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Soybean Oil-based Ink Feasibility Study

**State of Minnesota
Department of Administration
Print Communications
Division**

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1988 LAWS

Pursuant to Chapter 686, Article 1,
Section 6(f)



Department of Administration

PRINTING AND
MAILING SERVICES

SOYBEAN OIL-BASED INK FEASIBILITY STUDY

Laws of Minnesota, Chapter 686, Article 1, Sec. 6, Subd. F, requires the Department of Administration, Print Communications Division to study and report on the feasibility of using ink with a soybean oil base. The Print Communications Division is responsible for maintaining and operating for State agencies, a central duplicating and printing operation. The Division provides services only to State agencies and work is accomplished through contracts, individual bids and in-house production. The feasibility study conducted by the Print Communications Division has three elements.

Part one is a written survey completed by printing vendors within the State of Minnesota. The purpose of the survey was to determine (a) how many vendors are using soybean oil-based ink, (b) how many have tried soybean oil-based ink, (c) the type of equipment it has been used on, (d) the type of paper stocks it has been successfully used on, and, (e) to determine which vendors would be willing to use it if State printing specified its use.

Part two includes a verbal survey of printing ink manufacturers from the seven-county metro area. The purpose of this survey is to determine (a) which companies are making soybean oil-based inks and/or selling them, and (b) if they are not manufacturing such inks now, do they intend to do so in the future.

Part three of the Division study includes in-house testing on the State's printing equipment.

The American Newspaper Publishers Association (ANPA), headquartered in Reston, Virginia, has been largely responsible for the initial research and development of a soybean oil-based ink. Their board of directors determined the need to develop substitutes for petroleum-based inks during the Arab oil embargo. The Technical Research Department of ANPA, directed by George Cashau, successfully developed such an ink and began testing of the product on a national basis in 1986. Currently, more than 500 newspapers in the United States use soybean oil-based inks for all or part of their newspaper production. The ink was specifically developed for printing utilizing non-heatset web offset printing on newsprint.

The written survey conducted by the State printers office was sent to 743 known printing vendors in Minnesota and western Wisconsin. There were a total of 156 responses. Only six said that they use soybean oil-based ink for all or a portion of their printing on a regular basis. Three of those specifically indicated that newsprint was the appropriate medium for the subject ink. Nine additional vendors indicated that they had tried the ink on at least one occasion. Seven of the one-time users specifically referred to newsprint or uncoated offset as the approved substrate for the subject ink. Three quarters or 118 of the respondents indicated that they would be willing to try the subject ink if it meant securing State bids. A number of those indicated that their willingness would be dependent upon successful running of the ink. A copy of the survey and complete survey results can be found in Appendices A and B.

The author called all six printing ink manufacturers located in the seven-county metro area. General Printing Ink (GPI), a division of Sun Chemical Corp., is the only one of the vendors who makes the subject ink. I talked to the laboratory manager who indicated that GPI makes and sells small amounts of soybean oil-based ink to customers like the St. Paul Pioneer Press/Dispatch, the Minneapolis Star/Tribune and the Rochester Post Bulletin. He also stated that the ink is designed for use in newspaper applications running on non-heatset web presses, and, that it is not intended for use in sheet fed applications. It is not intended for sheet fed applications because soy oil-based ink dries by penetration and conventional sheet fed inks dry by oxidation. This limits the types of papers that can be utilized. Secondly, he noted that there is extremely low tack in soybean oil-based inks and, hence, some runnability problems are created in sheet fed processes where tacks are generally much higher. He indicated that there might be some application in forms printing but was unsure. All other vendors indicated that they neither make nor sell soybean oil-based ink now and do not intend to do so. Two specifically indicated the reason is the small size of the market.

The final part of the study was the use of soybean oil-based inks in the State's own production facility. This testing was done in a situation most closely representing actual production. The paper stocks selected are representative of the stocks run in the State's printing facility at least 80% of the time. These stocks are (a) uncoated offset, (b) no carbon required, (c) index and (d) enamel. A standard test plate used by the Division for several years in evaluating inks, plate material and press equipment was used. The press operator was instructed to mount the plate and run the State's present contract ink for a fixed number of sheets on the different types of stock listed above. When complete, the press was washed and soy oil ink was added and the various

stocks run again. After the initial test was completed, the operator would move to the next press and repeat the test process. The equipment used for the test was also selected on the premise that it represents the type of equipment currently used and likely to be used in the future in the State printer's operation.

Viscosity

During testing, it was noticed immediately that the lack of body made the ink extremely runny. The lack of body created three specific problems of runnability in the State's in-house printing facility. First, it required constant agitation of the ink in the fountain to assure that the ink was making proper contact with the metering roller in the press. Large non-heatset web presses generally have automatic agitating devices in ink fountains to deal with this situation. The State's equipment does not have agitating devices. The second problem was the difficulty in getting the ink out of the can and into the ink fountain. Web presses handle this problem using a pump that removes the ink from a barrel through a pipe, pumping it directly into the fountain, without operator intervention. In sheet fed printing, the operator is expected to take the ink out of the can on an ink knife and insert it into the fountain. Because of the low viscosity of the ink, it was hard to pick up the ink and move it to the fountain on a knife. The third and most serious problem, encountered due to low viscosity, was the apparent increase in dot gain or slur. Our test plates included a Graphic Arts Technical Foundation dot gain Star Target, developed in 1959 by GATF as a quality control device. In the pressroom, the Star Target quickly detects ink spread, slur and doubling on press sheets. Those sheets run using the soybean oil-based ink had Star Targets showing increased gain or slur. Dot gain or slur detracts from the overall quality of printing.

Drying

The second area specifically evaluated was drying. Our contract inks come with chemical driers ensuring that the stock can be worked in finishing operations shortly after printing. The test ink had no such additives. It was clear in running that in all cases, the soy ink dried more poorly than the contract ink. On the uncoated offset and no carbon required, the ink did not set up for 36 hours or about 1/3 greater than the normal time. On index paper it took about two times as long than with conventional inks. With the enamel paper the soybean ink failed to dry at all, even after several weeks!

Density

Another area specifically evaluated was that of density. Density of soybean oil-based ink was found to be comparable to that of the State's contract inks on all the sheets tested.

Clean-Up

The test specifically looked at the length of time required to clean up the equipment while running and after completion of a job. It was found that soybean oil-based ink cleaned up as easily as conventional inks on all the equipment.

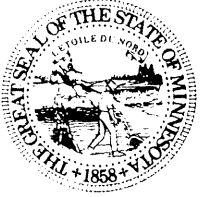
Cost Implications

Soybean oil-based ink is 10% to 15% cheaper than conventional contract inks used by the State printer. Soybean oil-based inks, however, are somewhat more expensive than conventional petroleum-based newsprint inks.

Recommendations

The State printer has four recommendations regarding the subject ink:

1. That the State printer's office recommend state agencies specify soybean oil-based inks on all print orders requiring newsprint products produced for State use. This would include such items as the State phone book and the tax instruction booklets provided to citizens in Minnesota by the Department of Revenue.
2. That we bid forms printing on a limited basis, specifying the use of soybean oil-based inks to vendors willing to cooperate in that endeavor to determine if they might be adequately used in that market.
3. That until further research and development is done on soybean oil-based inks, it is not practical to use beyond newsprint applications with the possible exception of forms printing.
4. That the State, through Greater Minnesota Corporation, promote research and development in soybean ink for wider applications than newsprint.



**Department of
Administration**

September 19, 1988

PRINTING AND
MAILING SERVICES

Dear Vendor:

In the 1988 Legislative Session, the Department of Administration was charged with the responsibility to complete a feasibility study on the use of soybean oil based inks. I have attached a copy of the House and Senate file pertaining to the study. In order for us to present a valid report with realistic recommendations, we must gather data from Minnesota's graphic arts community. Please complete the accompanying survey form and return it to us prior to October 21, 1988. The compiled data will be available to the Legislature, but specific responses/details will remain confidential.

We appreciate your cooperation.

Sincerely,

A handwritten signature in cursive script, reading "Berry J. Conway".

Berry J. Conway
Planning Unit Director
Department of Administration
Printing and Mailing Services

BC:fvf

Enclosure

sybn

Senators Vickerman, Beckman, Davis, Morse and Frederickson, D.J. introduced-
S.F. No. 2371 Referred to the Committee on Agriculture

1 A bill for an act
2 relating to agriculture; requiring a study on the
3 feasibility of using ink with a soybean oil base for
4 state printing.
5
6 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:
7 Section 1. [STUDY.]
8 The commissioner of administration shall study the
9 feasibility of using ink with a soybean oil base for printing
10 done by the commissioner, by other state agencies, and by
11 private vendors under contract to agencies in all branches of
12 state government. The study must include the cost implications
13 to the state of using ink with a soybean oil base, the types of
14 printing jobs that can and cannot be done effectively with this
15 ink, and any transitional steps the state would have to take to
16 implement the use of ink with a soybean oil base. The
17 commissioner shall report the results of the study to the
18 legislature by January 15, 1989.



STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

**SOYBEAN OIL BASED INK
VENDOR SURVEY**

1. The principal business of my firm at this location is (check only one):

- | | |
|--|---|
| ☐ Commercial Printer | ☐ Book Printer |
| ☐ Quick Printer | ☐ Envelope, Tag, or Label Printer |
| ☐ Publication Printer | ☐ Newspaper Printing or Publishing |
| ☐ Rotary Business Forms Printer | ☐ Other |

2. Number of people employed?

- | | | |
|--------------------------------|----------------------------------|--------------------------------------|
| ☐ 0-9 | ☐ 10-19 | ☐ 20-49 |
| ☐ 50-99 | ☐ 100-249 | ☐ 250 or more |

3. We have the following equipment (check where appropriate):

- ☐ Offset Duplicators — 14 X 20 and smaller
- ☐ Offset Presses — 17 X 22 and larger
- ☐ Commercial Web Offset Presses
- ☐ Publications Web Offset Presses
- ☐ Business Forms Presses
- ☐ Label or Narrow Web Presses

4. Have you bid on State of Minnesota printing work?

- ☐ YES ☐ NO

5. Have you ever won a bid?

- ☐ YES ☐ NO

6. Have you ever or do you now have a contract with the State of Minnesota or one of its agencies?

- ☐ YES ☐ NO

7. Do you use soybean oil based inks on all or a portion of your work now?

- ☐ YES ☐ NO

8. Has your firm ever tried soybean oil based inks?

- ☐ YES ☐ NO

9. To the best of your knowledge, what types of printing or papers are best suited for use with soybean oil based inks?

10. Would your firm be willing to use soybean oil based inks for State of Minnesota work?

- ☐ YES ☐ NO (If "no," please answer Question 11)

11. Would your firm be willing, if there were preference awards?

- ☐ YES ☐ NO

Please fold this panel out, seal with tape and mail.



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OPTIONAL INFORMATION:

NAME: _____ TITLE: _____

FIRM NAME: _____

STREET ADDRESS: _____

CITY _____ STATE _____ ZIP _____

AREA CODE _____ PHONE NUMBER _____

SUMMARY

SOYBEAN OIL BASED INK VENDOR SURVEY

Question

The principal business of my firm at this location is (check only one):

Response

Commercial Printer	85
Quick Printer	10
Publication Printer	6
Rotary Business Forms Printer	7
Book Printer	3
Envelope, Tag, or Label Printer	11
Newspaper Printing or Publishing	15
Other	24

Question

Number of people employed?

Response

0-9	35
10-19	38
20-49	21
50-99	24
100-249	17
250 or more	18

Question

We have the following equipment:

Response

Offset Duplicators - 14 x 20 and smaller	87
Offset Presses - 17 x 22 and larger	95
Commercial Web Offset Presses	22
Publications Web Offset Presses	24
Business Forms Presses	14
Label or Narrow Web Presses	17

Question

Have you bid on State of Minnesota printing work?

Response

Yes 126

Question

Have you ever won a bid?

Response

Yes 111

Question

Have you ever or do you now have a contract with the State of Minnesota or one of its agencies?

Response

Yes 65

Question

Do you use soybean oil based inks on all or a portion of your work now?

Response

Yes 7

Question

Has your firm ever tried soybean oil based inks?

Response

Yes 13

Question

Would your firm be willing to use soybean oil based inks for State of Minnesota Work?

Response

Yes 118

MATERIAL SAFETY DATA SHEET

(For Printing Ink and Related Materials)

1260-01

Page 1

I

Manufacturer's Name:
Sun Chemical Corporation (General Printing Ink)

Emergency Phone No:
(201) 933-4500

Street Address (No., City, State, Zip):

631 Central Avenue Carlstadt, New Jersey 07072

Product Class:
Newsinks

Trade Name:
Soy Bean Inks

Manufacturers Code:
(See Attached List)

II Hazardous Ingredients

Material or Component in Hazardous Concentrations:

None as defined by 29 CFR 1910.1200

Hazard Data:

III Health Effect Information

Eye Contact: May cause mild irritation.

Skin Contact: Prolonged or repeated contact may cause mild irritation.

Inhalation: None known.

Ingestion: None known.

Health Data: None.

Systemic Effects: None.

APPENDIX C

IV Emergency & First Aid Procedures

Eye Contact: Flush with water for 15 minutes.

Skin Contact: Wash with soap and water.

Inhalation: Remove to fresh air.

Ingestion: Do not induce vomiting. Seek medical attention.

V Personal Health Protection Information

Eye Protection: Safety glasses or goggles recommended.

Skin Protection: Gloves recommended for repeated or prolonged exposure.

Ventilation: In accordance with good engineering practices.

Respiratory Protection: None anticipated to be necessary.

Other: None.

VI Fire & Explosion Data

Flash Point Category (NFPA):

III. B

Lowest Flash Point:

250°F

Lower Explosion Limit:

not determined

Extinguishing Media: Carbon dioxide, dry chemical, foam.

Special Fire Fighting Procedure: Self-contained breathing apparatus and protective clothing should be worn in chemical fires.

Unusual Fire & Explosion Hazards: None.

MATERIAL SAFETY DATA SHEET

VII Reactivity Data

Stability (thermal, light, etc.):	Stable ☒ Unstable ☐	Conditions to Avoid None
Incompatibility (materials to avoid):	None	

VIII Physical Data

Boiling Range: 510°F	Lbs. Gal. approximately 8	Appearance: colored viscous fluid	Type of Odor: hydrocarbon oily
Vapor Density: Heavier ☒ Lighter ☐	vs. air	Evaporation Rate vs. Butyl Acetate: Faster ☐ Slower ☒	
Liquid Density: Heavier ☐ Lighter ☒	vs. water	Percent Volatile Wt.: 0	

IX Environmental Precautions

Procedure When Material is Spilled or Released: Clean up with absorbent material.

Waste Disposal Method: In accordance with federal, state, and local regulations.

X Special Precautions

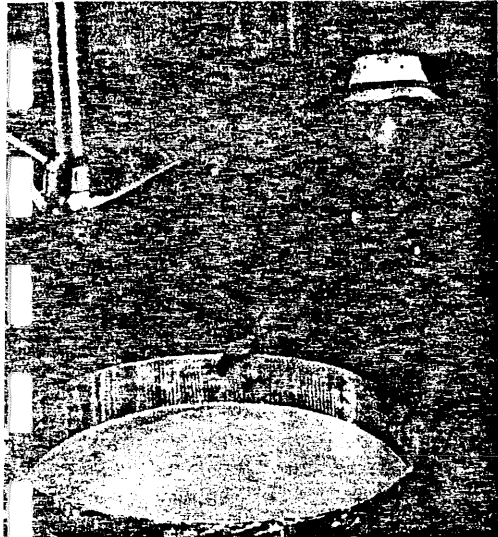
Handling and Storage Requirements: Rags and other materials containing this material may heat and spontaneously ignite if exposed to air. Store wiping rags and similar material in metal cans with tight fitting lids.

Precautionary Statements: None

Approved By:

Date: 5/18/87

The above information is based on data available to us and is believed to be correct. However, no warranty, merchantability, fitness for any use, or any other warranty, is expressed or to be implied regarding the accuracy of these data, the results to be obtained from the use thereof, the hazards connected with the use of the material, or that any such use will not infringe any patent. Since the information contained herein may be applied under conditions beyond our control and with which we may be unfamiliar, we do not assume any responsibility resulting from its use. This information is furnished upon the condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.



"Inks don't come under the toxic waste heading," adds Scarlett. "Especially the inks on the market today. They contain nothing that is considered toxic. They may be hazardous in the sense that they are flammable, but they are not toxic like lead and heavy metals."

"The primary concerns for printers today, as far as regulations are concerned, are environmental emissions and waste disposal," states Vince Bellini, market manager of web offset heatset inks, Sun Chemical Co., based in Northlake, IL. "Most printers have control equipment on their presses, but waste disposal is still a problem."

"Disposal via the popular landfill method is expensive," Scarlett of Delta Color explains. "It costs almost as much to get rid of a drum of waste ink as it does to buy a new drum of ink. In my opinion, the best method of waste disposal is to find someone who can get rid of it using an energy recovery program. This means that the material used gets burned and used as fuel. It's the best way of getting rid of waste, because once it's gone, it's gone. With landfills there could be unforeseen problems in the years ahead."

The newspaper segment of the printing industry has tried to combat environmental problems with the development of soybean inks. The American Newspaper Publishers Assn. (ANPA), headquartered in Reston, VA, developed ANPA soybean ink base several years ago. It has been commercially available for a little more than a year.

"Some years ago our board of directors wanted us to look for a substitute for petroleum in inks, because of the gas shortage and the environmental factors associated with petroleum," explains George Cashau, director of technical research, of ANPA. "We eventually discovered that the vegetable oil found in soybeans was a possible replacement. The ink works very well; it's at least as good as the petroleum-based black inks, and the performance of the color inks are considerably better. It disperses pigment better, and gives brighter, cleaner colors."

ANPA reports that more than 100 newspapers currently use soybean-based ink, and expects this number to grow in the near future. The biggest problem with the new inks right now is price. "If we can make the price comparable with petroleum, there's no reason why most newspapers shouldn't use soybean ink," states Cashau. "The color inks are about the same price as the petroleum-based color inks, although the black is considerably more expensive. But this type of ink definitely has potential."

Getting up to speed

Another area attracting attention is high-speed inks. "These have been developed for the new presses that run at 1,800 to 2,000 feet per minute," explains Delta Color's Scarlett. "Essentially they dry quicker and at higher speeds. Also, they are able to overcome condensation problems, which are a major concern when running at high speeds. Their flow and performance on press are different from inks that are geared toward slower speeds."

Two areas of past development—the use of high-solid inks and unconventional drying methods—seem to be standing still at present. "We've had some increase in the use of higher-solid inks in the heatset web offset segment of the industry in the past five years," notes GATF's Schaeffer. "But it's slowed down considerably. Most printing plants already have emission control equipment installed, so the difference between 40 percent ink oil and 35

A look into the past: paper and mill capacity, 1977-1986

by David Saltman,
Graphic Arts Consultant,
Wantagh, NY

WHAT'S NEW IN the paper industry? Although printers frequently ask this question, in reality they really seem to be concerned with price increases and paper availability.

In 1988, the chances for price increases are excellent, as they always have been. However, forecasting the availability of paper depends upon how we look at it. Manufacturers try to balance capacity with demand, hoping that the spread will not be too great. With the usual gyrations in the economy, supply and demand do have an effect on costs. However, while paper is always generally available when you need it, the question is how much lead time is needed to fill an order.

It is always suggested that if printers can anticipate their needs and cash flow is not a serious factor, they should plan two months ahead on orders. Certainly even more time will be needed if the supply tightens up and the mill backlog becomes greater.

Now let's try some Trivial Paper questions and see how we do. In the matter of coated paper in the 10-year period from 1977 to 1986:

- A. What was the percentage of increase in mill capacity?
- B. What was the percentage increase of shipments in this period?

The accompanying chart shows paper capacity figures for this pe-

percent ink oil isn't significant. The bulk of it is evaporated and processed by emission control equipment.

"And, the use of new methods of drying—UV, electron beam, chemically-reactive inks—has not increased in any striking manner," Schaeffer continues. "The most

Soybean Oil-based Inks

D4986-2

"A newspaper you can read, eat, or smoke."

That was the headline in a recent article by Jan Glidewell, a writer whose newspaper column, "Off/Beat," is carried in the St. Petersburg (Fla.) *Times*. He was writing about the research that is being done by newspaper publishers and their suppliers to find domestically available substitutes for the now imported raw materials that go into the manufacture of paper and printing ink. Glidewell reviewed two such materials that are showing unusually good promise:

Kenaf, a fast-growing plant related to cotton and okra, that yields nine times the fiber per acre as does timber, now the principal source for the wood pulp that goes into paper-making; and

Soybean oil, a vegetable derivative that is now being tested in oil-based news inks as a replacement for petroleum-based oils.

At the present time, newspapers and insert printers in the United States use more than 120 million tons of newsprint and close to 400 million pounds of news inks annually. Two-thirds of the newsprint is imported from Canada at an annual cost of about \$3 billion. About 80% of the content of the news inks, valued at about \$275 million annually, is petroleum-based oils, much of it from foreign sources.

Aside from offering the possibility of freeing the United States from dependence on imports, kenaf and soybean oil have the major advantage of being renewable resources. Kenaf can grow from a seedling to maturity in under six months, versus the six to ten years necessary to grow a tree. Soybeans are already a major American agricultural crop. Soybean oil is contained in numerous products from food to plastics, utilized both in industry and in the home.

The American Newspaper Publishers Association (ANPA) has been a leader in the search for petroleum substitutes. Its research institute, in cooperation with suppliers and their associations, has been conducting studies for more than a decade on a number of oils that are wood or agricultural derivatives. In all, more than

“
Soybean oil, a vegetable derivative, is now being tested in oil-based news inks as a replacement for petroleum-based oils.
”

8,000 different formulas were tested in its search for the best petroleum substitute.

Of the products, news inks and newsprint, the inks are closer to becoming generally available. The first kenaf paper milling plant is not due to be completed before 1990 and even at full production will only account for one percent of the newsprint

market. Current U.S. paper demand would require the construction of more than a dozen new mills with an annual capacity of 2.5 million tons annually. That's not likely for the immediate future.

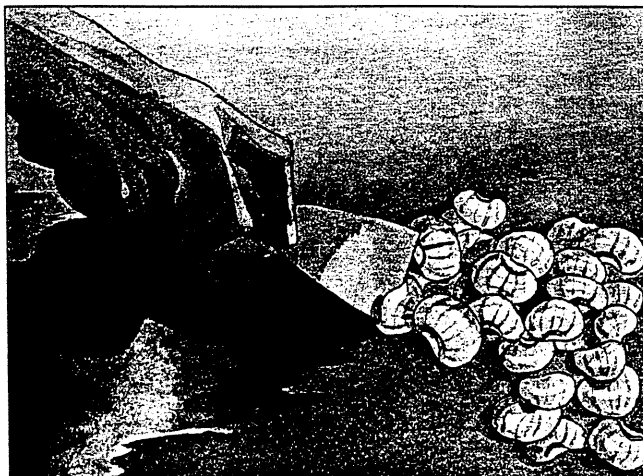
On the other hand, the technical research department of ANPA developed a soybean oil ink formula in 1986 that met the criteria given to it by the parent organization's board of directors back in 1980. An acceptable ink, they said at that time, had to:

- consist of non-petroleum ingredients.
- resist rubbing off on the hands and clothing of newspaper readers. Conventional news inks often fail the rub-off test, a major source of subscriber complaints;
- be environmentally safe. Petroleum-based inks have been under scrutiny by governmental agencies for some time as possibly hazardous materials in the workplace and because of waste disposal problems they might cause;
- meet high quality standards and be readily available at competitive prices.

ANPA's soybean ink formula was offered to ink manufacturers under license. Some major American ink companies accepted the offer and began producing trial batches of black and color soybean oil news inks in March of this year. These companies have been conducting generally successful field trials at newspapers around the country. Based on the results so far, other ink makers are expected to go into production in short order.

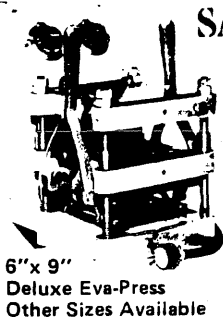
The inks being tested include black, process blue, red, and yellow. According to Lon Myers, operations manager at the Cedar Rapids (Iowa) *Gazette*, the soybean oil links are "equal to and maybe better than" petroleum-based inks. "They lay down evenly and smoothly . . . with better coverage and less rub-off."

He is seconded by Mike Sterns, production director of the Syracuse (N.Y.) *Herald-Journal*, who reports,



Marlies Najaka

This article was prepared with the help of NAPIM's 76 member companies.



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INK

"It runs like normal ink. We've had absolutely no problems."

George Cashau, technical research director for the ANPA, says the new ink compares favorably with conventional inks. He said, "I may be biased, but I think it lays down a little better. I think it's going to be a viable product eventually."

An executive with one of the ink manufacturers already in production agrees. "By the end of this year," he states, "our web offset no-heat color soybean oil inks could be an important part of our business. Though they are now slightly more expensive than conventional inks, the other plus factors they offer will make them attractive to publishers." Any cost differential may disappear, however, if crude oil prices continue to rise as they have in recent months.

Another factor that should make these new inks readily available is the fact that it is not necessary to modify present manufacturing equipment now used to make conventional inks. "Most of the difficulties we anticipated never occurred," says one company executive. "We should have no problem meeting any future demand, once the newspaper publishers become more fully aware of this ink's advantages."

His company has set up a special research and development team to improve the printability properties of the soybean oil inks. The team has already claimed a significant improvement in rub resistance over the original formula.

The USDA and America's farmers are watching these developments with more than passing interest. Farmers produce more than 10 billion pounds of soybean oil annually, making it the most abundantly available vegetable oil. Though most of it goes into food and industrial products, there is a significant surplus each year that more than meets current demands for ink usage.

As one farmer put it, "In these difficult times for the agriculture industry, we've got to be more creative in finding new ways to use and market our commodities. Here's a practical use for soybean oil that not only helps the newspaper industry, but also helps the farmer." It could also help the national economy by reducing reliance on imports.

The president of the American Soybean Association notes that "if all the newspaper publishers in the United States were to switch to these inks tomorrow, we'd still have enough soybean oil on hand to meet their needs for the next 20 years." That prediction may change if further research by ink manufacturers extends the use of soybean oil to other oil-based inks.

Another soybean association officer has reiterated the high enthusiasm his industry has for this development. "We intend to continue to work with any and all ink manufacturers, or to fund additional research, that will open up markets in other areas of the printing ink industry."

Newspaper publishers have expressed a belief that the inks will go a long way toward easing some of the current waste disposal and occupational health problems their industry now has to deal with. If the new inks also make the newspapers look better, smell better, and rub off less on their readers, both the publishers and their subscribers will be adding their smiles to those already on the faces of the farmers and the ink manufacturers.

AN IMPRESSION OF TODAY'S INKS

BY EUGENE LEHMAN

Improvements in inks have been the eternal goal of all inkmakers since the fabulous product was discovered. And improvements truly have been made since that important day in history. Today we take ink for granted. Yet other than food products, the printed sheet is probably next in line in our everyday usage of material things.

Tons of paper are fed through hundreds of thousands of printing presses worldwide, and every one of these machines is demanding quality ink and paper. There must be a relationship between the ink used and the paper carrying the message. However, most of us expect compatibility between the two over and above the capability that has been processed into the ink formulation or the paper. Ink, like the human race, cannot always choose its relatives. Otherwise, there would certainly be some changes made.

The trend toward rubber-based inks seemed to be very strong during the past few years. However, since the demand for greater eye appeal has become more prevalent in the full range of printing, from the work being done on the largest presses to the jobs being completed on the smallest duplicators and copiers, the trend seems to be shifting back to oil-based inks.

Rubber-based inks still fill an important place in the market for everyday run-of-the-mill materials that have the

job of carrying a specific message to the end-user. However, where a truly good impression is to be made, it seems that oil-based inks have the edge.

Some interesting experimentation has been taking place with soybean-based inks. The product is certainly not ready for small press production but is currently being used in the newspaper field with some degree of success.

The endeavor now is to process the inks so that they will do the job over a wider range of stocks, as well as to improve their compatibility with the various types of plates.

As we all know, any changes that have to be made in a production run mean a loss of time. Therefore, a beefed-up ink that will serve a wider range is always being sought. The finer grinds with a more stable body vehicle are becoming more desirable for metal, plastic and paper plates. With some of these inks capable of serving electrostatics also, the need for change is less frequent, which is always good news for the harried press operator.

With a demand for more fancy finished sheets and coated stocks, inks are being made to meet the challenge readily. Oil-based inks are now carrying a message with improved drying qualities without reflecting the undesirable tendencies that seemed to be a part of our everyday production a number of years ago.

With more halftones making an appearance, the better milling processes, combined with the improved adhesion qualities of the vehicle, have improved the chances of greater eye appeal in all color ranges. If proper care is taken, the

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chances for halftone fills, blurs or slurs (take your pick) are reduced. This is especially true with certain colors, where fine line work is demanded, and when trapping is important.

Ink is probably the ingredient blamed most often in the printing process when things begin to falter.

In the majority of cases, if a quality ink is used, the ink is usually found to be innocent. While most of the additives are also being upgraded, kitchen chemistry performed in the pressroom with a lack of diligence is usually at the root of the problem.

Ink chemists are skilled in their art and make every effort to see that the end-product gives a sterling performance without any doctoring. Even today in the modern print shop, though, the tendency to doctor ink is still evident. Additives are a wonderful product when needed but are not made to be used at the whim of the operator. They must be compared to prescription drugs: used correctly, they work wonders; used unnecessarily, they can be a real problem. In either case, an overdose is extremely difficult to remove once it has settled into place. Did you ever try to take out an additive once it had been introduced into the ink?

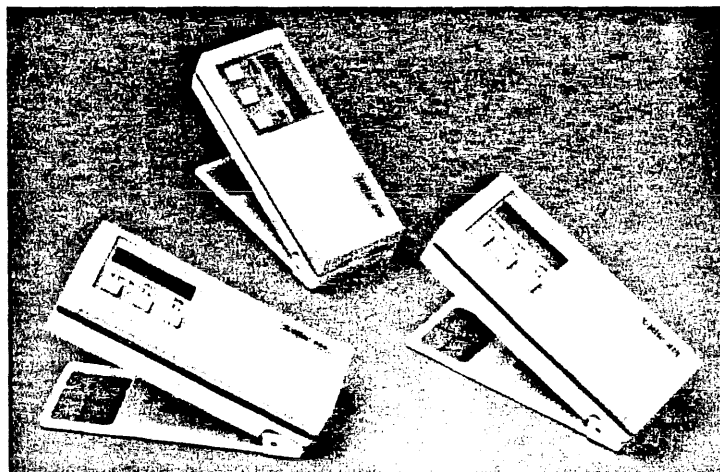
Any corrective measure is almost as impossible. So proceed cautiously when making corrections and be sure that the additive has been compounded specifically for the ink.

Fountain driers are firmly establishing themselves in everyday usage. Some of the old cobalt and manganese driers, while doing a reasonable job of firming up the ink, had a habit of causing undesirable side effects. If an ounce of a certain additive was altered in either direction, the ink would respond by filling on halftones and fine line copy. It also reacted at times by piling on the rollers. This impeded the flow, causing detriment to the copy and ordinary mileage processed into the original can of ink.

Fountain driers, while flexible, still have to be handled in a manner suggested by the manufacturer. The advantage of these driers is that because they are *not* introduced directly into the ink, contact is *not* made until the ink and water first touch on the plate.

In this manner, none of the ink in the fountain can react to any addition of drier that is overly healthy. This does not mean that an unwelcome reaction cannot occur when drier is introduced on the liberal side, however (even though this type of ingredient is now formulated with more flexibility than some of the older styles of driers).

Another advantage of fountain driers is that the trapping of any overprint is greatly improved. Anyone who has been in the printing business for a few years knows what took place when an overprint was required—the first color down had to be given encouragement in order to properly adhere on a “tricky” stock surface. This was accomplished with a drying agent, which seemed to respond favorably. Rub tests gave the assurance that the adhesion was doing its required duty. However, when the second color was introduced, it seemed that it was not fully welcomed, and the reception left something to be desired. Not only was the color strength not up to par in some cases, but the rub resistance was woefully weak and not at all attracted to the surface of the first ink



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resting on the surface.

Unlike current fountain-stimulating driers, this other drier did its thing with a vengeance, and sealed all pores on the surface of the stock and previous film. This is not to say that the current fountain driers cannot be forced into such a reaction, but more than likely if such a gross overdose is introduced into the dampening system, bleeding might occur.

Bleeding results when the pigment of ink gets separated from the vehicle carrier. It then has a tendency to float around on the surface of the plate and transfer to the printed sheet.

On some colors, a somewhat reverse reaction takes place and instead of floating wildly, the ink will have a tendency to tone and streak on the plate surface, and subsequently transfer that to the printed sheet. (If you would like a guide with general directions for additives, write me in care of *In-Plant Printer and Electronic Publisher*, and I will forward a copy to you without obligation.)

With modern-day grinding facilities for the pigments and improvements in the vehicles, misting and flying have been reduced. These advances, combined with roller improvements, encourage the ink to faithfully follow the track intended all the way to the sheet surface.

If roller pressures are over or under adjusted, or if the rollers have become glazed because of inadequate house-keeping, misting can occur, especially at high speeds; so can stripping.

But if roller tensions are kept close to specifications, the chances of either problem happening are lessened. If heavy production is the order of the shop, make sure rollers are replaced once they've given their all. Once the surface and body of the roller have paid their dues, it is best to retire it. Don't force a tired roller to produce eye-pleasing copy.

If extended life is desired from an over-extended roller, it may be possible to remove it from service and let it "rest" for a period of time, possibly a month or more. This may prove worthwhile, and allow it to be used for printing copy not considered top of the line. Any gouged or damaged rollers must be replaced,

however.

To make the most of a fine ink, you must have a blanket receptive and fully compatible with the oncoming message relayed from the plate. It is important, therefore, that the surface of the blanket be clean and free of any low spots. Blanket surfaces, like roller surfaces, have a tendency to collect residue. If such residue is not removed daily, it may build to a point where it will affect the transfer of ink.

Excellent blanket and roller cleaners are readily available today. It is false economy to hold back on giving blankets and rollers a proper cleaning periodically. Proper maintenance in both categories not only increases length of life, but does wonders in keeping the copy looking presentable.

In the case of the blanket, a resting period can be of help. The surface will respond favorably and give renewed effort if no deep low spots have been brought about, injuring the carcass.

There are a number of blanket healers on the market that do a nice job of bringing the blanket face back into ready production. Of course, as with all other products, healers must be used with caution. It is imperative that they be allowed to set properly and then be neutralized with water or fountain mixture. In no way should they come into contact with the image on the plate.

I would like to conclude with the topic of ink mileage in modern formulations. Ink distribution begins when the ink fountain roller becomes active. The keys regulating the release of the flow can be the starting point of any even, proper dispersing of the all-important fluid.

From that point on, proper roller settings (defined as the proper ink and water balance combined with a pH factor healthy enough to keep all things clean on the plate surface) get the flow moving toward the blanket. A kiss impression between plate and blanket, combined with a back cylinder free of any buildup and adjusted to the proper contact, will ensure your chances for a "dream" job.

Of course, you must realize that the surface of the stock processed has a great effect on the mileage from the ink.

Soft stocks with many eager pores waiting to gather in the ink will certainly demand a heavier toll on the ink than higher coated stocks.

I will leave the additional details regarding the effect of various stocks on ink mileage for a future article, however.

In the meantime, purchase a good ink and give it its just dues. You will be dollars ahead in the long run, and for that matter, in the short run, too. Q

NEWS/TECH

Soy oil-based ink

The latest ingredient to be tested as a substitute for petroleum-based oil in newspaper ink has shown positive results

By George Garneau

The latest word in news ink — and the latest ingredient — is soy oil.

Yes, the oil that is squeezed from soybeans and sold at grocery stores for frying chicken and tossing salads is being used to make ink for newspapers.

Soy oil is being tested as a substitute for petroleum-based oil, the main ingredient in news ink. And the results at several newspapers have been very positive, according to newspaper production executives, who warn that testing is just beginning, but encouraging.

Soy-based ink printing is "equal to and maybe looks better than" petroleum-based ink, said Lon Myers, operations director at the *Cedar Rapids (Iowa) Gazette*, which has been testing soy-based inks in its weekly farm newspaper *Iowa Farmer Today*. "It's got good potential for being widely used."

If soy-based inks succeed, they could change the way that 500 million pounds of ink used by newspapers annually are made. As a result, newspapers could avoid environmental problems stemming from the disposal of waste ink, and a plentiful, renewable source of biodegradable oils could create a new market for beleaguered American farmers. Other potential benefits include reduced dependence on foreign petroleum, a healthier newspaper production environment and more leverage over the price and supply of oils for making ink.

Most inks currently are made with petroleum-refined oils, accounting for up to 70% of most news ink, the rest mostly carbon black.

"By the end of the year it could be a major portion of our business," Mike Mylett, general manager of General Printing Ink news inks, said of soy-based inks. He said the greater mileage being achieved "certainly makes it financially attractive" and it was especially well-suited for reproducing color.

In addition, the benefits of the latest low-rub petroleum-based inks, designed to stay on the page and not rub off on the readers' hands, appear

to be available with soy-based inks. As *E&P* went to press on April 28, Iowa Farmer Today was testing its first batch of low-rub soy-based ink.

"It looks to be running quite well," Myers said as the Goss Metro offset press printed low-rub black on two section fronts and backs.

Myers said tests were so positive that he planned to order a bulk shipment of the low-rub black and 55-gallon drums of soy-based color inks for expanded testing.

Mike Stern, production director of the *Syracuse (N.Y.) Herald-Journal*, said after a day of testing soy-based letterpress black ink, it looked "real good...absolutely no problem. It runs like normal ink."

Soy oil is currently more expensive than petroleum oil, at least in part because of slumping world crude oil prices, which are expected to rise in the near future.

"There's some indication mileage may be better," said Stern of the *Herald Journal*. "It may prove to be economically feasible, cheaper. We have a great interest in it." He said in his tests, ink settings had to be cut back because of the new ink's strength.

Myers of the *Gazette* said that though soy-based inks cost more. "We may be at a standoff on price. It's a stronger formulation so we use less."

The ANPA's Cashau said: "The only downside is the economics — if

Soy-based ink printing is "equal to and maybe looks better than" petroleum-based ink, said Lon Myers, operations director at the Cedar Rapids (Iowa) Gazette . . .

Both papers used formulas from General Printing Ink in Carlstadt, N.J., based on a formula developed and licensed by the American Newspaper Publishers Association. About a dozen U.S. and foreign ink companies have been licensed by ANPA to produce its soy-based offset and letterpress inks, for which patents have been applied. Companies such as GPI have developed their own low-rub formulations.

George Cashau, technical research director for the ANPA, said the soy-based ink is "at least as good as current inks today. I may be biased, but I think it lays down a little better. I think its going to be a viable product eventually."

The bad news is: Soy oil costs more. It was still too early to tell how much more, but estimates were that it could cost up to 30% more than current petroleum-based inks.

The good news is: Some of the added cost may be negated because soy-based ink appears to print more newspapers per pound than petroleum-based ink.

it's going to be cheap enough to be competitive. It's a matter of economics."

Other papers testing or planning to test soy-based inks include the *Providence (R.I.) Journal Bulletin*, *Houston Chronicle* and New Brunswick, N.J., *Home News*.

Vegetable-based inks are not new. Cashau said the search for a replacement for petroleum oil in news inks began in 1980 after a cyclical U.S. oil shortage. The ANPA research department began development that included testing more than 8,000 formulas. It resulted in a tall-oil ink, made from trees, at the *Washington Post* several years ago. But not much activity ensued.

Myers said soy-based news ink "can certainly give the farmer another market for his product. Those of us in the heartland of America, surrounded by soybean fields, it behooves us to do what we can to help find another market for the farmers."

He said if petroleum is in short supply, soy oil could substitute.

(Continued on page 162)

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Henry Ansbacher restructures its operation

Following the departure of two key executives, the media and acquisitions firm of Henry Ansbacher Inc. announced the hiring of seven new people and a restructuring of its operations.

The departed executives were

senior vice president Will Whetzel, who joined Kidder, Peabody & Co., and senior vice president Richard Cohen, who went to Adler & Shayskin.

Chairman Christopher Shaw said Ansbacher will be structured into three teams.

President Peter Kent will be responsible for the West Coast and selected Middle West states. He will be joined by vice presidents Bruce A. Brown and Roy Weissman and assistant vice president Eric Straus. Straus

and Weissman are new hires.

Senior vice president Matti Prima, newly hired vice presidents Alan Landry and Michael Mac Innis and assistant vice president Richard Lipstein, will represent the Midwest and Middle Atlantic states.

The third team will be headed by senior vice president Hynton Philipson and concentrate on the Northeastern and Southeastern states. The team will also consist of three new hires: vice presidents Lawrence Goodhue II and assistant vice presidents Derek Goodman and William McCluskey.

Campus adviser to keep job in lawsuit settlement

The embattled staff adviser of Northern Illinois University's student newspaper dropped his \$110,000 federal lawsuit against the school in return for his job.

Under terms of the out-of-court settlement (April 28) adviser Jerry Thompson will remain adviser of the *Northern Star* student newspaper. In addition, NIU will pay \$15,000 of the \$23,000 in legal bills Thompson ran up during the yearlong court fight.

Thompson came under fire in April 1986 when he was removed from the *Star* and assigned to a university

public relations post.

Thompson was transferred by then-NIU president Clyde Wingfield, who objected to a series of articles that reported on alleged overspending during the remodeling of the president's state-owned residence.

In his lawsuit challenging his removal, Thompson argued he was transferred in retaliation for those articles. The school, for its part, said Thompson was removed because of loose accounting and financial procedures at the newspaper.

Ironically, just 10 days after Thompson filed his lawsuit, Wingfield resigned after being warned the Illinois Board of Regents intended to fire him. A state Senate committee also investigated the charges raised by the *Northern Star*.

Soy ink

(Continued from page 102)

Environmental factors promise to play an important role in what kind of inks are used, production executives say.

For example, publishers pressured ink suppliers a little over a year ago to use more expensive refined oils in news inks to avoid the hazardous classification entailed in using cheaper oil.

The same situation might occur with soy-based inks, especially in light of increasingly strict regulation of hazardous waste disposal and increasing legal liability stemming from newspapers being involved as responsible parties in hazardous waste dump sites.

"Disposal of waste is difficult, and is getting worse," Cashau said. He said of the soy-based ink: "There's no reason why it shouldn't be accepted at a landfill as any vegetable product should be."

But state regulations vary widely and he was not sure how soy-based ink waste would be treated. Cashau said news ink itself is classified as a hazardous material in some states, as is press waste containing petroleum-based ink and solvents.

Uncertainties about soy-based ink include questions about its stability over time, its relative inexperience under production conditions and the stability of petroleum and vegetable oil prices.

The use of soy oil also opens the possibility that other vegetable oils, such as palm oil, might be suitable for the 300 million pounds of oil a year used in news ink.

Myers said the ink left over from tests in the farm weekly was used on pages of the *Gazette* with the same "exceptionally good" results, including good laydown and good coverage. In that way he discovered it was compatible with petroleum-based ink.

Winners

(Continued from page 106)

Lufkin Daily News, winners of the 1977 prize for meritorious public service with the story of a local man who died in a Marine training camp, which grew into an investigation of that death and reforms in Marine Corps recruiting and training practices.

- Erwin H. "Skeeter" Hagler, *Dallas Times Herald*, 1980 feature photography winner for a series on the Western cowboy.

- Larry C. Price, *Fort Worth Star-Telegram*, whose photographs from Liberia won the 1981 spot news photography Pulitzer.

- Ben Sargent, *Austin American-Statesman*, winner of the 1982 prize for editorial cartoons.

- James B. Dickman, *Dallas Times Herald*, 1983 feature photography winner for his photos of life and death in El Salvador.

- Mark Thompson and the *Fort Worth Star-Telegram*, 1985 meritorious public service winner, for a series on "mast bumping," a problem cited as a cause in helicopter crashes involving aircraft built by Bell Helicopter/Textron.

- Craig Flournoy, George Rodrigue and project editor Howard Swindle, the *Dallas Morning News*, winners of the 1986 national reporting Pulitzer for an investigation into subsidized housing that uncovered patterns of racial discrimination and segregation in public housing across the United States.

Ad expenditures up 9.8% for February

Expenditures for newspaper advertising in February totaled \$2.089 billion, an increase of 9.8% over February 1986, according to estimates from the Newspaper Advertising Bureau.

Retail advertising for the month was up 7.5% to \$1.049 billion, national was up 2.7% for the same period to \$262 million, and classified continued strong with expenditures of \$778 million, an increase of 15.9%.

For the first two months of 1987, newspaper advertising expenditures were \$4.146 billion, an increase of 10.2%. Retail advertising for the two month period was up 9.1%, while national rose 1.0% and classified showed a 15.3% increase.