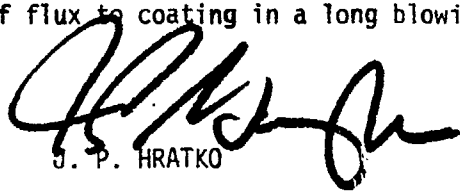
d. IMPLEMENTATION OF THE RECOMMENDATIONS SET FORTH IN SUB-PARAGRAPH 6.a.
The recommendations set forth in sub-paragraph 6.a cover operating
procedures which:

- 1) Do not require any capital investment.
- 2) Can be implemented immediately.
- 3) Are well within the capability of operating personnel.
- 4) Require a fairly high level of supervisory effort by management personnel.
- 5) Do not have any impact on the decisions to be ultimately made with regard to the uncompleted new asphalt blowing facilities at Franklin.

7. GENERAL COMMENT: The calculations developed in Enclosure (5) did not consider: (1) the increased electrical power consumed by the blower under the recommended system, and (2) the possible increase in shrinkage of flux in blowing the larger volumes of flux under the recommended system.

Under the recommended system, the total blowing still hours when in an operating configuration (pump-in, plus blowing, plus pump-out time) would have increased to 1385.04 hours from the actual figure of 1229.58 hours during September 1979. This would have resulted in increased electrical power consumption valued at approximately \$200.00 during September 1979.

The possible increase in asphalt shrinkage losses would be insignificant inasmuch as the increased shrinkage incurred in blowing a larger volume of flux to saturant in a short blowing process would be offset by the decreased shrinkage incurred in blowing a smaller volume of flux to coating in a long blowing process.


J. P. HRATKO

JPH/dv

cc: G. L. Dusty - BE G. A. Sayres - MF
J. A. Hixon - BB F. W. Wood - BBR

- Enclosure (1) DAILY STATISTICS COVERING THE OPERATION OF NO.1 BLOWING STILL AT
THE FRANKLIN ROOFING MILL DURING APRIL 1979
- (2) DAILY STATISTICS COVERING THE OPERATION OF NO.2 BLOWING STILL AT
THE FRANKLIN ROOFING MILL DURING APRIL 1979

RECOMMENDATIONS COVERING DEPLOYMENT OF BLOWING STILLS AT FRANKLIN DURING
PERIOD WHEN BOTH ROOFING MACHINES ARE IN A TWO-SHIFT OPERATING CONFIGURATION

23 October 1979

- 12 -

- Enclosure (3) DAILY STATISTICS COVERING THE OPERATION OF NO.3 BLOWING STILL AT THE FRANKLIN ROOFING MILL DURING APRIL 1979
- (4) SUMMARY OF OPERATING DATA COVERING THE BLOWING STILLS AT THE FRANKLIN ROOFING MILL DURING APRIL 1979
 - (5) CALCULATED REDUCTION IN COST OF ASPHALT THAT COULD HAVE BEEN REALIZED AT THE FRANKLIN ROOFING AND FELT MILL DURING SEPTEMBER 1979 IF TWO (2) BLOWING STILLS HAD BEEN DEDICATED TO BLOWING COATING WITH THE THIRD BLOWING STILL DEDICATED TO BLOWING SATURANT AND AN AVERAGE OF ONE (1) LOAD OF COATING HAD BEEN PURCHASED PER OPERATING DAY
 - (6) CALCULATION OF DAILY PURCHASES OF COATING ASPHALT THAT WOULD HAVE BEEN REQUIRED AT THE FRANKLIN ROOFING AND FELT MILL DURING SEPTEMBER 1979 IF TWO (2) BLOWING STILLS HAD BEEN DEDICATED TO BLOWING FLUX TO COATING AND THE THIRD BLOWING STILL HAD BEEN DEDICATED TO BLOWING FLUX TO SATURANT
 - (7) RECOMMENDED ASPHALT BLOWING SCHEDULE FOR THE FRANKLIN ROOFING MILL WHEN ROOFING MACHINES FFPM-10 AND FFPM-11 ARE BOTH IN A TWO-SHIFT OPERATING CONFIGURATION
 - (8) RECOMMENDED SCHEDULE FOR BLOWING FLUX TO SATURANT AT FRANKLIN ON ROOFING MILL NON-OPERATING DAYS (FFPM-10 AND FFPM-11 BOTH NOT IN OPERATION), WITH BLOWN SATURANT PUMPED INTO RESERVE SATURANT STORAGE TANK
 - (9) RECOMMENDED SCHEDULE FOR DEPLOYMENT OF BLOWING STILLS AT FRANKLIN DURING WEEKS WHEN BOTH FFPM-10 AND FFPM-11 ARE IN A TWO-SHIFT OPERATING CONFIGURATION FROM MONDAY THROUGH FRIDAY

DAILY STATISTICS COVERING THE OPERATION OF NO.1 BLOWING STILL AT THE FRANKLIN ROOFING MILL DURING APRIL 1979

DATE	DAY OF WEEK	BLOWING TIME			PRODUCTION			MELT POINT		TEMPERATURE OF CHARGE AT START OF BLOWING
		BLOWING COATING	BLOWING SATURANT	TOTAL BLOWING TIME Col.3 + Col.4	COATING PRODUCED	SATURANT PRODUCED	TOTAL PRODUCTION Col.6 + Col.7	COATING °F	SATURANT °F	
1	2	3	4	5	6	7	8	9	10	11
1	S									
2	M	620		620	25		25	259		450
3	T	600	140	740	25	25	50	255	145	450,475
4	W	600		600	25		25	258		480
5	TH	510		510	25		25	255		450
6	F	395		395	25		25	243		
7	S									
8	S	210	150	360		25	25		133	500,475
9	M	420		420	25		25	235		
10	T	210		210						450
11	W	700		700	25		25	213		490
12	TH	420		420	25		25	243		
13	F									
14	S									
15	S	690		690	25		25	240		490
16	M	600	160	760	25	25	50	240	128	410,500
17	T	605	165	770	25	25	50	239	129	395,430
18	W	570	200	770	25	25	50	254	131	395,450
19	TH	600		600	25		25	250		465
20	F	410	205	615	25	25	50	229	125	380
21	S	150	195	345		50	50		117,137	490,400
22	S	210		210						500
23	M	615	150	765	25	25	50	232	130	465,425
24	T	630	420	1050	25	50	75	237	128,139	380, 400,450
25	W	660	420	1080	25	50	75	226	125,114	375, 410,460
26	TH	615	450	1065	25	50	75	229	112,126	370, 375,425
27	F	375	225	600	25	25	50	234	126	385
28	S									
29	S	210	285	495		25	25		145	500,490
30	M	645	180	825	25	25	50	237	126	455,340
TOTAL/AVG.		12270	3345	15615	500	450	950	240.4	128.7	438.7

DAILY STATISTICS COVERING THE OPERATION OF NO.2 BLOWING STILL AT THE FRANKLIN ROOFING MILL DURING APRIL 1979

DATE	DAY OF WEEK	BLOWING TIME			PRODUCTION			MELT POINT		TEMPERATURE OF CHARGE AT START OF BLOWING
		BLOWING COATING	BLOWING SATURANT	TOTAL BLOWING TIME Col.3 + Col.4	COATING PRODUCED	SATURANT PRODUCED	TOTAL PRODUCTION Col.6 + Col.7	COATING	SATURANT	
		MINS	MINS	MINS	TONS	TONS	TONS	°F	°F	°F
1	2	3	4	5	6	7	8	9	10	11
1	S									
2	M	620	280	900	25	50	75	223	129,130	455, 460, 450
3	T	1025		1025	50		50	244, 240		440, 325
4	W	750	185	935	25	25	50	241	148	390, 440
5	TH	600	175	775	25	25	50	244	129	400, 450
6	F	530	320	850	25	50	75	236	127, 132	385, 385, 425
7	S	380	200	580	25	25	50	250	129	375
8	S	210	150	360		25	25		126	480, 460
9	M	540	145	685	25	25	50	233	126	450, 480
10	T	510	160	670	25	25	50	248	129	415, 430
11	W	700	200	900	25	25	50	218	131	395, 470
12	TH	480	210	690	25	25	50	217	134	400
13	F									
14	S									
15	S	210	180	390		25	25		138	490, 470
16	M	600	330	930	25	50	75	233	129, 125	400, 425, 490
17	T	1005		1005	50		50	242, 245		395, 450
18	W	720	350	1070	25	50	75	220	120, 120	370, 380, 365
19	TH	600	230	830	25	25	50	238	139	360, 465
20	F	530	200	730	25	25	50	225	134	375, 450
21	S	390	195	585	25	25	50	246	124	405
22	S	210		210						450
23	M	925	165	1090	50	25	75	212, 244	129	460, 460, 340
24	T	1180		1180	50		50	244, 248		385, 340
25	W	1265		1265	50		50	227, 261		400, 450
26	TH	540	285	825	25	25	50	234	139	380
27	F	965		965	50		50	238, 238		465, 375
28	S	150		150						430
29	S	750	140	890	25	25	50	242	131	425, 450
30	M	1100		1100	50		50	245, 222		460, 475
TOTAL/AVG.		17485	4100	21585	750	575	1325	235.9	130.4	422.6

DAILY STATISTICS COVERING THE OPERATION OF NO.3 BLOWING STILL AT THE FRANKLIN ROOFING MILL DURING APRIL 1979

DATE	DAY OF WEEK	BLOWING TIME			PRODUCTION			MELT POINT		TEMPERATURE OF CHARGE AT START OF BLOWING
		BLOWING COATING	BLOWING SATURANT	TOTAL BLOWING TIME Col.3 + Col.4	COATING PRODUCED	SATURANT PRODUCED	TOTAL PRODUCTION Col.6 + Col.7	COATING	SATURANT	
		MINS	MINS	MINS	TONS	TONS	TONS	°F	°F	°F
1	2	3	4	5	6	7	8	9	10	11
1	S									
2	M	620	140	760	25	25	50	236	129	455,400
3	T	600	265	865	25	50	75	238	141,131	420,440,390
4	W	600	360	960	25	50	75	245	122,140	370,390,430
5	TH	600	360	960	25	50	75	238	122,135	360,390,430
6	F	530	190	720	25	25	50	256	150	385,450
7	S	380	180	560	25	25	50	236	131	370
8	S	210	150	360		25	25		118	485,510
9	M	540		540	25		25	252		500
10	T	600	325	925	25	50	75	230	134,126	415,435,475
11	W	580	300	880	25	50	75	249	126,132	375,410,450
12	TH	380	320	700	25	50	75	247	129,117	375,400
13	F									
14	S									
15	S	210	180	390		25	25		147	490,480
16	M	600		600	25		25	261		460
17	T	605	355	960	25	50	75	237	133,142	380,390,340
18	W	950		950	50		50	245,255		375,420
19	TH	630	455	1085	25	50	75	236	130,160	360,385,465
20	F	495		495	25		25	266		490
21	S	390		390	25		25	263		
22	S	210		210						475
23	M	615	150	765	25	25	50	255	130	460,450
24	T	615	160	775	25	25	50	272	122	380,475
25	W	600	190	790	25	25	50	264	117	400,385
26	TH	1085		1085	50		50	257,260		360,375
27	F	405	415	820	25	50	75	248	122,130	360,400,500
28	S	600	120	720	25	25	50	235	119	375,475
29	S	630		630	25		25	256		475
30	M	645	280	925	25	50	75	228	134,123	455,460,460
TOTAL/AVG.		14925	4895	19820	650	725	1375	248.3	130.8	423.2

SUMMARY OF OPERATING DATA COVERING THE BLOWING STILLS AT THE FRANKLIN ROOFING MILL DURING APRIL 1979

LINE NO.	SUB-PARAGRAPH TITLE	ITEM	DATA	SOURCE OF DATA
1	GENERAL DATA	WEIGHT OF FLUX PER CHARGE TO STILL	25 TONS	
2		AVERAGE TOTAL PUMPING TIME REQUIRED TO CHARGE A STILL AND TO PUMP OUT THE BLOWN CHARGE	90 MIN	
3	NO.1 BLOWING STILL OPERATING DATA FOR APRIL 1979	TOTAL NUMBER OF CHARGES OF FLUX BLOWN TO COATING	20	
4		TOTAL COATING PRODUCED	500 TONS	line 1 x line 3
5		TOTAL BLOWING TIME FOR PRODUCTION OF COATING	12270 MIN	
6		AVERAGE BLOWING TIME PER CHARGE OF FLUX BLOWN TO COATING	613.5 MIN	line 5 + line 3
7		TOTAL CYCLE TIME REQUIRED TO PRODUCE A CHARGE OF COATING	703.5 MIN	line 2 + line 6
8		AVERAGE MELT POINT OF COATING PRODUCED	240.4°F	
9		TOTAL NUMBER OF CHARGES OF FLUX BLOWN TO SATURANT	18	
10		TOTAL SATURANT PRODUCED	450 TONS	line 1 x line 9
11		TOTAL BLOWING TIME FOR PRODUCTION OF SATURANT	3345 MIN	
12		AVERAGE BLOWING TIME PER CHARGE OF FLUX BLOWN TO SATURANT	185.8 MIN	line 11 + line 9
13		TOTAL CYCLE TIME REQUIRED TO PRODUCE A CHARGE OF SATURANT	275.8 MIN	line 2 + line 12
14		AVERAGE MELT POINT OF SATURANT PRODUCED	128.7°F	
15		TOTAL BLOWING TIME FOR NO.1 BLOWING STILL	15615 MIN	line 5 + line 11
16		TOTAL BLOWING TIME AND PUMPING TIME TO PRODUCE COATING	14070 MIN	line 3 x line 7
17		TOTAL BLOWING TIME AND PUMPING TIME TO PRODUCE SATURANT	4964 MIN	line 9 x line 13
18		TOTAL BLOWING TIME AND PUMPING TIME FOR NO.1 BLOWING STILL	19034 MIN	line 16 x line 17
19		TOTAL PRODUCTION BY NO.1 BLOWING STILL	950 TONS	line 4 + line 10
20		FRACTION OF TIME NO.1 BLOWING STILL WAS IN PRODUCTIVE OPERATION	.4406	line 18 + (30 x 24 x 60)
21	NO.2 BLOWING STILL OPERATING DATA FOR APRIL 1979	TOTAL NUMBER OF CHARGES OF FLUX BLOWN TO COATING	30	
22		TOTAL COATING PRODUCED	750	line 1 x line 21
23		TOTAL BLOWING TIME FOR PRODUCTION OF COATING	16385 MIN	
24		AVERAGE BLOWING TIME PER CHARGE OF FLUX BLOWN TO COATING	546.2 MIN	line 23 + line 21
25		TOTAL CYCLE TIME REQUIRED TO PRODUCE A CHARGE OF COATING	636.2 MIN	line 2 + line 24
26		AVERAGE MELT POINT OF COATING PRODUCED	235.9°F	

SUMMARY OF OPERATING DATA COVERING THE BLOWING STILLS AT THE FRANKLIN ROOFING MILL DURING APRIL 1979

LINE NO.	SUB-PARAGRAPH TITLE	ITEM	DATA	SOURCE OF DATA
27	NO.2 BLOWING STILL OPERATING DATA FOR APRIL 1979	TOTAL NUMBER OF CHARGES OF FLUX BLOWN TO SATURANT	23	
28		TOTAL SATURANT PRODUCED	575 TONS	line 1 x line 27
29		TOTAL BLOWING TIME FOR PRODUCTION OF SATURANT	4100 MIN	
30		AVERAGE BLOWING TIME PER CHARGE OF FLUX BLOWN TO SATURANT	178.3 MIN	line 29 + line 27
31		TOTAL CYCLE TIME REQUIRED TO PRODUCE A CHARGE OF SATURANT	268.3 MIN	line 2 + line 30
32		AVERAGE MELT POINT OF SATURANT PRODUCED	130.4°F	
33		TOTAL BLOWING TIME FOR NO.2 BLOWING STILL	21585 MIN	line 23 + line 29
34		TOTAL BLOWING TIME AND PUMPING TIME TO PRODUCE COATING	19086 MIN	line 21 x line 25
35		TOTAL BLOWING TIME AND PUMPING TIME TO PRODUCE SATURANT	6171 MIN	line 23 x line 31
36		TOTAL BLOWING TIME AND PUMPING TIME FOR NO.1 BLOWING STILL	25257 MIN	line 34 + line 35
37		TOTAL PRODUCTION BY NO.2 BLOWING STILL	1325 TONS	line 22 + line 28
38		FRACTION OF TIME NO.2 BLOWING STILL WAS IN PRODUCTIVE OPERATION	.5847	line 36 + (30 x 24 x 60)
39	NO.3 BLOWING STILL OPERATING DATA FOR APRIL 1979	TOTAL NUMBER OF CHARGES OF FLUX BLOWN TO COATING	26	
40		TOTAL COATING PRODUCED	650 TONS	line 1 x line 39
41		TOTAL BLOWING TIME FOR PRODUCTION OF COATING	14925 MIN	
42		AVERAGE BLOWING TIME PER CHARGE OF FLUX BLOWN TO COATING	574 MIN	line 41 + line 39
43		TOTAL CYCLE TIME REQUIRED TO PRODUCE A CHARGE OF COATING	664 MIN	line 2 + line 42
44		AVERAGE MELT POINT OF COATING PRODUCED	248.3°F	
45		TOTAL NUMBER OF CHARGES OF FLUX BLOWN TO SATURANT	29	
46		TOTAL SATURANT PRODUCED	725 TONS	line 1 x line 45
47		TOTAL BLOWING TIME FOR PRODUCTION OF SATURANT	4895 MIN	
48		AVERAGE BLOWING TIME PER CHARGE OF FLUX BLOWN TO SATURANT	168.8 MIN	line 47 + line 45
49		TOTAL CYCLE TIME REQUIRED TO PRODUCE A CHARGE OF SATURANT	258.8 MIN	line 2 + line 48
50		AVERAGE MELT POINT OF SATURANT PRODUCED	130.8°F	
51		TOTAL BLOWING TIME FOR NO.3 BLOWING STILL	19820 MIN	line 41 + line 47
52		TOTAL BLOWING TIME AND PUMPING TIME TO PRODUCE COATING	17264 MIN	line 39 x line 43

SUMMARY OF OPERATING DATA COVERING THE BLOWING STILLS AT THE FRANKLIN ROOFING MILL DURING APRIL 1979

LINE NO.	SUB-PARAGRAPH TITLE	ITEM	DATA	SOURCE OF DATA
53	NO.3 BLOWING STILL OPERATING DATA FOR APRIL 1979	TOTAL BLOWING TIME AND PUMPING TIME TO PRODUCE SATURANT	7505 MIN	line 45 x line 49
54		TOTAL BLOWING TIME AND PUMPING TIME FOR NO.3 BLOWING STILL	24769 MIN	line 52 + line 53
55		TOTAL PRODUCTION BY NO.3 BLOWING STILL	1375 TONS	line 40 + line 46
56		FRACTION OF TIME NO.3 BLOWING STILL WAS IN PRODUCTIVE OPERATION	.5734	line 54 + (30 x 24 x 60)
57	SUMMARY OF OPERATING DATA FOR NO.1, NO.2 AND NO.3 BLOWING STILLS DURING APRIL 1979	TOTAL NUMBER OF CHARGES OF FLUX BLOWN TO COATING	76	line 3 + line 21 + line 39
58		TOTAL COATING PRODUCED	1900 TONS	line 4 + line 22 + line 40
59		TOTAL BLOWING TIME FOR PRODUCTION OF COATING	43580 MIN	line 5 + line 23 + line 41
60		AVERAGE BLOWING TIME PER CHARGE OF FLUX BLOWN TO COATING	573.4 MIN	line 59 + line 57
61		TOTAL CYCLE TIME REQUIRED TO PRODUCE A CHARGE OF COATING	663.4 MIN	line 2 + line 60
62		AVERAGE MELT POINT OF COATING PRODUCED	241.3°F	WEIGHTED AVERAGE VALUE
63		TOTAL NUMBER OF CHARGES OF FLUX BLOWN TO SATURANT	70	line 9 + line 27 + line 45
64		TOTAL SATURANT PRODUCED	1750 TONS	line 10 + line 28 + line 46
65		TOTAL BLOWING TIME FOR PRODUCTION OF SATURANT	12340 MIN	line 11 + line 29 + line 47
66		AVERAGE BLOWING TIME PER CHARGE OF FLUX BLOWN TO SATURANT	176.3 MIN	line 65 + line 63
67		TOTAL CYCLE TIME REQUIRED TO PRODUCE A CHARGE OF SATURANT	266.3 MIN	line 2 + line 66
68		AVERAGE MELT POINT OF SATURANT PRODUCED	130.1°F	WEIGHTED AVERAGE VALUE
69		TOTAL BLOWING TIME FOR NO.1, NO.2 AND NO.3 BLOWING STILLS	57020 MIN	line 15 + line 33 + line 51
70		TOTAL BLOWING TIME AND PUMPING TIME TO PRODUCE COATING	50418 MIN	line 57 x line 61
71		TOTAL BLOWING TIME AND PUMPING TIME TO PRODUCE SATURANT	18641 MIN	line 63 x line 67
72		TOTAL BLOWING TIME AND PUMPING TIME FOR NO.1, NO.2 AND NO.3 BLOWING STILLS	69059 MIN	line 70 + line 71
73		TOTAL PRODUCTION BY NO.1, NO.2 AND NO.3 BLOWING STILLS	3650 TONS	line 19 + line 37 + line 55
74		FRACTION OF TOTAL BLOWING STILL TIME THAT BLOWING STILLS WERE IN PRODUCTIVE OPERATION	.5329	line 72 + (3x30x24x60)
75		AVERAGE TEMPERATURE OF CHARGE IN NO.1 BLOWING STILL AT START OF BLOWING	438.65°F	
76		AVERAGE TEMPERATURE OF CHARGE IN NO.2 BLOWING STILL AT START OF BLOWING	422.55°F	
77		AVERAGE TEMPERATURE OF CHARGE IN NO.3 BLOWING STILL AT START OF BLOWING	423.18°F	
78		AVERAGE TEMPERATURE OF CHARGE IN BLOWING STILLS AT START OF BLOWING	426.98°F	WEIGHTED AVERAGE VALUE

CALCULATED REDUCTION IN COST OF ASPHALT THAT COULD HAVE BEEN REALIZED AT THE FRANKLIN ROOFING MILL DURING SEPTEMBER 1979 IF TWO (2) BLOWING STILLS HAD BEEN DEDICATED TO BLOWING COATING WITH THE THIRD BLOWING STILL DEDICATED TO BLOWING SATURANT AND AN AVERAGE OF ONE (1) LOAD OF COATING HAD BEEN PURCHASED PER OPERATING DAY

LINE NO.	SUB-PARAGRAPH TITLE	ITEM	DATA	SOURCE OF DATA
1	GENERAL PRICE DATA FOR ASPHALT IN THE FRANKLIN AREA DURING SEPTEMBER - OCTOBER 1979	INVOICE PRICE OF RAW FLUX SUPPLIED BY BOSWELL OIL COMPANY IN LATE SEPT 1979	\$89.50/TON	FF
2		INVOICE PRICE OF SHINGLE SATURANT SUPPLIED BY TRUMBULL ASPHALT CO.(BROOKVILLE, IND.) SEPT 1979	\$122.50/TON	FF
3		QUOTED PRICE FOR COATING ASPHALT IN MID-OCTOBER 1979 F.O.B. BROOKVILLE, INDIANA	\$137.50/TON	FF 12 OCT 1979
4		COST OF RAW FLUX RECEIVED IN SEPT 1979 (INCLUDING TRANSPORTATION CHARGES)	\$94.31/TON	AP0-550-30 DATED 2 OCT 1979 PAGE 543
5		COST OF SHINGLE SATURANT RECEIVED DURING SEPT 1979 (INCLUDING TRANSPORTATION CHARGES)	\$131.80/TON	AP0-550-30 DATED 2 OCT 1979 PAGE 518
6		TRANSPORTATION CHARGES PER TON OF RAW FLUX	\$4.81/TON	line 4 - line 1
7		TRANSPORTATION CHARGES PER TON OF SHINGLE SATURANT	\$9.30/TON	line 5 - line 2
8		ESTIMATED TRANSPORTATION CHARGES PER TON OF COATING ASPHALT	\$9.30/TON	SAME AS LINE 7 ENTRY
9		ESTIMATED DELIVERED COST PER TON OF COATING ASPHALT	\$146.80/TON	line 3 + line 8
10	ASPHALT INVENTORY DATA AT START AND END OF SEPTEMBER 1979 FOR THE FRANKLIN ROOFING MILL	INVENTORY OF RAW FLUX AT START OF SEPTEMBER 1979	1032.11 TONS	FROM FF VIA TELEPHONE ON 11 OCT 1979
11		INVENTORY OF SHINGLE SATURANT AT START OF SEPTEMBER 1979	114.24 TONS	
12		INVENTORY OF COATING AT START OF SEPTEMBER 1979	46.2 TONS	
13		INVENTORY OF RAW FLUX AT END OF SEPTEMBER 1979	549.78 TONS	
14		INVENTORY OF SHINGLE SATURANT AT END OF SEPTEMBER 1979	143.64 TONS	
15		INVENTORY OF COATING AT END OF SEPTEMBER 1979	84.00 TONS	
16	CALCULATED TOTAL SHINGLE SATURANT AND COATING ASPHALT CONSUMED BY THE FRANKLIN ROOFING MILL DURING SEPTEMBER 1979	TOTAL SHINGLE SATURANT RECEIVED DURING SEPTEMBER 1979	2174.16 TONS	FF
17		TOTAL RAW FLUX RECEIVED DURING SEPTEMBER 1979	2215.01 TONS	FF
18		TOTAL RAW FLUX EXPENDED DURING SEPTEMBER 1979	2697.34 TONS	line 10 + line 17 - line 13
19		TOTAL NUMBER OF STILLS OF COATING BLOWN DURING SEPTEMBER 1979	110	FF
20		TOTAL NUMBER OF STILLS OF SATURANT BLOWN DURING SEPTEMBER 1979	3	FF
21		TOTAL NUMBER OF STILLS BLOWN DURING SEPTEMBER 1979	113	line 19 + line 20
22		AVERAGE WEIGHT OF FLUX CHARGED INTO STILLS FOR BLOWING	23.87 TONS/BTCH	line 18 + line 21
23		TOTAL RAW FLUX EXPENDED IN PRODUCTION OF COATING DURING SEPTEMBER 1979	2625.7 TONS	line 19 x line 22
24		TOTAL RAW FLUX EXPENDED IN PRODUCTION OF SATURANT DURING SEPTEMBER 1979	71.64 TONS	line 18 - line 23
25		TOTAL SHINGLE SATURANT CONSUMED DURING SEPTEMBER 1979	2216.40 TONS	line 11 + line 16 + line 24 - line 14
26		TOTAL COATING CONSUMED DURING SEPTEMBER 1979	2587.9 TONS	line 12 + line 23 - line 15

CALCULATED REDUCTION IN COST OF ASPHALT THAT COULD HAVE BEEN REALIZED AT THE FRANKLIN ROOFING MILL DURING SEPTEMBER 1979 IF TWO (2) BLOWING STILLS HAD BEEN DEDICATED TO BLOWING COATING WITH THE THIRD BLOWING STILL DEDICATED TO BLOWING SATURANT AND AN AVERAGE OF ONE (1) LOAD OF COATING HAD BEEN PURCHASED PER OPERATING DAY

LINE NO.	SUB-PARAGRAPH TITLE	ITEM	DATA	SOURCE OF DATA
27	CALCULATION OF ESTIMATED HOURLY CONSUMPTION RATES OF COATING ASPHALT AND SATURANT ASPHALT DURING HOURS WHEN FFPM-10 AND FFPM-11 WERE BOTH IN OPERATION DURING SEPTEMBER 1979	TOTAL PRODUCTION BY SHINGLE MACHINE (FFPM-10) DURING SEPTEMBER 1979	8965 TONS	BMGA
28		TOTAL PRODUCTION BY ROLL MACHINE (FFPM-11) DURING SEPTEMBER 1979	1608 TONS	BMGA
29		TOTAL PRODUCTION BY FRANKLIN ROOFING MILL DURING SEPTEMBER 1979	10573 TONS	line 27 + line 28
30		TOTAL OPERATING TIME BY SHINGLE MACHINE (FFPM-10) DURING SEPTEMBER 1979	398.5 HRS	FF
31		TOTAL OPERATING TIME BY ROLL MACHINE (FFPM-11) DURING SEPTEMBER 1979	337.5 HRS	FF
32		TOTAL ASPHALT CONSUMED DURING SEPTEMBER 1979	4804.3 TONS	line 25 + line 26
33		SHINGLE MACHINE PRODUCTION AS A FRACTION OF TOTAL ROOFING MILL PRODUCTION	.8479	line 27 + line 29
34		ESTIMATED ASPHALT CONSUMED BY SHINGLE MACHINE DURING SEPTEMBER 1979	4073.6 TONS	line 32 x line 33
35		ESTIMATED ASPHALT CONSUMED BY ROLL MACHINE DURING SEPTEMBER 1979	730.7 TONS	line 32 - line 34
36		AVERAGE ASPHALT CONSUMPTION RATE BY SHINGLE MACHINE	10.22 TONS/HR	line 32 + line 30
37		AVERAGE ASPHALT CONSUMPTION RATE BY ROLL MACHINE	2.17 TONS/HR	line 35 + line 31
38		AVERAGE ASPHALT CONSUMPTION RATE WITH BOTH MACHINES IN OPERATION	12.39 TONS/HR	line 36 + line 37
39		COATING ASPHALT AS A FRACTION OF TOTAL ASPHALT CONSUMED	.5387	line 26 + line 32
40		AVERAGE COATING ASPHALT CONSUMPTION RATE WHEN BOTH MACHINES ARE IN OPERATION	6.67 TONS/HR	line 38 x line 39
41		AVERAGE SATURANT ASPHALT CONSUMPTION RATE WHEN BOTH MACHINES ARE IN OPERATION	5.72 TONS/HR	line 38 - line 40
42	TOTAL PRODUCTION OF COATING AND SATURANT AT THE FRANKLIN ROOFING MILL DURING APRIL 1979	AVERAGE BLOWING STILL TIME REQUIRED TO BLOW A CHARGE OF FLUX TO SATURANT - INCLUDES PUMP-IN AND PUMP-OUT TIME (APRIL 1979)	266.3 MIN	ANALYSIS OF THE DAILY OXIDATION REPORTS FOR FRANKLIN DURING APRIL 1979
43		AVERAGE BLOWING STILL TIME REQUIRED TO BLOW A CHARGE OF FLUX TO COATING - INCLUDING PUMP-IN AND PUMP-OUT TIME (APRIL 1979)	663.4 MIN	
44		TOTAL STILLS BLOWN TO COATING DURING APRIL 1979	76	FF - DAILY OXIDATION REPORTS
45		TOTAL STILLS BLOWN TO SATURANT DURING APRIL 1979	70	FF - DAILY OXIDATION REPORTS
46		TOTAL COATING PRODUCED DURING APRIL 1979	1814.12 TONS	line 22 x line 44
47		TOTAL SATURANT PRODUCED DURING APRIL 1979	1670.90 TONS	line 22 x line 45
48		TOTAL COATING AND SATURANT BLOWN DURING APRIL 1979	3485.02 TONS	line 46 + line 47
49		TOTAL COATING AND SATURANT BLOWN DURING SEPTEMBER 1979	2697.31 TONS	line 21 x line 22
50	CALCULATED REDUCTION IN COST OF ASPHALT PURCHASED AT FRANKLIN THAT COULD HAVE BEEN REALIZED DURING SEPTEMBER 1979 IF THE BLOWING STILLS WERE OPERATED IN ACCORDANCE WITH THE SCHEDULE SET FORTH IN ENCLOSURES (6) AND (7)	PRICE DIFFERENTIAL BETWEEN SHINGLE SATURANT AND RAW FLUX DURING SEPTEMBER 1979	\$37.49/TON	line 5 - line 4
51		PRICE DIFFERENTIAL BETWEEN COATING AND RAW FLUX DURING MID-OCTOBER 1979	\$52.49/TON	line 9 - line 4
52		INCREASE IN COST OF SHINGLE SATURANT OVER COST OF RAW FLUX FOR SEPTEMBER 1979	\$81509.26	line 16 x line 50
53		TOTAL STILLS OF COATING THAT WOULD HAVE HAD TO BE PURCHASED DURING SEPTEMBER 1979 IF COATING AND NOT SATURANT HAD BEEN PURCHASED	21	Col. 15 of Enclosure (6)
54		TOTAL COATING THAT WOULD HAVE HAD TO BE PURCHASED DURING SEPTEMBER 1979 IF COATING AND NOT SATURANT HAD BEEN PURCHASED	501.27 TONS	line 22 x line 53
55		TOTAL INCREASE IN COSTS INCURRED BY PURCHASING COATING IN LIEU OF RAW FLUX DURING SEPTEMBER 1979	\$26311.66	line 51 x line 54
56		TOTAL DECREASE IN COST OF ASPHALT THAT COULD HAVE BEEN REALIZED DURING SEPTEMBER 1979 IF COATING AND NOT SATURANT HAD BEEN PURCHASED	\$55197.60	line 52 - line 55

**CALCULATION OF DAILY PURCHASES OF COATING ASPHALT THAT WOULD HAVE BEEN REQUIRED AT THE FRANKLIN ROOFING AND FELT MILL DURING SEPTEMBER 1979
IF TWO (2) BLOWING STILL HAD BEEN DEDICATED TO BLOWING FLUX TO COATING AND THE THIRD BLOWING STILL HAD BEEN DEDICATED TO BLOWING FLUX TO SATURANT**

DATE	DAY OF WEEK	SHINGLE MACHINE (FFPM-10)		ROLL MACHINE (FFPM-11)		TOTAL ASPHALT CONSUMED		COATING ASPHALT		SATURANT ASPHALT		TOTAL BLOWING STILL TIME REQUIRED		TOTAL LOADS OF COATING TO BE PURCHASED		TOTAL CHARGES OF COATING TO BE BLOWN IN 2 STILLS		TOTAL COATING PURCHASED	
		OPERATING TIME	TOTAL ASPHALT CONSUMED	OPERATING TIME	TOTAL ASPHALT CONSUMED	Col. 3x10.22	Col. 4	TOTAL TO BE BLOWN	TOTAL TO BE BLOWN	TOTAL TO BE BLOWN	TOTAL TO BE BLOWN	Col. 10 + Col. 13	Col. 10 + Col. 13	Col. 10 + Col. 13	Col. 10 + Col. 13	Col. 10 + Col. 13	Col. 10 + Col. 13	Col. 10 + Col. 13	Col. 10 + Col. 13
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	S																		
2	S																		
3	M																		
4	T	16	163.52	16	34.72	198.24	106.79	4.47	49.42	91.45	3.83	17.00	66.42	0	4				
5	W	16	163.52	16	34.72	198.24	106.79	4.47	49.42	91.45	3.83	17.00	66.42	1	4				23.87
6	TH	16	163.52	16	34.72	198.24	106.79	4.47	49.42	91.45	3.83	17.00	66.42	0	4				
7	F	16	163.52	16	34.72	198.24	106.79	4.47	49.42	91.45	3.83	17.00	66.42	1	4				23.87
8	S	16	163.52			163.52	88.09	3.69	40.80	75.43	3.16	14.03	54.83	0	4				
9	S																		
10	M	19.5	199.29	16	34.72	234.01	126.06	5.28	58.38	107.95	4.52	20.06	78.44	1	4				23.87
11	T	19.5	199.29	16	34.72	234.01	126.06	5.28	58.38	107.95	4.52	20.06	78.44	1	4				23.87
12	W	19.5	199.29	16	34.72	234.01	126.06	5.28	58.38	107.95	4.52	20.06	78.44	1	4				23.87
13	TH	19.5	199.29	16	34.72	234.01	126.06	5.28	58.38	107.95	4.52	20.06	78.44	2	4				47.74
14	F	19.5	199.29	16	34.72	234.01	126.06	5.28	58.38	107.95	4.52	20.06	78.44	1	4				23.87
15	S																		
16	S																		
17	M	11.5	117.53	16	34.72	152.25	82.02	3.44	38.03	70.23	2.94	13.05	51.08	0	4				
18	T	19.5	199.29	16	34.72	234.01	126.06	5.28	58.38	107.95	4.52	20.06	78.44	1	4				23.87
19	W	18.0	183.96	16	34.72	218.68	117.80	4.94	54.62	100.88	4.23	18.77	73.39	1	4				23.87
20	TH	19.5	199.29	16	34.72	234.01	126.06	5.28	58.38	107.95	4.52	20.06	78.44	2	4				47.74
21	F	19.5	199.29	16	34.72	234.01	126.06	5.28	58.38	107.95	4.52	20.06	78.44	1	4				23.87
22	S	19.5	199.29			199.29	107.36	4.50	49.75	91.93	3.85	17.09	66.84	0	4				
23	S																		
24	M	19.5	199.29	19.5	42.32	241.61	130.16	5.45	60.26	111.45	4.67	20.72	80.98	1	4				23.87
25	T	19.5	199.29	19.5	42.32	241.61	130.16	5.45	60.26	111.45	4.67	20.72	80.98	2	4				47.74
26	W	19.5	199.29	19.5	42.32	241.61	130.16	5.45	60.26	111.45	4.67	20.72	80.98	1	4				23.87
27	TH	19.5	199.29	19.5	42.32	241.61	130.16	5.45	60.26	111.45	4.67	20.72	80.98	2	4				47.74
28	F	19.5	199.29	19.5	42.32	241.61	130.16	5.45	60.26	111.45	4.67	20.72	80.98	1	4				23.87
29	S	16.0	163.52	16.0	34.72	198.24	106.79	4.47	49.42	91.45	3.83	17.00	66.42	1	4				23.87
30	S	398.5	4072.67	337.5	732.40	4805.07	2588.50	108.41	1198.64	2216.57	92.84	412.02	1610.66	21	89				501.27

ENCLOSURE (6)

RECOMMENDED ASPHALT BLOWING SCHEDULE FOR THE FRANKLIN ROOFING MILL WHEN ROOFING MACHINES
FFPM-10 AND FFPM-11 ARE BOTH IN A TWO-SHIFT OPERATING CONFIGURATION

TIME	NO.1 BLOWING STILL			NO.2 BLOWING STILL			NO.3 BLOWING STILL		
	PUMP-IN FLUX	BLOWING CHARGE	PUMP-OUT COATING	PUMP-IN FLUX	BLOWING CHARGE	PUMP-OUT COATING	PUMP-IN FLUX	BLOWING CHARGE	PUMP-OUT SATURANT
8:00 AM									
9:00 AM									
10:00 AM									
11:00 AM									
12:00 NOON									
1:00 PM									
2:00 PM									
3:00 PM									
4:00 PM									
5:00 PM									
6:00 PM									
7:00 PM									
8:00 PM									
9:00 PM									
10:00 PM									
11:00 PM									
12:00 MID									
1:00 AM									
2:00 AM									
3:00 AM									
4:00 AM									
5:00 AM									
6:00 AM									
7:00 AM									
8:00 AM									
9:00 AM									
10:00 AM									
11:00 AM									
12:00 NOON									
1:00 PM									
1:45 PM									

RECOMMENDED SCHEDULE FOR BLOWING FLUX TO SATURANT AT FRANKLIN ON ROOFING MILL NON-OPERATING DAYS
(FFPM-10 AND FFPM-11 BOTH NOT IN OPERATION) WITH BLOWN SATURANT PUMPED INTO A RESERVE SATURANT STORAGE TANK

TIME	NO.1 BLOWING STILL			NO.2 BLOWING STILL			NO.3 BLOWING STILL		
	PUMP-IN FLUX	BLOWING CHARGE	PUMP-OUT SATURANT	PUMP-IN FLUX	BLOWING CHARGE	PUMP-OUT SATURANT	PUMP-IN FLUX	BLOWING CHARGE	PUMP-OUT SATURANT
1	2	3	4	5	6	7	8	9	10
0:00 AM									
1:00 AM									
2:00 AM									
3:00 AM									
4:00 AM									
5:00 AM									
6:00 AM									
7:00 AM									
8:00 AM									
9:00 AM									
10:00 AM									
11:00 AM									
12:00 NOON									
1:00 PM									
2:00 PM									
3:00 PM									
4:00 PM									
5:00 PM									
6:00 PM									
7:00 PM									
8:00 PM									
9:00 PM									
10:00 PM									
11:00 PM									
12:00 MIDN									
1:00 AM									
2:00 AM									
3:00 AM									
4:00 AM									
5:00 AM									
6:00 AM									
7:00 AM									
8:00 AM									

**RECOMMENDED SCHEDULE FOR DEPLOYMENT OF BLOWING STILLS AT FRANKLIN
DURING WEEKS WHEN BOTH FFPM-10 AND FFPM-11 ARE IN A TWO-SHIFT
OPERATING CONFIGURATION FROM MONDAY THROUGH FRIDAY**

LINE NO.	DAY OF WEEK	NO.1 BLOWING STILL		NO.2 BLOWING STILL		NO.3 BLOWING STILL		TOTAL NUMBER OF CHARGES BLOWN	RESERVE SATURANT STORAGE TANK	
		NO. OF CHARGES BLOWN TO COATING	NO. OF CHARGES BLOWN TO SATURANT	NO. OF CHARGES BLOWN TO COATING	NO. OF CHARGES BLOWN TO SATURANT	NO. OF CHARGES BLOWN TO COATING	NO. OF CHARGES BLOWN TO SATURANT		NO. OF CHARGES TRANS-FERRED INTO STORAGE	NO. OF CHARGES WITH-DRAWN FROM STORAGE
1	2	3	4	5	6	7	8	9	10	11
1	SUN	2		MAINTENANCE STATUS		MAINTENANCE STATUS		2		
2	MON	2		2		1	2	7		3
3	TUES	2		2		1	2	7		3
4	WED	2		2		1	2	7		3
5	THUR	2		2		1	2	7		3
6	FRI	2		2			5	9		
7	SAT		4		4		4	12	12	
8	TOTAL	12	4	10	4	4	17	51	12	12

Not Data, But Savings, Says SCM Chief

Continued from Page One
 conservation in 1972. The work has been carried out on all levels, but as a "part-time thing" and never centralized, with energy coordinators serving to direct efforts at the seven divisions, said Walsh.
 According to Walsh, the process of finding room in the corporate structure and budget for his position took a full year, and it is this standard, but painful, time lag that he would like to eliminate in the execution of a companywide energy program. A point in case is Walsh's conservation goal for the first go-round. The five percent figure he's chosen, he said, is "an arbitrary first-year goal—I compromise between what I really thought I could do and what the boss wanted me to do."

But the cautious approach, said Walsh, is probably appropriate: "You have so many layers of inefficiency that things don't go as fast as you think they should."

Red Tape Plus Diversity

Added to the usual tangle of red tape is the diversity of SCM properties and facilities: Allied Paper, for example, which is one of the company's seven divisions, is further ahead in conservation efforts than most of the others, said Walsh. Talking with Allied people in the first month of his tenure, he was told he could reach and exceed his goal just by concentrating on the pulp and paper plants. "But I don't want that," he told them. "I want to get the entire corporation involved."

The corporate approach will mean, among other things, a new

attitude toward capital expenditures. "We're so new that our budget for this year is quite restricted, and we're still operating with the budgets of the divisions," Walsh said, but he intends to use the influence of his corporate office to make sure that those monies get directed toward energy projects.

Until Walsh took over, energy project funds went through the normal capital expense route and, in one sense, they will continue to follow that path. However, "we will consider energy reduction as a separate justification" instead of as part of simple cost reduction, Walsh said.

Investment guidelines will remain, however, he said, and though the company quotes no firm payback figures, projects which can be calculated at under three years will certainly receive priority treatment. Walsh said that SCM has already spent "several million" on energy conservation projects.

50% Of Time For Travel

Walsh says he has budgeted more than 50 percent of his time for travel, with visits to plants and divisional headquarters already scheduled. Regular communication with all the divisions will also be served by a monthly newsletter, one of which has already gone out to a companywide mailing list.

The October mailing started with an appeal to all plant energy committees to observe International Energy Conservation month by calling meetings. Each is expected to discuss 1978 progress, plan for the coming year and report on these developments to divisional headquarters.

He included in the newsletter information on DOE incremental pricing proposals and expects to give his readers regular data on

keep close tabs on Washington, and he has already sitting making contacts there, Walsh said.
 Every SCM plant is in a very different stage of development in its own energy conservation biography. In his effort to catch them up, Walsh plans audits, done by outside consultants, for the facilities responsible for 90 percent of SCM's energy consumption.

Audits Uncover Opportunities
 The audits done so far, by DuPont, have already turned up significant savings opportunities, Walsh said. For the organic chemicals division, for example, DuPont estimated a possible 18 percent energy-use reduction: the first 10 percent with no expenditures, and another 8 percent with some capital commitment. "And that's at a plant that's already begun to burn waste oil," Walsh pointed out.

"The biggest thing I see is waste utilization," Walsh judges, "and second is the efficient operation of our steam system—generating and use." He has already identified numerous opportunities to make use of heat recovery. "Low-level heat," Walsh reminds, "we used to ignore completely."

From the time he got out of school in 1939, Walsh said, until the early '60s, he and his colleagues wouldn't look at heat below 400 degrees Fahrenheit. "If it was below 400, we had something more important to do," Walsh said. "Now I can go after 180 degrees" and make it profitable.

"Going after" all these projects has already made Walsh very happy. "I'm at heart a thermodynamicist," he explains. Walsh taught thermodynamics at Case Western Reserve for 25 years before moving into the

SCM Names 1st Full-Time Energy Chief

By JOLIE SOLOMON
 NEW YORK—SCM Corp.'s appointment last month of a full-time corporate energy manager reflects a preference for energy reduction over energy data, according to that firm's new manager, Thomas J. Walsh. "You don't want data, you want to reduce usage," said Walsh.

Walsh, who was energy, environmental coordinator for one of SCM's seven product divisions, Durkee Foods, until he moved into his new role, is now in charge of energy conservation for all seven. He reports to Edward Romay, SCM vice president, and will stay in the Cleveland office, close to several SCM divisions, though company headquarters are in New York City.

SCM has concentrated on data collection since the company became sensitive to energy consumption.

See NOT, Page 6



Thomas J. Walsh, corporate energy manager at SCM Corp.

APPENDIX

ENERGY USER NEWS, MONDAY, OCTOBER 15, 1979

JULIA W. LUCY

Upgrades Its Energy Post

By DAN TANZ

TAMPA, Fla. — The Jim Walter Corp. has significantly upgraded its energy management program by establishing the new position of corporate director of energy conservation and has hired away the manager of energy utilization from U.A. Gypsum Co. to fill the post.

Making the move is Neale Beightol, who will be replaced at U.S. Gypsum by Raymond E. McCleary, who had been groomed by Beightol as U.S. Gypsum's technical manager for energy conservation. Both companies are major manufacturers of building materials.

Beightol will report to Marion Hambrick, Jim Walter's vice president of management engineering, and will head the company's energy advisory board. Following Beightol's appointment, that advisory board announced a corporate goal of a 25 percent reduction in energy use per unit of production over the next five to seven years.

"Our energy conservation program has been restructured so that our management believes there is a great deal of energy conservation to be done. The new management will be able to do it," Beightol said.

The company's energy management program was divided into three main areas: research, engineering and purchasing. Research was headed by Beightol, who had been with U.S. Gypsum for 11 years. Engineering was headed by Richard Mest, who formerly had the title of corporate energy manager, was in charge of the engineering department and had no direct responsibility for the program. Hambrick said. Mest is now in charge of purchasing function.

See 114, Page 1

CONSERVATION & MANAGEMENT

Jim Walter Upgrades Its Energy Post

Continued from Page One

one of the company's Celotex divisions, he added.

Fuel-Purchasing Separates

Three energy engineers from the research center now form the core of Beightol's technical staff. Fuel purchasing, however, remains a part of the purchasing and traffic department's function, said Hambrick.

The energy advisory board which Beightol chairs is made up of corporate staff executives and operating group executives and reports to the company's president, Joe B. Cordell — who was credited by both Beightol and Hambrick with upgrading the program.

"The advisory board gives teeth and stature to what we're trying to do," said Beightol.

At the board's meeting earlier this month, the company's 1980 energy conservation program was outlined, along with the accounting and reporting procedures that will be relied upon. The company is looking for a 5 percent reduction in energy use over fiscal 1979 (ending Aug. 31) and projects that over the next five years, it can achieve approximately \$120 million savings in terms of energy-use efficiency, said Beightol.

One of the areas he will concentrate on, said Beightol, is in putting into motion an effective system of energy accounting.

"Only Scratched Surface"

But Beightol admitted that the company has so far "only scratched the surface" on a corporate-wide basis and

Hambrick echoed that assessment.

"One or two divisions have done a creditable job, and they know it. But there are ones that haven't done a good job and they don't know it," Hambrick explained.

The significant change in the company's reporting system is that it will become all-inclusive, said Beightol. "All places where energy is used will be included in the corporate report and we'll give each facility an accounting tool."

2 Seminars Held

Beightol got his program off to a start last month with two energy seminars in Cincinnati and Houston for over 100 company plant managers and energy coordinators. These seminars will be continued in the coming months and will be directed first at the company's most energy-intensive operations, like roofing materials, coke iron and chemicals, and the pipe division. Content will focus on combustion efficiency of heating processes, boiler efficiency, use of insulation and a maintenance program for steam leaks.

"My engineers and I have put together an energy conservation manual four-and-a-half inches thick. It should get them through the first two years (of the five-year program)," said Beightol.

According to Hambrick, the company's business is organized around division or profit centers, each of which has a manager of energy, whose energy management responsibilities are a collateral duty. His job is to collate

information from plant locations and forward it to Beightol's office.

Special Situations

Although fuel planning and contracts will be managed by the purchasing department, Beightol will work as an adviser in special situations, like planned fuel conversions, and unusual developments in market price and availability of fuels.

Collaboration with purchasing will also take place in the development of capital projects, he said. "The key to our capital program is that it requires finished staff work before it goes on to top management," said Beightol. "That way we can tell them the bottom line."

Beightol added that in the purchase of capital equipment he will have the role of recommending types of equipment and vendors. "We'll be interested not just in price but in getting the equipment that will do the job right," he said.

The Jim Walter Corp. had annual sales of \$1.7 billion last year. It has about 120 plant locations around the country. Although company officials wouldn't reveal last year's overall energy costs, Hambrick said they were now more than the company's direct labor bill.



MEMORANDUM

Appendix 4

To G. L. Dusty - BE

From J. P. Hratko - BE

Date 29 October 1979

Subject ENERGY MANAGEMENT AT BIRD & SON, inc.

Reference (a) J. P. Hratko memorandum to G. L. Dusty, dated 19 October 1979,
Subject: BIRD & SON, inc. ENERGY MANAGEMENT PROGRAM

(b) J. P. Hratko memorandum to G. L. Dusty, dated 24 October 1979,
Subject: ENERGY SURVEY - SHREVEPORT

1. PREFACE. The purpose of this memorandum is to expand on the brief commentary outlined in reference (a), a copy of which is attached as Enclosure (1). This memorandum will cover the following subjects in the paragraphs that follow:

- An estimate of the energy supply situation during the 1980's.
- The national response to the energy situation in areas most directly impacting on Bird & Son, inc. operations.
- The response of Bird & Son, inc. to the energy situation.
- The rationale in support of a positive response by Bird & Son, inc. to the energy situation.
- The essential elements of a Bird & Son, inc. energy management program for the 1980's.

The dimensions of the long-term energy problem are now in sharper focus than in late 1974 when the Bird & Son, inc. energy management program was instituted in the aftermath of the 1973-1974 Arab oil embargo. In the intervening years, the emphasis and direction of the program have changed in response to the unfolding of events. There is today a better understanding of the many barriers that must be overcome if the effort to solve the energy problem is to be successful.

There is a need to redefine the Bird & Son, inc. energy management program. The thrust of this memorandum is the proposal that energy matters, which obviously have a significant impact on the financial success of a highly energy-intensive company such as Bird & Son, inc., be accorded a higher level of priority within the Company, consequently warranting a higher degree of attention on the part of top corporate management.

29 October 1979

- 2 -

Energy matters, important as they may be to the financial success of Bird & Son, inc., will not receive the requisite level of attention on the part of division management if the energy management program is perceived as something sponsored solely by a single individual holding a subordinate position on the corporate headquarters staff. Division management looks to top corporate management for guidance in establishing its priorities on energy as on other matters.

In energy matters we have a choice between drift or mastery. An argument can be made in favor of either course of action. The most compelling argument favors seeking mastery. If this course is to be chosen, then:

- Appropriate changes should be made in operating procedures.
- This decision should be communicated to division management.
- We should proceed onward.

2. AN ESTIMATE OF THE ENERGY SUPPLY SITUATION DURING THE 1980's. The energy problem will not go away. The era of low-cost energy is a thing of the past. There is no risk that capital expenditures designed to reduce the cost of energy will be nullified at some time in the future by a return to low energy prices. The price of all forms of energy will continue escalating during the 1980's at a rate far exceeding the inflation rate. Thus, there is nothing to be gained by delaying capital investment in projects designed to reduce the cost of energy - but much to lose. Huge increases in the prices of energy since 1973 have not had the anticipated effect of arresting the continuing decline in hydrocarbon reserves within the United States.

The OPEC countries would be justified in viewing oil in the ground as a better investment than dollars invested in foreign countries. It is highly unlikely that the major OPEC nations will increase production levels solely to accommodate the requirements of oil-importing nations. In fact, the action in the spot market during 1979 has provided OPEC with the valuable intelligence that, in crude oil production, the beer advertising slogan "less-is-more", is applicable.

Revenues can be dramatically increased by simply curtailing production. Ample evidence has been supplied to indicate that any claimed "right" of OPEC nations to refuse to increase production from current levels will not be effectively challenged. Formulating an effective challenge would be an extremely difficult task due to the large number of nations in OPEC and the diversity of interests of the oil-importing nations. Nevertheless, if a challenge were indeed mounted, the outcome would be most uncertain. --

Working against the possibility of mounting a challenge against OPEC is the fact that there are many organizations in the United States and many non-OPEC countries who reap significant benefits from OPEC pricing actions. In brief, there will be no quick fix to the energy problem.

29 October 1979

- 3 -

The political climate in many third-world nations is such that capital is not likely to be invested in exploration and development inasmuch as the risk of expropriation is great for those few ventures that do prove successful.

Crude oil production in the United States peaked in 1970 at 9,636,000 barrels per day and declined to approximately 8,641,000 barrels per day during 1979, this despite the large volume of crude oil coming on stream from the Alaskan North Slope since 1970. Natural gas production in the United States peaked at 22.61 trillion cubic feet in 1973.

Reserves of both domestic crude oil and natural gas have continued to decline. The substantial increases in prices allowed domestic producers since 1973 have failed to arrest the downward trends in both production and reserves. Granted, domestic producers have not been allowed world prices for their products, nevertheless, they have enjoyed very substantial increases in prices computed in constant dollars over the prices in effect prior to the 1973-1974 Arab oil embargo. The low prices prior to 1973-1974 were apparently sufficient to command ever-increasing rates of production. With the substantially higher prices now in effect, both production and reserves continue to decline.

Since production levels continued to rise when prices were low and continue to fall when prices are high, it can be concluded that an underlying factor more fundamental than price is determining the production levels of conventional crude oil and natural gas.

There is no shortage of reasons to explain this anomaly. My study of reports covering oil exploration within the United States, coupled with the observation that exploration efforts are being made in some of the most inhospitable environments imaginable, leads me to conclude that the non-responsiveness of reserve-additions to price signals is due to the fact that there are, at best, only a very limited number of large fields waiting to be discovered within the continental United States.

Synthetic crude oil will not be produced in volumes sufficient to have an impact on the energy supply situation during the 1980's. The price at which shale oil is deemed competitive with crude oil continues to move ahead of the rapid increases in crude oil prices, much the same as does a never-reached horizon.

In the event the Soviet Union, presently the world's largest producer of crude oil, shifts from being a crude oil exporter to a crude oil importer during the latter part of the 1980's - a real possibility - then we will encounter a profound new dimension in the energy situation; a dimension with potentially troublesome implications.

The energy situation will continue to be a major problem during the 1980's. The following is a listing of areas on which the energy situation will have an adverse impact:

- Inflation rate
- Growth rate
- Unemployment rate

29 October 1979

- 4 -

- Standard-of-living
- National security
- Flexibility of foreign policy initiatives
- Balance-of-payments
- Relations with allies

The brief outline above is a conservative assessment of the energy situation.

3. THE NATIONAL RESPONSE TO THE ENERGY SITUATION IN AREAS MOST DIRECTLY IMPACTING ON BIRD & SON, inc. OPERATIONS. It has not been possible to get a consensus in the Congress behind legislation which would effectively meet the challenge of overcoming the energy problem. Instead, in the years since the Arab oil embargo of 1973-1974, the energy situation within the United States has progressively deteriorated.

Imports of crude oil and refined petroleum products now constitute a larger fraction of total petroleum consumption than at the time of the 1973-1974 embargo, this despite the fact that in the intervening years substantial oil flow has been realized from the Alaskan North Slope.

There has been continuous carping and criticism between all parties to this national debate. Perhaps we are realizing the best that can be achieved within the workings of the "democratic process", messy and unsatisfactory as the end result may be. In energy matters, the interval since 1973 could be termed as "the years the locust hath eaten."

The National Energy Act was enacted into law on 9 November 1978. The following is a listing of the five (5) individual laws constituting the National Energy Act:

<u>Title of Law</u>	<u>Public Law No.</u>
National Energy Conservation Policy Act	PL 95-619
Power Plant and Industrial Fuel Use Act of 1978	PL 95-620
Public Utility Regulatory Policies Act of 1978	PL 95-617
Natural Gas Policy Act of 1978	PL 95-621
Energy Tax Act of 1978	PL 95-618

Part of the National Energy Conservation Policy Act establishes an industrial energy conservation program applicable to large industrial energy users in selected SIC manufacturing areas. Bird & Son, inc. has been identified as one of the corporations required to participate in this program.

29 October 1979

- 5 -

A system mandating the submission of voluminous data covering the progress of each plant location and the corporation as a whole in meeting the conservation goals is presently being developed by the Department of Energy.

The Power Plant and Industrial Fuel Use Act of 1978 provides for requiring that new boilers at power plants and industrial major fuel burning installations which exceed a certain designated capacity (as defined in the regulations) be designed for firing with fuels other than petroleum or natural gas as the primary fuel. The statute also provides authority to require the conversion from petroleum or natural gas to another primary fuel of existing boilers at power plants and industrial major fuel burning installations which exceed designated capacity as defined in the regulations.

This legislation has the potential for impacting adversely on the Bird & Son, inc. power plant at East Walpole.

The Public Utility Regulatory Policies Act of 1978 has the potential for doing much mischief under the guise of requiring industry to pay its "fair share" of the cost of electricity. It may result in tariffs which effectively conceal from the public the true cost of electricity consumed.

The Natural Gas Policy Act of 1978 is commonly viewed as a statute that deregulates natural gas. The immediate effect of this act is that all natural gas, including intrastate natural gas which was not previously regulated, is now subject to Federal regulation. The legislation provides for "complete deregulation" by 1985, but even under "complete deregulation" some natural gas will continue to be regulated.

The Natural Gas Policy Act of 1978 must surely qualify as one of the most incredibly complicated pieces of legislation ever enacted into law. The law itself is simplicity when compared to the voluminous implementing regulations which have been crafted with most meticulous attention to detail. This act and the associated implementing regulations are truly mind-boggling.

The effect of this law on Bird & Son, inc. will be to increase the price of natural gas via the mechanism provided in Title II for imposing incremental pricing surcharges on natural gas consumed by non-exempt industrial users supplied by the interstate system. The law may inadvertently serve to reduce the volume of gas available to industry located in the gas-producing states.

The Energy Tax Act of 1978 purports, in part, to offer tax incentives to industry to encourage industry to invest in certain categories of energy property. The energy tax credit is a puny 10% and, as such, is hardly likely to stimulate investment in energy conservation property for the primary purpose of conserving energy. It will be claimed on those projects which would have been executed regardless of the so-called "incentives" in the Energy Tax Act of 1978.

29 October 1979

- 6 -

4. THE RESPONSE OF BIRD & SON, inc. TO THE ENERGY SITUATION. It is axiomatic that for a corporate energy management program to be most successful it must enjoy the support of top management; and that support must be effectively communicated to division management. This support has not been provided within Bird & Son, inc.

I am aware that there are many factors - almost all of which I am not privy to - that top management must integrate into the decision-making process in order to establish corporate priorities. However, during the past five (5) years energy has not even been accorded the status of one of the many factors that is evaluated in the decision-making process. At least I have not perceived so much as a hint of an indication that energy was at any time so considered.

Resistance has been encountered in regard to implementing some very cost-effective recommendations that could have a significant impact on plant profitability while requiring only a modest capital expenditure, a modest increase in operating skills, and a modest increase in expenditure of effort by supervisory management personnel. There has been encountered what could best be described as a cavalier attitude towards massive and obvious waste of energy in the manufacturing process. The attitude displayed is that as long as the mill is profitable it need not concern itself with energy waste.

The first encounter with such a negative attitude towards energy is baffling. However, further analysis of all the relevant circumstances allows this attitude to be viewed from a different perspective. Division management does not consider - mild rhetoric to the contrary notwithstanding - that it shares any responsibility for contributing to the solution of the nation's energy problem, but, rather, that its responsibilities are discharged by producing the top quality products demanded by the market and by earning a favorable return on invested capital in doing so.

It would be uncharitable not to accord some sympathy toward this attitude when it is realized that the payroll is met, not with funds saved on energy consumption, but with revenues realized through product sales. The position implicit in this attitude is that the solution to the energy problem is in the direction of increasing supply and, therefore, the responsibility rests elsewhere.

To the novice in energy management it would appear that the high prices of energy, coupled with the rapid escalation in energy prices in the future, would yield a very high return on investment for many energy projects. Therefore, it would appear that all that is required is that such projects be identified to division management, and once brought to the attention of division management, the energy projects will sell themselves. But this is not so.

Funds to purchase energy are easy to get and can be expensed. The competition is exposed to the same high energy prices, thus, energy costs are not considered as adversely impacting on the competitive position of the mill in its geographic location. It is assumed that the higher costs so incurred will be recovered through higher prices. All is well if this is how the scenario unfolds.

29 October 1979

- 7 -

Funds for projects designed to reduce the future cost of energy must compete with other projects in the capital budgeting process, and after being expended, must be depreciated. Energy projects suffer in the competition for capital funds - assuming such projects are even entered into the competition - for the very reason that they are amenable to a detailed calculation of return on investment.

These projects receive short shrift in "competing" with projects not burdened with a detailed return on investment calculation, but briefly justified on the basis that the project will:

- Increase production.
- Permit production of a new product.
- Protect against the possibility of unschedule downtime.
- Promote safety.
- Satisfy the requirements of law enforcement agencies.

It is understandable that many vital projects can be processed through the budgeting system without benefit of a detailed return on investment calculation. The justification for such projects can be intuitively felt. However, this cannot explain the almost automatic rejection syndrome encountered by energy projects with highly favorable return on investment rates.

It is my opinion, based on observation, that significant capital expenditures are made on projects that could only have been justified on the basis that an increase in productive capacity would be realized thereby, but that in reality have an impact on productive capability that is only tenuous at best. Energy projects are rejected in favor of obviously non-productive projects that can only be justified on the basis that they are considered as providing convenience or comfort for personnel.

Energy projects suffer from a feminine image associated with a narrow perception of energy projects as limited for "energy conservation". Conservation projects an image of scarcity, wanting and weakness. This makes it difficult, if not impossible, for energy projects to compete with the masculine image projected by almost any project, of whatever intrinsic worth, that ostensibly promises to increase productive capabilities.

A cavalier attitude towards energy effectively dismisses a vital area of management responsibility; an area that could very well be most demanding of management skills. To a great extent, generous applications of energy are often a substitute for modest applications of management skills. It is my opinion, based on five (5) years involvement in this area, that these are valid perceptions of one of the most difficult-to-surmount barriers standing in the way of the solution to the energy problem.

29 October 1979

- 8 -

5. THE RATIONALE IN SUPPORT OF A POSITIVE RESPONSE BY BIRD & SON, inc. TO THE ENERGY SITUATION. The temptation to expound on the many altruistic reasons for making a positive response to the energy situation can not be resisted. It would be easy to write a long dissertation on the subject. However, a brief commentary will suffice for the present purposes.

Unfortunately, the true costs of marginal supplies of energy remain effectively concealed via the mechanism of "rolled-in" pricing. For example, crude oil has recently (fourth week of October 1979) commanded prices as high as \$50.00 per barrel on the spot market. This high-priced oil is purchased by a supplier who must have it to supply his customers. However, none of his customers will pay anywhere near \$50.00 per barrel for the oil. The cost of this high-priced oil merely raises the average unit cost of the supplier's inventory which, in turn, is passed on to all purchasers via slightly higher prices. However, a price signal has been given to OPEC as to what the market will bear and as to how desperately willing oil-importing countries are to pay just about any imaginable price for petroleum.

It is only a matter of months before contract prices for crude oil move towards the heights previously commanded by spot prices which, in the meantime, have moved on to even greater heights.

The energy situation has an adverse impact on the nation's: (1) inflation rate, (2) growth rate, (3) unemployment rate, (4) standard-of-living, (5) balance of payments, and (6) national security.

The cost to the nation's economy imposed by all these factors is huge. If these costs were allocated to the marginal supplies of energy demanded - demanded because the nation refuses to conserve - then the true cost per barrel for the last 2,000,000 to 3,000,000 barrels per day that could be eliminated from imports via conservation is not the \$23.50 per barrel recent contract price, but more likely in excess of \$100.00 per barrel.

Everyone "deploras" this situation; righteous rhetoric fills the air, blame-laying is in season, scapegoats are sought, some profit handsomely, while the rest hope that everyone else will take the necessary action to rectify the situation. Eventually, something will be done, and the instrument of action may be the heavy hand of the Federal government intruding ever further into the affairs of individual citizens and industry.

Bird & Son, inc. can justify a positive response to the energy situation on the basis of direct corporate self-interest. Energy projects designed to reduce the cost of energy offer one of the very best investment opportunities available to industry. In many cases these projects involve nothing more than the straight-forward application of long-established technology.

The projects presented have a high rate of return on investment, even when calculated on the conservative (but unrealistic) assumption that energy prices will remain constant over the entire asset depreciation period of the project. But energy prices will not remain constant, nor will the increase in energy prices merely parallel the general background inflation rate.

29 October 1979

- 9 -

The fact that energy prices during the 1980's will rapidly escalate at rates far in excess of the background inflation rate can be taken as one of the fixed beacons for charting a course through the energy problem during the 1980's. Energy prices will even escalate at a higher rate than the inflation in cost of capital projects designed to reduce the cost of energy.

In general, these points are stipulated, thus, it is not considered necessary to develop even a brief dissertation in support of the statement underlined above. For this reason, the actual return on investment rate will be far higher than the already high, but significantly understated, return on investment rate using conservative accounting procedures.

As an example, Central Engineering is in the latter stages of a study project covering a proposal to install a roofing mill waste incinerator with heat recovery, in the form of steam generated to meet all the requirements of the Norwood Roofing Mill. The installed cost of the complete system was calculated to be approximately \$2,540,000 as of April 1979. This installation would permit an annual reduction in consumption of No.6 fuel oil at Norwood of approximately 1,200,000 gallons.

The price of No.6 fuel oil at Norwood has increased from \$.341466 per gallon during December 1978 to \$.551067 per gallon during September 1979. The price of No.6 fuel oil at Norwood has increased at an annual rate of approximately 82%. It can be anticipated that the cost of No.6 fuel oil at Norwood during the latter part of the 1980's will be in the neighborhood of \$2.00 per gallon. Thus, this installation could yield a reduction in cost of energy in excess of \$2,400,000 per year during the latter part of the 1980's - or perhaps sooner.

It may be held that the huge increase in the price of No.6 fuel oil during 1979 was unusual and that crude oil prices will stabilize in the future. This is wishful thinking, and a prudent energy management program would not accord any merit to such a contention.

The vulnerability to interruptions in production resulting from curtailments or reduced allocations of conventional fuels (natural gas and petroleum) would be eliminated if Bird & Son, inc. plants had the capability to burn other fuels such as coal, roofing mill waste, or self-produced synthetic gas manufactured on the premises from coal.

The continued increase in the prices of refined petroleum products means that the absolute value of the spread between the price of No.2 fuel oil and No.6 fuel oil will double with every doubling of fuel prices. This being the case, the magnitude of the annual reduction in cost of fuel that can be realized by shifting from No.2/No.4 fuel oil to No.6 fuel oil will continue to increase as fuel prices increase.

It should be noted that shifting from No.2/No.4 fuel oil to No.6 fuel oil at current fuel oil prices requires a capital investment that yields a very substantial reduction in costs and at a payout time measured in a few months rather than several years.

29 October 1979

- 10 -

6. THE ESSENTIAL ELEMENTS OF A BIRD & SON, inc. ENERGY MANAGEMENT PROGRAM FOR THE 1980's

- a. Plant Energy Surveys. The program in effect since October 1974 of having one or two mills simultaneously the subject of a comprehensive energy survey should be continued. The surveys consist of on-site work, with data analysis and report preparation completed at East Walpole
- b. Conversion From No.2/No.4 Fuel Oil to No.6 Fuel Oil. All apparatus that has a firebox configuration and tube spacing that permits burning No.6 fuel oil should be converted to No.6 fuel oil without delay. It is an absolute absurdity for large industrial fuel burning apparatus, such as that operated by Bird & Son, inc., to continue to pay the substantially higher prices commanded by premium fuels such as No.2/No.4 fuel oil and diesel fuel. These premium fuels should be burned in home heating units or in precision built diesel engines. Burning premium fuels in industrial apparatus capable of burning No.6 fuel oil is a luxury that can no longer be afforded. This practice should no longer be tolerated.

The Federal Energy Regulatory Commission received comments in rule-making proceedings carried out in Docket No. RM 79-21 covering the three-tier approach for incremental pricing of natural gas. The state of Louisiana commented to the Commission that in Louisiana large industrial boilers equipped to burn No.6 fuel oil outnumber by more than three to one boilers that are equipped to burn No.2 fuel oil (FR Vol.44, No.195, Friday, 5 October 1979, page 57756, right hand column). The boilers at Shreveport are large industrial boilers. The example of the large majority of operators of industrial boilers in Louisiana is further evidence of the merit of the recommendation to shift to No.6 fuel oil at Shreveport.

The Shreveport Roofing and Felt Mill consumed approximately one-half of one percent of all the industrial distillate fuel consumed in the states of Arkansas, Louisiana, Mississippi, New Mexico and Texas during 1977. The 1979 level of fuel oil consumption at Shreveport is very close to that of 1977. This would make Bird & Son, inc. one of the largest industrial users of distillate fuel oil in Louisiana.

It is conservatively estimated that a reduction in the cost of boiler fuel oil of approximately \$400,000 per year could be realized at Shreveport simply by making a modest capital investment of approximately \$160,000 to permit No.6 fuel oil to be burned.

Most of the distillate fuel oil consumed by Bird & Son, inc. is burned at Shreveport. This is the reason that emphasis has been placed on the great cost reduction opportunity at Shreveport that can be realized by shifting from No.2/No.4 fuel oil to No.6 fuel oil. Additional information regarding this matter at Shreveport is outlined in reference (b), a copy of which is attached as Enclosure (2).

29 October 1979

- 11 -

Conversion to No.6 fuel oil should be implemented at all other locations where the volumes of fuel oil burned warrant the necessary capital investment. Getting off distillate oil as the alternate fuel to natural gas will result in significantly reducing the incremental pricing surcharges that will be imposed when the three-tier incremental pricing system goes into effect on 1 November 1980.

There are ample reasons to justify according a high priority to the recommendation to get off distillate oil to the greatest extent possible - and as soon as possible.

- c. Product Design. The price of asphalt during the 1980's will continue to escalate at the same rate as other petroleum products. This will result in a continuing increase in the magnitude of the cost differential incurred in producing a ton of organic felt-based shingles versus a ton of glass mat-based shingles. This increasing cost differential may erode the competitive position and profitability of the organic felt-based shingle.

This comment is offered somewhat tentatively inasmuch as I am not privy to any available data covering the intrinsic merit, or lack thereof, of the glass mat-based shingle. The point of this sub-paragraph is to invite attention to the impact of the energy situation on the relative profitability of these two types of asphalt shingle - on the assumption that both types are of equal intrinsic merit and are equally acceptable in the market place.

- d. Asphalt Management. Asphalt is energy consumed as "feed stock" in the manufacture of roofing products. For this reason, asphalt management is considered an element of the Bird & Son, inc. energy management program. Petroleum-based hydrocarbons consumed as "feed stock" will be subjected to the same rapid escalation of prices during the 1980's as hydrocarbons consumed for their energy value.

The manufacturing operations of Bird & Son, inc. are highly energy-intensive. However, the value of hydrocarbons consumed as asphalt is more than twice as great as all the fuel and electrical power consumed by Bird & Son, inc. in all manufacturing operations. There is a significant potential for cost reduction in more effective management of asphalt resources.

A study is presently in progress to determine the economic feasibility of installing asphalt blowing facilities at selected roofing mills. The price differentials between raw flux and refined asphalt products, combined with asphalt consumption levels at the Pacific Division roofing mills, tentatively indicate that asphalt blowing facilities would be an extremely profitable investment at two or perhaps all of our Pacific Division plants.

The technology of blowing asphalt is long-standing and there should be no difficulty in introducing this equipment at these plants. There might also be the collateral benefit of exercising more effective quality control of the refined asphalt products going into the manufacturing process.

29 October 1979

- 12 -

e. Waste Management

- 1) Roofing mill dry waste incineration with heat recovery and raw material recycling. As a rough estimate, approximately 100,000 tons of roofing mill dry waste was generated by Bird & Son, inc. roofing mills during 1978. The gross heating value of this waste material is estimated to be approximately 1,400,000 million btus. Assigning a conservative value of \$3.00 per million btus yields the result that the presently unrecovered fuel value of the waste now disposed of to landfill is approximately \$4,200,000 per year. The value of the granules that can be recovered for recycling as base granules is approximately \$950,000 per year. In brief, the total potential value of the resources that could be recovered is in excess of \$5,000,000 per year at 1979 prices.

It is recognized that recovery of 100% of the waste generated is not likely to be economically feasible. However, installation of a fluid bed roofing mill waste incinerator with heat recovery and raw material recycling capability at each of our largest plants would permit the recovery of most of the value that is now being disposed of to landfill sites.

- 2) Burning of condensate oil in lieu of disposal as waste. At some locations condensate oil generated in the asphalt blowing process is collected and sold as waste for a paltry fraction of the fuel value of this material. At other locations the condensate is successfully burned in lieu of fuel oil to supply part of the plant's energy requirements.

All condensate oil should be utilized on the premises to displace part of the purchased fuel oil required.

- f. Coal Capability. The installation of fluid bed combustors for incineration of roofing mill waste as outlined in sub-paragraph 6.e above will provide these locations with a coal burning capability.

The rapid increases in the prices of fuel oil and natural gas during the 1980's will work to make the burning of coal in states such as Ohio an option that will warrant careful consideration. A planning and research effort should be initiated in this area.

- g. Industrial Coal Gasification. A planning and research effort should be initiated in order to acquire the necessary background information essential in making a determination of the economic feasibility of installing facilities for the production of medium btu gas from coal feed stock at such locations where all the relevant factors combine to make this option cost-effective.

29 October 1979

- 13 -

- h. Capital Budgeting. The Energy Manager and Central Engineering Department should be assigned an active role in the capital budgeting process. This role should include participation in the decision-making process leading to the selection of those projects selected for capital funding. This proposal will most likely be held anathema in those quarters in which this decision-making authority is now concentrated. Be that as it may, this proposal merits consideration.

The Central Engineering Department is the sole depository within the company of a unique body of in-depth knowledge covering the machinery configuration at each of our manufacturing facilities. The information should be brought to bear in the capital budget decision-making process to improve the probability that of all the capital projects considered, only the most cost-effective are rewarded with funding.

It is very possible that information available in the Central Engineering Department could, if it were authorized to enter into the decision-making process, alter significantly the priorities assigned to some capital projects that otherwise would win funding. Central Engineering participation in the decision-making process should be looked upon as a useful check on the system.

In the matter of energy management, it is essential that the Energy Manager be brought into the decision-making process for preparing the capital budget. Energy considerations have far too great an impact on the profitability of operations to be ignored at the time the capital budget is prepared.

- i. Providing Input to the Law-Making Process. There are situations wherein trade associations cannot come to a consensus on pending legislation due to conflicting interests of the association's constituent members. At other times, the association's position may reflect the views of dominant members. For these and other reasons, trade associations may take no position or a position adverse to the interests of Bird & Son, inc.

It is suggested that Bird & Son, inc. develop a position on a limited number of energy-related issues and that our position be communicated to the appropriate committees of the Congress or the appropriate agency within the Executive Branch. The government will always yield on a particular issue if sufficient pressure is brought to bear. We should do our part in applying this pressure and thereby become more directly involved in shaping the laws and regulations affecting the economy.

Our involvement should not be limited to the merely passive role of determining what laws we must comply with and how such compliance is to be effected. The resources that can be allocated to this task are limited, but an effort should nevertheless be made. We should consider it our duty to do so.

JPH/dv

J. P. HRATKO
Energy Manager

ENERGY MANAGEMENT AT BIRD & SON, inc.

29 October 1979

- 14 -

- Enclosures (1) J. P. Hratko memorandum to G. L. Dusty, dated 19 October 1979,
Subject: BIRD & SON, inc. ENERGY MANAGEMENT PROGRAM
- (2) J. P. Hratko memorandum to G. L. Dusty, dated 24 October 1979,
Subject: ENERGY SURVEY - SHREVEPORT

MEMORANDUM



To G. L. Dusty - BE

From J. P. Hratko - BE

Date 19 October 1979

Subject BIRD & SON, Inc: ENERGY MANAGEMENT PROGRAM

1. SCOPE OF DUTIES: The following is a listing of the primary objectives of the energy management program:

- a. Cost reduction
- b. Compliance with rules and regulations
- c. Data collection
- d. Keeping current on energy related technology
- e. Keeping current on the energy situation

More detailed information on the approach taken with regard to each of the above categories is set forth in the paragraphs that follow.

2. COST REDUCTION: The following areas are covered within this category:

- a. Energy Conservation Comprehensive energy surveys are conducted and detailed reports prepared recommending cost-effective action to be taken to reduce the energy consumed per unit of production.

The Energy Manager devotes approximately forty (40) days of on-site work at each location surveyed. This on-site work provides an opportunity to become familiar with the piping systems and machinery layout at each location.

Sketch notes are recorded which are later converted into drawings which serve as useful reference material in the development of the energy survey report. Various tests and measurements are made during the on-site work periods. The operating configuration of the plant is observed both on operating days and non-operating days. The on-site work periods provide a valuable opportunity to be exposed to the expertise at each manufacturing location.

The bulk of the work involved in completing an energy survey is conducted at East Walpole.

BIRD & SON, inc. ENERGY MANAGEMENT PROGRAM

19 October 1979

- 2 -

The energy survey is not limited solely to energy conservation, but rather to reduction in energy consumed per unit of production. Thus, factors that are not directly energy related, but which can have an impact on the specific energy consumption level (BTUS/TON - KWH/TON) are evaluated and considered in the energy survey.

- b. Reduction in Cost of Energy This part of the cost reduction effort is based on continuous monthly monitoring of fuel prices and consumption at each Bird & Son, inc. manufacturing facility. Reports are prepared recommending the shift to another fuel if an analysis of the situation indicates this to be a cost-effective move.

The possible incineration of roofing mill waste with heat and raw material recovery is being considered as a means of reducing costs through energy management.

Review and analysis of the rate schedules covering electrical power supplied at each plant location is a part of this effort.

There is an on-going effort to persuade division management to shift from expensive - but convenient to burn - No.2 distillate fuel oil to lower cost - but more difficult to burn - No.6 residual fuel oil. This change will eventually come to pass, but not soon enough to maximize the substantial savings in energy costs that can be realized. It will be necessary to expend more effort towards overcoming the reluctance to burn No.6 fuel oil.

- c. Reduction in the Cost of Hydrocarbons (Asphalt) Consumed as "Feed Stock" in the Manufacturing Process This part of the cost reduction effort reviews the usage of hydrocarbons as a component of the raw material input to the manufacturing process.

Asphalt prices are continuously monitored on a monthly basis. The data are analyzed and recommendations are developed, when deemed cost-effective, to make capital improvements which will result in a reduced cost of energy purchased in the form of hydrocarbons (asphalt) consumed as "feed stock" in the manufacturing process.

3. COMPLIANCE WITH RULES AND REGULATIONS: The following laws constitute THE NATIONAL ENERGY ACT passed into law in late 1978:

<u>Title of Law</u>	<u>Public Law No.</u>
National Energy Conservation Policy Act	PL 95-619
Powerplant and Industrial Fuel Use Act of 1978	PL 95-620
Public Utility Regulatory Policies Act of 1978	PL 95-617

BIRD & SON, inc. ENERGY MANAGEMENT PROGRAM

19 October 1979

- 3 -

Natural Gas Policy Act of 1978

PL 95-621

Energy Tax Act of 1978

PL 95-618

These laws are now in various stages of implementation. Federal rules and regulations are being promulgated, many now in final form.

It is essential to stay current with the laws and regulations - not just for the purpose of determining action required to be in compliance with the law - but in order to develop recommendations for action that can be taken to minimize the adverse financial impact of the regulations.

Bird & Son, inc. consumes more than one (1) trillion btus per year in each of two (2) manufacturing classifications (SIC-26, SIC-29) for which energy conservation goals have been established by Federal government. Therefore, Bird & Son, inc. is identified as one of the companies required to participate in this program and to make periodic reports on progress made in reaching the goals.

It is anticipated that in the near future the task of determining action required to comply with the regulations, and of preparing reports in response to the regulations, will demand an ever-increasing amount of time.

4. DATA COLLECTION: Work in this area permits the Energy Manager to have a readily available data base that can be quickly employed in response to a current need. Development of energy consumption and production data supplies a data base for developing specific energy consumption data (btus/ton) or (kwh/ton).

All internal Bird & Son, inc. data are compiled from existing sources (i.e., there are no requirements that the divisions compile and submit data specifically in support of the energy management program).

Data are collected for other than Bird & Son, inc. operations where it is considered these data are useful in evaluating the energy situation in any part of the United States. These data are in the form of periodic reports issued by the Department of Energy and other sources.

5. KEEPING CURRENT ON ENERGY RELATED TECHNOLOGY: There is a vast amount of information available from a great many sources covering the state of the art technology relating to energy matters. In addition, an attempt is made to acquire information on process technology in those areas having the potential for a significant indirect effect on the efficiency with which energy is utilized in manufacturing.

A small part of each working day must be allocated to reviewing journals and other publications for the purpose of selecting those materials that will be studied in-depth at a later time.

19 October 1979

- 4 -

6. KEEPING CURRENT ON THE ENERGY SITUATION: This area covers non-technology matters. It requires staying current on energy related legislation being considered by the Congress and on plans and policies being developed by the Administration on energy matters.

This task requires allocating a small part of each working day in reviewing the news of the day (or week) to determine the impact of current events on the energy situation.

7. ENERGY IN THE FUTURE: Volumes could, and have been, written on this subject. I will be brief. It is my considered judgement - based on extensive review of a large number of comprehensive reports on this subject prepared by authoritative sources - that energy will continue to be a major problem during the 1980's. The energy problem is not going to go away:

Higher prices will not solve the energy problem.

The prognosis for increased crude oil production in the United States is not favorable.

The political situation in many countries in the world is such that capital is unlikely to be invested in exploration and development when the risk of expropriation is great for those ventures that prove successful.

Energy supplies will be tight throughout the 1980's.

Prices will continue to move higher at a rate exceeding the inflation rate.

8. RECOMMENDATIONS:

- a. Corporate Commitment It is axiomatic that any corporate energy management program must enjoy top level support and commitment if it is to be most successful. This support and commitment must be communicated via those channels that division management views as representing most unambiguously and most forcefully the wishes of top management. It is unlikely that any division manager will take any action that will have the effect of putting him out in front of top corporate management on energy matters.
- b. Capital Budgeting The Energy Manager and Central Engineering should have an opportunity to provide meaningful and timely input in the preparation of capital budgets. This input should be provided throughout the entire budgeting period. By input, I refer to nothing more than being granted an opportunity to provide constructive suggestions on the most effective deployment of capital resources at those facilities that have been subjected to a comprehensive energy survey.

BIRD & SON, inc. ENERGY MANAGEMENT PROGRAM

19 October 1979

- 5 -

- c. The Impact of Energy on Strategic Planning The long-range planning process should provide for consideration of the impact of energy on action planned.
- d. Public Affairs Bird & Son, inc. should make its views known on energy matters during the law-making stage in Congress and in the development of rules and regulations by the cognizant enforcement agencies of the Federal government.

We should do our part in the never-ending task of persuading the government to be responsive to the needs of industry. The resources that can be devoted to this task are limited, but we should, out of a sense of duty, find the time and will to make a direct contribution to the law making process.

9. PENDING PROJECTS: Enclosure (1) is a list of non-administrative projects that I am currently involved with.

J. P. HRATKO

JPH/dv

Enclosure (1) PENDING PROJECTS - J. P. HRATKO - 19 October 1979

Name: J. P. HRATKO

Date: 19 October 1979

PROJECTS PENDING

<u>Project Title Designation</u>	<u>Who is Working on Project</u>	<u>Man Weeks to Completion</u>	<u>Comments</u>
ECONOMIC EVALUATION OF INSTALLING ASPHALT BLOWING FACILITIES AT PACIFIC DIV. ROOFING MILLS	J. P. HRATKO	4	
ENERGY CONSERVATION SURVEY - FRANKLIN ROOFING & FELT MILL	J. P. HRATKO	26	
ENERGY CONSERVATION SURVEY - CHICAGO FELT MILL	J. P. HRATKO	26	
ENERGY CONSERVATION SURVEY - EAST WALPOLE PAPERBOARD MILL	J. P. HRATKO	26	
FLUID BED INCINERATION WITH HEAT & GRANULE RECOVERY AT NORWOOD ROOFING MILL	P. BARRA J. P. HRATKO		
REPORT ON ASPHALT BLOWING AT FRANKLIN ROOFING MILL	J. P. HRATKO	2	

MEMORANDUM



To G. L. Dusty - BE
From J. P. Hratko - BE
Date 24 October 1979
Subject

ENERGY SURVEY - SHREVEPORT

Reference (a) SHREVEPORT ENERGY CONSERVATION SURVEY REPORT, dated
 24 July 1978

(b) SHREVEPORT FELT MILL - REPORT RECOMMENDING THE INSTALLATION
 OF RECIPROCATING VALVES ON THE THREE (3) DEFIBRATOR BLOW
 LINES, dated 28 April 1979

1. **SUMMARY:** The following data are extracted from section 2.1 of reference (a) covering fuel cost reduction and energy conservation that can be realized at Shreveport if the recommendations set forth in reference (a) were implemented:

Total annual reduction in cost of fuel that can be realized	\$1,126,505.93
Annual reduction in cost of fuel that can be realized by shifting from No.6 fuel oil to No.2 fuel oil	\$ 270,132.34
Annual reduction in cost of fuel that can be realized by burning condensate oil	\$ 24,622.82
Annual reduction in cost of fuel that can be realized through conservation of energy	\$ 831,750.27
Total cost of fuel and electrical power consumed during the twelve (12) month period from 1 June 1977 through 31 May 1978	\$3,012,788.53
Total annual reduction in btus supplied by fuel that can be realized due to conservation	389601410500 Btus
Total annual btus supplied by fuel during the 18-month period from 1 July 1975 through 31 December 1976	1175106325000 Btus
Percentage reduction in total heat energy that can be realized at Shreveport due to conservation	33.15%
Total energy consumed by Bird & Son, inc. (including Bird Machine Co.) during 1975	5404491900000 Btus.
Percentage reduction in total energy consumed by Bird & Son, inc. that can be realized by implementing all energy conservation recommendations at Shreveport	7.21%

ENERGY SURVEY - SHREVEPORT

24 October 1979

- 2 -

It was estimated in reference (a) that the capital cost of implementing all the recommendations would be approximately \$1,500,00.00. As of this date, no action has been taken to implement any of the recommendations set forth in reference (a) and (b).

2. UTILIZATION OF NO.4 FUEL OIL AT SHREVEPORT: Starting in October 1978, Shreveport has replaced some of the No.2 fuel oil requirement with No.4 fuel oil. Apparently No.4 fuel oil is not always available in the volumes required.

The following table, based on a review of the invoice file at Corporate Headquarters, sets forth fuel oil purchases at Shreveport during the three-month period July through September 1979:

<u>Item</u>	<u>Volume (Gals)</u>	<u>Cost</u>	<u>Avg Price \$/Gal</u>
No.2 fuel oil	289000	\$167,620.00	\$.58
No.4 fuel oil	273750	144,037.00	.526
Total fuel oil	562750	\$311,657.00	\$.5538

The pricing spread between No.2 and No.4 fuel oil indicates that the No.4 fuel oil (48.65% of total fuel oil received) is a mixture in which the greater part is No.2 fuel oil. This factor, combined with the fact that No.2 fuel oil was 51.35% of total fuel oil received, indicates that, for all practical purposes, Shreveport essentially continues to burn No.2 fuel oil as an alternate to natural gas.

The final rule on incremental pricing of natural gas consumed as boiler fuel was published in the Federal Register on 5 October 1979. Under the three-tier incremental pricing rule promulgated in FERC Order No.50, a non-exempt industrial user whose alternate fuel capability is No.4 fuel oil will be incrementally priced at the No.2 fuel oil level when the three-tier pricing system goes into effect on 1 November 1980. This is a further indication of the fact that No.4 fuel oil is in large part made up of No.2 fuel oil.

According to computer printout APO-550-30 dated 2 October 1979, Shreveport consumed 1,864,459 gallons of fuel oil during the first nine (9) months of 1979. This indicates that Shreveport will consume approximately 2,500,000 gallons of fuel oil during 1979.

The potential for realizing a significant reduction in cost of fuel at Shreveport by shifting from No.2 fuel oil to No.6 fuel oil as recommended in section 4.1 of reference (a) is not being realized.

3. NORWOOD ROOFING MILL DATA: Enclosure (1), NORWOOD ROOFING MILL AND GRANULE PLANT - ENERGY CONSUMPTION AND PRODUCTION DATA FOR THE YEARS 1975 AND 1978, indicates on line 20 a value of 1,553,788 btus/ton for the specific heat energy consumption of roofing produced during 1978.

ENERGY SURVEY - SHREVEPORT

24 October 1979

- 3 -

4. SPECIFIC ENERGY CONSUMPTION (BTUS/TON) AT SHREVEPORT DURING 1978: The following data are extracted from Enclosure (2) covering specific energy consumption (btus/ton) at selected roofing mills during 1978:

<u>Location</u>	<u>Btus/Ton</u>	<u>Does Facility Blow Asphalt</u>	<u>Production of Granules Included in Total Heat Input Used in Calculations</u>
			<u>Tons</u>
Shreveport	2293386	Yes	None
Norwood	1553788	Yes	None
Perth Amboy	1745266	No	None
Portland	1631217	No	None
Martinez	1545147	No	None
Charleston	1470403	Yes	71439 Tons
Chicago	1450938	No	None

The specific heat consumption required to produce a ton of roofing was 47.6% higher at Shreveport as compared to Norwood. This is despite the fact that Shreveport enjoys a higher annual average ambient temperature than does Norwood.

A significant reduction in the cost of energy at Shreveport can be realized by implementing the cost-effective recommendations set forth in references (a) and (b).

J. P. HRATKO

JPH/dv

- Enclosures (1) NORWOOD ROOFING MILL AND GRANULE PLANT - ENERGY CONSUMPTION AND PRODUCTION DATA FOR THE YEARS 1975 AND 1978
- (2) SPECIFIC HEAT ENERGY CONSUMPTION (BTUS/TON) AT ROOFING AND FELT MILLS DURING 1978

NORWOOD ROOFING MILL AND GRANULE PLANT-ENERGY CONSUMPTION AND PRODUCTION DATA FOR THE YEARS 1975 AND 1978						
LINE NO.	SUB-PARAGRAPH	ITEM	YEAR		SOURCE OF DATA	
			1975	1978		
1	ROOFING MILL	TOTAL FUEL CONSUMED	NO.6 FUEL OIL	2327343 GALS.	2324882 GALS.	FBGA
2		NO.2 FUEL OIL	---	37591 GALS.	REFER TO NOTE ON LINE 36	
3		PROPANE	58359 GALS.	81792 GALS.	LINE 37	
4		NATURAL GAS	7726712 CU FT	7881160 CU FT	LINE 38	
5		GASOLINE		2936.7 GALS.	LINE 39	
6		GROSS HEATING VALUE OF FUEL	NO.6 FUEL OIL	146800 $\frac{\text{BTUS}}{\text{GAL}}$	146800 $\frac{\text{BTUS}}{\text{GAL}}$	LINE 40
7			NO.2 FUEL OIL	136856 $\frac{\text{BTUS}}{\text{GAL}}$	136856 $\frac{\text{BTUS}}{\text{GAL}}$	REFER TO NOTE ON LINE 42
8			PROPANE	91614 $\frac{\text{BTUS}}{\text{GAL}}$	91614 $\frac{\text{BTUS}}{\text{GAL}}$	REFER TO NOTE ON LINE 43
9			NATURAL GAS	1031 $\frac{\text{BTUS}}{\text{CU FT}}$	1031 $\frac{\text{BTUS}}{\text{CU FT}}$	REFER TO NOTE ON LINE 44
10			GASOLINE	124952 $\frac{\text{BTUS}}{\text{GAL}}$	124952 $\frac{\text{BTUS}}{\text{GAL}}$	REFER TO NOTE ON LINE 44
11		TOTAL BTUS SUPPLIED BY FUEL	NO.6 FUEL OIL	341653950000 BTUS	341292670000 BTUS	line 1 x line 6
12			NO.2 FUEL OIL	---	5144553800 BTUS	line 2 x line 7
13			PROPANE	5346501400 BTUS	7493292200 BTUS	line 3 x line 8
14			NATURAL GAS	7966240000 BTUS	8125475900 BTUS	line 4 x line 9
15			GASOLINE		366946530 BTUS	line 5 x line 10
16			TOTAL BTUS SUPPLIED BY FUEL	354966690000 BTUS	362055960000 BTUS	line 11+ line 12+ line 13+ line 14+ line 15
17		SPECIFIC ENERGY REQUIRED PER TON OF PRODUCTION	TOTAL ELECTRICAL POWER CONSUMED	6844270 KWH	9622000 KWH	FBGA
18			TOTAL FINISHED PRODUCTION	189227 TONS	233015 TONS	FBGA
19			ELECTRICAL POWER REQUIRED PER TON OF PRODUCTION	$\frac{\text{KWH}}{\text{TON}}$ 36.17	$\frac{\text{KWH}}{\text{TON}}$ 41.29	line 17 + line 18
20			BTUS FROM FUEL REQUIRED PER TON OF PRODUCTION	$\frac{\text{BTUS}}{\text{TON}}$ 1875878	$\frac{\text{BTUS}}{\text{TON}}$ 1553788	line 16 + line 18

NORWOOD ROOFING MILL AND GRANULE PLANT-ENERGY CONSUMPTION AND PRODUCTION DATA FOR THE YEARS 1975 AND 1978						
LINE NO.	SUB-PARAGRAPH	ITEM	YEAR		SOURCE OF DATA	
			1975	1978		
21	GRANULE PLANT	TOTAL FUEL CONSUMED	NO.2 FUEL OIL	403043 GALS	576331 GALS	FBGA
22			NATURAL GAS	157688 CU FT	160840 CU FT	FBGA
23		TOTAL BTUS SUPPLIED BY FUEL	NO.2 FUEL OIL	55158852000 BTUS	78874355000 BTUS	line 7 x line 21
24			NATURAL GAS	162576320 BTUS	165665200 BTUS	line 9 x line 22
25			TOTAL BTUS SUPPLIED BY FUEL	55321428000 BTUS	79040020000 BTUS	line 23 + line 24
26		SPECIFIC ENERGY REQUIRED PER TON OF PRODUCTION	TOTAL ELECTRICAL POWER CONSUMED	1834000 KWH	2925800 KWH	FBGA
27			BASE GRANULES PRODUCED	38981 TONS	47266 TONS	FBGA
28			COLORLED GRANULES PRODUCED	35021 TONS	39723 TONS	FBGA
29			TOTAL GRANULES PRODUCED	74002 TONS	86989 TONS	line 27 + line 28
30			ELECTRICAL POWER REQUIRED PER TON OF PRODUCTION	KWH 24.78 TON	KWH 33.62 TON	line 26 + line 29
31			BTUS FROM FUEL REQUIRED PER TON OF PRODUCTION	BTUS 747567 TON	BTUS 908621 TON	line 25 + line 29
32			TOTAL BTUS REQUIRED BY ROOFING MILL AND GRANULE PLANT	410288110000 BTUS	441095980000 BTUS	line 16 + line 25
33			TOTAL ELECTRICAL POWER REQUIRED BY ROOFING MILL AND GRANULE PLANT	8678270 KWH	9632000 KWH 12647800 KWH	line 17 + line 26
34			TOTAL BTUS REQUIRED PER TON OF ROOFING MILL PRODUCTION	BTUS 2168232 TON	BTUS 1892994 TON	line 32 + line 18
35			TOTAL KWH REQUIRED PER TON OF ROOFING MILL PRODUCTION	KWH 45.86 TON	41.33 KWH 50705 TON	line 34 + line 18
36	NOTES ON SOURCES OF DATA	BASED ON TOTAL NO.2 FUEL OIL PURCHASED DURING 1978 AS SUPPLIED BY COMPUTER PRINTOUT APO-550-30 DATED 3 JANUARY 1979 LESS ENTRY ON LINE 21				
37		SUPPLIED BY FBGA FOR 1975 (INFORMATION RECEIVED IN SEPT. 1976)				
38		TOTAL PROPANE PURCHASED DURING 1978 AS SUPPLIED BY COMPUTER PRINTOUT APO-550-30 DATED 3 JANUARY 1979				
39		SUPPLIED BY FBGA FOR 1975 (INFORMATION RECEIVED IN SEPT. 1976)				
40		TAKEN AS .98 TIMES THE TOTAL NATURAL GAS CONSUMPTION FOR 1978 AS SUPPLIED BY COMPUTER PRINTOUT APO-550-30 DATED 3 JANUARY 1979				
41		TOTAL GASOLINE PURCHASED DURING 1978 AS SUPPLIED BY COMPUTER PRINTOUT APO-550-30 DATED 3 JANUARY 1979				
42		AVERAGE OF TWENTY ONE (21) TEST REPORTS COVERING DELIVERIES TO FB DURING 1978 - ASSUMED TO BE THE SAME VALUE DURING 1975				
43		GROSS HEATING VALUE OF NO.2 FUEL OIL SUPPLIED TO COMBUSTION TURBINE UNITS OPERATED BY NEW ENGLAND ELECTRIC UTILITIES DURING 1977 - (DOE/FERC-0015) ASSUMED TO BE SAME VALUE FOR 1975 AND 1978				
44		BASED ON CONVERSION FACTORS SET FORTH IN FEDERAL REGISTER, VOL. 41 NO.171 DATED 1 SEPTEMBER 1976				

SPECIFIC HEAT ENERGY CONSUMPTION (BTUS/TON) AT ROOFING AND FELT MILLS DURING 1978						
LINE NO.	LOCATION	TOTAL BTUS IN FORM OF HEAT ENERGY MMBTUS	ROOFING MILL PRODUCTION TONS	SPECIFIC ENERGY CONSUMPTION	FELT MILL PRODUCTION TONS	SPECIFIC ENERGY CONSUMPTION
1	NORWOOD	362055.96	233014.5	1553788 BTUS/TON		
2	PHILLIPSDALE	1012693			83305 (including board)	12156449 BTUS/TON
3	PERTH AMBOY	249159	142766	1745266 BTUS/TON		
4	CHARLESTON (ROOFING & GRANULE)	297661	202435	1470403 BTUS/TON		
5	SHREVEPORT	623248 - FELT 591033 - ROOFING 1214281 TOTAL	257712	2293386 BTUS/TON	77113	8082266 BTUS/TON PAGE 164 SHREVEPORT REPORT
6	FRANKLIN	573996	84038		30132	
7	CHICAGO FELT	311513			31223	9977036 BTUS/TON
8	CHICAGO ROOFING	76566	52770	1450938 BTUS/TON		
9	PORTLAND	215507	80684	1631217 BTUS/TON	10380	8082266 BTUS/TON ASSUMED SAME AS AT SHREVEPORT
10	MARTINEZ	153493	99338.8	1545147 BTUS/TON		
11	SUB-PARAGRAPH TITLE	ITEM		DATA	SOURCE OF DATA	
12	COMPARISON OF SPECIFIC HEAT ENERGY REQUIRED PER TON OF ROOFING AND FELT MILL PRODUCTION AT NORWOOD AND AT SHREVEPORT	TOTAL BTUS CONSUMED IN ROOFING PRODUCTION AT FB, FJ, FK, FS, FC, FO, FH			1893796 MMBTUS	lines 1, 3, 4, 5, 8, 9, 10
13		TOTAL ROOFING MILL PRODUCTION AT FB, FJ, FK, FS, FC, FO, FH			1068720.3 TONS	lines 1, 3, 4, 5, 8, 9, 10
14		AVERAGE SPECIFIC ENERGY CONSUMPTION IN ROOFING MILL PRODUCTION			1772022 BTUS/TON	line 12 + line 13
15		SPECIFIC ENERGY CONSUMPTION AT NORWOOD ROOFING MILL			1553788 BTUS/TON	line 1
16		SPECIFIC ENERGY CONSUMPTION AT FS IN PRODUCTION BY FELT MILL			8082265 BTUS/TON	FS REPORT DATED 24 JULY 1979 PAGE 164, line 85
17		TOTAL FELT MILL PRODUCTION AT SHREVEPORT DURING 1978			77113 TONS	line 5
18		TOTAL BTUS SUPPLIED TO SHREVEPORT FELT MILL DURING 1978			623248 MMBTUS	line 16 x line 17
19		TOTAL BTUS SUPPLIED BY FUEL CONSUMED BY SHREVEPORT DURING 1978			1214281 MMBTUS	line 5
20		TOTAL BTUS SUPPLIED TO SHREVEPORT ROOFING MILL DURING 1978			591033 MMBTUS	line 19 - line 18
21		TOTAL SHREVEPORT ROOFING MILL PRODUCTION DURING 1978			257712 TONS	line 5
22		SPECIFIC ENERGY CONSUMPTION IN ROOFING MILL PRODUCTION AT SHREVEPORT - NO GRANULE PRODUCTION			2293386 BTUS/TON	line 20 + line 21
23		SPECIFIC ENERGY CONSUMPTION IN ROOFING MILL PRODUCTION AT NORWOOD			1553788 BTUS/TON	line 1 (3rd column)