Summary of Focus Group Discussions with Screen Printers and Lithographers for the Design for the Environment Printing Project

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1. Introduction

The Design for the Environment (DfE) Printing Project is a unique, cooperative effort between the Environmental Protection Agency (EPA) and the printing industry aimed specifically at developing pollution prevention information for printers. The project was initiated when printing industry associations came to EPA and requested assistance in evaluating products that claim to be environmentally friendly. EPA and several trade associations responded by establishing the DfE Printing Project. As one of the first steps in this project, industry representatives were asked to prioritize areas of environmental concern in printing. Blanket washes in lithography and screen reclamation products in screen printing were identified by printers as the two areas of greatest concern and have been the primary focus of the project to date. The DfE printing project is now gathering information on the performance, cost and the health and environmental risks of alternative blanket wash and screen reclamation products.

Information on the performance of alternative products will be collected through product performance demonstrations conducted at volunteer printing facilities. The health and environmental risks associated with these alternative products will be estimated by the EPA DfE staff. In gathering this data, the DfE project hopes that this information will assist printers by:

- providing printers with information on a variety of alternatives to the products they currently use,
- encouraging printing suppliers to compete on the basis of the environmental and health characteristics of their products, and by
- giving printers guidelines so that when they consider new products, they will know what type of information concerning environmental effects their suppliers should be providing.

The information collected in the DfE printing project represents a significant effort by both the printing industry and the EPA. The EPA will prepare a full report, known as the Cleaner Technologies Substitutes Assessment (CTSA), documenting this research. Prior to the completion of this project, however, the Agency wants to make sure that this information reaches as many printers as possible and that it is summarized in a format that is most useful to printers. To determine the needs and preferences of printers regarding the format and content of information products developed by the project, Abt Associates was contracted by EPA to conduct a series of focus groups nationwide with lithographers and screen printers.

These focus groups were designed to answer to following questions:

- What type of information do printers need in order to evaluate environmentally friendly alternative products?
- In what format would printers like to see this information presented?
- What is the best way to distribute this information to as many printers as possible?

Abt Associates conducted eight focus groups; four with screen printers and four with

lithographers. These focus groups were held in the northeast, midwest, northwest, and southwest sections of the country. A total of 88 people attended the eight meetings including 48 printers, 14 printing supplies manufacturers or distributors, 6 printing industry consultants, 13 state and local government agency representatives and 7 trade association representatives.

This report first presents the methodology used to conduct the focus groups, provides an overview of findings, and then summarizes the findings of screen printing focus groups and lithography focus groups separately. Individual summaries of each focus group, the facilitator's guides and the "mockups" presented at the focus groups are attached as appendices to this report.

2. Methodology

To determine the most appropriate content and format for the final information products generated by the DfE printing project, focus groups were held separately with screen printers and lithographers. These focus groups were conducted in five cities to capture the variety of printers' perspectives nationwide. Boston, Chicago, Seattle, Portland, and Los Angeles were identified by the Screen Printers Association International (SPAI) and the Printing Industries of America (PIA) as 1) having active local screen printing or lithography trade groups and 2) being cities where similar focus groups have not already been conducted. It was felt that printers in these locations would be likely to use the information coming out of the DfE printing project and could provide important input into the development of the content and format of the final information products.
Each focus group is described in the table below:

Location	**Date**	**Industry Group**	**Number of Participants**
Boston *Cambridge, MA*	November 16, 1993	Screen Printers	6
Natick, MA	October 21, 1993	Lithographers	10
Chicago	December 6, 1993	Screen Printers	11
	December 7, 1993	Lithographers	10
Seattle	January 19, 1994	Screen Printers	23
Portland	January 20, 1994	Lithographers	12
Los Angeles	April 21, 1994	Screen Printers	8
	April 21, 1994	Lithographers	8

Because the DfE printing project affects several groups involved in the printing industry, attendance at the focus groups was not limited to printers. Manufacturers and suppliers of blanket

washes and screen reclamation products, printing equipment manufacturers, trade association representatives, printing industry consultants, and state and local government representatives were also present. Two-thirds of the participants, however, were printers or represented printers interests (consultants, trade association representatives). To encourage printers to speak freely about the DfE project, EPA did not attend any of the focus groups.

To recruit participants, several approaches were employed. For screen printers, Abt Associates contacted both SPAI members and non-members in Boston, Chicago, and Los Angeles following a written invitation from SPAI. In Seattle, the Seattle Metro Hazardous Waste Management Program (contacted by EPA's DfE outreach staff) requested the attendance of screen printers from their on-site consultations with screen printers and their Screen Print Advisory Team.[1] For lithographers, the Printing Industries of New England (an affiliate of Printing Industries of America (PIA)) coordinated a focus group with their regular environmental committee meeting in Boston. In Chicago, lithographers were contacted from the general DfE mailing list. In Portland, the Pacific Printing and Imaging Association (also contacted by EPA's DfE outreach staff) invited members (lithographers) interested in environmental issues. The local PIA affiliate, PIA - Southern California, invited members to the Los Angeles lithography focus group. As shown in the table, actual participation ranged from 6 participants to 23 participants. High participation in the latter case was due to the attendance of 10 state and local government representatives.

It should be noted that since most focus group participants are either involved in environmental committees or are active trade association members, their responses may not be representative of the experiences or opinions of screen printers or lithographers as a whole. In fact, many participants pointed out that small printers and quick print shops were not well represented at the focus groups and may view the DfE information products somewhat differently. Participants, however, were asked for their recommendations on what information and format would be most appropriate for small facilities.

In the focus groups, participants were asked a series of questions about the usefulness of information related to alternative blanket washes or screen reclamation products. An initial matrix was passed out to participants that presented the type of information that will be gathered by the DfE project and disseminated to printers. After reviewing and commenting on the type of information included in the initial matrix, participants were given four additional format mockups to review. The initial matrix was presented as an option as well. Mockup formats ranged from descriptive text to detailed technical information. See Appendix C for examples of the mockups. These mockups presented risk, performance, and cost information in a variety of formats and varying levels of detail. Participants were asked to comment specifically on each mockup as well as on other informational needs they have that might be addressed by the DfE project. Discussions centered around the following topics:

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[1] Seattle Metro is charged with assisting small quantity generators as part of the State's Hazardous Waste Reduction Plan. Through the Plan, Seattle Metro has conducted on-site visits and has formed the Screen Print Advisory Team. This team is made up of screen printers and vendors.

- **Content** -- Mockups included descriptive or numeric information about the chemical constituents, chemical characteristics, performance, cost, risk, and disposal of the alternative product. In addition, the test conditions present during performance demonstrations were also included to facilitate the interpretation of the information presented in the mockups. Participants were asked whether the type of information presented was adequate for them to make comparisons between alternative products. Suggestions were requested for possible additions or deletions to the mockups.

- **Format** -- Mockups were presented in a variety of formats including: a matrix, a table, and a fact sheet. Two versions of the matrix were displayed; mockup #1 included detailed, technical descriptions of product characteristics (e.g., cancer risk of 10^{-4}) while mockup #2 used more descriptive language to describe the product attributes (e.g., carcinogen, skin irritant). The table format of mockup #3 is very similar to mockup #2, except that headings appear on opposite axes and cells of information are not outlined. Three versions of a fact sheet were offered. The first two stand alone while the third functions as an attachment to the matrices or table. In mockup #4, all products are listed on one fact sheet. Descriptions of the attributes of alternative products are grouped by category (i.e. performance, risk). In mockup #5, a separate fact sheet is provided for each product. Each fact sheet covers all categories for an individual product. As an attachment, the fact sheet serves as a reference for each category in the matrix or table by providing details on how to interpret the information contained therein. Participants were asked to select the format they felt would be most appropriate for receiving this information. Suggestions were also solicited on alternative formats.

- **Vehicle** -- There are several options for delivering the DfE information to printers. To determine the most appropriate vehicle, participants were asked where they currently get such information. More importantly, they were asked which source they considered to be most credible to themselves and to smaller printers. Suggestions were requested for additional methods of delivering this information.

3. Overview of Findings

Overall, screen printers and lithographers were enthusiastic about DfE and felt it was an important first step in encouraging pollution prevention practices in the industry. To make the information more user-friendly, however, there was general agreement in all focus groups that, whatever the final format, the information should be presented simply and in the most descriptive terms possible. A simple format was thought to be the most useful to the widest audience. In addition, most printers asked for more information than is currently included in the mockups. Most printers emphasized that variations among print shops and work practices could make the results of the demonstrations hard to interpret, unless detailed information about the demonstrations is made available.

Another common concern among focus group participants was that the trade names of the products demonstrated will not be disclosed. Both screen printers and lithographers agreed that this omission could make it much more difficult for them to use the information from the DfE project in their shops. Specifically, printers felt that if product names are not disclosed, a supplier could *claim* to be selling them the requested alternative product. Printers, however, would have no way of verifying that they were actually receiving the product they had requested. Many printers asked that a list of the names and phone numbers of participating manufacturers should be added as an appendix to the final information product. This list would allow printers to contact a limited number of manufacturers directly for more information on their product lines.

Focus group participants were also concerned that the demonstrations would not be conducted in a controlled setting such as a laboratory. They felt that through laboratory tests, products could be evaluated under consistent conditions instead of being subject to the highly variable conditions that exist across printing facilities.

Finally, all focus group participants agreed that it will be necessary to distribute the DfE information through several different sources in order to reach the greatest number of printers. Sources suggested by printers included: trade publications, direct mailing and state technical assistance personnel.

4. Screen Printers Focus Group Findings

As mentioned in Section 2, participants were asked a series of questions on the content, format and vehicles for distributing information products generated by DfE. The most frequently reported comments and concerns for each of these questions are summarized below.

4.1 Content

An initial mockup in matrix format was presented to participants that listed the categories of information that could be included in the final product (see screen reclamation system mockup #1 in Appendix C). Attendees had many suggestions for additional information they would like to see incorporated into the matrix. They suggested expanding on the information currently presented as well as adding new information to the matrix. In general, they want as much information as is practical to present in a matrix format. Additionally, they want the information presented in descriptive language; not in technical terms. The participants' specific recommendations are presented below.

4.1.1 Product System Names and Chemical Constituents

A common concern in all four focus groups was that it would be extremely useful if the trade

names were given for the products demonstrated. Without product names, printers felt it would be difficult to be sure they were purchasing products with the same characteristics as the products presented in the matrix. In addition, printers would have to invest their time in researching products and contacting suppliers to identify a supplier for the product they wanted to try. It was mentioned that smaller shops probably would not make this effort. Printers voiced a general distrust of their suppliers, and felt a supplier could *claim* to be selling them the requested alternative product, however, printers had no way of verifying they were actually getting the product they had requested.

There was also concern regarding the reporting of chemical constituents in ranges, instead of specific percentages. Participants felt this exacerbated the difficulty in obtaining the requested products from suppliers.

4.1.2 Performance

Under the Performance category, participants suggested some changes to the existing subcategories. Three of the focus groups recommended that "Quantity" should be reported as "Quantity per area of screen cleaned" instead of an absolute volume. One group suggested the "Cleaning time" category should note if the haze remover required overnight drying time. Another group indicated that if the product is recycled or reused, the number of times it is recycled or reused prior to disposal or addition of fresh product should be listed.

Several printers suggested expanding the "Printing limitations" column to include information on the incompatibilities and restrictions for product use. Several participants suggested adding a category to include information on the effects of the ink remover on the stencil and the effects of the haze remover on the screen mesh.

4.1.3 Cost

In the initial matrix, cost is presented as "$/gallon." Participants felt that this was the best way to present cost information because they could easily calculate their own total cost by combining the volume of product used and cleaning time with their wage rate. For ease of comparison, cost should be presented as a standard quantity for all products. A quantity of "$/5-gallon container" was suggested as the standard. Participants in Los Angeles pointed out, however, that due to regional differences in prices, comparisons may not be very accurate.

4.1.4 Risk/Hazard

Risk information was presented in both descriptive and technical terms. All focus groups agreed that the descriptive language would be most understandable for the largest number of readers. In general, printers' greatest concern was with the human health and safety risks of their screen

reclamation products.[2] Some of their suggestions for additional information on risk include:

- Divide information into short-term risks and long-term risks;
- Report exposure route(s) of concern;
- Document the Personal Protective Equipment requirements and recommendations of the manufacturer; and
- Report any other recommended precautions.

4.1.5 Disposal Issues

Waste disposal was one of the most complicated issues in the focus group discussions. Participants recognized the difficulty in reporting specific disposal requirements due to variability among state and local regulations and the site specific nature of what wastes are generated. This difficulty was particularly evident in the Los Angeles focus group. Participants there expressed that information on disposal requirements would only be useful to them if it was specific to Southern California air quality requirements. Some of the suggestions they made include:

- Clearly state that the disposal information in the matrix applies only to products that have not been mixed with other products, chemicals or materials. Disposal requirements may change significantly after the product is used and mixed with waste ink or other printing materials.
- Provide guidance on <u>how</u> to get disposal information. For example, describe what lab tests are required prior to making a decision on disposal methods and the approximate costs of these tests.
- List federal reporting requirements associated with the products (e.g., EPCRA).
- Do not just note to "...dispose of in accordance with federal, state and local regulations..." as is stated on MSDSs. A local government official pointed out the importance of noting that printers should contact their state and local environmental agencies for regulatory information, since small printers may not be aware of all the regulations that may apply to them.
- Add a description of the disposal requirements of the strictest state or local regulations in the country. Printers felt that since all regions may eventually adopt these regulations, printers could use this information to plan ahead for future compliance.

4.1.6 Test Conditions

[2] Due to strict air quality requirements in Southern California, printers in Los Angeles were somewhat more concerned with whether or not use of an alternative product would allow them to meet air quality regulations than with the risks associated with the product.

Test conditions presented in the initial matrix included ink type, emulsion type and ink color. Since the variability of conditions from one screen printer to another is so great, participants stressed the need for more information on test conditions in order to adequately interpret the performance and risk information presented in the matrix. It was suggested that the following test conditions be added:

- Screen Mesh (threads per inch) and Tension -- Mesh count and tension level can influence screen reclamation products' performance.
- Application Method -- Due to differences in shop equipment and procedures, printers want specific information on the type of equipment (brush, rag, pressure wash, etc.) used in the demonstrations.
- Ink and Emulsion type -- Screen reclamation products will perform differently depending on the ink and emulsion used. Solvent based ink was felt to be too broad a category. It would be more appropriate to use specific ink types such as acrylic-based lacquer ink.
- Temperature, Humidity, Ventilation -- These conditions are important since product performance will vary depending on ambient conditions.
- Screen Drying Time -- How long a screen has dried prior to reclamation can affect the performance and cost of the reclamation products.
- Screen History -- Factors such as total number of impressions, number of screens times screen had been reclaimed previously, and general screen condition will influence performance of the reclamation products.

4.1.7 Suggestions for Additional Information to be Included in the Final Information Product

Participants identified additional details that they felt should be included somewhere in the final information product. Several of their suggestions could be included in the notes column of the matrix. For example, it was recommended that effects of the products on the mesh, product incompatibilities, and any printing limitations be listed. Other product characteristics such as VOC content and pH were suggested as separate columns. Finally, many printers asked that a list of the names and phone numbers of participating manufacturers should be added as an appendix to the final information product. This list would allow printers to contact a limited number of manufacturers (i.e., the participating manufacturers) directly for more information on their product lines.

4.2 Format

After reviewing and commenting on the type of information to be included in the final information product, as presented in the initial matrix, participants were given four additional format mockups to review. The initial matrix was presented as an option as well. Mockup formats ranged from descriptive text to detailed technical information. Reaction to the level of detail offered in the

mockups was mixed. Members of the Boston focus group felt that the format should be as scientific and quantitative as possible. They, therefore, chose mockup #1 (the initial matrix - includes very detailed information in technical terms) as the superior choice. In contrast, Chicago attendees preferred simplified explanations using descriptive text as in mockup #2 (descriptive, easy to read matrix). Descriptive text was thought to be more accessible to the largest audience. In Seattle and Los Angeles, participants recommended a combination of the descriptive text in mockup #2 and detailed information presented in mockup #1. In all cases, participants felt that an explanatory fact sheet should accompany the mockup. This fact sheet would help users interpret the information presented in each category by defining the terms used in the matrix and describing how the information was obtained.

One participant proposed that mockup #1 be combined with mockup #5 (a collection of one page fact sheets on each product). In this format, mockup #1 would serve as a table of contents that would allow a printer to look through the matrix of information and select the products that appeared most suitable for his/her operations. For more information, the printer could then turn directly to the fact sheets on the products of interest. Other printers agreed that this option would probably be the most useful format.

Two suggestions were made to simplify the final information product format. First, many participants expressed an interest in seeing products ranked in a "consumer reports" format where each attribute is rated as poor, fair or good. This ranking would allow for easy comparison between products. Second, some participants felt that screen printers do not typically use more than one type of ink (i.e., solvent, aqueous, UV) in the same facility. As a result, they suggested that the results be separated into different matrices: one for solvent-based inks, one for aqueous-based inks and one for UV-based inks.

While the discussion centered on the mockups, several other formats were presented to participants for their consideration. For example, the information generated by the DfE printing project could be relayed through videotapes, posters, brochures, or on diskette. Videotapes were a popular option since printers felt this would be an excellent way to present the information to all shop employees at the same time. Some printers indicated, however, that they did not have the time to preview videotapes and would prefer to receive a hard copy of the information.

4.3 Vehicles

Focus group participants had numerous ideas for disseminating this information to printers, including hard to reach printers such as small shops that are not involved in a trade association. In addition, some attendees stressed the importance of receiving the final information product from several sources at once. Dissemination through multiple sources would serve two purposes. First, distribution through a variety of sources would increase the number of printers receiving the information. Second, receiving the information through many channels would help to emphasize its importance and improve its credibility.

To distribute the information to as many printers as possible, participants suggested the

following:

- Trade Associations -- Make the information available at trade shows and seek the endorsement of trade associations. With endorsement of several trade associations, the information would reach a wider audience and would also increase it's credibility.
- Trade Journals -- It was suggested that articles announcing their release and describing the DfE results should be published in trade journals such as Screen Print Magazine. A tear-out card could be added to the journal that would allow printers to mail in a request for a copy of the final information product. Additionally, the final products could be mailed out with or included in the journals. Some participants, however, noted that trade journal articles can appear biased.
- Suppliers -- Since printers receive a great deal of information from suppliers already, suppliers were thought to be a good vehicle for conveying this material. Some printers, however, felt that suppliers would not be a credible source for interpreting the DfE information since suppliers may not want to pass on information that could be beneficial to their competitors. Others noted that since suppliers are the only source of information for some printers, distribution of this material through suppliers may be required.
- Direct Mail -- Participants felt that direct mailings of the final products could come from a variety of organizations including: EPA, state and local government agencies (offices of technical assistance), and trade associations. It would also be useful to stamp mailings as "EPA Official" and to indicate that the information is the result of joint research with EPA and "printers just like you."

4.4 Participants' Comments on the DfE Performance Demonstrations for Screen Printers

Throughout the focus groups, participants had many questions and comments regarding the performance demonstration methodology. In general, most printers viewed the demonstrations as a good starting point for implementing pollution prevention concepts in their industry. They expressed concerns, however, in three areas. First, some printers felt the information collected during performance demonstrations would not provide them with the type of information they need to select between alternative products (i.e., specifications or guidance on product attributes). They suggested DfE provide a list of questions for them to ask their suppliers regarding alternative products. Alternatively, a participant recommended that DfE provide a list of the chemical constituents that printers might want to avoid and a list of those that are acceptable for use. Second, some printers said they would prefer to see laboratory testing of alternative products instead of demonstrations in printing facilities. They felt that through laboratory tests, products could be evaluated under consistent conditions instead of being subjected to the highly variable conditions that exist across printing facilities in the U.S. Under consistent test conditions, printers thought it would be easier to compare products. Moreover, in the absence of "hard data" collected under controlled conditions, it would be very easy for suppliers to discredit the results. For example, they could attribute poor performance of their product or their lack of participation to inconsistent test conditions. Third, some participants thought the information generated from the demonstrations would become obsolete quickly. It is, therefore, important to make the final information product available to

printers as soon as possible. In addition, they noted that without annual demonstrations, the utility of the information would be limited.

5. Lithographers Focus Groups

As in the screen printers' focus groups, lithographers were asked a series of questions on the content, format and vehicles for distributing information products generated by DfE. The most common comments and concerns raised by participants in the course of the focus groups are summarized below.

5.1 Content

An initial mockup in matrix format was presented to participants that illustrated a number of categories of information that could be included in the final product (see blanket wash mockup #1 in Appendix C). As in the screen printer focus groups, lithographers had many suggestions for additional information they would like to see included. Regarding additional information, they suggested expanding on the information currently presented as well as adding new information to the matrix. They would like to see as much information about the performance demonstration conditions and associated risks/hazards as possible. The participants specific recommendations are presented below.

5.1.1 Product names and chemical constituents

Most participants felt that it was important to include the trade names of the products demonstrated. Similar to screen printers' concerns, lithographers felt that it would be difficult to be sure they were purchasing products from their suppliers with the same characteristics as the products listed in the matrix. Furthermore, some printers voiced a mistrust of their suppliers. They felt a supplier could *claim* to be selling them the requested alternative product, however, printers had no way of verifying they were actually getting the product or attributes they had requested. One participant offered a suggestion to avoid such problems. He suggested that a "reader service card" be included with the final information product. This would allow printers to circle a number corresponding to a blanket wash demonstrated and mail it back to EPA. EPA would then forward the card to the appropriate manufacturer so the manufacturer could contact the printer with more information on the product.

There was also a request that as much information as possible be provided on the chemical content of the products. Without trade names, requesting particular chemical compositions is the only way that printers can communicate to their suppliers the types of products they would like to try. One focus group preferred to see the chemical constituents given as an upper limit instead of as a range (e.g., "Product A contains < 10% Chemical 1" instead of "Product A contains 5% - 15% Chemical 1"). Because suppliers may use different synonyms for the same chemical, Chemical

Abstract Service (CAS) numbers should be included. Information on the non-hazardous but active components of the products would be helpful as well.

5.1.2 Performance

In the initial matrix, performance of the alternative blanket wash refers to its: ability to cut ink, the quantity of the product required to clean the blanket, the time required to clean the blanket, and the ease with which the product dries. Focus group participants suggested revisions to existing columns of information in the matrix and proposed that supplementary columns be added. Specifically, it was suggested that quantity of blanket wash required should be reported in comparison to the quantity of the baseline product used in order to reduce the subjectivity of the measurement. To obtain a more accurate estimate of the total time requirements associated with the alternative product, the time required to clean the blanket should be expanded to include the time and number of cleanings needed to get the press back up to color when changing from a dark color to a light color. In addition, the "ease of drying" category should be changed to "speed of drying." Information on the side effects of the blanket wash on the blanket (e.g., swelling and glazing) is another component of the product's performance that printers requested be included in the matrix.

Several printers suggested adding three more columns under the Performance category; product odor, ease of use, and necessity of a drying step (e.g., additional rag wiping). Product odor would indicate whether or not the alternative blanket wash had an unpleasant odor. Printers reported that some press operators would refuse to use a product with a particularly unpleasant odor. "Ease of use" would report information such as whether or not the blanket wash was slippery or greasy, whether or not there was any drag on the blanket when using the alternative, and the physical effort required to clean the blanket. The "drying step" column would indicate whether or not a product had to be dried off the blanket with wipes.

5.1.3 Cost

In the initial matrix, the cost of using an alternative blanket wash is presented as "$/gallon." Participants felt that this was the most appropriate way to present product costs because it would easily allow them to calculate their own total cost by combining the volume of the product used and cleaning time with their wage rate.

5.1.4 Risk/Hazard and Federal Regulations

Risk/hazard information was presented in the matrix in both technical and descriptive terms. Most participants agreed that this information should be presented in the most descriptive terms possible. It was also suggested that the risk/hazard and federal regulations columns might be more useful if they were renamed "health and safety" and "environmental burden" respectively. The health and safety column could include the permissible exposure limit (PEL), the hazardous materials information system (HMIS) codes for the health risks of each chemical, and recommendations for personal protective equipment. One printer pointed out that when selecting products he reviews the risk/hazard information on products' MSDS first. He felt, and other participants agreed, that it would be very important to include this information in the DfE final product.

In the environmental burden column, information could be presented on both waste disposal requirements and other regulatory issues such as reporting and permitting requirements. Regarding waste disposal, participants would like to have information about their state and local requirements. They suggested a cooperative effort between state and local agencies that would provide regulatory information about the alternative blanket washes listed in the matrix to local printers. At a minimum, a warning indicating that state and local requirements may be more stringent than federal requirements should be included. Phone numbers of state and local regulatory contacts should also be provided. The Los Angeles group felt very strongly that it was more important to list the local regulations than the federal regulations, for their situation. These printers feel that if they are in compliance with the strict emissions limits set by the Southern California Air Quality Management District, they will also be meeting the federal requirements.

Regardless of the information given on local regulations, federal regulatory information affecting the product should be listed. Information such as whether the chemical is a TRI chemical or a hazardous air pollutant (HAP) under the Clean Air Act was thought to be particularly useful for printers in determining whether, when eliminating a problem in one medium, they will create a problem in other media. Participants in Los Angeles thought it would be a good idea to include information on the strictest regulations in the country for each medium on the final information product.

5.1.5 Chemical Characteristics

The chemical characteristics of alternative blanket washes such as VOC content, vapor pressure, and flash point are presented in the initial matrix. Participants' comments on this information were limited to requesting that the vapor pressure column be replaced by a column on evaporation rate and that the matrix contain more specific information on VOC content (i.e. reporting actual VOC content instead of giving a range). VOC content should also be reported in "pounds/gallon" and "grams/liter" instead of as a percent of total volume.

5.1.6 Suggestions for Additional Information to be Included in the Final Information Product

Participants proposed additional details that they felt should be included somewhere in the final information product. Several participants commented that the conditions under which the demonstrations were performed would affect the results. As such, they felt that to accurately interpret the matrix they would need as much information as possible on demonstration conditions. They, therefore, suggested that a separate column be added on test conditions. This column could present information on: ink coverage, press manufacturer and model, age of press, length of run, blanket condition, and dampening system. Finally, a list of the names and phone numbers of participating manufacturers should be added as an appendix to the final information product. This list would allow printers to contact a limited number of manufacturers (i.e., the participating manufacturers) directly for more information on their product lines.

5.2 Format

After reviewing and commenting on the type of information to be included in the final information product, as presented in the initial matrix, participants were given four additional format mockups to review. The initial matrix was presented as an option as well. Mockup formats ranged from descriptive text to detailed technical information. Similar to the screen printers focus group, reaction to the level of detail offered in the mockups was mixed. It was pointed out that just as there are significant variations from one printing facility to another, the target audience for the DfE results will also be disparate. As a result, many participants suggested that there should be more than one final product. In Boston, Portland, and Los Angeles, the preferred format was a version of mockup #1 (the initial matrix - includes very detailed information in technical terms), with some variations. Boston attendees preferred mockup #1 for their own use, but felt that it would be too detailed for printers at quick print shops and other small operations, and suggested that mockup #3 (a descriptive, easy to read table) would be better for less informed printers. Los Angeles participants wanted to include the one page fact sheets on each product (as in mockup #5) as supplemental information to mockup #1. In Chicago, printers felt that mockup #2 (descriptive, easy to read matrix) would be the best format for the press operators since they are typically most interested in health and safety hazards. They preferred a more detailed mockup such as mockup #1, however, for themselves (management or supervisors, as opposed to operators). All of the focus groups agreed that, whatever

the format, an explanatory factsheet should always be included. This fact sheet would help all users interpret the information presented in each category by defining the terms used in the matrix and explaining how the information was obtained.

To make cross-product comparisons easier, participants in Boston and Chicago proposed ordering the products by VOC content, listed in ascending order. In Portland, one printer suggested that the DfE information would be more accessible if it were on disk in a spreadsheet format. This format would allow management to reformat and tailor the information to their facility's needs.

Whatever format is used for the final information product, participants thought it was important to make it eye catching and of high quality. For example, they particularly liked the DfE printing industry case study.

While the discussion concentrated on the formats presented in the mockups, several other formats were presented to attendees for their consideration. As was suggested to screen printers, the information coming out of the DfE project could be relayed via videotape, brochures, and posters. The most popular alternative format was a poster. Participants liked the idea of putting the final information product on a poster so that they could review all the products at once, without turning pages. The poster would be enhanced by providing a supplemental booklet of fact sheets (one for each alternative blanket wash). The booklet would allow users to locate detailed information for any alternative blanket wash they were interested in.

Reaction to videotape was mixed. Some printers felt that a video would be a useful addition to the printed material and would make it easier to educate many of their workers at the same time. In contrast, others felt that they would never take the time in a business day to look at the tape. In Portland, a fold-out brochure was proposed that would consist of a slightly enlarged version of the final information product.

5.3 Vehicles

Focus group participants had numerous ideas for disseminating the DfE information to printers, including hard to reach printers such as small shops that may not be involved in a trade association. Among the most commonly heard recommendations was enlisting the support of trade associations and suppliers. Specific ideas include:

- Disseminate the information through trade association presentations, conferences, and trade journals. Articles and announcements in trade journals would be useful in notifying printers that the information was coming. The final information product itself could also be published in trade publications.

- Provide the final information product to suppliers for distribution. Participants explained that printers rely on their suppliers to inform them of new developments in the industry.

- Conduct a general mailing of the DfE final information product to printers. If possible, the mailing should be addressed to the production manager, purchasing agent, and/or the pressman. The mailing should also be labeled with an "EPA official stamp." This label would tend to make the piece stand out from all the other mail printers receive each day. This approach might be the only way to reach small printers that do not belong to a trade association.

- Contact franchise headquarters. Franchise headquarters could pass on the information to their franchises in newsletters or separate mailings.

- Have state and local environmental regulatory staff, especially technical assistance program personnel, publicize the final product in their outreach efforts such as bringing the final information product to print shops during their visits.

5.4 Participants' Comments on the DfE Performance Demonstrations for Lithographers

Each focus group voiced a unique set of questions and concerns about the performance demonstration methodology. In general, however, printers reacted positively to the DfE printing project and felt that it would serve as a good first step in encouraging printers to implement pollution prevention concepts in their shops. In Boston, concern centered on the details of how the demonstrations would be performed. For example, participants felt that it was important to consider the characteristics of the rags used in performance demonstrations. Because the age and type of rag can greatly affect the volume of blanket wash used, variations in rags used during the demonstrations could skew the results. It was suggested, therefore, that new rags be used consistently during the demonstrations, otherwise the volume of blanket wash used might vary for reasons other that differences in the alternative products. Concern was also voiced about the variability among pressmen applying the blanket wash. Due to variations in quantities used by different pressmen, participants felt that it was important for the same person to use the product for the duration of the demonstration.

In Chicago, printers using automatic blanket washers pointed out that they are limited to the blanket washes recommended by their equipment supplier. As such, the DfE information may be of limited usefulness to them, particularly if the alternative products included in the performance demonstrations have not yet been tested for compatibility by automatic blanket washer suppliers.

Focus group attendees in Portland had more general concerns about the performance demonstrations. They felt that the demonstrations would be much more useful (i.e., credible and less subjective) if conducted in a controlled setting. They felt there was too much variability from one print shop to another to make meaningful comparisons among alternative products. They added, however, that it would be best to confirm the results of a laboratory test with in-field product demonstrations. One suggestion was to conduct such in-field tests on a multi-unit press where the baseline product and alternative product are used on the same press at the same time. This group also expressed concern over the number of alternative products to be demonstrated. They felt that

data on 30 - 35 products would be too much information to digest. It was suggested that products either be grouped by similar chemical formulations or limited to less than 10 alternative products in total.

Los Angeles participants also suggested some changes to the demonstration methodology. First, they would like to see the in-field demonstrations limited to printers who have similar operations, such as only 24" sheet-fed presses, to provide more consistent results. Second, they suggested the scope of the in-field demonstrations should be expanded to record information on the ability of the product to remove ink from rollers and printing tools (where ink may be thicker) in addition to it's performance in cleaning the blanket. Their last recommendation was to include a run where the press is changed from a dark color to a light color and a run from a light to a dark color. This will give an indication of the additional time, effort, and quantity of product needed to come up to color in two distinct scenarios.

APPENDIX A

Screen Printer and Lithographer Focus Group Summaries

Lithography DfE Focus Group
Natick, MA
October 21, 1993
4:00 - 5:30 p.m.

1. Logistics

The focus group was held at the Printing Industries of New England (PINE) office in Natick, MA as part of their Environmental Committee meeting. There were 10 people there including 5 printers, 3 consultants, and 2 PINE environmental staff members. Being members of a trade association Environmental Committee, the attendees were probably more knowledgeable about environmental issues in the printing industry than the average printer.

2. Reaction to DfE

After a brief introduction to the DfE Printing Project, there were several comments and questions centered around the issue of masking the product names in the results. From the discussions at the start of the meeting, participants seemed to feel the information would be useless without the product names because they wouldn't know how to get the same products from suppliers. However, by the end of the meeting, there was a change in attitude and it appeared that everyone was enthusiastic about receiving the results and they felt that the information would be very useful, even without the supplier names.

3. Content

There were several parameters that were not included in the matrix that would be useful. These were:

- **Effort** required to clean the blanket (this is a function of the lubricity of the product).
- Physical characteristics of the product including the **odor** and the "feel" (i.e., is it oily).
- **CAS#**. Different suppliers use different synonyms for the same chemical, making it difficult to identify a chemical if the CAS # is not included.

The "Risk/Hazard" category would be more useful if it was divided into two categories: "Health and Safety Risk" and "Environmental Burden". The "Environmental Burden" category could tie into waste disposal and regulatory issues, such as reporting, disposal and permitting requirements.

A list of participating suppliers should be included as part of the final information product with the company name, phone number and a contact name for all participating suppliers.

4. Format

Group the products in the matrix by VOC content, listed in ascending order.

Just as there are great variations from one printing facility to another, the target audience for the DfE results will also be disparate. Printers suggested there should be more than one final product. The people attending this focus group preferred Mock Up #1; the most detailed format. However, when they thought about the people in quick print shops and other small operations, they felt that Mock up #1 would be too detailed. Mock up #3 was suggested as a product for less informed printers.

A Fact Sheet explaining the matrix should always be included with each of the matrix formats.

They liked the idea of putting the matrix on a poster so they could glance over all the products at once, without turning pages.

5. Vehicles

Trade publications, trade associations, industry conferences and ECB were suggested as vehicles for distributing this information.

It was also suggested that federal, state and trade association environmental regulatory staff, especially technical assistance program personnel, bring this information to the facilities.

Another suggestion was to send a general mailing. For a mailing, labelling it with some sort of "EPA Official" header would tend to make the piece stand out from all the other mail they get in a day.

Many small printers do not belong to a trade organization. They can be reached through a general mailing. Franchise operations can be reached through their corporate headquarters. The corporate offices often publish newsletters or send mailings out to their franchises and they also make recommendations about the types of supplies their franchises use.

6. Other issues related to DfE

Testing Protocol

Consider the rags used in performance testing. The age and type of rag could greatly affect the volume of cleaning solution used and therefore skew the test results. It was suggested that new rags always be used for the test, otherwise the volume of cleaning solution used could be extremely inconsistent.

Some printers expressed concerns regarding the long term effects of the alternative blanket wash solution on the blanket and rollers. These effects would not surface in a one week test.

The same person should be testing the product all week. There are great variations in volume from one operator to the next.

The atmospheric conditions (including temperature and ventilation) and the equipment (press, rollers, blanket, ink) used in testing should be recorded as part of the testing.

Other

Printers are suspicious of the information they get from suppliers. They feel they can not trust the information on the MSDS. Also, the suppliers' literature they get does not provide much information on alternative products besides the VOC content.

Screen Printing DfE Focus Group
Cambridge, MA
November 16, 1993
8:30 - 10:30 a.m.

1. Logistics

The focus group was held at Abt Associates offices in Cambridge MA. Six people attended including 5 printers and 1 distributor.

2. Reaction to DfE

The participants were concerned that without the product names, the results would be difficult to use. They voiced their preference for naming the products and manufacturers, but, unlike the lithography focus group, there was not much discussion on this topic.

They also preferred to see the products ranked somehow and suggested a "Consumer Reports" format.

3. Content

The group suggested several characteristics that should be added to the final information product. In general, they wanted to get as much information as possible in the greatest detail possible. They recommended the following additions and changes:

• Include information on the **Side Effects** of the products on the mesh (e.g., corrosive damage).
• Report "**Quantity**" as quantity per area of screen cleaned.
• In the "**Reclamation time**" category, note if the haze remover required overnight drying time or not.
• For "**Risk**", include detailed, **descriptive** information. It was suggested that risk information be divided into "Short Term Risks" and "Long Term Risks". Also, they would like information on the exposure route of concern and recommended personal protection equipment.
• Regarding "**Disposal Issues**", they **do not** want anything that says "...dispose in accordance with federal, state and local regulations," similar to many MSDSs. One printer suggested adding a description of the disposal method required to comply with the strictest local regulations in the country (usually California). He felt that eventually all areas would have to comply with such strict requirements and he would like to plan ahead for regulatory changes.

They felt that it was important to have an objective evaluation of the disposal requirements for the product. Most printers felt they could not trust the information on the MSDS. One printer commented that there was a crowd of "snake oil" salesmen at the New Orleans conference, making such questionable environmental claims that one would expect a "baby Jesus in every gallon" of the product that will change it into water.

• Since the variability of operations from one screen printer to another is so great, they want as much information as possible on the "**Test Conditions**." Such factors as temperature, humidity, ventilation and screen drying time are critical.
• Add information on the "**Application Method**" used in testing and list alternative application methods since printing facilities have all different kinds of equipment.

4. Format

In general, they want as much information as possible to collect. The more scientific and quantitative, the better. One participant suggested that the matrix (mockup #1) be provided along with a fact sheet (similar to mockup #5) on each product. The matrix would serve as a table of contents, where a printer could look through the list and screen the products down to the few that looked most suitable for his operation. Then, he would read the fact sheets (or a case study format was also suggested) that give detailed information on just those products that interested him. Those fact sheets would need to include much more information regarding the test conditions. The other participants agreed that this suggestion would probably be the most useful format.

This group of printers said that no screen printer uses both solvent-based inks and UV-based inks in the same facility. They suggested breaking the results into different matrices: one for solvent-based inks, one for UV-based inks and one for aqueous-based inks.

5. Vehicles

To distribute this information to as many screen printers as possible, they suggested:
• Send out a direct mailing. Place announcements in the trade publications' "In the News" column that this information will be coming in a mailing. That is, advertise the mailing before sending it.
• Enlist the four major trade publications to send out the final information product with a copy of the magazine (or a tear-out card to mail back for the report).
• Some printers may only get information through their suppliers. Printers who are more concerned with issues of worker health and safety and environmental effects, do not trust the information coming from suppliers. These printers, will get this information from a trade publication or from a direct mailing. However, the printers who are less concerned with risk issues, **only** get their information from their suppliers and this route should definately be used.

6. Testing Protocol

Participants expressed several concerns with the Testing Protocol. They wanted these comments passed on to EPA in hopes of influencing the final Testing Protocol. These comments are summarized in a separate memo.

Screen Printing DfE Focus Group
Chicago, IL
December 6, 1993
8:30 - 10:30 a.m.

1. Logistics

The focus group was held at the Holiday Inn at O'Hare airport in Chicago. Eleven people attended including 6 printers, 1 consultant, 1 equipment manufacturer, 3 product suppliers/manufacturers.

2. Reaction to DfE

The participants, mainly the suppliers, felt that it would be difficult to provide enough information about the performance demonstrations to make the results useful. They noted that there are so many variables involved in testing that it would be hard to include them all in the final information product.

Printers felt that the final information coming out of DfE would be limited in it's usefulness in selecting an alternative product. The lack of product names and the variability between printing shops were the primary limitations. However, they did feel that it would help them to determine what kinds of information and questions they *should* get from their suppliers.

Some participants were concerned that by the time this information is published, it will be obsolete as new products come to market.

3. Content

The group suggested several characteristics that should be added to the final information product. They recommended:

• Add information on the "**Application Method**" used in testing. How is the product applied? What procedures and equipment were used in applying the product during the demonstration.

• Report "**Quantity**" as quantity per area of screen cleaned.

• For "**Risk**", include detailed, **descriptive** information. They also requested specific information on what Personal Protective Equipment was required and any other recommended precautions.

• Report **"Cost"** in terms of a standard quantity. They suggested $/5 gallon container as a standard.

• Regarding "**Disposal Issues**", they wanted information on both regulatory issues and on exactly how to dispose of the product. Since it may be difficult to provide detailed disposal information (because of local variations in regulations and because the product will most likely be mixed with ink and other chemicals when disposing it), one participant suggested providing information on *how* to go about getting the disposal information. For example, describe what lab tests are required prior to disposal and the price you can expect to pay for the testing. They also wanted to know the federal reporting requirements associated with the product.

• Since the variability of operations from one screen printer to another is so great, they want as much information as possible on the "**Test Conditions**." Such factors as temperature, screen drying time, more information on ink type, the resin system, the history of the screen, screen mesh and screen tension are critical.
• Add a column that lists the incompatibilities and restrictions for product use.
• The equipment supplier recommended that the term "System" be replaced with "Test" or "Product". He felt that "System" suggested that the cleaning process depended only on the chemicals you use without regard for how they are applied.

4. Format

Printers felt, and suppliers agreed, that the information should be in the most simple terms possible. They mentioned that the information must be in a format that the average printer can quickly understand. Within the discussion of "simple formats", there were two different suggestions: Several printers suggested very simple, basic information on the performance and risks of the product be provided. Mock Up #2, with a fact sheet, was proposed as an appropriate format for providing this simple information. Alternatively, other participants proposed the final information product should be a list of questions/information that printers should ask of their suppliers. Such a proposal eliminates the need for performance demonstrations. The reasoning was that it would be impossible to get all the information needed to evaluate the products, so instead give printers guidance or a "grocery list" of the information they should be receiving from suppliers on alternative products. Other printers at the focus group disagreed with this proposal and noted that the performance information is needed.

5. Vehicles

Participants like the idea of supplying this information on videotape because they could present the information to several people in the shop at the same time. The suppliers mentioned that "nobody reads anymore". They said the majority of questions they receive by phone are already answered in their printed material, but no one reads it.

To distribute this information to as many screen printers as possible:
• Distribution through SPAI, trade publications (but don't allow them to edit it) and suppliers. They said that it would be most credible if the got the **same** information from several of these sources.
• One participant recommended that printers would find the information most credible if it indicated that it was a result of discussions from industry focus groups, of "printers just like you".

6. Testing Protocol

Suppliers expressed several concerns with the Testing Protocol. The focus of their comments was that they did not want to give away their chemical formulations. After spending a lot of money on research, they would not allow their formulations to be published so that someone else could go mix the same product.

Lithography DfE Focus Group
Chicago, IL
December 7, 1993,
8:30 - 10:00 a.m.

1. Logistics

The focus group was held at the Abt Associates office in Chicago. Ten people attended including 8 printers, 1 PIA affiliate representative, 1 equipment manufacturer.

2. Reaction to DfE

The group felt that the information coming out of the project would be useful, but limited because product names were not given. They would like to see a list with the name of the manufacturers who participated in the performance demonstration, including a contact name and phone number for each participating company.

Some participants were concerned that this information could become obsolete quickly as new products come to market. One printer suggested that a performance demonstration occur annually.

3. Content

The group suggested several characteristics that should be added to the final information product. They recommended:

• In the "**Performance**" category, add a column for "Odor", "Lubricity" (a.k.a., "rag drag"), and whether or not a drying step was required.
• Supply as much information as possible on "**Chemical Content**". Chemical composition is the only means the printer has available to communicate to their suppliers the products they would like to try. Include information on the non-hazardous components of the product also.
• Report "**Quantity**" as compared to the baseline product quantity to reduce subjectivity.
• Record how long it takes to get the press back up to color.
• Note if a residue of the previous job is still on the blanket after the wash.
• For "**Risk**", include **descriptive** information. They mentioned that eye and skin effects were very important.
• Report **"Cost"** in terms of $/gallon.
• Regarding the "**Disposal Issues**" category, they want information on both disposal and regulatory issues. The printers were interested in a list of the applicable federal regulations for the product, and they also recommended including a warning saying local regulations may be more stringent than the federal regulations. They requested that phone numbers of state level regulatory contacts be provided.
• Be more specific about the VOC content. Report the percent VOC content (not the range) and also report in "pounds/gallon".

4. Format

Printers felt that Mock Up #2 would be the best format for the press operators since they are typically most interested in the health and safety hazards. They preferred Mock Up #3 for themselves (management or supervisors, as opposed to operators). Although Mock Ups #2 and #3 contain the same information, the presentation is different and it may have appeared to the participants that Mock Up #3 contains more numerical information. They felt a "Fact Sheet" explaining the columns of the matrix would be helpful with any of the formats.

Some printers felt a video would be useful in addition to the printed material. Others felt they would never take the time to view a tape.

They agreed the products should be sorted by VOC content.

5. Vehicles

To get this information to as many printers as possible, they suggested:

• Mail it to printers with an "EPA OFFICIAL" stamp on it. They would not ignore a mailing with "EPA" on it.

• Provide this information to the suppliers for distribution. They use their suppliers as consultants and they trust suppliers to inform them of what's coming down the pike.

• Publish the information in as many trade publications as possible.

6. Other Comments

Printers using automatic blanket washers mentioned that they had to use blanket washes that were on the equipment suppliers recommended blanket wash list; they would only consider washes that are on this approved list.

The equipment supplier noted that their automatic blanket washer used significantly *less* blanket wash solution when they switched from high VOC to the low VOC blanket washes. This observation contradicted what other printers have said about switching to low VOC solutions in manual applications where significantly *more* wash is reportedly required.

Screen Printing DfE Focus Group
Seattle, WA
January 19, 1994,
8:30 - 10:30 a.m.

1. Logistics

The focus group was held at the offices of Metro Hazardous Waste Management in Seattle. Twenty-three people attended, including 7 printers, 3 printing supply manufacturers, 2 printing suppliers, 10 representatives from local and state technical assistance groups and the county health department, and 1 consultant.

2. Reaction to DfE

• The printers and suppliers felt the information would be much more useful if trade names were provided. One participant felt the information would be useless without trade names of products. Others were concerned that they would have to do a lot of work (i.e., contacting suppliers, researching products) to identify the manufacturer of the product they wanted to try. They felt that smaller shops might not make this effort. Participants were all concerned that if they had to request a formulation from their suppliers, the supplier may not give them what they had asked for. Printers felt that suppliers would try to claim that the product that looked the best was theirs.

•By the end of the meeting, participants agreed that while DfE does not address all their concerns, it is a good staring point for the industry.

• Also, a representative from the state Department of Ecology mentioned that state agencies may be able to help address printers' concern regarding trade names. The state may be able to assist printers by providing more information that could help to identify manufacturers. Also, the state may be able to provide additional information on disposal requirements tailored to state regulations.

3. Content

The group suggested several additions to the information in the matrix. They recommended:

• Add a column for VOC content.

• Include the pH of the product, where applicable.

• The disposal procedures on this document refer only to the disposal of screen reclamation products *before* use. Add a disclaimer noting that once the demonstration products are combined with ink or other printing products, the disposal procedures may vary.

• Add "screen mesh" under Test Conditions.

• Be more specific on the "ink type" and "emulsion type." For example, list "acrylic based lacquers" instead of just "solvent based" inks.

• For Risk, include detailed *descriptive* information.

• Add information on the application procedure(s) used for each alternative system demonstrated.

• The local technical assistance representative suggested that a note to say "state and local regulations may be more stringent. Check with your state and local offices before disposal."
• They want to see Cost reported as $/gallon.
• One supplier felt that the type of information printers need is a list of the chemical constituents to avoid in products and a list of those that are acceptable for use.
• All participants agreed that it would be very helpful to include a list of the manufacturers who participated, including a contact name and phone number.

4. Format

• Most participants agreed that a combination of mockup #1 and #2 would be the most useful. They liked the descriptive text of mockup #2, combined with the detailed information and tabular format of mockup #1.
• All participants felt that a fact sheet describing the columns of the matrix would be helpful.
• One printer mentioned he would like to see products ranked in a *Consumer Reports* format.

5. Vehicles

• They liked the idea of a videotape so they could show it to all their employees at once. One printer suggested that footage of a printer reclaiming a screen would be a useful part of the videotape.
• To distribute the information to as many screen printers as possible, they suggested:
  — Distribution through SPAI trade shows.
  — They noted that it would be less credible if published in trade journals, which sometimes appear biased.
  — Direct distribution from EPA with trade association endorsements. The best way would be with endorsements from several trade associations.
  — To reach printers that don't belong to a trade association, it may be best to have states do direct mailings.
  — Most printers agreed that they would <u>not</u> view this information as credible if it came only from their suppliers.

6. Demonstration Protocol

• Some of the printers would prefer to see the performance of alternative products evaluated under consistent, comparable, laboratory test conditions. The current methodology of demonstrations at a variety of printing facilities will not allow them to compare results.
• Another printer disagreed with laboratory testing because he felt that it would turn into a product "approval" procedure. Such a procedure would not allow emerging technologies to enter the market easily.

Lithography DfE Focus Group
Portland, OR
January 20, 1994
2:00 - 4:00 p.m.

1. Logistics

The focus group was held at the Pacific Printing and Imaging Association (PPIA) office in Portland, Oregon. Twelve people attended: 5 printers, 2 trade association representatives, 3 state agency officials, 1 supplier, and 1 consultant.

2. Reaction to DfE

The group's reaction to the DfE project centered mainly on the demonstration methodology. These comments are summarized in Section 6. Unlike the previous two focus groups, discussions regarding the omission of product trade names was minimal.

3. Content

The group suggested the following changes to the final information product:

- Under the **Performance** category a column should be added for "Odor."
- An additional column should be added to the **Performance** category for "Ease of Use." This column would report information such as whether or not the blanket wash was slippery or greasy, and whether or not there was any drag when using the alternative blanket wash.
- It was suggested that "Ease of Drying" be changed to "Speed of Drying."
- Report **Cost** in terms of $/gallon.
- Include Hazardous Materials Information System (HMIS) codes for health risks of each chemical.
- **Risk** information should be presented in descriptive terms.
- Participants would like to see personal protective equipment recommendations included in the matrix.
- Participants would like information presented on specific human health and safety concerns. They would also like information specific to environmental concerns, including: waste disposal, federal regulations, and environmental burden.
- Include the PEL for each chemical in the human health and safety column.
- Regarding disposal issues, participants would like to have information about their state and local requirements. They suggested a cooperative effort with state and local agencies that would provide regulatory information tailored to local printers.
- Eliminate "Vapor pressure" column, but add "Evaporation rate."
- Participants would also like to have detailed information on test conditions such as: ink coverage, press manufacturer and model, age of press, length of run, blanket condition, dampening system.

4. Format

Mock-up #1 was the preferred format for presenting the DfE information. There was also interest in mock-up #3. They felt that the fact sheets explaining the columns of the matrix would be useful with any of the formats. It was also suggested that a spreadsheet on disk would be very useful. A spreadsheet format would allow management to reformat and tailor the information to their facility's needs. Other suggestions included: a poster and a fold-out brochure. All participants agreed that several formats would ultimately be necessary.

5. Vehicles

To get this information to as many printers as possible, they suggested:

• Direct mailing to printers. If possible, address to production manager, purchasing agents, and/or pressman. Labeling it with the official EPA logo would get their attention.

• Disseminate the information through trade association presentations and trade journals. Articles and announcements in trade journals would be useful in notifying printers that the information was coming.

• Provide information to suppliers for distribution.

• It was also suggested that state and local environmental agency staff, especially technical assistance program personnel, bring this information to the facilities during their visits.

6. Testing Protocol Issues

Participants had several comments about the testing protocol. These comments are as follows:

• There was general agreement that performance demonstrations would be much more useful (i.e., credible and less subjective) if conducted in a controlled setting. They felt there was too much variability from one print shop to another to make any comparisons among products. They added, however, that it would be best to confirm the results of a laboratory test with in-field product demonstrations. One suggestion was to conduct such in-field tests on a multi-unit press where the baseline product and alternative product are used on the same press at the same time.

• Concern was expressed over the number of alternative products to be demonstrated. They felt that it would be too much information to digest. It was suggested that products either be grouped by similar chemical formulations or limited to less than 10 total.

Lithography DfE Focus Group
Los Angeles, CA
April 21, 1994
9:00 - 11:00 am

1. Logistics

The focus group was held at the Printing Industries of America - Southern California office in Los Angeles. Eight people attended including 6 printers and 2 trade association representatives.

2. Reaction to DfE

The group expressed concern that product names would not be supplied. Without product names, printers felt it would be difficult to be sure they were purchasing products with the same characteristics as the products presented in the matrix. In addition, ranges of chemical constituents were thought to be a problem. Specifically, they were concerned that products requested might not be the same formulation as products included in the demonstrations. Furthermore, printers would have to invest their time in researching products and contacting suppliers to identify a supplier for the product they wanted to try. One participant suggested, however, that it might be useful to include a "reader service card" with the final information product that would allow printers to circle a number corresponding to a blanket wash and mail it back to EPA. EPA would then forward the card to the appropriate manufacturer. The manufacturer could then contact the printer with more information on the product.

3. Content

This group's primary concern was whether or not the product would comply with local air regulations. With the strict air regulations in Southern California, they felt that if they used products that were in compliance, their environmental and worker health risks would be low. The group suggested several changes to the final information product. They recommend:

- In the **Chemical Constituents** column, report percentages as "percent less than", rather than in a range. Use 5 percent increments for reporting. For example, the product contains: Chemical 1 at < 5 percent, Chemical 2 at < 40 percent, Chemical 3 at < 45 percent.
- In the **Performance** category, add a column indicating the effect of the alternative product on the blanket. For example, did the product glaze the blanket or cause swelling?
- Also in the **Performance** category, indicate how many cleanings were required to bring the press back up to color, and how many shop towels were required to clean the blanket.
- In the **Cost** category, report cost in terms of a standard quantity. They suggested reporting it in 2 quantities -- $/5 gallon container and $/55 gallon drum.

• For **Risk**, include personal protective equipment recommended for use with product by California OSHA.
• Regarding **Federal Regulations**, add an indication of whether the product is subject to reporting requirements such as SARA 311, 312, and 313.
• This group felt very strongly that it was important to list the local regulations that apply to the product. They are most concerned with the emission limits set by the Southern California Air Quality Management District. As was suggested in other focus groups, they thought it would be a good idea to include information on the strictest regulations in the country for each medium on the final information product.
• For **Chemical Characteristics**, printers agreed that it would be useful to present VOC content as lbs/gallon and grams/liter instead of as a percent of total volume. In addition, vapor pressure should be listed as partial vapor pressure rather than total vapor pressure.
• Add a **Test Conditions** category to the matrix. This category should include information on ambient air temperature, ambient humidity, type of press, size of press, type of ink, and the type of blanket and roller, and the length of the run.

4. Format

Initially, reaction was mixed to the various formats discussed in the focus group. Some printers felt that it was important to provide information in the most descriptive terms possible. Others felt that numeric information would be more useful to them. After some discussion, however, all agreed that mockup #1 accompanied by a fact sheet on each product was the preferred format. One printer commented that a "chart-like" format would make products easier to compare. Whatever format is used for the final information product, it should be eye catching and of high quality. For example, they particularly liked the DfE printing industry case study. Other formats discussed but not well received included; posters, brochures, and videotapes. One participant recommended using an electronic format for the final information product such as CD ROM. The rest of the group felt that an electronic format is not readily portable and accessible and would be of limited use.

5. Vehicle

To distribute this information to as many lithographers as possible, they suggested:
• Publish the results of the performance demonstrations as an article in a trade journal.
• Distribute the final information product at trade shows and through regional printing newsletters.
• Have PIA and EPA distribute the final information product directly to printers.
• Use as many sources as possible to disseminate the information. Multiple sources would lend credibility to the final product.

6. Other DfE Issues

Demonstrations Methodology

The printers had several suggestions regarding the Demonstration Methodology, such as:

• They would like to see the in-field demonstrations limited to printers who have similar operations, such as only 24" sheet-fed presses. Such a limitation would provide more consistent results.

• Demonstrations should also record information on the ability of the product to remove ink from rollers and printing tools (where ink may be thicker) as well as it's performance in cleaning the blanket.

• The demonstrations should include a run where the press is changed from a dark color to a light color and a run from a light to a dark color. This will give an indication of the time, effort, and quantity of product needed to come up to color in the worst case and best case scenarios.

• This information should be updated annually (at least) due to the rapid introduction of new products to the market.

MSDSs

• Printers do not rely on the information from MSDSs. They describe receiving out-dated MSDSs and MSDSs that are generic to a product line, but offer no specific information on the product they purchased. They also complained that the formats are not consistent, making them even more difficult to interpret.

Screen Printing DfE Focus Group
Los Angeles, CA
April 21, 1994
1:00 - 2:30 pm

1. Logistics

The focus group was held at the Printing Industries of America - Southern California office in Los Angeles. Eight people attended including 6 printers and 2 suppliers.

2. Reaction to DfE

The group expressed concern that product names would not be supplied. Without product names, printers felt it would be difficult to be sure they were purchasing products with the same characteristics as the products presented in the matrix.

3. Content

This group was concerned about whether or not alternative products would comply with local air regulations and whether or not they cleaned the screen as well as the products they were currently using. Other issues such as disposal requirements and product risks were secondary considerations. The group suggested several changes to the final information product. They recommend:

- In the performance column, clarify the information on quantity of product used and time required to reclaim by including the screen size used in the demonstration. Also, if the product is reused or recycled, indicate how many times it is reused before disposal or addition of fresh product.
- Add information about the effects of the ink remover on the stencil and the effects of the haze remover on the screen mesh.
- Information on drying time of the ink remover was considered important, but only for on-press application of the product.
- Include information on the application method of the product as it was used in the demonstration.
- In the cost category, report cost in terms of a standard quantity. They noted that it was useful for comparison of products, but that prices differ regionally, so such a comparison may not be very accurate.
- For risk, include personal protective equipment.
- Report risk information in descriptive terms and "plain language". Currently, air regulations are such a large concern, that product risk is not often a consideration.
- They recognize that disposal issues are very localized, so they thought it would be difficult to include any information that was really useful to them. Disposal issues are further complicated because products are mixed with inks and emulsion before disposal.

• Under Test Conditions, include more specific information on the ink type used. For example, list epoxy ink instead of just solvent-based ink. Also include the number of impressions of the last run. They did not think it was very useful to include the ink color.

4. Format

The participants felt that it was important to provide information in the most descriptive terms possible. Generally, they liked mockup #2, but suggested adding more specific information on the performance such as is presented in mockup #1 (i.e., quantity applied and cleaning time). The printers preferred the simple, understandable terms of mockup #2 used to describe the Risks and the Disposal Issues. After some discussion, all agreed that mockup #2 accompanied by a fact sheet on each product was their preferred choice of formats. Other formats discussed but not well received included posters, brochures, and videotapes.

5. Vehicle

To distribute this information to as many lithographers as possible, they suggested:
• Publish the results of the performance demonstrations in a trade journal. Screen Printing Magazine was suggested as a publication that most print shops receive.
• Distribute the final information product at trade shows.
• SPAI was the most credible source to some printers. One printer noted that he feels SPAI is "on my side".
• Use as many sources as possible to disseminate the information. Multiple sources would lend credibility to the final product.

6. Other DfE Issues

They agreed that it was important to get this information out to printers as soon as possible.

APPENDIX B

Screen Printer and Lithographer Focus Group Facilitator's Guides

Facilitator's Guide
Final Products Focus Group - Lithography
DfE Printing Project

1. Introduction

I'd like thank you all for participating in this focus group. We appreciate the time you're taking to be here today. It looks like everyone is here so let's get started.

My name is _____ and I will be serving as the facilitator of the focus group. I am from Abt Associates, a consulting firm in Cambridge. We have been contracted by the EPA to help determine the best format for presenting the information collected in the Design for the Environment Printing Project. Abt is also involved in several other aspects of the Design for the Environment Project such as the Performance Testing of alternative products. Also from Abt is _____ who will be taking notes and helping me to summarize your comments.

a. Self introductions

I'd like to begin today by having each of you introduce yourself, including your name, your company and your position.

b. Logistics

The point of this focus group is to have an open discussion. Please speak openly and candidly as we go through the Design for Environment information; our goal here is to get your opinions. In addition to this focus group, similar focus groups with lithographers will be held in 2 or 3 other locations. We will also hold a series of focus groups with Screen Printers. Following these meetings, Abt will put together a report summarizing the discussions and findings. The report will not attribute specific comments to particular individuals and it will be available to anyone who would like a copy. Unless anyone objects, we would like to record this meeting as a back up to the note taking.

Is it OK if we tape the meeting?

2. Goals/Purpose of Meeting

a. Intro to DfE

For those of you who have not heard much about the EPA's Design for the Environment Printing Project, I'll briefly describe what it's all about and where this focus group fits in.

The Design for Environment Printing Project, referred to as DfE, is a unique project in that it is a cooperative effort by the EPA and printing trade associations like PIA, SPAI (the screen printers association), and others. The project is aimed specifically at developing pollution prevention information for printers. This project was initiated when printing industry association groups came to the EPA and asked for help in evaluating products that claim to be environmentally friendly. The EPA and several trade associations responded by setting up the DfE Printing Project. As one of the first steps in this project, industry representatives prioritized the areas of environmental concern in printing. Blanket washes in lithography and screen reclamation in screen printing were identified by printers as the two areas of greatest concern, so these two areas have been the primary focus of the project to date. For lithography, the project is gathering information on the performance, cost and the health and environemntal risks of alternative blanket wash products.

A lot of information will be collected and the DfE project hopes that this information will assist printers by:

- Providing information on a variety of alternative blanket wash products
- Encouraging your suppliers to compete on the basis of the health and environmental characteristics of their products
- and by Giving you a guide so when you consider other new products, you'll know what type of information on environmental effects you should be getting from your supplier.

The information collected from the testing and research represents a significant effort by both the printing industry and the EPA. The EPA will prepare a fairly lengthy document summarizing this research. However, one of the final steps in this project is to make sure that this information gets to the people who can use it, printers, and that it is summarized in a format that is most useful to you.

b. Purpose of this focus group

That is where this focus group comes in. Through a series of meetings like this one, we are talking with lithographers to determine what the final product or products should look like.

This is an opportunity for you to influence the final product you receive. Even if you have an idea that you think only applies to your specific operation, let us know about it. It might be an idea that we end up hearing from other focus groups.

Today, we want to get your ideas and opinions on:

- ***What information is most useful to you?*** (CONTENT)
- ***What format is most useful to you?*** (FORMAT) and
- ***What is the best way to get this information to printers?*** (VEHICLE)
- ***Within the printing facility, who can (or who should) use this information?***

This is a lot to cover. I'll first go over the specifics of what information is being collected in the DfE project, so we can discuss what information is most useful to you.
Second, we'll look at some mock ups of different formats for presenting the performance, cost and risk information so we can discuss which format works best for you.

Are there any questions about the DfE project as I've explained it so far?

3. Content of CTSA Information

There are 2 ways that DfE is gathering information:

First, the EPA is testing alternative blanket wash products to determine how effectively they clean the blanket. All testing will be done at actual printers facilities where they will use the product in production for a week. These printers are interested in finding substitute products and they have volunteered their facility to help the DfE project collect the most useful information possible. The products being tested are voluntarily submitted by suppliers who want their products included in the testing.

Second, the EPA will calculate the risks associated with the products tested based on the chemical content and estimates of the occupational exposure.

☞ ***Pass out copies of mock ups***

I'm passing out copies of some ideas of how all this information may be compiled. We'll go through the content and format of each of these individually, but you can see on the first page the type of information that will come out of the testing and the risk analysis work. What we will end up with is a mix of objective and subjective information. The information will include a subjective evaluation of how effective the product was, an estimate of the cost of the product, risk information, and chemical characteristics of the product.

I'd like to go through each of these categories and talk about what kind of information you would like to see coming out of this project in the future, but before we do that I'd like to get some background and talk about what information you get **now**.

If you wanted to try a different blanket wash, how do you go about getting the information

you need to evaluate the new product?

- Has anyone tried a different blanket wash recently?
- Where did you get the information about the product? (Did the supplier approach you? Did you get the information through a trade journal or trade association?)
- Did you have sufficient information to make a decision about the product?
- Is there any information that you would like to have that you DID NOT get?
- For those of you who haven't made a change recently, if you wanted to try a new blanket wash, how would you go about getting information to make a change?
- Who would use this type of information within the facility?

☞ ***Turn to Mock Up #1***

OK, that gives us some good background on the kind of information you're getting now. So next let's go through the matrix and talk about what kind of information you would like to get in the future. The first page of your handouts is MOCK UP #1. Each mock up is labelled in the upper right hand corner. Using this matrix as a starting point, let's go through the types of information that you would like to have when selecting a blanket wash.

There are a few things to note here:

- Products are not referred to by their trade names, instead they are referred to as Product A, B, C etc. This was the agreement made with suppliers in order to get their full cooperation.
- The chemical constituents of the products are reported in ranges in order to protect trade secrets.
- Also, as we go through the different format options, you will notice that there are no rankings of products. No product is listed as "Best" or "Worst". The intention of this project is not to promote or endorse any product. The goal is to gather all the necessary information on alternative blanket washes, present it to the printers, and then let the printer make their own decision on which products are best for their operation.

I'd like to go through each of these categories and get your ideas on what kind of information should be included in each.

Starting with the first category, **PERFORMANCE**:

- The evaluation of performance will be subjective, determined by the printer who is doing the testing. To reduce the subjectivity, the printer will first clean the blanket using a baseline product. Then, the performance of the test product will be compared to the baseline. This should reduce the subjectivity between different people in different facilities. As we go through the performance categories listed here, think about what other performance factors you would need to know about a new product. The parameters in this matrix include:

- Ability to cut ink
  This category would list the types of ink that the solution was able to remove during the testing.
- The quantity of solution required per application
  The data for the other 3 performance categories compares the test product to the baseline product. Each printer testing a product, will first clean the blanket using the baseline. "Quantity" column indicates how much test product was required compared to the volume of baseline product used.
- The time required to clean the blanket
- and the Effort Required

Are there any other performance characteristics that you would like to see in this chart?

What other information about the specific test conditions is useful (length of time ink was allowed to dry before cleaning, type of press etc.)?

Now for **COST**:

• Cost is presented here in $/gallon. ***What is the best way to present cost information? Is there some way to present it in $/cleaning? What would constitute a cleaning?***

The next category on this matrix is RISK:

The risk information is based on the chemical composition of the blanket wash. The EPA will look at the chemical constituents and identify the toxic properties associated with each one. They put the toxicity information together with information of exposures that they have estimated from a number of work place surveys, and estimate the risk of the product. What information do printers need regarding the risk of the product? is 10^{-4} too complicated? Would simple terms such as "eye and skin irritant" be preferred?

The last category on this matrix lists the CHEMICAL CHARACTERISTICS of the product.

VOC content and flash point are being measured as part of the testing. ***Are there any other chemical properties that you would find useful in selecting a blanket wash?***

Vapor pressure will not be measured, but the value as reported by the supplier could be included.

4. Format of Performance Testing Information

• OK, now let's talk about *HOW you would like to see this information presented? What format is most useful?* The rest of the information packet I handed out has some other formats for presenting this information. These are only drafts at this point. These will be revised based on the comments we get from the focus groups. I want to get your suggestions on what type of format best suits your needs.

☞ ***Refer to MOCK UP #1***

Mock Up #1, the detailed format we have been discussing so far, is the most detailed format and contains the most numerical information.

☞ ***Turn to the Fact Sheet***

Another option would be to include a "Fact Sheet" with this matrix. Such a Fact Sheet would serve as a reference for each column in the table. For example, everyone reading this chart may not be familiar with what a flash point of 100 F means. The Fact Sheet would explain this column by describing that the flash point is the temperature at which the liquid gives off a vapor sufficient to form an ignitable mixture. A flash point of less than 100 F is considered LOW, meaning that it may be a safety hazard. To avoid a fire hazard, precautions must be taken in storing and handling products with low flash points. A flash point greater than 200 F is generally not considered to be a hazard, but the safety of the product is dependent on the specific conditions in the facility. The Fact Sheet describes how to interpret the information in each column, but it does not describe the specific results associated with each product. In the case of performance, the Fact Sheet would describe how the performance ratings were obtained. For cost, the Fact Sheet would describe the factors that were used in the cost calculation including what wage rate was used. The Risk/Hazard column would describe what a risk of 10^{-4} means and what range is considered an acceptable risk.

- Would the Fact Sheet make this format easier to understand?
- Would you be likely to read the Fact Sheet?
- Do you think the length of the Fact Sheet should be limited? To 1 page?

Now, I'd like to flip through each of the other 4 mockups I handed out, and then we can talk about which one best suits your needs or what changes need to be made to these formats or any other formats that you think would be useful that aren't included in this set of mockups.

☞ ***Turn to MOCK UP #2***:

This format is similar to the previous one, however, it uses more descriptive text where the first matrix used numbers to describe the results. For example, in the RISK column, the first example reported carcinogenic risk as 10^{-4}, and this format describes how the product can be a health risk. There are differences in the other categories as well.

☞ ***Turn to MOCK UP #3***

The third mock up gives the same type of information as the first matrix, but uses a different format. The products are listed across the top of the page. the content is also slightly different in that it is a combination of the descriptive and numeric information. The risk information is given descriptively.

☞ ***Turn to MOCK UP #4***

This mockup is a Fact Sheet only; no matrix is included. In format, it is similar to the Fact Sheet we talked about earlier. But, since it is not accompanied by a matrix, it will contain information on the test results instead of just explanations of what the different testing categories mean. For example, the performance category will describe how the product performed under the given test conditions and will include any limitations of the product.

☞ ***Turn to MOCK UP #5***

The final mockup is a series of Fact Sheets. It's similar to the fact sheet we just looked at, but it has only one product on each page. With an expected 35 or more products involved in the testing, this format would result in a 35 or more page document.

- In which format is the risk information most useful to the printers?
- Which format is easiest to understand?
- Do you have any suggestions to improve any of these formats?
- Are there any other formats that would be better?

5. Vehicles

Several other ways of presenting this information were considered such as Brochures, posters, video conference, videotape, ...

- Would a different vehicle for presenting this information be more useful?
- Would another format in addition to the matrix be useful?

Who would you like to get this information from?

- What source do you consider as the MOST CREDIBLE in reaching you with this kind of information? Why?

6. Closing

I hope you have a better idea of what information will be coming out of the Design for Environment Printing Project.

- Does anyone have any further comments on content or format of this information or on the DfE project in general?

Once again, I want to thank you again for participating.

Facilitator's Guide
Final Products Focus Group - Screen Printing
DfE Printing Project

1. Introduction

I'd like to welcome you all and thank you for participating in this focus group. We appreciate the time you're taking to be here today. It looks like everyone is here so let's get started.

My name is _____ and I will be facilitating today's meeting. I am from Abt Associates, we're a private consulting firm. We've been contracted by the EPA to help determine the best format for presenting the information collected in the Design for the Environment Printing Project. Abt is also involved in several other aspects of the Design for the Environment Project such as the Performance Testing of alternative products. Also from Abt is _____ who will be taking notes and helping me to summarize your comments.

a. Self introductions

I'd like to begin this morning by having each of you introduce yourself, including your name, your company, and approximately what percentage of your business is in screen printing.

b. Logistics

The point of this focus group is to have an open discussion. Please speak openly and candidly; feel free to ask questions anytime; our goal here is to get your opinions. Abt will be putting together a report summarizing the discussions and findings. The report will not attribute specific comments to particular individuals and it will be available to anyone who would like a copy. Unless anyone objects, we would like to record this meeting as a back up to the note taking.

Is it OK if we tape the meeting?

2. Goals/Purpose of Meeting

a. Intro to DfE

For those of you who have not heard much about the EPA's Design for the Environment Printing Project, I'll briefly describe what it's all about and where this focus group fits in.

The Design for Environment Printing Project, referred to as DfE, is a unique project in that it is a cooperative effort by the EPA and printing trade associations like SPAI, PIA (the lithographers association), NAQP and others. The project is aimed specifically at developing pollution prevention information for printers. This project was initiated when printing industry association groups came to the EPA and asked for help in evaluating products that claim to be environmentally friendly. The EPA and several trade

associations responded by setting up the DfE Printing Project. **As one of the first steps in this project**, industry representatives prioritized the areas of environmental concern in printing. Screen reclamation in screen printing and blanket washes in lithography and were identified by printers as the two areas of greatest concern, so these two areas have been the primary focus of the project to date. For screen printing, this will include performance testing alternative screen reclamation systems. In addition to the performance and cost data generated during these tests, the EPA is researching the associated environmental, health and safety risks of these products.

The information collected from the testing and research represents the cumulative effort of both the printing industry and the EPA as they work together to gather concrete information on substitute products. The EPA will prepare a fairly lengthy document summarizing this research. However, **one of the final steps in this project is to make sure that this information gets to the people who can use it, printers**, and that it is summarized in a format that is most useful to you.

b. Purpose of this focus group

That is where this focus group comes in. Through a series of meetings like this one, we are talking with screen printers to determine what the final information should look like.

Today, we want to get your ideas and opinions on:

- ***What information is most useful to you?*** (CONTENT)
- ***What format is most useful to you?*** (FORMAT) and
- ***What is the best way to get this information to printers?*** (VEHICLE)
- ***Within the printing facility, who can (or who should) use this information? Who is the TARGET audience?***

This is a lot of information to cover, so I'll first go over the specifics of **what information is being collected** in the DfE project, so we can discuss what information is most useful to you.
Second, we'll look at some mock ups of different formats for presenting the performance, cost and risk information so we can hear your ideas on what format works best for you.

Are there any questions about the DfE project as I've explained it so far? Irealize this is pretty much all new information for some of you.

OK, I'd like to start by explaining the types of information being collected in the DfE project.

3. Content of CTSA Information

There are 2 ways that DfE is gathering information:

The first way is through **performance testing**. The EPA is testing alternative screen reclamation systems to determine how effectively they clean the screen. All testing will be done at actual printers facilities where they will use the product in production for one month. These printers are interested in finding substitute products and they have volunteered their facility to help the DfE project collect the most useful information possible. The products being tested are voluntarily submitted by suppliers who want their products included in the testing.

Second, the EPA will calculate the risks associated with the products tested based on the chemical content and estimates of the occupational exposure.

☞ ***Pass out copies of mock ups***

I'm passing out copies of some ideas of how all this information may be compiled. These mockups are a way to start the discussion, but the point of this meeting is to hear your thoughts on what format works best for you. It may not be one I've thought of here. We'll be looking at the content and format of each one of these, let's start by looking at the chart on the first page. This chart shows the type of information that will come out of the testing and the risk analysis work. What we will end up with is a mix of objective and subjective information. The information will include a subjective evaluation of how effective the product was, an estimate of the cost of the product, risk information, and chemical characteristics of the product.

There are a few things to note here:

• Products are not referred to by their trade names, instead they are referred to as System A, B, C etc. This was the agreement made with suppliers in order to get their full cooperation.

(This was the agreement because:

- EPA does not want to give the impression that they are endorsing or promoting any products.
- Suppliers can advertise which products are theirs.
- Some suppliers DO want to publicize which product is theirs and ideally someone will crack the code and advertise which products are which, but the EPA can't do that.
- Hopefully, the results will spark the interest of printers and you will go to your suppliers and say, "I want this type of system. What do you have?"

• The chemical constituents of the products are reported in ranges in order to protect trade secrets.
• Also, as we go through the different format options, you will notice that there are no rankings of products. No product is listed as "Best" or "Worst". Again, the intention of this project is not to promote or endorse any product. The goal is to gather all the necessary information on alternative screen reclamation systems, present it to the printers, and then let the printer make their own decision on which products are best for their operation.

The DfE project hopes that this information will assist printers by:
• Providing information on a variety of alternative screen reclamation products
• Encouraging your suppliers to compete on the basis of the health and environmental characteristics of their products
• and by Giving you a guide so when you consider other new products, you'll know what type of information on environmental effects you should be getting from your supplier.

Are there any questions?

Before we go over the type of information you'll get from the DfE project in the (near) future, I'd like to talk about what information you get **now**.

When you want to try a different screen reclamation system now, how do you go about getting the information to make a change?

Why would you consider trying a new screen reclamation system? How would you go about getting information to make a change?

Has anyone tried a different screen reclamation system recently?

Where did you get the information about the product? (Supplier, trade journal, trade association, MSDS?) DfE advantage over MSDS bc. all products are evaluated in the same way, using the same method and the same sources.

Did you have sufficient information to make a decision about the product?

Is there any information that you would like to have that you DID NOT get?

Who would use this type of information within the facility?

OK, that's some good background information on where you are now. SUMMARIZE.

☞ ***Turn to Mock Up #1***

OK, now let's move on to the first chart in the handouts and talk about what kind of information you would **like** to get. The first page of your handouts is labelled MOCK UP #1. Each mock up is labelled in the upper right hand corner. Using this matrix as a starting point, let's go through the types of information that you would like to have when selecting a screen reclamation system.

Each column lists a characteristic for each of the products listed down the left hand side of the page. The column headings include the performance of the product, the cost, it gives a numerical risk for carcinogens and a descriptive risk for non-carcinogens, it describes the

federal regulations that apply to the specific chemical and then lists some of the test conditions.

I'd like to go through each of these categories and get your ideas on what kind of information should be included in each.

Starting with the first category, **PERFORMANCE**:

• The evaluation of performance will be subjective, determined by the printer who is doing the testing. How a product performs is very subjective and it is judged by the operator doing the test. As we go through the performance categories listed here, think about what other performance factors you would need to know about a new product. The parameters included in this matrix include:

- Quantity applied
  How much product was used. This can be reported as an average amount per square inch of screen.
  (calibrated squeeze bottle? TBD. Observer will be present for 1st day).
- Cleaning time
  How long did it take to clean the screen.
- Was the screen reusable?
  Yes or No. This category could also include subjective information on the quality of the screen.
- and Were there any printing limitations on the screen after it was cleaned?

Are there any other performance characteristics that you would like to see in this chart?

Now for **COST**:

On this chart, cost is presented in $/gallon.

• *What is the best way to present cost information? Is there some way to present it in $/cleaning? What would constitute a cleaning?*

The next category on this matrix is RISK:

The risk information is based on the chemical composition of the product. The EPA will look at the chemical constituents and identify the toxic properties associated with each one. They put the toxicity information together with information of exposures that they have estimated from a number of work place surveys, and estimate the risk of the product.

• *What type of information on risk is most useful to you?*

What information do you need in order to evaluate the risk associated with a particular product?

What about the format of the risk information?

Would printers prefer to see risk listed in this scientific format, like 10^{-5}, or is a description of risk preferred, such as "the ink remover is a skin irritant".

WASTE DISPOSAL

The last category deals with the waste disposal issues associated with using this product.

What type of information on waste disposal do you need? Should federal regulatory

requirements for the test product be listed? For example, "Hazardous Air Pollutant" or "RCRA waste 005/U220" or "SARA listed chemical", etc.

TEST CONDITIONS

Test conditions include the Ink type used during testing, the type of emulsion that was on the screen and the ink color used during the test. These may list several different types if the cleaning results were fairly consistent throughout the testing period using different types of screens and inks.

Is there any other information concerning the test conditions that you would need to know?

4. Format of Performance Testing Information

• OK, now let's talk about *HOW you would like to see this information presented? What format is most useful?* Let's go through each mockup in this packet, briefly, and then talk about which one of these best suits your needs. If you have any ideas for different formats, we want to hear those too. As we go through these think about...

Is there any information that you would need in selecting a screen reclamation system that is <u>not</u> on this chart? (What's missing?)

What information is essential? Why?

Is this format easy to understand?

Do you have any suggestions to improve this format?

☞ ***Refer to MOCK UP #1***

Mock Up #1, the detailed format we have been discussing so far, is the most detailed format and contains the most numerical information.

☞ ***Turn to the Fact Sheet***

Another option would be to include a "Fact Sheet" with this matrix. Such a Fact Sheet would serve as a reference for each column in the table. For example, it would explain all the factors that were used to calculate the COST listed in the matrix. It would list the product cost/gallon, the labor time required/area of screen cleaned, standard screen cleaning wage and the labor and costs associated with waste disposal requirements to meet federal regulations

The Fact Sheet describes how to interpret the information in each column, but it does not describe the specific results associated with each product. In the case of performance, the Fact Sheet would describe how the performance ratings were obtained. For cost, the Fact Sheet would describe the factors that were used in the cost calculation including what wage rate was used. The Risk/Hazard column would describe what a risk of 10^{-4} means.

Would the Fact Sheet make this format easier to understand?

Would you be likely to read the Fact Sheet?
Do you think the length of the Fact Sheet should be limited? To 1 page?

☞ ***Turn to MOCK UP #2***:

This format is similar to the previous one, however, it uses more descriptive text where the first matrix used numbers to describe the results. For example, in the RISK column, the first example reported carcinogenic risk as 10^{-4}, and this format describes how the product can be a health risk.

Like the first MOCK UP, this matrix could also be accompanied by a Fact Sheet. The Fact Sheet would be very similar to the Fact Sheet discussed with MOCK UP #1.

☞ ***Turn to MOCK UP #3***

The third mock up gives the same type of information as the first matrix, but uses a different format. The products are listed across the top of the page. The content is also slightly different in that it is a combination of the descriptive and numeric information. The risk information is given descriptively.

☞ ***Turn to MOCK UP #4***

This mockup is a Fact Sheet only; no matrix is included. In format, it is similar to the Fact Sheet we talked about earlier. But, since it is not accompanied by a matrix, it will contain information on the test results instead of just explanations of what the different testing categories mean. For example, the performance category will describe how the product performed under the given test conditions and will include any limitations of the product.

☞ ***Turn to MOCK UP #5***

The final mockup is a series of Fact Sheets. It's similar to the fact sheet we just looked at, but it has only one product on each page. With an expected 15 products involved in the testing, this format would result in a booklet of fact sheets.

Now, looking at the different formats in this packet, I want to ask some questions about which format you as a printer find most useful in selecting an alternative screen reclamation system...

Which format is easiest to understand?
Do they all give enough information to make a decision about which product(a) to try? Is any information missing?
Do you have any suggestions to improve these formats?
Do you prefer the matrix over the fact sheet format?

5. Vehicles

Several other ways of presenting this information were considered such as
Brochures, posters, video conference, videotape, ...
Would a different vehicle for presenting this information be more useful?
Would another format in addition to the matrix be useful?
What source do you consider as the MOST CREDIBLE in reaching you with this kind of information? Why?

6. Closing

I hope you have a better idea of what information will be coming out of the Design for Environment Printing Project.
Does anyone have any further comments on content or format of this information or on the DfE project in general?
Once again, I want to thank you again for participating.

APPENDIX C

Screen Printer and Lithographer Focus Group Final Information Product Mockups

Mockups for Blanket Washes

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR BLANKET WASHES

	Chemical Constituents	Performance				Cost	Risk/Hazard	Federal Regs	Chemical Characteristics			Notes
		Ability to cut ink	Qty Req'd	Time Req'd	Ease of Drying				VOC Content	Vapor Pressure	Flash Point	
Baseline Product	VM&P Naphtha											
Product A	Chem 1: 15-25%	Removes inks X, Y.	~Same qty. used as baseline.	~1 min. > baseline req'd.	more than baseline	$X/gal.	concern only if large amount released to water	MCL= 0.02 mg/l	30 - 50%	<5mm	140 F	Product A was tested on a rubber blanket. The blanket was cleaned after 1,500 - 6,000 impressions. The supplier does not recommend using this product for cleaning photopolymer blankets.
	Chem 2: 30-40%						negligible risk; negligible hazard					
	Chem 3: 40-50%						moderate concern for carcarcinogenic risk: 10^{-4}-10^{-5}					
Product B	Chem 1: 30-40%	Removes ink X, Z.	~2 oz. more than baseline needed.	~2 mins. > baseline req'd.	= baseline	$X/gal.			<30%	10mm	180 F	Not recommended for ink Y.
	Chem 2: 10-20%											
	Chem 3: 20-30%											
	Chem 4: 20-30%											
Product D												

FACT SHEET FOR
BLANKET WASH PRODUCTS MATRIX

Product Name

• Products are referred to as "Product A", "Product B", etc.. The product name and the supplier name are not given.

Chemical Constituents

• The chemical composition of each blanket wash tested is reported within a range.
• Exact chemical percentages are not reported in order to protect trade secrets of the suppliers.
• All chemicals that make up greater than 1% of the product are listed. Both hazardous and non-hazardous constituents are included in this list.

Performance

• *Ability to cut ink: ...*
• *Quantity required: ...*
• *Time required: ...*
• *Effort required: ...*

Cost

Cost includes:
1. the product cost/gallon x quantity of product required per area of blanket cleaned +
2. the labor time required/area of blanket cleaned x standard blanket cleaning wage +
3. labor and costs associated with waste disposal requirements to meet federal regulations

Risk/Hazard

The risk and hazard information in the matrix is based on the chemical composition of the product. The toxic properties of each chemical constituent of the product was identified as part of the risk analysis done by the EPA. The toxicity information was combined with estimates of work place exposures to calculate an estimate for risk. The exposures were estimated from a number of work place surveys completed by printers; the risk is not based on measurements of work place exposure.

Chemical Characteristics

• *VOC content: ...*
• *Vapor pressure: ...*
• *Flash point:* The temperature at which the liquid gives off a vapor sufficient to form

an ignitable mixture. A flash point of less than 100 F is considered LOW, meaning that it may be a safety hazard. To avoid a fire hazard, precautions must be taken in storing and handling products with low flash points. A flash point greater than 200 F is generally not considered to be a hazard, but the safety of the product is dependent on the specific conditions in the facility. For each product tested, the flash point was measured in triplicate at the GATF laboratory.

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR BLANKET WASHES

Product	Performance	Cost	Risk and Hazard Concerns	VOC content	Notes
Description of product by formulation, function, application	Performance information and testing conditions.	$/gal.	Qualitative description of chemicals of concern, toxicity concerns, and major release and exposure points	%	Performance limitations; supplier recommendations.
Baseline Product VM&P Naphtha					
Product A Chemical 1: 25-30%, Chemical 2: 25-30%, Water: 40-50%.	• Used same quantity as baseline. • Took some additional effort over baseline to remove ink. • Took 1 min. longer than baseline to clean blanket.	$/gal.	Dermal exposure can cause skin irritation and rash. Low vapor pressure minimizes exposures via inhalation.	30-50%	The supplier does not recommend this product for use on photopolymer blankets. Product can be reused or recycled after ultrafiltration.
Product B					
Product C					

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR

BLANKET WASHES

	BASELINE PRODUCT	PRODUCT A	PRODUCT B	PRODUCT C
CHEMICAL CONSTITUENTS	VM&P Naphtha	Chemical 1: 15-25% Chemical 2: 30-40% Chemical 3: 40-50%	Chemical 1: 30-40% Chemical 2: 10-20% Chemical 3: 20-30% Chemical 4: 20-30%	
PERFORMANCE	Removed inks X, Y, Z.	Removed inks X, Y	Removed inks Y, Z from rubber blanket.	
COST	$X/gallon	$X/gallon	$X/gallon	
RISK/HAZARD	Causes drowsiness, respiratory discomfort via inhalation. Eye and skin irritant.	Dermal exposure can cause skin irritation	Contains no listed hazardous chemicals	
CHEMICAL CHARACTERISTICS	>50% VOC, Flash point = 110 F, Vapor pressure <5mm	30 - 50% VOC, Flashpoint = 100 F, Vapor Pressure = 5mm	<30% VOC, Flash point = 180 F, Vapor Pressure = 10mm	
Notes	Time req'd to clean blanket = 2.5 mins.; Minimal effort required.	Time req'd = 4 mins.	Not recommended for use with photopolymer blankets.	

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR BLANKET WASH PRODUCTS

Background

Through the Design for the Environment (DfE) Printing Project, blanket wash products were evaluated through performance testing and through an evaluation of the risks and hazards associated with the product. This fact sheet presents the results of the product evaluations.

Description of Products

Product A is solvent-based, containing solvent x, solvent y and solvent z.
Product B is an aqueous-based product containing chemical x and chemical y.
Product C...

Performance

Product A: Effectively removed all ink (both X and Y types) without any noticeable damage to the blanket.
Product B: Effectively removed ink X. Removed ink Y, however it took 4 minutes and required more effort.
Product C:...

Relative Risks

Product A: Classified as a possible carcinogen meaning there is evidence of carcinogenicity in animals in the absence of human data. Irritation and rash may result from dermal exposure. For long-term exposures via inhalation, there is evidence of nervous system and respiratory disorders.
Product B: No evidence of carcinogenic effects. Skin irritation and rash may result from dermal exposure. Animal studies indicate some evidence of developmental toxicity.
Product C:...

Safety Issues

Product A: With a flashpoint of 160 F, flammability may be of moderate concern. Standard handling precautions apply.
Product B: With a flashpoint of 97 F, flammability may be a significant concern. Fire prevention measures and proper ventilation are required for safe use.
Product C:...

Waste Disposal Issues

Product A: Must be filtered before disposal to comply with federal regulations.
Product B: Contains no RCRA regulated materials
Product C:...

Costs

Cost includes:
1. the product cost/gallon x quantity of product required per area (?) of blanket cleaned +
2. the labor time required per area of blanket cleaned x standard blanket cleaning wage +
3. labor and costs associated with waste disposal requirements to meet federal regulations
Product A:...
Product B:...
Product C:...

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR
BLANKET WASH PRODUCTS

PRODUCT A

Performance

- Effectively removed inks X and Y.
- Average cleaning time was 2 minutes longer than the baseline product, Naphtha.
- Quantity of product required ranged from 1.0 - 2.0 oz. more than the baseline product.
- The press operator characterized the effort required to clean the blanket as approximately the same as the effort required using the baseline product.
- The supplier does not recommend using this product with ink Z.
- A rubber blanket, approximately 2 months old, was used in the testing.
- The press used was a Heidleberg model 1234.

Relative Risks

- Classified as a possible carcinogen meaning there is evidence of carcinogenicity in animals in the absence of human data.
- Irritation and rash may result from dermal exposure.

Chemical Characteristics

VOC content = 30 - 50%
Vapor pressure = <5mm
Flashpoint = 97 F

Safety Issues

- With a low flashpoint, combustibility and flammability may be a significant concern. Fire prevention measures and proper ventilation are required for safe use.

Costs

Cost includes:
1. the product cost/gallon x quantity of product required per area of blanket cleaned
+
2. the labor time required/area of blanket cleaned x standard blanket cleaning wage
+
3. labor and costs associated with waste disposal requirements to meet federal regulations

Notes

- Product must be filtered before disposal to comply with federal regulations.

Mockups for Screen Reclamation Systems

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR

SCREEN RECLAMATION SYSTEMS

	Chemical Constituents	Performance				Cost	Risk/Hazard	Disposal Issues	Test Conditions			Notes
		Quantity applied	Cleaning time	Screen reusable?	Printing Limitations?				Ink type	Emulsion type	Ink Color	
System A	*Ink remover* Chem 1: 15-25% Chem 2: 30-40% Chem 3: 35-35%	5.0 oz.	2 mins.	Yes	None.	$X/gal.	carcinogenic risk: 10^{-4}-10^{-5}; Kidney effects	Hazardous Air Pollutant;can not release to POTW	Solvent-based	Capillary film	Black	• This system is not recommended for use with UV-inks. • Reused same screen x times w/out tears or damage to the mesh.
	Emulsion Remover: Chem 2: 30-40% Chem 4: 60-70%	8 oz.	5 mins.				Corrosive liquid; can cause burns	Adjust pH prior to POTW discharge				
	Haze Remover: Chem 5: 40-50% Chem 5: 40-50%	12 oz.	3 mins.				negligible risk; negligible hazard	Can be reused after ultrafiltration.				
System B	*Ink Remover:* Chem 1: 30-40% Chem 2: 30-40% Chem 3: 25-35%	8.0 oz.	2.5 mins.	Yes	Can not be used to print a reverse.	$X/gal.		Must be filtered prior to disposal to comply with federal regs.	Solvent and UV-based	Direct photo stencil	Blue	• In future printing, a ghost image appeared in ~50% of screens w/ UV-based ink. • With a low flashpoint (97 F), flammability may be a concern.
	Emulsion Remover: Chem 4: 65-75% Chem 2: 25-35%	12 oz.	3 mins.									
	Haze Remover: Chem 5: 40-50% Chem 3: 40-50%	8 oz.	2 mins.									
System C	*Ink Remover:*											
	Emulsion Remover:											
	Haze Remover:											

FACT SHEET FOR
SCREEN RECLAMATION SYSTEMS MATRIX

Product Name

• Products are referred to as "System A", "System B", etc.. The product name and the supplier name are not given.

Chemical Constituents

• The chemical composition of each screen reclamation system tested is reported within a range.
• Exact chemical percentages are not reported in order to protect trade secrets of the suppliers.
• All chemicals that make up greater than 1% of the product are listed. Both hazardous and non-hazardous constituents are included in this list.

Performance

• *Quantity applied:*
• *Cleaning time:*
• *Screen reusable:*
• *Printing limitations:*

Cost

Cost includes:
1. the product cost/gallon x quantity of product required per area of screen cleaned +
2. the labor time required/area of screen cleaned x standard screen cleaning wage +
3. labor and costs associated with waste disposal requirements to meet federal regulations

Risk/Hazard

The risk and hazard information in the matrix is based on the chemical composition of the product. The toxic properties of each chemical constituent of the product was identified as part of the risk analysis done by the EPA. The toxicity information was combined with estimates of work place exposures to calculate an estimate for risk. The exposures were estimated from a number of work place surveys completed by printers; the risk is not based on measurements of work place exposure.

Test Conditions

• *Ink type:*
• *Emulsion type:*
• *Ink color*:

Disposal Issues

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR

SCREEN RECLAMATION SYSTEMS

Product	Performance	Cost	Risk and Hazard Concerns	Disposal Issues	Notes
Description of product by formulation, function, application	Performance information and testing conditions.	$/gal.	Qualitative description of chemicals of concern, toxicity concerns, and major release and exposure points	Description of waste disposal generated in using this product	Performance limitations; suppliers recommendations.
System A *Ink Remover:* Chemical 1: 25-30% Chemical 2: 25-30% *Emulsion Remover:* Chemical 3: 40-50% Chemical 4: 40-50% *Haze Remover:* Chemical 2: 35-45% Chemical 5: 30-40% Chemcial 6: 15-25%	• System A effectively removed solvent-based ink and stencil without any tears in the mesh. • Screen was reusable x times without damage.	$/gal.	• Dermal exposure can cause skin irritation and rash. • Low vapor pressure minimizes exposures via inhalation.	This product must be filtered before disposal to comply with federal regulations.	• Not recommended for use with UV-based inks. • With a low flashpoint (97 F) flammability may be a concern.
System C *Ink Remover:* *Emulsion Remover:* *Haze Remover:*					
System D					

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR

SCREEN RECLAMATION SYSTEMS
PRODUCT A

	Ink Remover	**Emulsion Remover**	**Haze Remover**
CHEMICAL CONSTITUENTS	Chemical 1: 15-25% Chemical 2: 30-40% Chemical 3: 40-50%	Chemical 1:30-40% Chemical 1: 10-20% Chemical 3: 20-30% Chemical 4: 20-30%	Chemical 1: 40-50% Chemical 2: 40-50%
PERFORMANCE	• Effectively removed solvent-based ink. • Screen was reused x times without damage.	• Effectively removed stencil without any tears in the mesh.	• Effectively removed haze. No ghost image appeared.
COST	$X/gallon	$X/gal	$X/gal
RISK/HAZARD	• Causes drowsiness, respiratory discomfort via inhalation.	• Eye and skin irritant.	• No known adverse health effects.
DISPOSAL ISSUES	• Can be reused after ultrafiltration.		
Notes	• Not recommended for use with UV-based inks.		

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR SCREEN RECLAMATION SYSTEMS

Background

Through the Design for the Environment (DfE) Printing Project, screen reclamation systems were evaluated through performance testing and through an evaluation of the risks and hazards associated with the system. This fact sheet presents the results of the system evaluations.

Description of Systems

System A is solvent-based, containing solvent x, solvent y and solvent z.
System B is a citrus-based system containing chemical x and chemical y.
System C...

Performance

System A: Effectively removed all ink (both UV-based and solvent-based) and stencil without any tears in the mesh.
System B: Effectively removed solvent-based inks and stencils. Not able to remove all of the UV-based ink from the screen: a ghost image appeared in some (~50%) of the UV-based ink screens in future printing.
System C:...

Relative Risks

System A: Classified as a possible carcinogen meaning there is evidence of carcinogenicity in animals in the absence of human data. Irritation and rash may result from dermal exposure. For long-term exposures via inhalation, there is evidence of nervous system and respiratory disorders.
System B: No evidence of carcinogenic effects. Skin irritation and rash may result from dermal exposure. Animal studies indicate some evidence of developmental toxicity.
System C:...

Safety Issues

System A: Moderate flashpoint. Flammability is of moderate concern. Standard handling precautions apply.
System B: With a flashpoint of 97 F, combustibility and flammability are a significant concern. Fire prevention measures and proper ventilation are required for safe use.
System C:...

Waste Disposal Issues

System A: Must be filtered before disposal to comply with federal regulations.
System B: Contains no RCRA regulated materials
System C:...

Costs

Cost includes:
1. the system cost/gallon x quantity of product required per area of screen cleaned +
2. the labor time required per area of screen cleaned x standard screen cleaning wage +
3. labor and costs associated with waste disposal requirements to meet federal regulations
System A:...
System B:...
System C:...

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR
SCREEN RECLAMATION PRODUCTS

SYSTEM A

Chemical Characteristics

Ink Remover	Emulsion Remover	Haze Remover
Chemical 1: 15-25%	Chemical 1: 30-40%	Chemical 1: 40-50%
Chemical 2: 30-40%	Chemical 2: 10-20%	Chemical 2: 40-50%
Chemical 3: 20-30%	Chemical 3: 40-50%	
Chemical 4: 20-30%		

Performance

- Effectively removed solvent-based ink and light-sensitive emulsion stencil from screen.
- Average cleaning time was 10 minutes.
- Quantity of product required ranged from 3.0 - 5.0 oz. per x sq. inch of screen cleaned.
- The screen was reusable after each cleaning. x cleanings were done without any tears or damage to the screen.
- The supplier does not recommend using this product with UV-based inks.

Relative Risks

- Classified as a possible carcinogen meaning there is evidence of carcinogenicity in animals in the absence of human data.
- Irritation and rash may result from dermal exposure.

Safety Issues

- With a flashpoint of 97 F, combustibility and flammability are a significant concern. Fire prevention measures and proper ventilation are required for use.

Waste Disposal Issues

- Product must be filtered before disposal to comply with federal regulations.

Costs

Cost includes:

1. the product cost/gallon x quantity of product required per area of screen cleaned
+
2. the labor time required per area of screen cleaned x standard screen cleaning wage +
3. labor and costs associated with waste disposal requirements to meet federal regulations

RESULTS OF CLEANER TECHNOLOGIES SUBSTITUTE ASSESSMENT (CTSA) FOR
SCREEN RECLAMATION PRODUCTS

SYSTEM B

Chemical Characteristics

Ink Remover	Emulsion Remover	Haze Remover
Chemical 1: 15-25%	Chemical 1: 30-40%	Chemical 1: 40-50%
Chemical 2: 30-40%	Chemical 2: 10-20%	Chemical 2: 30-40%
Chemical 3: 20-30%	Chemical 3: 40-50%	Chemical 3: 10-20%
	Chemical 4: 20-30%	

Performance

- Effectively removed UV-based ink and direct photo stencil from screen.
- Average cleaning time was 8 minutes.
- Quantity of product required ranged from 6.0 - 8.0 oz. per x sq. inch of screen cleaned.
- The screen was reusable after each cleaning. x cleanings were done without any tears or damage to the screen.

Relative Risks

- No evidence of carcinogenic effects.
- For long-term exposure via inhalation, there is evidence of nervous system and respiratory disorders.

Safety Issues

- With a flashpoint of 137 F, combustibility and flammability, are a moderate concern. Recommended ventilation and handling procedures should be followed.

Waste Disposal Issues

- Contains no RCRA regulated materials.

Costs

Cost includes:

1. the product cost/gallon x quantity of product required per area of screen cleaned
+
2. the labor time required per area of screen cleaned x standard screen cleaning wage +
3. labor and costs associated with waste disposal requirements to meet federal regulations