

**Calumet Eco-Industrial
Network Survey Project**

**Partnership Opportunities
for Reusing Materials,
Water, and Energy**

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**Southeast Chicago
Development Commission**



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Executive Summary

The Calumet Eco-Industrial Network Survey Project was conducted to collect baseline information for the purpose of developing an Eco-Industrial Network in the Calumet region of Chicago. Southeast Chicago Development Commission (SCDCom) believes that local companies can utilize the basic principles of material re-use, waste reduction, and energy efficiency within networks of companies. Information gathered from this survey project could be a first step in creating an Eco-Industrial Network (EIN) between local companies in the Calumet region.

The survey focused on byproducts—items that are waste to one company but could be used by another. By partnering to exchange byproducts, businesses in the Calumet area could accomplish two important goals: first, they could lower waste disposal costs and become more competitive; second, they could reduce their impact on the natural environment. Lowering business costs and protecting the environment would help ensure the longevity of local businesses, which would in turn provide much needed jobs and a pleasant living environment for local residents in the Calumet area.

The Calumet survey project was largely inspired by a survey done by the Triangle J Council of Governments in North Carolina. There were 182 surveys completed in the Triangle J project and 44 surveys completed in the Calumet project. The Calumet survey collected information on what items local companies use and which of those are recycled or reused. Several exchange possibilities were identified but it was not in the scope of this project to pursue those possibilities. The survey also collected information on companies' water and energy use. Additionally, the survey collected information on companies' awareness of the Industrial Materials Exchange Service (IMES), a statewide program headed by the Illinois Environmental Protection Agency. Local companies generally expressed an interest in IMES, as well as the idea of a local network similar to IMES.

This byproduct survey was only the first step toward an EIN in the Calumet region. The Triangle J report outlines five elements for creating a local infrastructure: a website, warehouse space, a taxi service, a facilitator, and funding. SCDCom hopes to continue working toward developing an EIN by implementing a website and by conducting focus groups so that companies can discuss exchange possibilities amongst themselves.

Survey Report

Introduction and Background

Eco-Industrial Development has been endorsed by the President's Council on Sustainable Development, the Department of Energy's Center of Excellence for Sustainable Development, and the Environmental Protection Agency as a promising strategy for the next century. Based on the concepts of industrial ecology, flexible manufacturing, and business clustering, Eco-Industrial Development is a strategy for targeting commercial opportunities for local companies as well as for realizing higher levels of environmental performance. The Southeast Chicago community understands this potential for the various industrial corridors located in the Calumet region. Although Eco-Industrial Parks tend to be considered physical places, the Southeast Chicago Development Commission (SCDCom) believes that local companies can utilize the basic principles of material re-use, waste reduction, and energy efficiency within networks of companies without needing to be in physical proximity to each other. Information gathered from this survey project could be a first step in creating an Eco-Industrial Network (EIN) between local companies in the Calumet region. The region covered in this survey extends roughly from 75th Street to the north, Western Avenue to the west, just past the Chicago border to the south, and to Lake Michigan and the Indiana border to the east (see Appendix A-1).

In 1993, the City of Chicago Department of Planning and Development (DPD), in conjunction with numerous governmental and civic organizations, began work on *CityScope: An Open Space Plan for Chicago*. This plan recognizes that, "The Lake Calumet district holds unique opportunities for the preservation and restoration of wetlands and natural areas and an expansion and improvement of Chicago's industrial base." In addition, in 1993, DPD designated the Calumet Corridor as one of 26 "model industrial corridors" throughout the City.

The Calumet area suffers from disinvestment, with an abundance of vacant lots and problems with crime. The image of the Calumet area discourages business investment. Environmental contamination and inadequate infrastructure cause hazards, business problems, and eyesores in key areas in the corridor. The lack of drainage has caused flooding severe enough to curtail business operations. Also present are remnants of illegal dumps and pre-regulation industrial landfills, which are contaminating the area. Industrial contamination is especially hazardous in the Calumet Corridor because pollutants move via groundwater and surface water runoff, reaching the Calumet River and Lake Calumet and entering the food chain through fish and other wildlife. Industrial contamination is also of great concern to people living in nearby residential communities and to recreational users of the river and lake. There is a serious need to clean up existing contamination and prevent further pollution in the area. SCDCom has an interest in seeing the Calumet region cleaned up because the contamination has an adverse affect on quality of life in the area.

SCDCom has played a leading role in the redevelopment efforts of the area for over 19 years. In 1994, SCDCom prepared a strategic plan for the Calumet Industrial Corridor, bringing together industrial business owners and managers, developers, retailers, residents and other concerned citizens. The plan focuses on issues such as safety, attractiveness, image and marketability of the area.

In 1998, DPD in collaboration with SCDCCom and the Open lands Project (OLP) received a Sustainable Development grant. The goal was to develop the Lake Calumet Industrial Corridor as a modern industrial park that integrates the area's significant ecological character and natural assets to its economic and physical development strategy. DPD is also establishing a tax increment financing district (TIF) in the Lake Calumet region which, when implemented, will be the largest TIF in Chicago.

In order to keep up the momentum of industrial planning that the City of Chicago and SCDCCom have been working on together for nearly a decade, SCDCCom would like to introduce the concept of a virtual EIN to the Calumet region. Helping companies to reduce their waste stream by working together will increase their profitability and benefit the environment. Thriving companies and a cleaner environment mean better jobs and better surroundings for a community that has long been plagued by disparity.

Project support:

The following organizations and government agencies have pledged support to the Calumet Eco-Industrial Network project:

Illinois EPA's Industrial Material Exchange Service
City of Chicago Department of Planning and Development (DPD)
City of Chicago Department of Environment (DOE)
United States Environmental Protection Agency
Cornell Center for the Environment
Delta Institute

Survey Personnel

Kristen Groce, the original survey facilitator for the SCDCCom project, conducted background research regarding byproduct exchanges that had already been implemented in other areas. Kristen developed the survey booklet and interview questions for this survey, which were modeled after a previous survey done by Triangle J Council of Governments in North Carolina. In addition, Kristen put together an initial list of businesses to be contacted about the survey. Prior to the time she left SCDCCom, Kristen was able to complete five surveys.

Stacey Thomas replaced Kristen Groce as the SCDCCom facilitator partway through the survey. Stacey expanded the contact list and continued to search for potential survey participants. She was ultimately able to conduct another 39 surveys. Stacey also developed and entered data into spreadsheets to analyze the information collected from companies who completed surveys. Additionally, she wrote one progress report and the final project report.

Resources and Acknowledgements

The idea for how to implement the Calumet survey project was largely inspired by a survey done by the Triangle J Council of Governments in North Carolina. Judy Kincaid, Solid Waste/Materials Resources Program Manager for the project, was encouraging in the development of the Calumet survey project. Diane McClain from the Industrial Material Exchange Service (IMES), co-sponsored by Illinois Environmental Protection Agency and Illinois State Chamber of Commerce, and Otis Omenazu from City of Chicago-Department of Environment provided informational assistance. Jorge Perez and Michael Sapienza from Calumet Area Industrial Commission (CAIC) provided business information and professional advice on administering the survey. George Krumins from Waste Management and Research Center created maps for the project.

On a conceptual level, a Cornell University report entitled *Eco-Industrial Development: A Strategy for Building Sustainable Communities* (Schlarb) was helpful in defining the concept of eco-industrial development and eco-industrial networks. Information on an eco-industrial model in Kalundborg, Denmark and a study by the Cornell University Work and Environment Initiative on the Fairfield Ecological Industrial Park in Baltimore, Maryland were also helpful. Larisa Salamacha, Development Director for the City of Baltimore Development Corporation, explained in a telephone interview that the Eco-Industrial Park (EIP) concept did not work there. The EIN concept is broader than an EIP, however, and one setback does not discredit the principles behind Eco-Industrial Development.

Survey Purpose and Objectives

As mentioned in the Triangle J Council of Governments project report (Kincaid, 1999), the purpose of that survey was to “encourage local partnerships that provided an alternative to...disposal in a landfill, disposal in wastewater, disposal by a hazardous materials handler, or recycling or reuse involving more distant transportation.” The goal was not to focus on source reduction or on items that are commonly recycled, such as cardboard, glass and aluminum; however, these items are included in the Calumet survey because participants frequently mentioned them. The key purpose of the Calumet survey was to examine possible partnerships between businesses in dealing with waste. If byproduct exchange partnerships could be established as a result, they would hopefully provide a platform for developing a larger Eco-Industrial Network (EIN) in the future.

Partnership is the basic principle of Eco-Industrial Development (Schlarb, 2001). By partnering to exchange byproducts, businesses in the Calumet area could accomplish two important goals. First, they could lower waste disposal costs and become more competitive. Second, they could reduce their impact on the natural environment. Lowering business costs and protecting the environment would help ensure the longevity of local businesses, which would in turn provide much needed jobs and a pleasant living environment for local residents in the Calumet area.

Survey Design

The Calumet area survey was modeled closely after the Triangle J survey, which was conducted from June 1997 through May 1999. The Triangle J survey provided valuable information on several levels: as a guide to model the Calumet survey after; as a benchmark to measure the Calumet survey against; and as a resource for ideas on how to proceed after completion of the Calumet survey. The Calumet survey was conducted in much the same way as the Triangle J survey, except that the Triangle J survey was done on a larger scale. There were 182 surveys completed in the Triangle J project, while there were 44 surveys completed in the Calumet project.

In the Triangle J survey, a list of potential survey participants was first compiled using several sources. A list of potential survey participants for the Calumet survey was compiled from the *Harris Industrial Directory* for Illinois and from a membership list of the Calumet Area Industrial Commission (CAIC). Also in the Triangle J survey, a professional advisory panel reviewed the survey format and made suggestions. The Calumet survey did not have an advisory panel, but some industrial and environmental professionals made suggestions about the survey prior to it being sent out. Both the Triangle J survey and the Calumet survey contacted potential participants by phone. The Triangle J project asked established members of the community to make the phone calls in order to project a higher level of professionalism for the project. Both of the callers for the Calumet survey had environmental backgrounds but not industrial backgrounds. The fact that the callers in the Calumet survey were not known in the industrial community may have had an adverse affect on the survey's participation level. Callers in the Triangle J survey estimated that it took one-and-a-half hours on the phone for every one business that agreed to participate in the survey. They also estimated that for every business that agreed to participate it took another one-and-a-half hours on the phone after the survey had been sent out to set up an interview. Therefore, for every survey completed, an estimated three hours was spent on the phone. Although time spent making calls for the Calumet survey was not precisely recorded, this estimate seems reasonably close. Using the Triangle J estimate, approximately 132 hours were spent making phone calls for the Calumet survey. Based on the number of companies called, it is estimated that around 1500 total calls were made for the Calumet survey. The Triangle J survey conducted in-plant interviews. Interviewers received a three-hour training session before going out on interviews. They reported that plant tours helped to identify more exchange possibilities that interviewees might otherwise not have mentioned. Plant tours were also found to be useful in the Calumet surveys. The Triangle J survey entered interview information into the database. Project team members estimated it took about 30 minutes to enter the information into the database. Entering data for the Calumet survey took longer, perhaps because with fewer surveys the system was less streamlined. The Triangle J survey used data that was mapped using GIS software. GIS mapping was not feasible in the Calumet survey due to the fact that there was only one facilitator working within a shorter time limit. Finally in the Triangle J survey, information was compiled on possible survey matches. The information was available only to project members who then contacted survey participants with possible matches. Possible or probable matches were found for 36 materials. At the same time, groups of representatives from facilities in close proximity to each other were brought together to discuss byproduct exchange possibilities. Information on possible survey matches was also compiled for the Calumet survey. Possible matches were found for three

types of byproducts. Discussions between industry representatives were out of the scope of the Calumet survey.

Survey Participants

Contacting Potential Survey Participants

Initial contact for this survey was made by phone. Attempts were made to contact a total of 304 businesses. Of the 304 businesses, 219 were able to be reached. Of the 219 businesses that were reached, 162 (54 percent) declined to participate in the survey. Thirty-eight businesses (14 percent) ultimately participated in the survey. Another six businesses gave information over the phone, for a combined total of forty-four businesses.

Company Response to Survey		
	<u>#</u>	<u>%</u>
Unable to be reached	98	32
Participated in survey	44	14
Declined to participate	162	54

There were 98 businesses (32 percent) that were unable to be reached. After double-checking, ten of those businesses had wrong numbers and five had numbers that were not available. Another eleven businesses had numbers that were disconnected, suggesting that they had gone out of business. One business was not contacted because it was known to have gone out of business during the course of the survey.

Non-participants

There were various reasons given by businesses that declined to participate in the survey. Thirty-eight businesses did not give a reason why they declined to participate in the survey. The second most common reason, given by 22 businesses, was that there was no actual production at their facility. Most of these businesses were either distribution facilities or wholesalers. The third most common reason, given by 17 businesses, was simply that they were not interested. Sixteen businesses said that they already recycled their most common byproduct—metal. Sixteen businesses also claimed they had no byproducts. Fourteen businesses said that they already reused or recycled at least some of their byproducts. Nine businesses said that they were either closing or in some sort of transition. Eight businesses said that they did not have any reusable byproducts. Five businesses said that they were too busy or that they did not have time to participate in the survey. Four businesses declined because they are recyclers, although at least one of these businesses would be interested in referrals from the survey. Three businesses declined because they are part of a larger corporation. Two businesses did not think a byproduct network would work in the Calumet region. It may be of interest to note that one of these is a recycler. One business stated that they are happy with their current procedures; another did not feel that they

have enough byproduct to recycle or to be part of a byproduct network; and finally, one did not have an English speaking person with whom to discuss the survey.

Reasons for Declining Survey		
	#	%
Reason not given	38	23
Distribution/transfer facility	22	14
Not interested	17	10
Already recycle scrap metal	16	10
No byproducts	16	10
Already recycle/reuse	14	9
Company closing/in transition	9	6
No reusable byproducts	8	5
Don't think survey applied	5	3
No time/too busy	5	3
Recycler/metal processor	4	2
Corporate	3	2
Don't think project will work	2	1
Other	3	2

Of the 16 businesses that already recycle or reuse their byproducts, they named a variety of products. Three businesses stated that they reuse wood products. Two of these are construction companies that save wood from project to project. The third is a lumberyard that grinds its scrap wood into sawdust and sells it as horse bedding. A machining company recycles its waste oil and scrap metal. A roofing business recycles its asphalt and fiberglass roofing material. A tee-shirt business reuses defective shirts as cleaning rags. A uniform business recycles scrap wool, which gets turned into roof tar. A framing business donates scrap matting to a school. A printing business turns scrap paper into notepads for its customers. A cement business remixes dust and other leftover products back into its cement. A (water-based) chemical company recovers 90 percent of its waste and remixes it back into its products. An oil processor recycles its waste oil, which gets turned into lubricant. Finally, a container company sends its cardboard to a paper mill to be recycled.

Participants

The 44 companies who agreed to participate in the survey or a phone interview are spread throughout an eight zip-code area in the southeast Chicagoland region (see Appendix A-1).

Companies by Zip Code		
	<u>#</u>	<u>%</u>
60409/Calumet City	1	2
60617/Chicago	12	26
60619/Chicago	8	18
60620/Chicago	5	11
60628/Chicago	7	16
60633/Chicago, Burnham	7	16
60643/Chicago, Calumet Park	4	9
60827/Riverdale	1	2

These companies represent a variety of industries. Using the Standard Industrial Code (SIC) classification system, they fall into 16 general categories: chemicals and allied products; food and kindred products; primary metal industry; machinery, except electrical; lumber and wood products, except furniture; furniture and fixtures; printing, publishing and allied industry; petroleum refining and related industry; business services; social services; paper and allied products; clay, glass and concrete products; fabricated metal products, except machinery and transport equipment; electrical and electronic machinery, equipment and supplies; transportation equipment; and wholesale trade-durable goods. There were five companies whose SIC codes could not be identified.

Companies by Sic Code		
	<u>#</u>	<u>%</u>
2000/Food	7	16
2400/Lumber	2	5
2500/Furniture	2	5
2600/Paper	1	2
2700/Printing	1	2
2800/Chemicals	8	18
2900/Petroleum	2	5
3200/Clay, glass, concrete	1	2
3300/Primary metals	4	9
3400/Fabricated metal	1	2
3500/Machinery	3	7
3600/Electrical	1	2
3700/Transportation	1	2
5000/Wholesale trade	1	2
7300/Business services	2	5
8300/Social services	2	5
Unknown	5	11

The surveyed companies also vary in size and corporate affiliation. Of the 40 companies with available employee information, they range from three to 550 employees, for a total of 3,556 employees. The average number of employees for these 40 companies is 89. Specifically, 20

companies have 39 employees or less; 9 companies have between 40 and 99 employees; and 11 companies have more than 100 employees. Of the 40 companies with available corporate information, 16 companies have corporate affiliations and 24 do not. Four companies did not provide employee or corporate information. Size and corporate affiliation did appear to affect survey participation and responses. In general, larger companies seem to have less trouble finding recyclers or other takers for their byproducts because their byproducts were typically in larger quantities. Three companies declined to participate in the survey because of corporate affiliations. Many companies with corporate affiliations that did participate in the survey stated that they have limited control over their input and output materials because of corporate policies.

Company Size		
	<u>#</u>	<u>%</u>
39 or fewer employees	20	46
40-99 employees	9	20
100 or more employees	11	25
Information not given	4	9
Corporate Affiliation		
	<u>#</u>	<u>%</u>
Have corporate affiliation	16	36
No corporate affiliation	24	55
Information not given	4	9

Material Use

The survey tracked three major items: water, energy and material use. Response on material use was by far the most prevalent. All materials were separated into fourteen general categories: oil, chemicals, paint, acids/bases, scrap metal (ferrous), scrap metal (non-ferrous), wood, storage (steel drums, wood pallets, cardboard, plastic storage), clay/carbon, plastic/synthetics, food, paper, fabric, special waste, and other. Companies were asked to list their material inputs and outputs (byproducts) so they could be checked against other companies for possible matches.

Material Inputs and Outputs (Byproducts)		
	Input	Output*
Oil	18	12
Chemicals	19	9
Paint	6	2
Acids/Bases	9	0
Scrap Metal (ferrous)	7	11
Scrap Metal (non-ferrous)	7	10
Wood	4	5
Steel Drums	1	13
Wood Pallets	1	18

<i>Continued...</i>	Input	Output
Cardboard	0	20
Plastic Storage	0	10
Clay/Carbon	6	4
Plastic/Synthetic	5	4
Food	4	4
Paper	2	7
Fabric	2	2
Special Waste	0	7
Other	0	1
* Number of companies that mentioned each item as an input or a byproduct		

Companies were also asked if they recycle or reuse any of their byproducts and if they could get any of their input materials used. For the purpose of this survey, “recycling” means sending products to a recycler; “reusing” means using the product in-house. There was little response from companies on whether they could get used input materials. When companies listed items that they do not recycle or reuse, they were asked if they knew of any possible ways they could be recycled or reused (Table 5).

Material Byproduct Use			
	Total	Recycle	Reuse*
Oil	12	12	0
Chemicals	9	2	3
Paint	2	2	2
Acid/Base	0	0	0
Scrap (ferrous)	11	10	0
Scrap (non-ferrous)	10	6	0
Wood	5	3	0
Steel Drums	13	9	0
Wood Pallets	18	9	5
Cardboard	20	12	0
Plastic Storage	10	1	1
Clay/Carbon	4	3	0
Plastic/Synthetic	4	3	0
Food	4	3	1
Paper	7	3	0
Fabric	2	2	0
Special Waste	7	0	0
Other	1	1	0
* Uses may not equal total			

Twelve companies listed oil as a byproduct. All twelve of those companies send their oil to a recycler. Partnering to reuse oil was discussed with several companies; however, it was not feasible because all the waste oil was dirty. Dirty oil could be burned as fuel but none of the surveyed companies do this because it requires a special kind of burner, which is expensive, and because it requires special permitting. One company was interested in combining its waste oil with other companies to cut disposal costs, which may be a possibility for them. Six companies listed nine types of chemicals as a byproduct. Three of the chemicals are reused, two are recycled and four are specially disposed of. One company has unused laboratory chemicals, which could possibly be sent to a school science department. One company listed paint and paint dust as byproducts. They recycle or reuse them as appropriate. No companies listed acids or bases as byproducts.

Eleven companies listed ferrous (iron, steel) scrap as a byproduct. Ten of those companies send their ferrous scrap to a recycler. One company has brackets, which it does not recycle because it does not have large quantities, even though it could be recycled. Ten companies listed non-ferrous scrap as a byproduct. Six of those companies send their non-ferrous scrap to a recycler. Three companies do not recycle their non-ferrous scrap. One company has tin cans, one company has aluminum chip wrappers and aluminum cans, and one company has motor parts, all of which could be sent to a recycler. Also, there was an aluminum foundry company that participated in the survey, but may not take unprocessed metal. Five companies listed wood as a byproduct. Three companies send their scrap wood to a dealer who distributes (recycles) it. Two companies do not recycle their scrap wood, which could possibly be used by a woodworking studio. Another company does not recycle its sawdust, which could be used for horse bedding. Thirteen companies listed steel drums as a byproduct.

Nine companies send their steel drums to a drum reconitioner (recycler) and one company buys used drums. Two companies are storing their drums because they haven't found anyone to take them. Eighteen companies listed wood pallets as a byproduct. Nine companies send their wood pallets to a pallet reconitioner (recycler) and five reuse them. Nine companies do not recycle or reuse their pallets. Twenty companies listed cardboard as a byproduct. Twelve companies send their cardboard to a recycler. Eight companies do not recycle their cardboard. Ten companies listed plastic storage (crates and bags) as a byproduct. One company sends its plastic to a recycler and one reuses its plastic. Four companies each do not recycle their plastic crates or bags. All the storage items (steel drums, wood pallets, cardboard, and plastic) could be sent to a warehouse for storage and then sent to a recycler once enough material is collected. Also, there were two surveyed companies that will take used drums and one that will take used pallets, but they must be clean and in good condition.

Four companies listed clay/carbon as a byproduct. Three companies recycle their product—brickbats, diatomaceous earth and cement slurry. The brick bats are sometimes used for road fill, although the company is currently looking for someone to take them; the diatomaceous earth along with food scraps is sent to a farmer for animal feed; and the cement slurry is used for stone aggregate. One company has silica sand, which could possibly be used for road fill but for which they have not found any takers. One company listed three types of plastic/synthetics as a byproduct—EVA rubber, PVC plastic and polyurethane foam. All of these materials are sent to a recycler. One company does not recycle its foam, which could also be sent to a recycler. Four

companies listed food as a byproduct. One company sends its meat scraps to a recycler and two companies send their food byproducts to farmers for slop. One company reuses its food byproduct. Seven companies listed paper as a byproduct. Three companies recycle their paper and four companies do not. Paper could also be sent to a warehouse for storage and then to a recycler once enough is collected. One company listed two kinds of fabric as byproducts—scrap fabric and polyester batting, which are donated and made into bags and pillows. Seven companies listed special waste: scale solids, wastewater, dust collector ash, acrylic filters, wastewater with glue, and blast slag. All of these items are specially disposed of except for blast slag, for which the disposal method was not given. One company listed light bulbs (other) as a byproduct, which they recycle.

Surveyed companies indicated concerns about recycling and reuse. The most common concern was simply that recycling or reuse is not profitable for many companies. The second most common concern was that companies cannot find a recycler or other company to take their byproducts. Less common concerns were: that there is a lack of storage space, that the company wants one recycler for all of its byproducts, that there is a lack of equipment, that it takes too much effort to sort out recyclable or reusable byproducts from the waste stream, and that the company cannot find a local recycler. One company is not sure what happens to its byproducts after they are hauled away. “Other” reasons for concern included: that the byproduct is in poor condition, that there is a lack of transportation, that there are safety hazards with storage, that there is no identifiable use for the byproduct, that it is only a one time byproduct, that the company only wants to sell its byproduct, that the company wants to find a better use for the byproduct, and that the company is looking for a more reliable recycler.

Material Recycling/Reuse Concerns	
	Total
Not profitable	11
Cannot find anyone to take byproducts	10
Other	8
Do not have enough byproducts	7
Lack of storage space	3
Want one recycler for all byproducts	3
Lack of equipment (cardboard bailer)	2
Too much effort to sort	2
Cannot find local recycler	2
Not sure what happens to byproducts	1

On the whole, the logistics of getting byproducts to a place where they can be reused or recycled in a cost effective manner seems to be the biggest challenge. If an Eco-Industrial Network (EIN) is implemented in the Calumet region, addressing the logistics problem by providing transportation and storage facilities should be a main priority. With transportation and storage services, companies could combine their byproducts in one storage space until there is enough to sell each type of byproduct. This might work well for storage items: *clean* steel drums, wood pallets, cardboard and plastic storage, because many companies have these items and because they do not require permitting to transport or store. Scrap metal, wood and paper might also work well for

this kind of storage. Oil might not be good for this kind of storage because of potential spillage during transportation or storage. Chemicals would not be good for this kind of storage due to permitting and liability issues. Items that require large spaces and/or special handling equipment such as brickbats or silica sand would also not be good. Other byproducts such as fabric may work if enough companies have similar items.

Water and Energy Use

The concept of sharing water and energy between companies got little to no response from participants. The concept of improved conservation of water and energy in-house got a much better response from participants than sharing between companies. Currently, thirteen companies interviewed reuse their cooling water, three companies reuse their process water, and two companies recirculate their water condensate (steam). Seven companies did not identify any water conservation methods and nine companies do not use water in their production processes. Ten companies mentioned various ways they can improve their water conservation methods, although none of them actually planned to implement any of these methods at the time of the survey interview. Two companies did mention that they could sell deionized water if other companies expressed an interest.

Regarding energy conservation, eight companies currently have their machines on timers or regulators, six use efficient lighting, six turn machines off when not in use, five reuse or conserve heat, four have good building insulation, three have updated equipment, two keep building heat low in the winter, and one uses soap that works at a low temperature so the water does not have to be heated. Eight companies did not identify any energy conservation methods. Eight companies mentioned various ways they could improve their energy conservation methods, but only two planned to implement those methods. A foundry is considering heating its offices with foundry heat and another company plans to install an evaporator to save on water heating. Almost all the companies surveyed could update their equipment in one way or another to increase energy conservation, but it would cost money that they are reluctant to spend.

Waste Exchange Services

One of the questions asked in the survey was whether companies currently participate in any waste exchanges. Local companies generally expressed an interest in the Industrial Materials Exchange Service (IMES), a statewide program headed by the Illinois Environmental Protection Agency, as well as the idea of a local network similar to IMES. Only nine of the surveyed companies were familiar with IMES, twenty-seven companies were not familiar with IMES and eight did not give information regarding IMES. Of the nine companies who were familiar with IMES, only five had used it. Of the five companies who used IMES, only one company (in the steel industry) benefited from it. Of the four companies who used IMES but did not benefit from it, their reasons were: they did not get a response, the product was already gone, no one contacted them, and one could not remember. Of the four companies who were familiar with IMES but had not used it, their reasons were: they are corporate and have no control over their material use, they already reuse/recycle

their byproducts, they do not have enough byproduct to exchange, and one did not give a reason. Only three companies had used other exchange networks.

Familiarity with IMES		
	<u>#</u>	<u>%</u>
Not familiar with IMES	27	62
Familiar with IMES	9	20
Information not given	8	18
Use of IMES		
Companies that have used IMES		5
Companies that have benefited from IMES		1

When asked about the possibility of a local exchange, companies had a much greater response. Twenty-four of the surveyed companies indicated that they would be interested in a local exchange network. Six companies were not interested in an exchange network. They were fairly general in their reasons, suggesting there is no overall or specific barrier that would keep a lot of businesses from using a local exchange network.

Interest in Local Exchange Network		
	<u>#</u>	<u>%</u>
Interested in local exchange	24	54
Not interested in local exchange	6	14
Information not given	14	32

Based on the positive response rate, implementing a local exchange network would be a beneficial next step toward an Eco-Industrial Network in the Calumet region. A local exchange network would be designed to work with IMES by improving familiarity and awareness of IMES as well as by encouraging the use of IMES.

Survey Problems

The biggest problem by far was finding companies that were willing to participate in the survey. As mentioned previously, it took hours of calling to find participants. After a certain point, it became hard to find new companies to call within the survey area. The list of potential survey participants was expanded several times and each of the companies on the final list were attempted to be contacted up to six times (and more in some cases). Company secretaries were not always helpful, and it was sometimes difficult getting past them, especially for companies without a contact name to ask for. Even after getting past the secretaries, some of the contact people seemed nearly impossible to reach because they never answered their phones.

Once phone contact was made, another difficulty ensued. Trying to explain the concept of an Eco-Industrial Network (EIN) in a concise enough manner for people to listen to was very challenging. Some people seemed to think they were being asked to buy something, and they refused to even listen to an explanation of the project. Also, mention of the word “survey” itself seemed to have a negative effect on some people. Some people were willing to answer some questions over the phone but they were not interested in going through the full survey interview; therefore, their answers were limited to the subject of material use. These are the six companies referred to in the report as “phone surveys.” On the whole, people who agreed to participate in the full survey interview seemed to be naturally friendly, which may have played a part in their decision. Whether they were more likely to benefit from the survey than people who declined to participate is unknown. In spite of these difficulties, calling companies to find survey participants still seems like the best option. Direct calling appears to be necessary in order to gain the interest of companies, as illustrated by the Triangle J survey project. Prior to conducting their survey, Triangle J hosted a breakfast for local industry professionals featuring a guest speaker on sustainable business. There was no interest in attending the breakfast.

Problems also occurred during the survey interviews. Some participants were anxious to get back to their regular work, so their answers were probably not as in depth as they could have been. A fine line had to be walked between asking thorough questions and being intrusive. Getting participants to physically fill out the survey was also sometimes difficult. They did not want to give specific answers because they were not sure if the effort of looking up the information was worth the potential benefit. Also, some survey participants admitted they did not expect to gain much from the survey project. The Triangle J report mentions that participants in that survey tended to underestimate their potential for byproduct exchange, which may explain why some participants in the Calumet survey did not expect to gain from it.

Participants tended to talk about what they were interested in, even if it was not included in the survey. Some of the most frequently discussed byproducts were commonly recycled materials such as cardboard, steel drums and wood pallets, rather than industry specific items. Originally, it was not the intent to include these kinds of items in the survey, but it soon became apparent that these were items of concern for companies. Ultimately, all items discussed were recorded in the data spreadsheets to reflect the interests of participating companies.

Another thing that made the interviews difficult was the fact that neither of the facilitators were industry professionals, which sometimes made it hard to discuss with companies the details and concerns of possible exchanges. In these situations, “the right questions” may not always have been asked. If the facilitators had been members of the industrial community, they may also have been able to convince more companies to participate in the survey. One problem unique to this survey was the fact that a new facilitator came in partway through the project. Time as well as information was unfortunately lost due to the switch.

There was not enough time for the second facilitator to begin the process of contacting businesses to discuss potential exchanges. This is a process that could start to happen with a local exchange network in the form of a newsletter and an interactive website where companies could see what byproducts other companies have to offer and enter into dialogue with each other. SCDCOM would be interested in pursuing this next step provided there is funding. Initially, the newsletter

and website would need public or private funding, but eventually the service could pay for itself if user fees are charged to participating businesses. SCDCCom is currently developing a scope of work for the project.

Further Steps

This byproduct survey is only the first step toward a virtual Eco-Industrial Network (EIN) in the Calumet region. The Triangle J report outlines five elements for creating a local infrastructure: a website, a warehouse space, a taxi service, a facilitator, and funding. The report explains that a website would act as a local waste exchange as well as a forum for discussing byproduct exchanges. Warehouse space and a taxi service would address the problems of storage space and transportation, which were prevalent in both the Triangle J survey and the Calumet survey. According to the Triangle J report, a facilitator would be necessary in bringing focus groups of industries together to exchange byproducts. The report describes two kinds of focus groups, one based on proximity and one based on industry type. The Triangle J project implemented a focus group of industries located in proximity to each other to help identify exchange possibilities. Finally, sources of funding would have to be located. The Triangle J report suggests that local governments, participating industries, and economic development associations among others may be interested in funding EIN's because they could all stand to benefit from them.

There was a very positive response from industries on the idea of a local exchange. SCDCCom believes that a newsletter and website featuring a local exchange and an idea forum would be the logical next step toward developing an EIN in the Calumet region. A newsletter could be distributed to companies to inform them about byproduct exchange and to promote the website. The newsletter and website would be coordinated so companies could get updated information from either source. Once a newsletter and website are developed and distributed, it should be viable to engage local industry professionals in a dialogue on byproduct networks. From that point, SCDCCom would be interested in facilitating focus groups, possibly for several of the industrial corridors in the area. The goal of the focus groups would be to establish relationships between neighboring companies and to arrange and finalize exchange partnerships. Once the project is in operation, it could eventually support itself through user or membership fees from participating companies. SCDCCom would like to coordinate the local exchange with IMES, possibly by cross-referencing listings. IMES staff may also be able to lend expertise and ideas to the focus groups.

Another future step would be establishing a taxi service and warehouse space. Several companies expressed that they would like to have one recycler take all their usable byproducts instead of contracting different recyclers to take each type of byproduct. There may be an opportunity for a taxi and warehouse storage service that would take many kinds of byproducts. Once the byproducts are collected, sorted and stored at the warehouse, traditional recyclers could buy their respective products in bulk from the warehouse and take them to be recycled. The service would initially need funding, but it should begin to pay for itself through company user fees.

SCDCCom is beginning a project with two other organizations to conduct pollution prevention (P2) assessments in fall 2002 and to host an environmental management system workshop in spring

2003. SCDCCom plans to invite survey participants to attend the workshop and, if applicable, have assessments done of their facilities. The goal is to attain ten participants for the P2 assessments and fifty participants for the workshop. Given the rate of participation in this survey, SCDCCom believes the goal of ten P2 assessments and fifty workshop attendees can be met if the geographic area for participants is expanded to include companies located further south and west. Expanding the geographic area for the new project should not be an issue because only 10 companies will be visited for that project. The workshop and assessments will be “sold” to companies in much the same way as the Calumet survey—as a way for companies to increase efficiency and as a result save money and help the environment.

The results of this survey will be sent to participants in a letter. The letter will also contain a brief description of SCDCCom’s future plans for an EIN in the Calumet Region, as mentioned above. Survey participants will be encouraged to continue their involvement so that they may help bring about a positive change for themselves and the area.

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Appendices

Map 1: Locations of Participating Companies

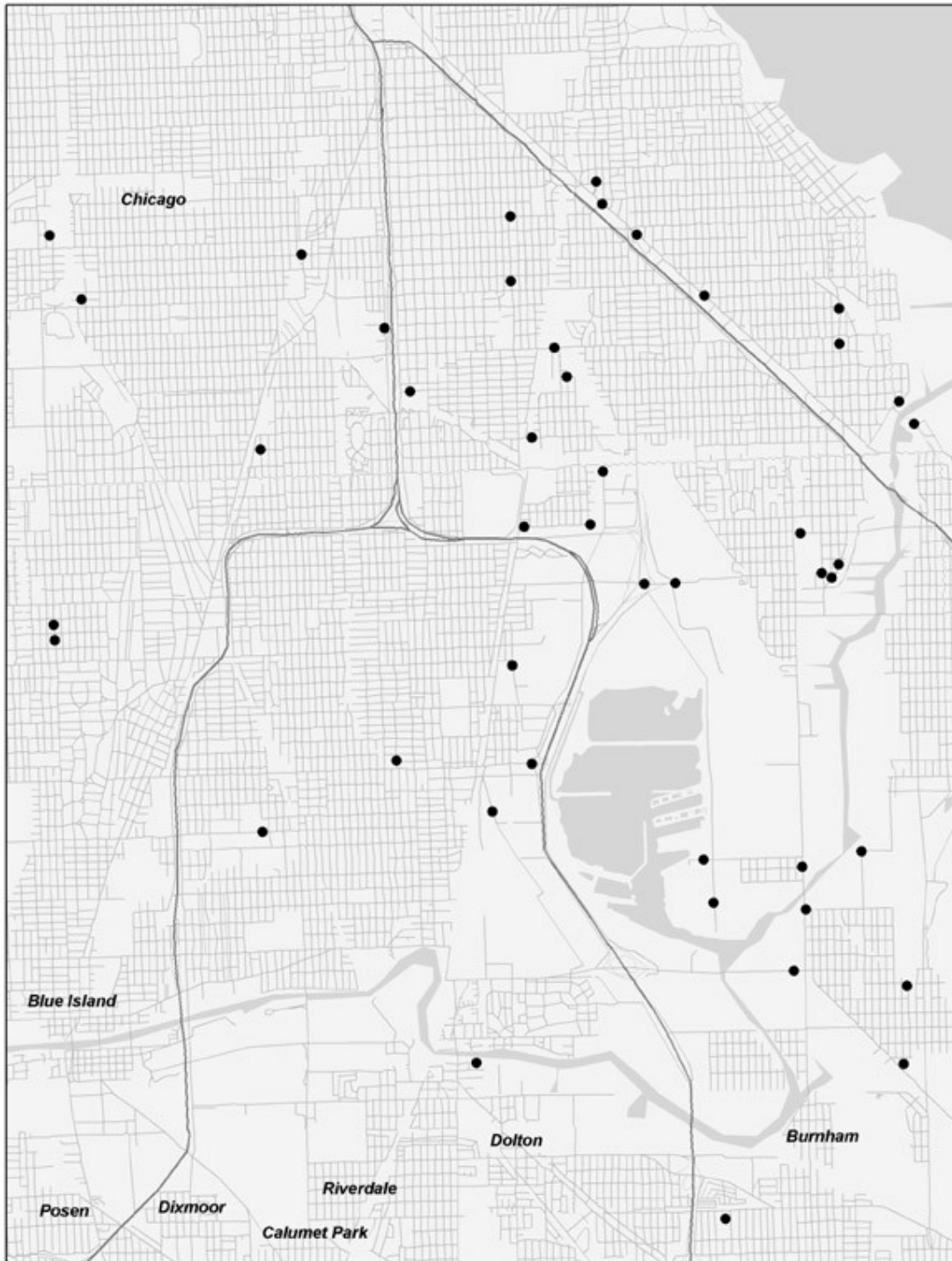


Table 1: Material Inputs by Company		
Company ID Number	Inputs	Category
1	oil	oil
	aluminum-based compounds	scrap (non-ferrous)
2	oil/grease	oil
	hard latex paint slurry	paint
	dust: TiO2, clay, pigments	paint
3	none identified (lumber)	wood
4	none identified (meat)	food
5	none identified (dairy)	food
6	none identified (water-based glue)	chemical
7	vegetable oil byproducts	oil
	sulfuric acid	acid/base
	sodium hydroxide	chemical
8	oil	oil
9	oil	oil
10	sulfuric acid	acid/base
	sodium based: sodium hydroxide (50%)	chemical
11	steel	scrap (ferrous)
12	raw steel	scrap (ferrous)
13	none identified (unpackaged product)	chemical
14	antique bricks	clay/carbon
15	paint	paint
	lumber	wood
	building materials	wood
16	wood	wood
17	none identified (pin-on buttons)	scrap (non-ferrous)
	(button covers)	plastic/synthetic
18	none identified (unpackaged product)	chemical

Table 1

Table 1 Continued...		
Company ID Number	Inputs	Category
19	oil	oil
	grease	oil
	other lubricants	oil
20	oil	oil
	iron castings	scrap (ferrous)
21	vegetable oil	oil
	alkalis: diluted caustic soda	acid/base
	clay, carbon, absorbents	clay/carbon
22	machine lube oil	oil
	machine grease	oil
	hydrochloric acid	acid/base
	alkalis: various soaps	acid/base
23	stainless steel	scrap (non-ferrous)
	clean drums	storage (SD)
	wood crates	storage (WP)
24	none identified (steel industry)	clay/carbon
25	latex paint	paint
26	aluminum grindings	scrap (non-ferrous)
	clay, carbon, absorbents: carbon raiser/petroleum coke	clay/carbon
	latex paint (for offices)	paint
27	none identified (printing machines)	scrap (ferrous)
28	halogenated solvents	chemical
	sulfuric acid	acid/base
	hydrochloric acid	acid/base
	sodium-based compound: caustic wash	chemical
	other alkalis: zinc nitrate hexahydrate	acid/base
	alum-based compound: alum acetyl acetate	scrap (non-ferrous)
29	aqueous ammonia	chemical
	halogenated solvents	chemical
	non-halogenated solvents	chemical
	oil machine lube	oil
	grease	oil
	sulfuric acid	acid/base
	phosphoric acid	acid/base
	hydrochloric acid	acid/base
	nitric acid	acid/base
	calcium-based compounds	chemical
sodium-based compounds	chemical	

Table 1 Continued...		
Company ID Number	Inputs	Category
30	none identified (machine parts)	scrap (non-ferrous)
31	oil	oil
32	none identified (upholstery)	fabric
33	none identified (aluminum panels) (speaker materials)	scrap (non-ferrous) plastic/synthetic
34	motor oil 10W30 JT-1 high temp grease boron based: Borax 5 mol alkalis: liquid caustic (50% sol) clay, carbon, absorbent: oil dry PP plastic: strapping Rust Oleum flexo/letterpress inks ex-heavy gear oil	oil oil chemical acid/base clay/carbon plastic/synthetic paint chemical oil
35	none identified (mattress ticking) (steel) (foam)	fabric scrap (ferrous) plastic/synthetic
36	sulfuric acid sodium based: sodium carbonate sodium based: sodium bisulfate catalysts: vanadium sulfur	acid/base chemical chemical chemical chemical
37	plastic dinnerware	plastic/synthetic
38	none identified (scrap)	scrap (ferrous)
39	none identified (bakery)	food
40	none identified (newspaper)	paper
41	none identified (sugar, syrup, molasses)	food
42	none identified (cement slag)	clay/carbon
43	scrap metal	scrap (ferrous)
44	none identified (newsprint) (ink)	paper chemical

Table 2: Material Byproducts by Sic Code

Sic Code	Item	Category
2000 food & kindred products		
2013 sausage producer	cans	scrap (non-ferrous)
	cardboard	storage (CB)
	meat byproducts	food
2021 butter producer	cardboard	storage (CB)
	old pallets	storage (WP)
2051 bakery	leftover pieces of cake, crumbs (topping)	food
	cardboard	storage (CB)
2061 syrup, molasses manufacturer	plastic drums (odd size)	storage (PL)
2077 acid oils & animal fats renderer	steel drums	storage (SD)
	wood pallets	storage (WP)
2096 potato chip factory	potato mash	food
	cardboard	storage (CB)
	office paper	paper
	old wood pallets	storage (WP)
	aluminum chip wrappers	scrap (non-ferrous)
	aluminum cans	scrap (non-ferrous)
2099 ice cream cone manufacturer	used oil	oil
	wood pallets	storage (WP)
	cardboard	storage (CB)
	ice cream cone scraps	food
	diatomaceous earth	clay/carbon
	office paper	paper
2400 lumber & wood products	drums	storage (SD)
	wood scrap (firewood)	wood
	sawdust	wood
2421 lumber & saw mill	steel scrap from wood bundles	scrap (ferrous)
2434 wood kitchen cabinet maker	wood scrap and sawdust	wood
2500 furniture & fixtures		
2512 furniture upholsterer	polyester batting	fabric
	old fabric	fabric
	old foam	plastic/synthetic
	cardboard rolls	storage (CB)
2515 mattress & bedspring manufacturer	none listed	none
2600 paper & allied products		
2653 corrugated box manufacturer	none listed	none
Sic Code	Item	Category
2700 printing, publishing		
2711 printer	office paper	paper
	old newsprint	paper

Table 2 Continued...		
2800 chemicals & allied products		
2819 industrial chemical & sulfuric acid manufacturer	none listed	none
2819 desulfurizer, dephosphorizer & insulating slag manufacturer	waste oil plastic packaging	oil storage (PL)
2819 steel mill & foundry producer	broken pallets waste oil steel drums ash from dust collector	storage (WP) oil storage (SD) special waste
2821 resin & adhesive manufacturer	caustic wash cleaning tank resin sample materials filters for acrylic off-specification materials cardboard office paper drums pallets scrap metal (old pipes)	chemical chemical chemical special waste chemical storage (CB) paper storage (SD) storage (WP) scrap (ferrous)
2844 hair & health care product	oil wood pallets	oil storage (WP)
2851 water based trade coating manufacturer	damaged paint cans (tin) paint dust returned paint drums pallets plastic bales	scrap (non-ferrous) paint paint storage (SD) storage (WP) storage (PL)
2865 chemical intermediate manufacturer	drums paper plastic bags	storage (SD) paper storage (PL)
2891 woodworking & packaging adhesive manufacturer	steel drums wood pallets plastic totes	storage (SD) storage (WP) storage (PL)
2900 petroleum refining		
2992 industrial oil manufacturer	steel drums cardboard waste/low grade vegetable oil	storage (SD) storage (CB) oil
2992 compound & blended lubricating oil producer	wood pallets cardboard boxes unopened laboratory chemicals (chloroform)	storage (WP) storage (CB) chemical

Table 2 Continued...		
Sic Code	Item	Category
3200 clay, glass & concrete		
3273 ready mixed concrete manufacturer	oil	oil
	cement slurry	clay/carbon
3300 primary metals		
3312 structural steel tubing & pipe manufacturer	steel scrap	scrap (ferrous)
	scale solids	special waste
	steel drums	storage (SD)
	waste oil	oil
	wood pallets	storage (WP)
3341 stainless steel scrap processor	wood pallets	storage (WP)
	cardboard	storage (CB)
3369 nonferrous sand casting & machine work	silica sand	clay/carbon
	aluminum, bronze, brass	scrap (non-ferrous)
	solvent	chemical
3398 metal heat treater	steel drums	storage (SD)
	metal shot	scrap (ferrous)
	cardboard boxes	storage (CB)
	wood skids	storage (WP)
3400 fabricated metal products		
3441 hydraulic cylinders & RR housing manufacturer; steel fabricating & stamping	waste oil	oil
	scrap metal	scrap (ferrous)
	wood blocks	wood
	empty paint drums	scrap (non-ferrous)
	cardboard	storage (CB)
3500 machinery, except electrical		
3545 machine vice and rotary table producer	steel castings	scrap (ferrous)
	wood skids/crates	storage (WP)
	cardboard	storage (CB)
3555 precisioned machine parts manufacturer	scrap metal	scrap (ferrous)
	wood pallets	storage (WP)
	waste coolant	chemical
	waste oil	oil
3589 floor buffer assembler	aluminum scrap	scrap (non-ferrous)
	bad motors	scrap (non-ferrous)
3600 electrical & electrical machinery		
3629 metal stamping & assembler	steel scrap	scrap (ferrous)
	office paper	paper
	wood pallets	storage (WP)
	cardboard drums	storage (CB)
	plastic bags	storage (PL)

Table 2 Continued...		
Sic Code	Item	Category
3700 transportation equipment		
3714 accoustic parts producer	aluminum panels	scrap (non-ferrous)
	EVA rubber	plastic/synthetic
	PVC plastic	plastic/synthetic
	polyurethane foam	plastic/synthetic
	waste water mixed w/glue	special waste
	returnable dunnage (plastic crates)	storage (PL)
	metal scrap brackets	scrap (ferrous)
	cardboard	storage (CB)
5000 wholesale trade-durable goods		
5051 steel service center: sheet steel processing & slitting	scrap metal	scrap (ferrous)
	oil	oil
7300 business services		
7389 contract packager	steel drums	storage (SD)
	wood pallets	storage (WP)
	plastic	storage (PL)
	cardboard	storage (CB)
	waste water	special waste
7389 contract packager	corrugated cardboard	storage (CB)
	waste solvents	chemical
	steel drums	storage (SD)
	plastic tubes	storage (PL)
8300 social services		
8331 job trainer & vocational rehabilitation services	cardboard	storage (CB)
	steel drums	storage (SD)
	plastic shrink wrap	storage (PL)
8331 job trainer & vocational rehabilitation services	none listed	none
unknown		
pre-fabricated housing manufacturer	light bulbs	other
	metal machine parts	scrap (non-ferrous)
	scrap lumber	wood
brickyard	brick bats	clay/carbon
slag & cement processor	corrugated cardboard	storage (CB)
	scrap metal	scrap (ferrous)
	blast slag	special waste
barge towing service	waste oil	oil
package printer	carton material (cardboard)	storage (CB)
	waste water	special waste
	ink	chemical
	waste oil	oil
	pallets	storage (WP)

Table 3: Material Byproducts by Company						
Company	Byproducts	Category	Recycling?	Reusing?	Buy used?	Special disposal?
1	silica sand	clay/carbon				
	aluminum, bronze, brass	scrap (non-ferrous)	X			
	solvent	chemical	X			
2	damaged paint cans (tin)	scrap (non-ferrous)				
	paint dust	paint		X		
	returned paint	paint	X	X		
	drums	storage (SD)*	X			
	pallets	storage (WP)	X			
	plastic bales	storage (PL)				
3	wood scrap (firewood)	wood	X			
	sawdust	wood	X			
	steel scrap from wood bundles	scrap (ferrous)	X			
4	cans	scrap (non-ferrous)	X			
	cardboard	storage (CB)	X			
	meat byproducts	food	X			
5	cardboard	storage (CB)	X			
	old pallets	storage (WP)		X		
6	steel drums	storage (SD)	X			
	wood pallets	storage (WP)	X			
	plastic totes	storage (PL)				
7	steel drums	storage (SD)				
	wood pallets	storage (WP)				
8	steel drums	storage (SD)	X			
	metal shot	scrap (ferrous)	X			
	cardboard boxes	storage (CB)	X			
	wood skids	storage (WP)				
9	wood pallets	storage (WP)	X			
	cardboard boxes	storage (CB)				
	unopened laboratory chemicals (chloroform)	chemical				
10	drums	storage (SD)	X			
	paper	paper				
	plastic bags	storage (PL)				
11	steel scrap	scrap (ferrous)	X			
	office paper	paper				
	wood pallets	storage (WP)				
	cardboard drums	storage (CB)				
	plastic bags	storage (PL)				
12	steel scrap	scrap (ferrous)	X			
	scale solids	special waste				X
	steel drums	storage (SD)	X			

Table 3

Table 3 Continued...						
Company	Byproducts	Category	Recycling?	Reusing?	Buy Used?	Special disposal?
	wood pallets	storage (WP)	X			
13	corrugated cardboard	storage (CB)	X			
	waste solvents	chemical	X			
	steel drums	storage (SD)	X			
	plastic tubes	storage (PL)				
14	brick bats	clay/carbon	X			
15	light bulbs	other	X			
	metal machine parts	scrap (non-ferrous)	X			
	scrap lumber	wood				
16	wood scrap and sawdust	wood				
17	cardboard	storage (CB)	X			
	steel drums	storage (SD)				
	plastic shrink wrap	storage (PL)				
18	steel drums	storage (SD)	X			
	wood pallets	storage (WP)	X			
	plastic	storage (PL)	X			
	cardboard	storage (CB)	X			
	waste water	special waste				X
19	potato mash	food	X			
	cardboard	storage (CB)	X			
	office paper	paper				
	old wood pallets	storage (WP)				
	aluminum chip wrappers	scrap (non-ferrous)				
	aluminum cans	scrap (non-ferrous)				
	used oil	oil	X			
20	steel castings	scrap (ferrous)	X			
	wood skids/crates	storage (WP)		X		
	cardboard	storage (CB)				
21	steel drums	storage (SD)			X	
	cardboard	storage (CB)				
	waste/low grade vegetable oil	oil	X			
22	wood pallets	storage (WP)	X			
	cardboard	storage (CB)	X			
	ice cream cone scraps	food	X			
	diatomaceous earth	clay/carbon	X			
	office paper	paper	X			
	drums	storage (SD)				
23	wood pallets	storage (WP)	X			
	cardboard	storage (CB)	X			
24	waste oil	oil	X			
	plastic packaging	storage (PL)		X		

Table 3

Table 3 Continued...						
Company	Byproducts	Category	Recycling?	Reusing?	Buy Used?	Special disposal?
	scrap metal	scrap (ferrous)	X			
	wood blocks	wood	X			
	empty paint drums	scrap (non-ferrous)	X			
	cardboard	storage (CB)				
26	broken pallets	storage (WP)	X			
	waste oil	oil	X			
	steel drums	storage (SD)	X			
	ash from dust collector	special waste				X
27	scrap metal	scrap (ferrous)	X			
	wood pallets	storage (WP)		X		
	waste coolant	chemical				X
	waste oil	oil	X			
28	caustic wash	chemical		X		X
	cleaning tank resin	chemical				X
	sample materials	chemical				X
	filters for acrylic	special waste				X
	off-specification materials	chemical		X		
	cardboard	storage (CB)	X			
	office paper	paper				
	drums	storage (SD)	X			
	pallets	storage (WP)		X		
	scrap metal (old pipes)	scrap (ferrous)	X			
29	oil	oil	X			
	wood pallets	storage (WP)		X		
30	aluminum scrap	scrap (non-ferrous)	X			
	bad motors	scrap (non-ferrous)				
31	oil	oil	X			
	cement slurry	clay/carbon	X			
32	polyester batting	fabric	X			
	old fabric	fabric	X			
	old foam	plastic/synthetic				
	cardboard rolls	storage (CB)				
33	aluminum panels	scrap (non-ferrous)	X			
	EVA rubber	plastic/synthetic	X			
	PVC plastic	plastic/synthetic	X			
	polyurethane foam	plastic/synthetic	X			
	waste water mixed w/glue	special waste				X
	returnable dunnage (plastic crates)	storage (PL)				
	metal scrap brackets	scrap (ferrous)				
	cardboard	storage (CB)				
34	none listed	none				
35	none listed	none				

Table 3

Table 3 Continued...						
Company	Byproducts	Category	Recycling?	Reusing?	Buy Used?	Special disposal?
36	none listed	none				
37	none listed	none				
38	scrap metal	scrap (ferrous)	X			
	oil	oil	X			
39	leftover pieces of cake, crumbs (topping)	food		X		
	cardboard	storage (CB)				
40	office paper	paper	X			
	old newsprint	paper	X			
41	plastic drums (odd size)	storage (PL)				
42	corrugated cardboard	storage (CB)	X			
	scrap metal	scrap (ferrous)	X			
	blast slag	special waste				
43	waste oil	oil	X			
44	carton material (cardboard)	storage (CB)	X			
	waste water	special waste				X
	ink	chemical		X		
	waste oil	oil	X			
	pallets	storage (WP)	X			
*SD=steel drums						
WP=wood pallets						
CB=cardboard						
PL=plastic						

Table 4: Byproduct Recycling/Reuse by Category					
Material	Total by-products listed*	Recycle	Reuse	Buy Used	Special Disposal
Oil	12	12	0	0	0
Chemicals	9	2	3	0	4
Paint	2	2	2	0	0
Acid/Base	0	0	0	0	0
Scrap (ferrous)	11	10	0	0	0
Scrap (non-ferrous)	10	6	0	0	0
Wood	5	3	0	0	0
Steel Drums	13	9	0	1	0
Wood Pallets	18	9	5	0	0
Cardboard	20	12	0	0	0
Plastic Storage	10	1	1	0	0
Clay/Carbon	4	3	0	0	0
Plastic/Synthetic	4	3	0	0	0
Food	4	3	1	0	0
Paper	7	3	0	0	0
Fabric	2	2	0	0	0
Special Waste	7	0	0	0	6
Other	1	1	0	0	0
*Uses may not equal the total.					

Table 5: Byproduct Recycling/Reuse Opportunities

Item	Category	Possibilities
unused laboratory chemicals (chloroform)	chemicals	school science department
metal brackets	scrap (ferrous)	recycler
tin paint cans	scrap (non-ferrous)	foundry recycler
aluminum chip wrappers and cans	scrap (non-ferrous)	foundry recycler
bad motor parts	scrap (non-ferrous)	foundry recycler
scrap wood	wood	woodworking studio
sawdust	wood	horse bedding
steel drums	storage	stainless steel scrap processor recycler
wood pallets	storage	stainless steel scrap processor recycler
cardboard	storage	recycler
plastic storage	storage	recycler
brickbats	clay, carbon	roadfill
silica sand	clay, carbon	roadfill
foam	plastic/synthetic	recycler
paper	paper	recycler

Company: _____
Date of interview: _____ Length: _____ Tour? Y or N
Names & titles of company people at interview:
1.
2.
3.

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Interview Reporting Form

Question 1: (Look to see if they use water in their processes) Do you reuse/conserve water at your facility?

Question 2: (If they treat their water onsite) Do you have the ability to do any more onsite water treatment than you do now?

Question 3: Could you use water from a nearby facility?

Question 4: How much water could you use?

Question 5: What water quality requirements would you have? (Dirty or clean?)

Question 6: Can you identify any barriers in using the recycled water input? (Be specific regarding what items these barriers relate to.) If not, explain why.

Question 7: What is the monetary value, or what is the most you would pay, including added benefits (Ex. If you require heated water and it comes to you already hot)?

Question 8: Are you aware of other facilities around you that might be reusing water, either from another plant or within their own facility? If yes, what was the result?

Question 9: What types of waste do you have?

Question 10: Are there any additional items that you have turned into reusable? What was the result? If no would you be interested in learning more?

Question 11: What by-products at your facility do you think have the greatest potential for reuse?

Question 12: When looking at ways to reuse your by-products, what barriers were found? (Be specific regarding what by-products these barriers relate to.)

Question 13: Does the facility reuse/ conserve any source of energy?

Question 14: What is the biggest barrier to reusing/conserving energy?

Question 15: As far as you know, do any of your neighboring businesses reuse any energy sources?

Question 16: Are you currently exchanging? If yes, what was the result?

Question 17: Have you ever tried IMES? If not, why?

Question 18: Would you be interested in a local exchange network similar to IMES?

Question 19: Have you listed any materials in any other exchange service? If yes, what was the result? If no, would you be interested in learning more?

Question 20: Are you involved in any other local transfers of excess materials, water, or energy?

Question 21: Do you have any other ideas for potential partnerships?

Question 22: What barriers are there for you to making waste/excess materials available to others?

Question 23: How might this project benefit your facility?

Question 24: Do you have any other suggestions of resources we should use?

Analyze Questions

From the examples that they provide from other companies, do any of them reuse any of the items that come through their plant?

What is the interviewer's assessment of the level of experience with reuse at the facility?

- None
- No experience, but interested
- A few examples
- Some large examples (as % of inputs or outputs)
- Extensive consideration already, few options remain.

Did they list any materials? Inputs/outputs

Other concerns?

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