STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

April 30, 1985

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Frank Cross, P.E.
Cross/Tessitore and Associates
4759 S. Conway Road
Orlando, Florida 32812

Dear Mr. Cross:

Attached is one copy of the Technical Evaluation and Preliminary Determination, and proposed permit to Yorker Doliner and Company to construct a wet process auto-metal shredder at the applicant's facility in Rockledge, Brevard County, Florida.

Before final action can be taken on your draft permit, you are required by Florida Administrative Code Rule 17-103.150 to publish the attached Notice of Proposed Agency Action in the legal advertising section of a newspaper of general circulation in Brevard County no later than fourteen days after receipt of this letter. The department must be provided with proof of publication within seven days of the date the notice is published. Failure to publish the notice may be grounds for denial of the permit.

Please submit, in writing, any comments which you wish to have considered concerning the department's proposed action to Mr. Bill Thomas of the Bureau of Air Quality Management.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

Attachments

cc: Jeffrey Doliner
Charles Collins

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of an Application for Permit by:	)
Yorke Doliner and Company Post Office Box 1659 Cocoa, Florida 32922	) DER File No. AC 05-097961

INTENT TO ISSUE

The Department of Environmental Regulation hereby gives notice of its Intent to Issue, and proposed order of issuance for, a permit pursuant to Chapter 403, Florida Statutes, for the proposed project as detailed in the application specified above. The Department is issuing this Intent to Issue for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

The applicant, Yorke Doliner and Company, applied on January 7, 1985, to DER for a permit to construct a wet process auto-metal shredder at the applicant's existing facility in Rockledge, Brevard County, Florida.

The Department has permitting jurisdiction under Chapter 403, Florida Statutes and Florida Administrative Code Rules 17-2 and 17-4. The project is not exempt from permitting procedures. The applicant was officially notified by the Department that an air construction permit was required for the proposed work.

This intent to issue shall be placed before the Secretary for final action unless an appropriate petition for a hearing pursuant to the provisions of Section 120.57, Florida Statutes, is filed within fourteen (14) days from receipt of this letter or publication of the public notice (copy attached) required pursuant to Rule 17-103.150, Florida Administrative Code, whichever occurs first. The petition must comply with the requirements of Section 17-103.155 and Rule 28-5.201, Florida Administrative Code (copy attached) and be filed pursuant to Rule 17-103.155(1) in the Office of General Counsel of the Department of Environmental Regulation at 2600 Blair Stone Road, Tallahassee, Florida 32301.

Petitions which are not filed in accordance with the above provisions are subject to dismissal by the Department. In the event a formal hearing is conducted pursuant to Section 120.57(1), all parties shall have an opportunity to respond, to present evidence and argument on all issues involved, to conduct cross-examination of witnesses and submit rebuttal evidence, to submit proposed findings of facts and orders, to file exceptions to any order or hearing officer's recommended order, and to be represented by counsel. If an informal hearing is requested, the agency, in accordance with its rules of procedure, will provide affected persons or parties or their counsel an opportunity, at a convenient time and place, to present to the agency or hearing officer, written or oral evidence in opposition to the agency's action or refusal to act, or a written statement challenging the grounds upon which the agency has chosen to justify its action or inaction, pursuant to Section 120.57(2), Florida Statutes.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition, may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Model Rule 28-5.207 at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of

Administrative Hearings, 2009 Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

Executed the 30 day of April, 1985, in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

C. H. Fancy
C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

Copies furnished to:

Jeffrey B. Doliner
Yorke Doliner and Company
Post Office Box 1659
Cocoa, Florida 32922

Frank Cross, P.E.
Cross/Tessitore and Associates
4759 S. Conway Road
Orlando, Florida 32812

Charles Collins
Department of Environmental Regulation
St. Johns River District
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803

CERTIFICATION

This is to certify that the foregoing Intent to Issue and all copies were mailed before the close of business on 30 April, 1985.

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management
2600 Blair Stone Road
Tallahassee, Florida 32301

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Patricia G. Adams 4/30/85
Clerk Date

Technical Evaluation
and
Preliminary Determination

Yorke Doliner and Company
Brevard County
Rockledge, Florida

Permit Number:
AC 05-097961

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

April 30, 1985

State of Florida
Department of Environmental Regulation
Notice of Proposed Agency Action on Permit Application

The Department of Environmental Regulation gives notice of its intent to issue a permit to Yorke Doliner and Company to construct a wet process auto-metal shredder at the applicant's existing facility at Nova Industrial Park, U.S. Highway 1, Rockledge, Brevard County, Florida. A determination of best available control technology (BACT) was not required.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period constitutes a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Model Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009, Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Regulation
St. Johns River District
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803

Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Any person may send written comments on the proposed action to Mr. Bill Thomas at the department's Tallahassee address. All comments mailed within 30 days of the publication of this notice will be considered in the department's final determination.

RULES OF THE ADMINISTRATIVE COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

28-5.15 Requests for Formal and Informal Proceedings

(1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.

(2) All petitions filed under these rules should contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name and address of the petitioner or petitioners;

(c) All disputed issues of material fact. If there are none, the petition must so indicate;

(d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;

(e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;

(f) A demand for the relief to which the petitioner deems himself entitled; and

(g) Such other information which the petitioner contends is material.

I. Project Description

A. Applicant

Yorke Doliner and Company
P. O. Box 1659
Cocoa, Florida 32922

B. Project and Location

The company applied on January 7, 1985, for a construction permit to add a new wet process auto-metal shredder. The SIC designation is 5093 (SCC: 3-04-002-30). This addition of the wet process auto-metal shredder will have a significant net emissions increase of particulate matter from the facility. Yorke Doliner & Company currently operates an existing automobile based resource recovery facility located in Rockledge, Brevard County, Florida. The wet process auto-metal shredder will be located centrally on this property, which lies at the southwest corner of Nova Industrial Park, Rockledge, Brevard County, Florida. The UTM coordinates are Zone 17, 753.01 km East and 3126.58 km North.

C. Process and Controls

The wet process auto-metal shredder to be constructed is designed and fabricated by Newell Industries/Texas Shredder Parts Inc. An automobile designated for shredding undergoes three distinct stages:

1) Pre-shredder preparation: Items and contaminants which are either most easily removed manually (battery, tires, electronics, etc.) or which are essential to remove due to possible contamination to the environment (brake shoes and pads, all VOC's, battery and tires) are dealt with in this stage. After these items and contaminants have been removed, the remainder of the vehicle is positioned on a conveyor feeding the shredder.

2) Shredding: This a purely mechanical methodology which reduces an articulate vehicle to more manageable pieces. This process intrinsically produces a great amount of heat and particulate debris. In an effort to reduce the likelihood of an explosion of a vehicle subjected to shredding and to reduce fugitive particulate emissions, water is introduced to the system. Water is also employed as a medium of transport for the third stage.

3) Recovery: Ferrous and non-ferrous metals are recovered in this stage. The properties which make these groups dis-similar are employed to segregate the same. The process is wet and very little particulate matter should escape.

The primary shredder consists of the feed chute, feed rollers, shredder and undermill pick-up conveyor. Water drains out and is collected in a sump.

Shredder material from the shredder is wetted in a magnetic separator from which the ferrous material is spilled onto a drainage apron. The non-ferrous metals and debris are routed through a rising current separator and subsequent flotation separator.

II. Rule Applicability

The proposed project to construct a wet process auto-metal shredder is subject to preconstruction review under provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (FAC) Chapters 17-2 and 17-4.

The application was complete on March 26, 1985.

The plant site is located in an area of attainment for all criteria air pollutants (17-2.420).

The existing site is a minor facility. With the addition of this new source, Yorke Doliner and Company will become a major facility for particulate matter.

Under current Federal guidelines, a PSD (Prevention of Significant Deterioration) review is not required because the proposed project is a minor modification to a minor facility (FAC Rule 17-2.500). The auto-metal shredder will be permitted under FAC Rule 17-2.610, General Particulate Emission Limiting Standards, and FAC Rule 17-2.620, General Pollutant Emission Limiting Standards.

III. Summary of Emissions

No specific procedures allow for calculations of this type of auto-metal shredding process with respect to airbourne emissions for particulate matter (PM). Emissions are, therefore, based on "process weight" (FAC Rule 17-2.610(1)). Upon this basis, the following emission data are summarized:

Pollutant	Emissions (actual)	Emissions (allowable)	Emissions (w/o controls)
PM	Unknown	34.4 lb/hr *35.8 TPY	Unknown

Note: *Based on 2080 hours of operation.

IV. Ambient Air Impact

Because of the low elevation of the emissions and relatively large size of the particles from the shredder, the ambient air impact should be confined to the yard. No significant impact is expected off the yard's property. Consequently, no ambient air quality analysis was required.

V. Conclusion

Based on a review of the data submitted by Yorke Doliner and Company, the Department has concluded that the emissions for the addition of the wet process auto-metal shredder can be approved without causing any violations of the air pollution control regulations.

Therefore, the Department proposes to issue Yorke Doliner and Company a permit for construction of the wet process auto-metal shredder. The General and Specific Conditions listed in the proposed permit will assure compliance with all applicable air pollution regulations.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Yorke Doliner and Company
P. O. Box 1659
Cocoa, Florida 32922

Permit Number: AC 05-097961
Expiration Date: July 1, 1986
County: Brevard
Latitude/Longitude: 28° 16' 15"N/ 80° 42' 08"W
Project: Wet Process Auto-Metal Shredder with Conveyors, Separators, and Settling Chamber

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the construction of a 65 ton per hour (maximum) wet process auto-metal shredder at the existing facility located in the Nova Industrial Park off U.S. Highway 1, Rockledge, Florida. The UTM coordinates are Zone 17, 753.01 km East and 3126.58 km North.

Construction shall be in accordance with the permit application and plans, documents, amendments and drawings, except as otherwise noted on pages 5 and 6 of the "Specific Conditions".

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), which was received on January 7, 1985, by the St. Johns River District office.
2. C. H. Fancy's letter dated February 6, 1985.
3. Frank L. Cross's letter dated February 15, 1985.
4. Frank L. Cross's letter with attachments dated February 21, 1985.
5. Frank L. Cross's letter with attachment dated March 21, 1985.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

PERMITTEE: Yorke Doliner and Company

Permit Number: AC 05-097961
Expiration Date: July 1, 1986

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD)
( ) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. The operations hours shall not exceed 2,080 hours per year.

2. Input rate shall not exceed 65 tons per hour.

3. Particulate matter emissions, as determined by EPA Method 5 (described in 40 CFR 60, appendix A) or other methods approved by the Department, shall not exceed 34.4 lb/hr and 35.8 TPY.

4. Objectionable odors shall not be allowed on off-plant property.

SPECIFIC CONDITIONS:

5. Visible emissions, as determined by EPA Method 9 (described in 40 CFR 60, Appendix A), shall not exceed 20 percent opacity, 6 minute average.

6. Construction shall reasonably conform to the plan and schedule in the application. Any changes in the plan or schedule shall be reported to the St. Johns River District office.

7. The permittee shall take precautionary measures, such as wetting the work area, to minimize fugitive dust emissions during the construction and operation of the shredder. Solid waste and sludge shall be disposed of in an environmentally sound manner and where required, in accordance with permitted conditions pursuant to Department rules and regulations.

8. The permittee shall submit a complete application for a permit to operate the shredder, which must include an emissions tests report, to the St. Johns River District at least 90 days prior to the expiration date of this construction permit. The permittee may continue to operate this source, if it is in compliance with all conditions of this construction permit, until its expiration date.

9. Upon obtaining a permit to operate, the permittee will be required to submit annual operation reports to the St. Johns River District office which shall include the actual hours of operation, total tonnage of input material, and the actual annual pollutant emissions.

PERMITTEE: Yorke Doliner and Company

Permit Number: AC 05-097961
Expiration Date: July 1, 1986

SPECIFIC CONDITIONS:

Issued this ___ day of________, 1985

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

ATTACHMENT 1

Best Available Copy

AC 05-09 [illegible]

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SIC # 5093
SCC # 3-[illegible] (Secondary)

SOUTHWEST DISTRICT

7601 HIGHWAY 301 NORTH
TAMPA, FLORIDA 33610

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

WILLIAM K. HENNESSEY
DISTRICT MANAGER

100
JAN 07 1985
SAINT JOHNS DISTRICT

RECEIVED JAN 1985 Saint Johns River District

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Metal Shredder [xx] New[1] [ ] Existing[1]

APPLICATION TYPE: [xx] Construction [ ] Operation [ ] Modification

COMPANY NAME: Yorke Doliner & Company COUNTY: Brevard

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) fugitive

SOURCE LOCATION: Street Nova City Rock Ledge

UTM: East 7530059 North 3126584

Latitude 28 ° 16 ' 15 "N Longitude 80 ° 42 ' 8 "W

APPLICANT NAME AND TITLE: Yorke Doliner & Company

APPLICANT ADDRESS: Nova Industrial Park, U. S. Highway 1, Rock Ledge, Florida

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Yorke Doliner & Co.

I certify that the statements made in this application for a metal shredder permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: Jeffrey B. Doliner

Jeffrey B. Doliner, Vice-President
Name and Title (Please Type)

Date: 12/31/84 Telephone No. 904-255-1453

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed [signature]

Frank L. Cross, Jr.
Name (Please Type)

Cross/Tessitore & Associates, P.A.
Company Name (Please Type)

4759 South Conway Road, Orlando, FL 32812
Mailing Address (Please Type)

Florida Registration No. 7916 Date: 12/31/84 Telephone No. 305-851-1484

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

To install a new metal shredder on a property approximately 2600' south and 900' east of its present facility. This is an entirely wet system and does not require any air pollution control equipment.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction June 1984 Completion of Construction February 1985

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Shredder, conveyors, etc. (equipment) -	$800,000.00
Erection Costs	200,000.00
Total	$1,000,000.00

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

None

E. Requested permitted equipment operating time: hrs/day 8 ; days/wk 5 ; wks/yr 52 ;

if power plant, hrs/yr ____; if seasonal, describe: N/A

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No

   a. If yes, has "offset" been applied? --

   b. If yes, has "Lowest Achievable Emission Rate" been applied? --

   c. If yes, list non-attainment pollutants. --

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. No

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   a. If yes, for what pollutants? N/A

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants Type	Contaminants % Wt	Utilization Rate - lbs/hr	Relate to Flow Diagram
Auto bodies and	ferrous metal	75.4	109,760 } product	B
other scrap	non-ferrous metal	4.6	6,720 }	C
metal (A)	trash	18.0	26,208 } waste	D
	waste solids	2.0	2,912 }	E
			29,120 lbs/hr 14.6 lbs/hr	

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 145,600

2. Product Weight (lbs/hr): 116,480 (Fe + non Fe)

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission[1] Maximum lbs/hr	Emission[1] Actual T/yr	Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission lbs/~~yr~~ hr	Potential[4] Emission T/yr	Relate to Flow Diagram
Particulates	0.73	0.76	17-2.610(b)	34.4	7.3	7.6	A

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4) NOT APPLICABLE

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)

E. Fuels NOT APPLICABLE

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: NOT APPLICABLE

Percent Sulfur: ______ Percent Ash: ______

Density: ______ lbs/gal Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb ______ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal.

SEE ATTACHMENT

NOT APPLICABLE

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: ______ ft. Stack Diameter: ______ ft.

Gas Flow Rate: ______ ACFM ______ DSCFM Gas Exit Temperature: ______ °F.

Water Vapor Content: ______ % Velocity: ______ FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Patholog-ical)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Inciner-ated							
Uncon-trolled (lbs/hr)							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

Manufacturer ______

Date Constructed ______ Model No. ______

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: ______ ft. Stack Diamter: ______ Stack Temp. ______

Gas Flow Rate: ______ ACFM ______ DSCFM* Velocity: ______ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) ______

Brief description of operating characteristics of control devices: ____________________

____

____

____

____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

____

____

____

____

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

NOT APPLICABLE

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device: b. Operating Principles:

c. Efficiency:[1] d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy:[2] h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device: b. Operating Principles:

c. Efficiency:[1] d. Capital Costs:

e. Useful Life: f. Operating Cost:

g. Energy:[2] h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device: 2. Efficiency:[1]

3. Capital Cost: 4. Useful Life:

5. Operating Cost: 6. Energy:[2]

7. Maintenance Cost: 8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

NOT APPLICABLE

A. Company Monitored Data

1. ____________ no. sites ____________ TSP ____________ ( ) SO^2* ____________ Wind spd/dir

Period of Monitoring ____ / ____ / ____ to ____ / ____ / ____
month day year month day year

Other data recorded ________________________________

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. ______ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location)________________

3. Upper air (mixing height) data obtained from (location)________________

4. Stability wind rose (STAR) data obtained from (location)________________

C. Computer Models Used

1. ________________ Modified? If yes, attach description.

2. ________________ Modified? If yes, attach description.

3. ________________ Modified? If yes, attach description.

4. ________________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	________________ grams/sec
SO^2	________________ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

SECTION V SUPPLEMENTAL REQUIREMENTS

1. Total process input rate (see flow diagram)

Material	lbs/hr	TPH	Cars/hr
Auto bodies and scrap metal	145,600	65	65

Note: 1 car ≅ 2,240 lbs, 1 ton ≅ 2,240 lbs

Product Rate

Material	lbs/hr	TPH
Ferrous Metal	109,760	49
Non-Ferrous Metal	6,720	3
Total		52

Waste Rate

Material	lbs/hr	TPH
Trash	26,208	11.7
Solids	2,912	1.3
Total		13.0

2. Controlled Emission Estimate - Particulates

Water is added to the shredder (see water balance) so that the fragmentizing of the metal, etc., is done wet. All of the material is handled wet and water is added at the magnetic separator and at the rising current separator. The only potential emissions are from the inlet and outlet of the wet shredder. (See shredder sketch).

As the shredder generates large quantities of heat, steam and water vapor are forced from the inlet and outlet of the system. These emissions may have a small quantity of particulates and be a minor source of fugitive emissions. At present there is no test data on the fugitive emissions from the units of this type that have been installed by Texas Shredder Parts, Inc. We are suggesting that the unit be installed and then inspected by FDER prior to issuing an operating permit to evaluate the fugitive emissions to determine an opacity limit consistent with the operation.

To estimate fugitive emissions from the crusher, we have applied a 90% removal efficiency for a wet scrubber, as the crusher will be flooded with water at all times.

∴ controlled emissions

= uncontrolled emissions x 0.1 (90% efficiency)

$= 7.3 \text{ lbs/hr} \times 0.1 = 0.73 \text{ lbs/hr} \times 2080 \frac{\text{hrs}}{\text{yr}} \times \frac{1}{2000} \frac{\text{ton}}{\text{lb}}$

= 0.76 TPY

3. <u>Basis of Potential Emission</u>

There are no data for car crusher emissions. To estimate the emissions, we have used a primary crusher for a stone quarrying operation and applied a wet scrubber factor of 90% efficiency.

emission facor (suspended emission) = 0.1 lbs/ton

(AP 42 Part B, 3rd edition pg 8.20-1, Table 8.20-1)

$72.8 \text{ (65 TPH)} \times 0.1 \text{ lb/ton} = 7.3 \text{ lb/hr} \times 2080 \frac{\text{hrs}}{\text{yr}} \times \frac{1}{2000} \frac{\text{ton}}{\text{lb}}$

= 7.6 TPY

4. <u>Allowable Emission Rate</u>

(Based on Chapter 17-2)

$E = 17.31 \ P^{0.16}$ (over 30 TPH)

$E = 17.31 \ (72.8)^{0.16}$

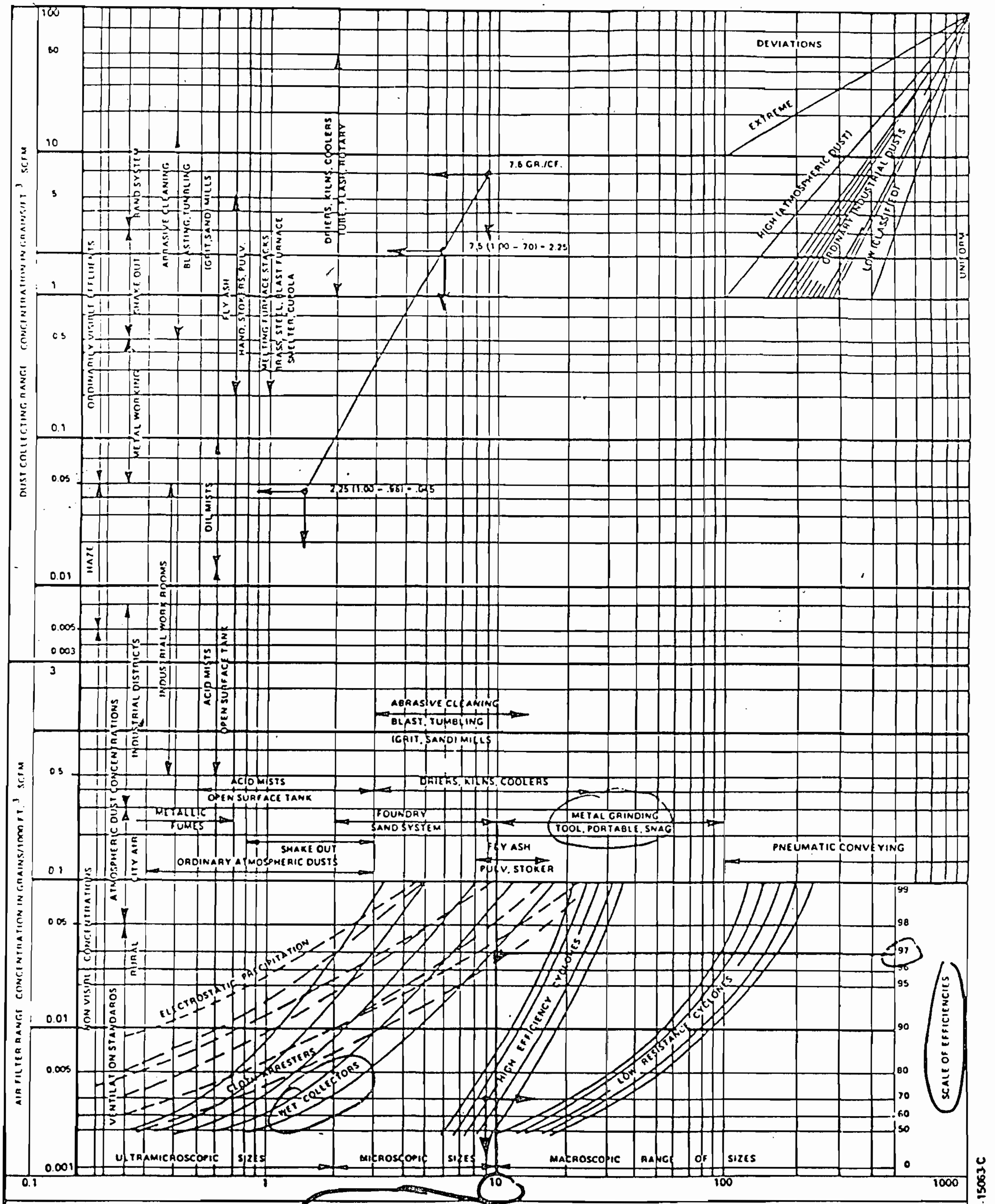
E = 34.4 lbs/hr

5. <u>Derivation of Control Device Efficiency</u>

As there are no data on a wet scrubber, we have used the Sylvan chart for our estimate. The low end (smaller, more restrictive size) of the metal grinding operations indicates a particle size of 10μ. A low efficiency wet scrubber (lower curve) indicates an efficiency of 97%. An efficiency of only 90% has been used for our calculations.

6. Diagram attached.
7. Diagram attached.
8. Diagram attached.

Best Available Copy



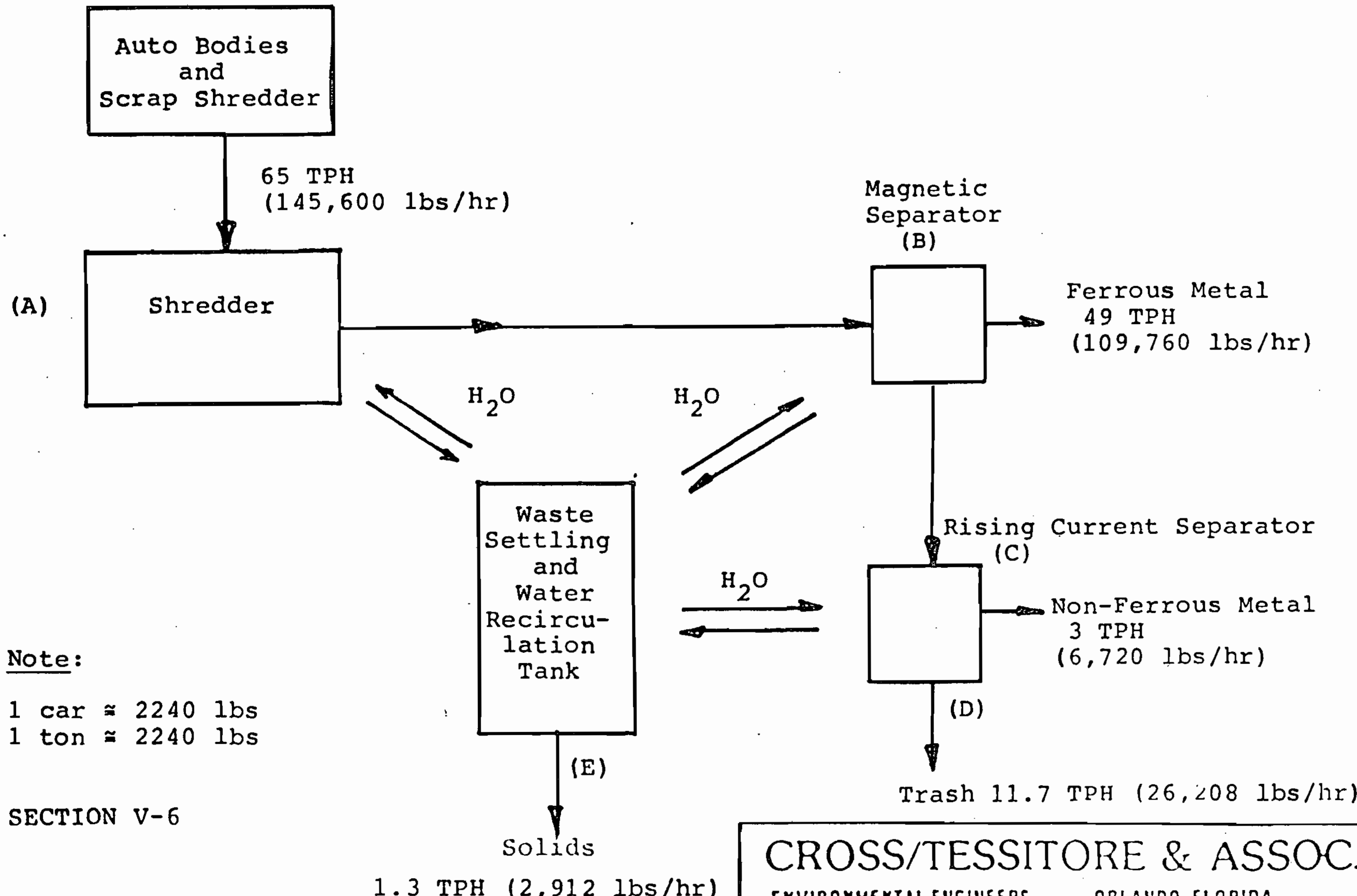
RANGE OF PARTICLE SIZES, CONCENTRATION, & COLLECTOR PERFORMANCE

COMPILED BY S. SYLVAN APRIL 1952: COPYRIGHT 1952 AMERICAN AIR FILTER CO. INC.

DATA REPORTED:

FLOW DIAGRAM

METAL SHREDDER SYSTEM



Note:

1 car ≈ 2240 lbs
1 ton ≈ 2240 lbs

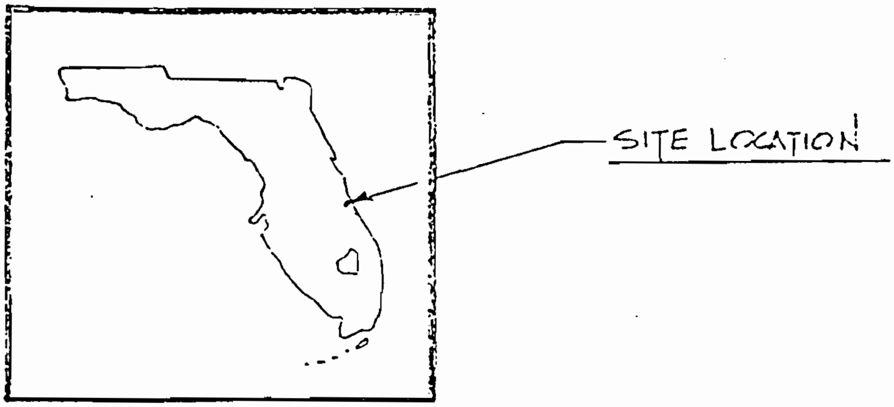
SECTION V-6

CROSS/TESSITORE & ASSOC., P.A.
ENVIRONMENTAL ENGINEERS ORLANDO, FLORIDA

Best Available Copy

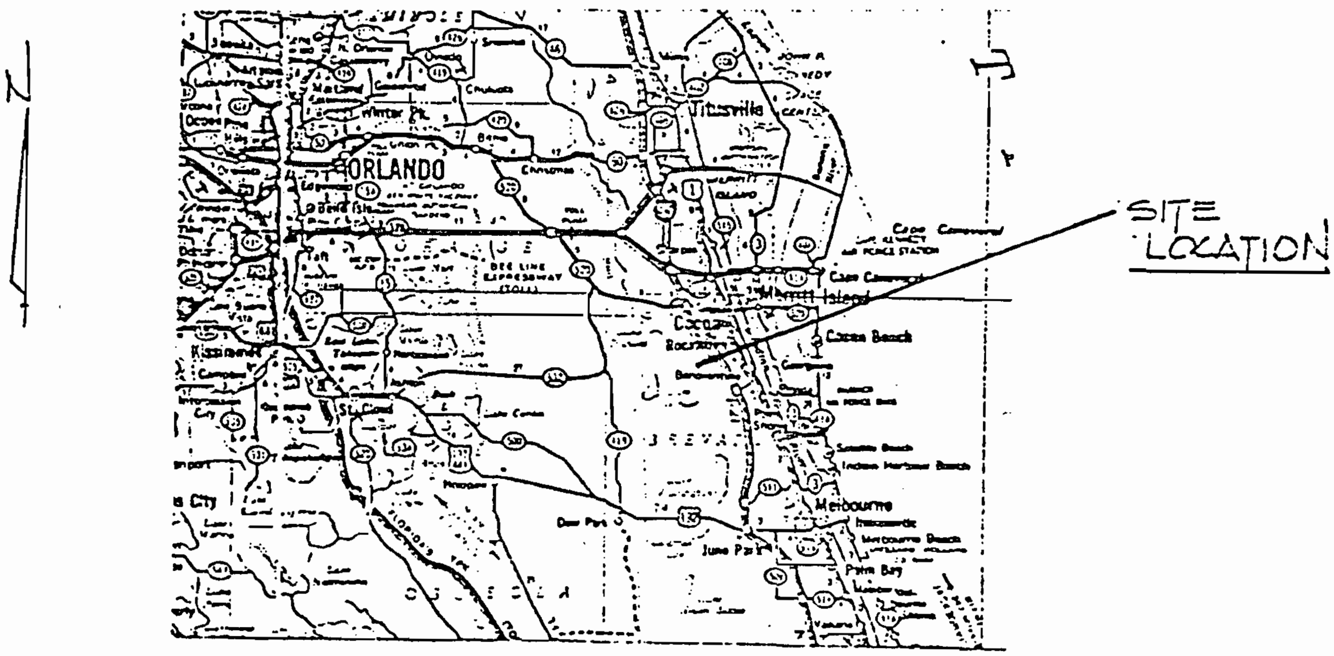
SECTION V-7

STATE LOCATION



YORKE DOLINER & COMPANY
ROCKLEDGE, FLORIDA

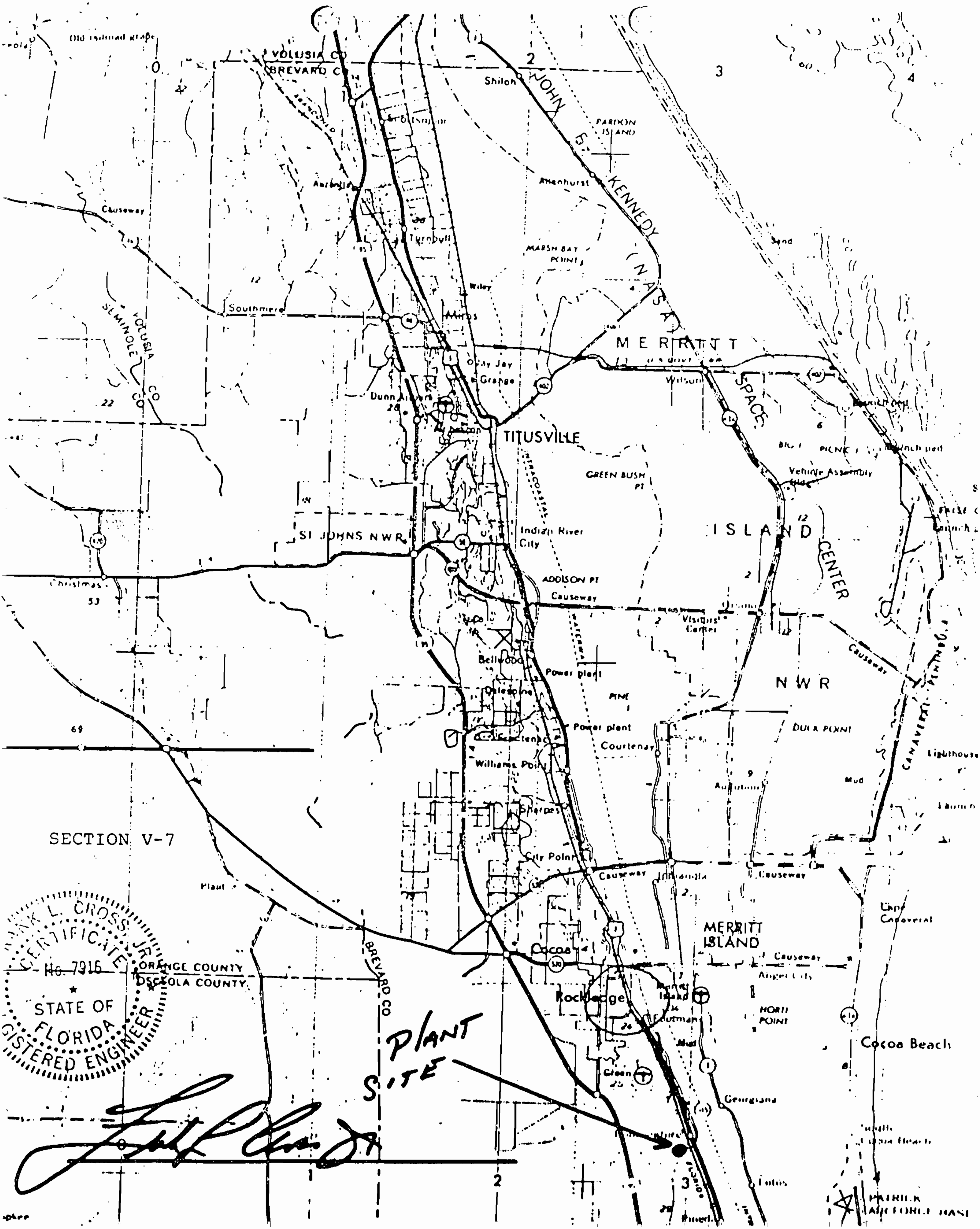
AREA LOCATION



Frank L. Cross, Jr.
Registration No. 7916

FRANK L. CROSS, JR.
CERTIFICATE
No. 7916
STATE OF FLORIDA
REGISTERED ENGINEER

BEST AVAILABLE COPY



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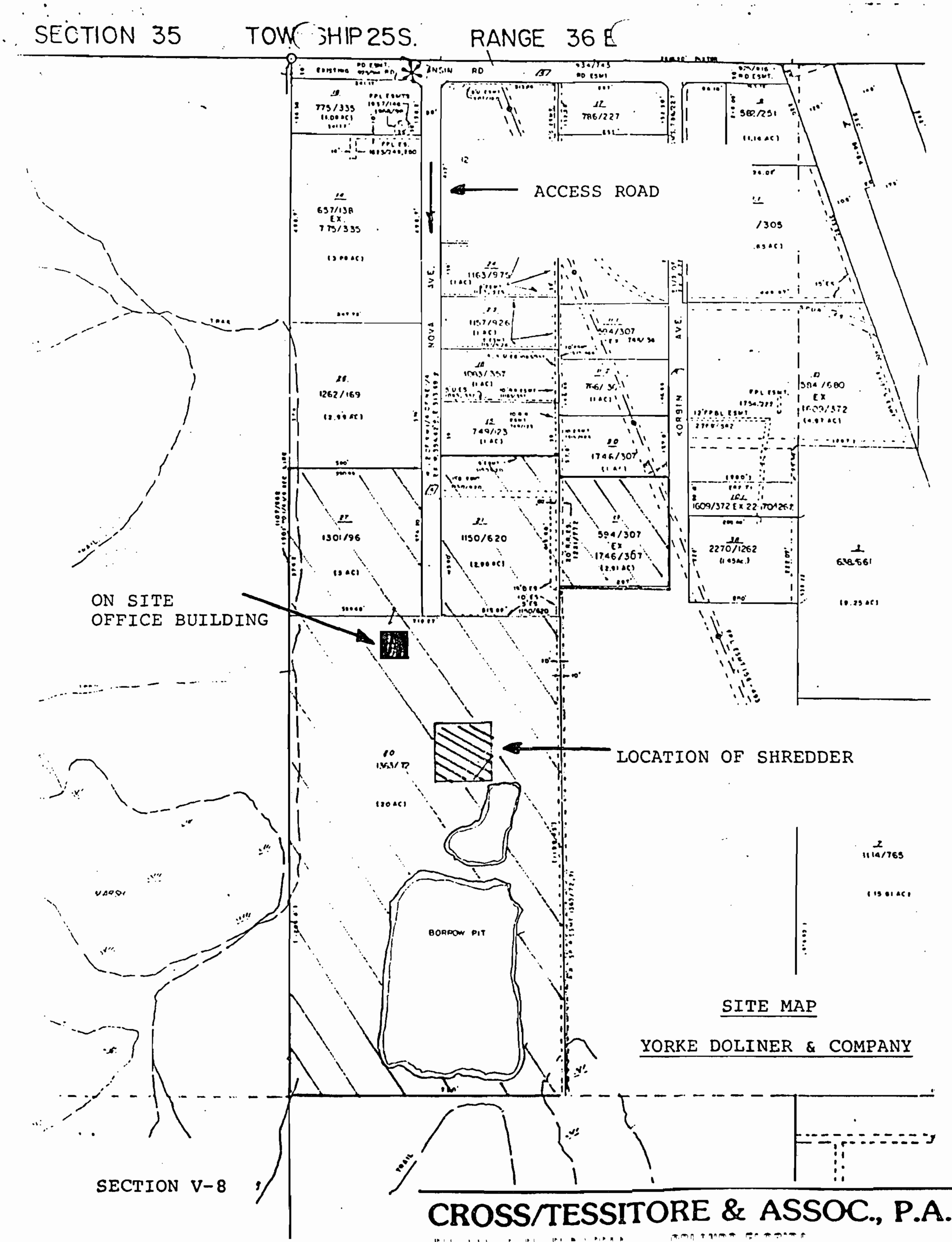


ATTACHMENT

Section III(F) Liquid and Solid Wastes Generated

SOLID WASTES

Solid wastes consist of trash (11.7 tph) and waste solids (1.3 tph) or a total of 13 tph (29,120 lbs/hr ≅ 14.6 tph).

This material is not considered hazardous. See attached memo from the Institute of Scrap Iron and Steel, Inc. (ISISI) to its members. This material will be disposed of at a sanitary landfill.

LIQUID WASTES

Water/waste water used in the system is completely recirculated. There is no runoff or discharge to the waters of the State of Florida from this operation. See attached drawing.

Institute of Scrap Iron
and Steel, Inc.

established 1928
1627 K street n.w.
Washington, D.C. 20006
202 • 466-4050

MEMORANDUM TO ISIS MEMBERS
OPERATING SCRUBBER-TYPE SHREDDERS

In the summer issue of Review & Outlook, ISIS advised members that, in conjunction with the Institute's EPA-approved program for industry-wide analysis of wastes from shredders, shears, and balers, sludge generated by shredder scrubbers also would be evaluated at the request of the membership. On August 13, ISIS further advised members that preliminary analyses indicated that shredder scrubber sludge probably was hazardous due to excessive concentrations of certain heavy metal contaminants. That advice was based upon the preliminary evaluation of a limited number of shredder scrubber sludges which the Institute's consultant, Clayton Environmental Consultants, Inc., had been able to complete at that time. Accordingly, ISIS advised operators of shredder scrubbers to notify EPA on or before August 18, 1980, that they are generators of a hazardous waste, i.e., scrubber sludge. Such facilities were also advised to notify, where appropriate, that they treat, store or dispose of a hazardous waste.

CEC has now completed its study of scrap processing waste, including scrubber sludge, and has formally reported its findings to ISIS. CEC had determined, based upon analysis of complete samples of scrubber sludge and further statistical evaluation, that such sludge is not hazardous. (This finding, like CEC's findings that wastes from shredders, shears, and balers are not hazardous, is applicable only to processes which, in terms of inputs, are not atypical of the processes sampled by CEC.)

In view of CEC's findings that scrubber sludge from typical operations is not hazardous, upon the advice of counsel we would advise that you consider withdrawing any hazardous waste notification which you may have filed with EPA for your scrubber sludge. A form letter for that purpose is attached. The letter should be addressed to the EPA regional office where you submitted your notification form. You will need to fill in identifying information as indicated.

Do not hesitate to contact the Institute if you have questions regarding this de-notification process.

(EPA Regional Notification Contact --
Person to whom original notification
submitted)

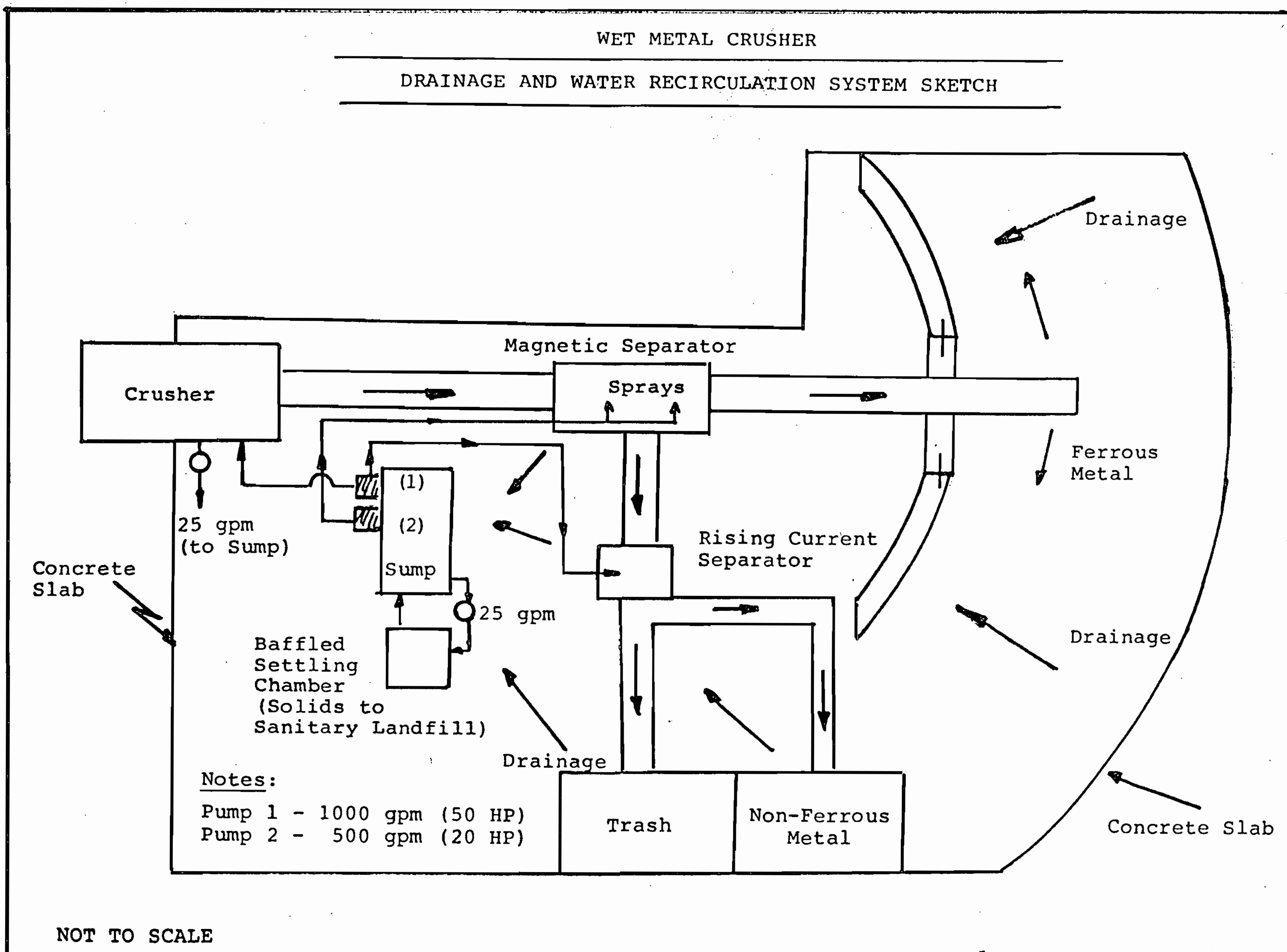
RE: Notification of Hazardous Waste Activity (EPA Form 8700-12) filed by (your company name)

On August___, 1980, we notified your office that our installation located at (street address, city, state, zip code) is a generator of (and treats/stores/disposes of) hazardous wastes characterized by EP Toxicity. (The installation's EPA I.D. No. is_________.)

We notified as a hazardous waste facility because we were unable to complete our evaluation of the facility's wastes. prior to the August 18, 1980, notification deadline. However, it has been established that the installation does not generate any hazardous waste within the meaning of EPA's Subtitle C regulations. Accordingly, we hereby rescind and withdraw the above-referenced hazardous waste notification.

Sincerely yours,

(signature of company official
who signed original notification
form)

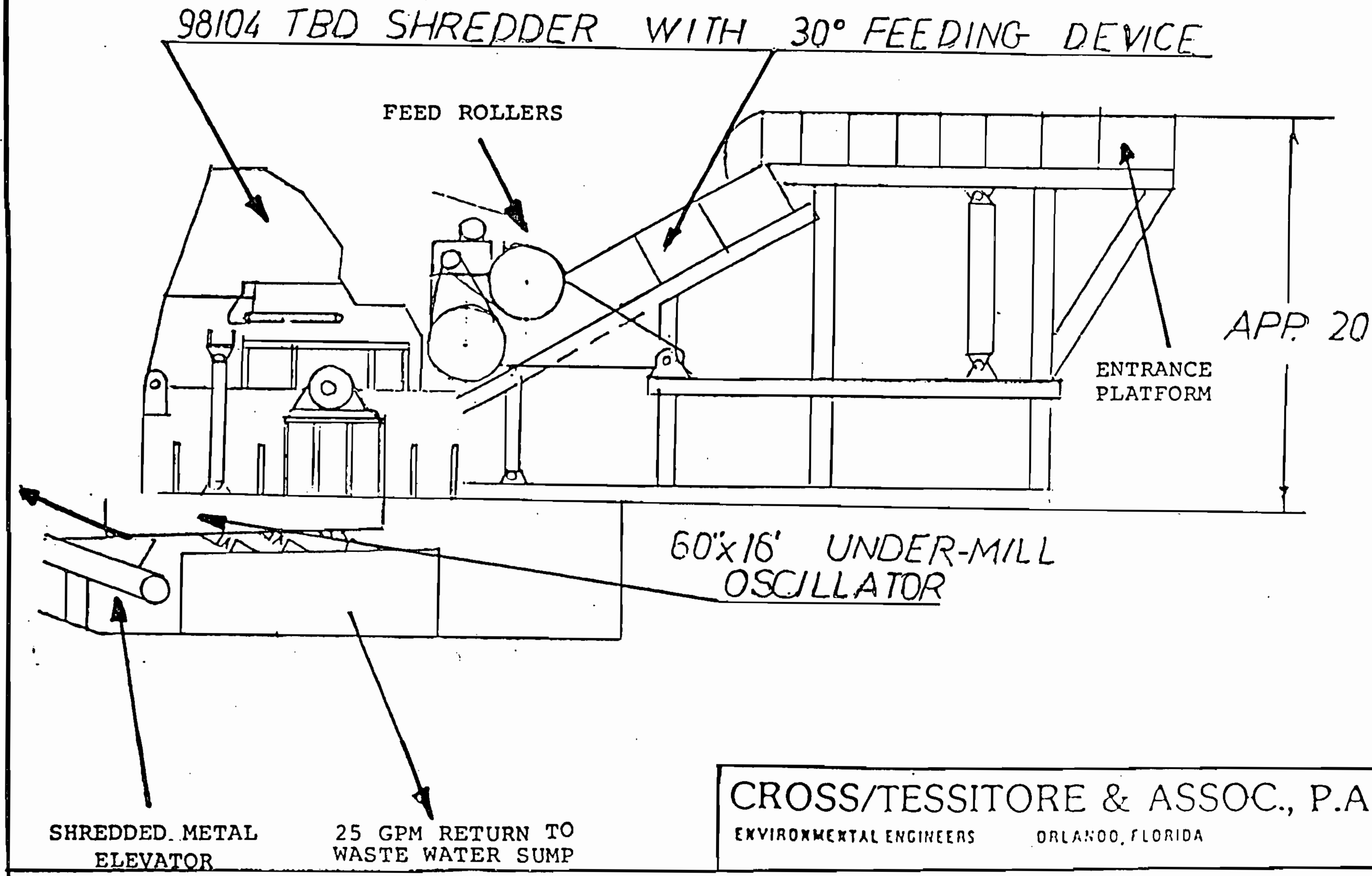


CROSS/TESSITORE & ASSOC., P.A.

ENVIRONMENTAL ENGINEERS ORLANDO, FLORIDA

METAL SHREDDER (WET SYSTEM)

YORKE DOLINER & COMPANY



CROSS/TESSITORE & ASSOC., P.A.

ENVIRONMENTAL ENGINEERS ORLANDO, FLORIDA

ATTACHMENT 2

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 6, 1985

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Frank L. Cross, Jr.
Cross/Tessitore and Associates
4759 South Conway Road
Orlando, Florida 32812

Dear Mr. Cross:

RE: Permit Application No. AC 05-097961
Yorke Doliner and Company, Auto Metal Shredder

The above application will be processed by our central section. All further communications regarding this permit should be made to the above address.

A review of your application to construct the referenced air pollution source indicates that it is incomplete. The following is required to complete your application.

1. In Section II-A, state whether the project will result in full compliance with existing DER rules.

2. In Section II-B, give actual dates for expected construction start and completion.

3. In Section III-A and V-I, please clarify raw materials processed. Specifically: (1) Have all volatile liquids been removed? (2) Is the interior (vinyl seats, etc.) shredded also? (3) Are batteries removed prior to shredding? (4) Is any of the drive-train removed from auto? (5) Describe: (a) non-ferrous metals (b) trash (c) waste solids; also substantiate percentages of contaminants. (6) Clarify process rate via flow diagram or manufacturers specifications.

4. In Section V-2: Manufacturers information/data on this system should be provided. Specific sketch(s) of process system is to be provided us inclusive of any inhibiting devices (e.g. curtains), which are to be utilized to reduce fugitive emissions from process.

Mr. Frank L. Cross, Jr.
Page Two
February 6, 1985

5. In Sections V-4 & 8: Specific cross sections/sketch are required to indicate emissions controul: (a) Indicate by means of a cross-section how the level of flooding water will be maintained in the auto shredder (the drainage & circulation system sketch does not indicate the amount of water flow to the primary crusher & water losses from the crusher and magnetic separator). (b) Placement of any other devices to inhibit fugitive airborne particulates (e.g. curtains around inlet & outlet).

Use of water in this shredding operation may require an industrial wastewater permit. Mr. R. Maloy of the St. Johns River District office may be contacted to discuss this.

Upon receipt of your response to the above items, processing of your application will resume. Please refer to this letter in your response.

If there are any questions, please call M. G. Phillips at (904) 488-1344 or write to me at the above address.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/MP/s

cc: Jeffrey B. Doliner
R. Maloy
A. T. Sawicki

ATTACHMENT 3

CROSS/TESSITORE & ASSOCIATES, P.A.
4759 S. CONWAY ROAD, SUITE D
ORLANDO, FLORIDA 32812
305/851-1484

February 15, 1985

RECEIVED FEB 1985

Mr. Ralph Maloy
FDER-St. Johns River District
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803

RE: Yorke Doliner & Company
AC 05-097961
Letter from C. Fancy 2/6/85

Dear Ralph:

Mr. Fancy has asked (his letter of February 6 enclosed) that we check with you regarding an industrial wastewater permit for subject source. We have enclosed a copy of our air permit applications, which has the water recirculation and make-up system illustrated on the drawings.

There will be no discharge of any wastewater to the waters of the State of Florida. All water is recirculated in the system and make-up water will actually be added because of evaporation in the wet scrubber.

As indicated in the permit, the drained solids, which are non-hazardous, will be disposed of at a sanitary landfill.

We would appreciate your comments at an early date. Thank you very much.

Sincerely,

Frank L. Cross, Jr., P.E.
President

FLC:kim

Enc.a/s

cc: Mr. Dan Smith, YD
Mr. A. T. Sawicki, FDER
Mr. C. H. Fancy, FDER

ATTACHMENT 4

BEST AVAILABLE COPY

CROSS, TESSITORE & ASSOCIATES, P.A.
4759 S. CONWAY ROAD, SUITE D
ORLANDO, FLORIDA 32812
305/851-1484

February 21, 1985

DER
FEB 25 1985
BAQM

Mr. C. H. Fancy, P.E.
Deputy Chief, Bureau of
Air Quality Management
State of Florida DER
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

RE: Permit Application No. AC 05-097961
Yorke Doliner & Company, Auto Metal Shredder

Dear Mr. Fancy:

Reference is made to your letter of February 6, 1985.

Question 1: In Section II-A, state whether the project will result in full compliance with existing DER rules.

Response: This project will result in full compliance with FDER rules and regulations.

Question 2: In Section II-B, give actual dates for expected construction start and completion.

Response: Start of Construction: 1 April 1985
Completion of Construction: 1 May 1985.

Question 3: In Section III-A and V-I, please clarify raw materials processed. Specifically: (1) Have all volatile liquids been removed? (2) Is the interior (vinyl seats, etc.) shredded also? (3) Are batteries removed prior to shredding? (4) Is any of the drive-train removed from auto? (5) Describe: (a) non-ferrous metals (b) trash (c) waste solids; also substantiate percentages of contaminants. (6) Clarify process rate via flow diagram or manufacturers specifications.

Response: Part (1) All volatile liquids have been removed from the vehicles before processing.

Part (2) The interior of the vehicles are shredded along with the rest of the vehicle.

Part (3) All batteries are removed from the vehicles before shredding.

Part (4) The drive train remains with the auto and is shredded along with the rest of the vehicle.

Part (5) We have enclosed a copy of the Scrap Age Report of October 1984, and ISIS Report done by Clayton dated 1 January 1980.

Part (6) See figure in Section V-6 flow diagram. This balance is based upon the manufacturerer's information and indicates an input of 65 TPH and an output as follows:

Ferrous Scrap	-	49.0 TPH
Solids from Settling Chamber	-	1.3 TPH
Non-Ferrous Scrap	-	3.0 TPH
Trash		11.7 TPH
		65.0 TPH

Question 4: In Section V-2: Manufacturers information/data on this system should be provided. Specific sketch(s) of process system is to be provided us inclusive of any inhibiting devices (e.g. curtains), which are to be utilized to reduce fugitive emissions from process.

Response: Enclosed are manufacturers drawings, data, information requested.

Question 5: In Sections V-4 & 8: Specific cross sections/ sketch are required to indicate emissions control: (a) Indicate by means of a cross-section how the level of flooding water will be maintained in the auto shredder (the drainage and circulation system sketch does not indicate the amount of water flow to the primary crusher & water losses from the crusher and magnetic separator). (cont.)

Mr. C. H. Fancy, P.E.
Page 2, 21 February 85
RE: Yorke doliner & Co.
AC 05-097961

(b) Placement of any other devices to inhibit fugitive airborne particulates (e.g. curtains around inlet & outlet).

Response: (a) Water is injected into the center top of the shredder through 5-3/4" Ø pipes and then flows directly out of the bottom and then into the sump for recirculation. There is no water level maintained in the shredder. (See sketch). Attached is a water balance flow sheet as requested.

(b) No devices are provided to inhibit fugitive airborne particulates. The equipment manufacturer expects these to be negligible. If after construction, FDER inspection reveals any problems in this area, the owner will agree to fugitive control before an operating permit is issued.

Mr. Maloy has been contacted as you suggested in your letter.

We appreciate that the processing of subject application will resume upon your receipt of this letter.

Sincerely,

Frank L. Cross, Jr., P.E.
President

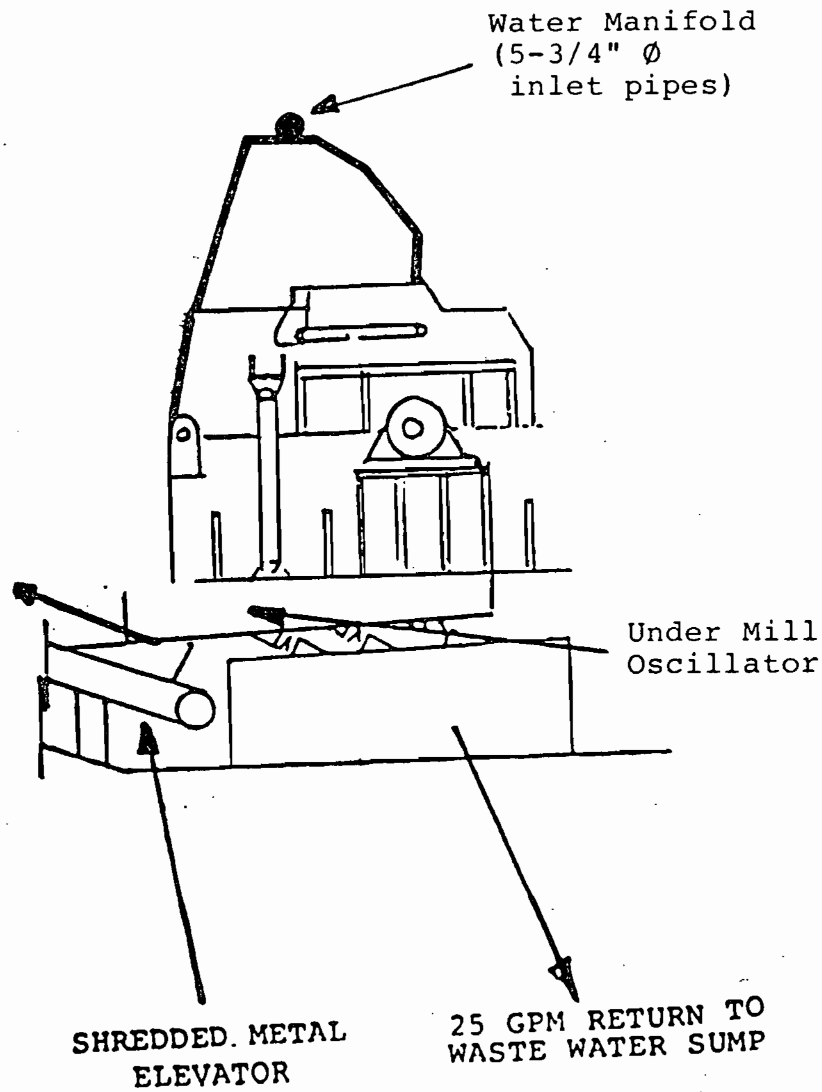
FLC:kim
Enc.a/s

cc: Mr. A. T. Sawicki
FDER, St. Johns River District

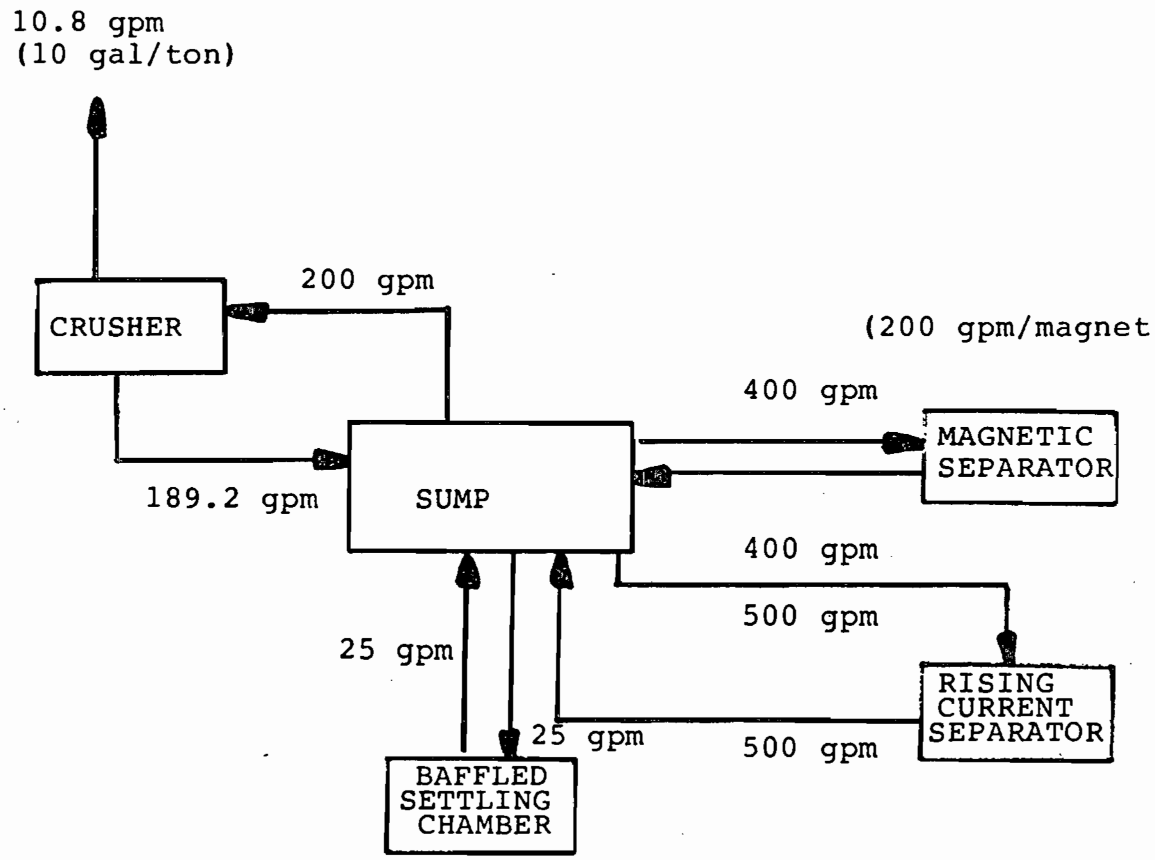
Mr. Dan Smith, Plant Superintedent
Yorke Doliner & Company

Q5 (a)

DETAIL OF CRUSHER SHOWER WATER INLET PIPING



WATER FLOW USAGE SKETCH



Hand Dismantling and Shredding Of Japanese Automobiles to Determine Material Contents and Metal Recoveries

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ABSTRACT

The Bureau of Mines conducted studies on four makes of Japanese automobiles, three 1981 and one 1982 model years, received from three manufacturers to determine if their materials composition would present problems to the current technology used to process junk automobiles for metal recovery. One of each make of automobile was hand dismantled to determine the materials composition. In addition, two nearly identical automobiles of each make were shredded at a commercial operation where all metal products and rejects were collected for analysis to determine metal and nonmetal distribution. The average weight of the four automobiles to be dismantled, less batteries, tools and fluids, was 1,938.3 lb. The weight was distributed as 1,472.9 lb ferrous and 115.6 lb nonferrous metals, 275.2 lb combustibles, 72.3 lb noncombustibles, and 2.3 lb electrical components. The dismantled automobiles, less gas tanks, fluids, tools, wheels, tires and batteries, which were all removed from the automobiles that were shredded, contained an average of 1,389.1 lb ferrous and 101.6 lb nonferrous metals, 305.7 lb nonmetals, and 2.3 lb electrical components. In comparison, materials collected from the shredded automobiles averaged 1,304 lb ferrous metals, 80 lb nonferrous metals, and 341 lb landfill materials. There were no materials used in the manufacture of the late model Japanese automobiles that should present handling or processing problems to the steelmaking or secondary metal recyclers.

INTRODUCTION

Since the energy shortage crisis in the mid-1970s, the popularity of smaller, fuel-efficient automobiles has resulted in downsizing, redesigning and substitution of lighter weight materials in both domestic and foreign automobiles. Newly developed nonferrous metal alloys and high-strength, low-alloy (HSLA) steels are being used to reduce automobile weights. The use of plastics also continues to increase.

Foreign automobile manufacturers, already producing compact and subcompact automobiles, quickly increased their exports to the United States, where most auto production was geared to larger cars. Expansion of existing technology was easier, less costly and quicker for foreign automobile manufacturers to accomplish than was this country's retooling and redesigning of automobile production facilities. Today, Japanese imported automobiles account for approximately one-third of domestic new car sales[1].

The changing automobile size and materials content potentially could affect the capability and technology of the automobile scrap processors. Junked automobile ferrous and nonferrous metals are a major scrap source for steel and secondary metal industries. The smaller automobiles contain less ferrous metals but as much or more nonferrous metals and nonmetals than most automobiles being junked today. Automobile shredders presently process 80 to 90 percent of the junked automobiles for metal recycling. These shredders tear and cut an automobile into fist-sized or smaller chunks in less than a minute. Ferrous metals are recovered by magnetic separation; nonmagnetic metals are recovered by air classification or water elutriation[2,3]. Nonmetal rejects are used as landfill.

In 1969, the Bureau of Mines completed research to determine the average composition of a typical automobile to determine the potential quantities of recoverable metals and nonmetals. A detailed hand-dismantled material classification was conducted on 15 junked automobiles[4] and showed that the circa 1960 "full-size" automobile contained, in pounds:

Ferrous metals	3,043.3
Nonferrous metals	157.1
Rubber and combustibles	172.2
Glass and noncombustibles	102.0
Total	3,574.6

The nonferrous metals included 20.4 lb battery lead.

The Bureau of Mines obtained four makes of 1981 and 1982 Japanese manufactured automobiles (fig. 1) to determine their materials content and if any of the materials used would present potential recycling problems. A three-phase study was conducted to:

1. Determine material composition of Japanese-imported automobiles by hand dismantling and categorizing.
2. Shred nearly identical model automobiles from each manufacturer to determine shredded component distribution.
3. Compare known metal contents of hand dismantled automobiles with metals recovered from shredding.

The automobiles used in the study included three each of the following:

1981 Honda Accord	1981 Datsun 210
1981 Toyota Tercel	1982 Nissan Sentra

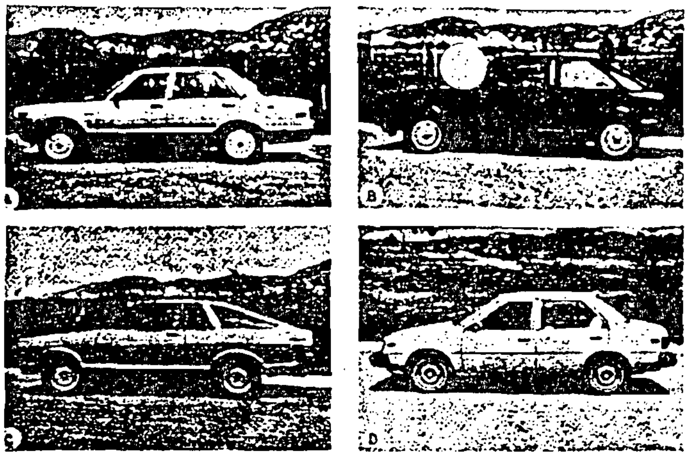

FIGURE 1. 1981 Honda Accord, 1981 Toyota Tercel, 1981 Datsun 210, and 1982 Nissan Sentra automobiles donated for the study.

PROCEDURES

Hand Dismantling

The automobiles to be dismantled were weighed, then systematically dismantled using common handtools plus air and electric-powered hammers, wrenches, chisels and screwdrivers. Infrequently, an acetylene cutting torch was required for bimetal separations.

Each area of the automobile—interior, exterior, body, engine and transmission—was systematically dismantled (fig. 2). Identification of components, materials, location and weight data were continuously recorded during the progress of the work. Electronic components were removed from the automobiles as complete units, and weight data were obtained before they were forwarded to the Bureau's Avondale Research Center for determining the precious metal content. After dismantling, material balances were obtained. All materials were categorically displayed, identified and photographed (figs. 3-6). Each automobile was dismantled and categorized completely before progressing to the next one to avoid material loss or mix-up.

The automobile compositions were calculated excluding batteries, fluids and tools. A second composition was also calculated which excluded batteries, fluids, tools, gasoline tanks, wheels and tires to represent the automobiles as they would be shredded.

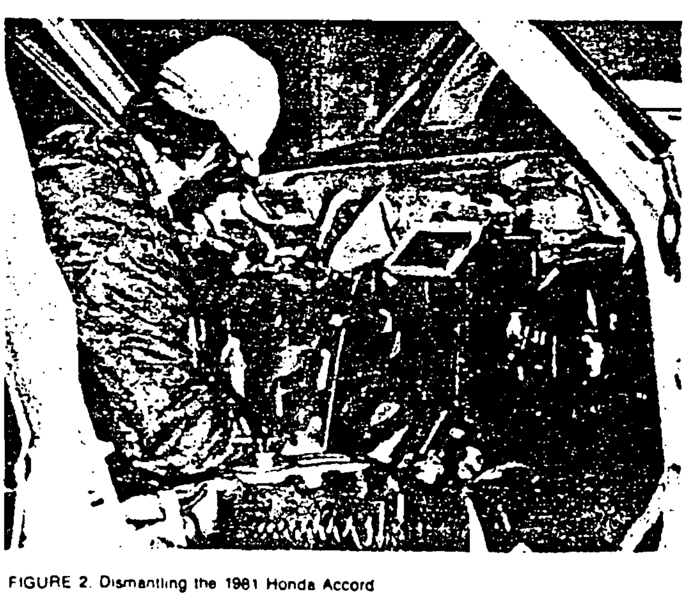

FIGURE 2. Dismantling the 1981 Honda Accord

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Shredding

Automobile weights were obtained at the shredding site both before and after preparation for shredding. Preparation included removing the gasoline tanks (fig 7), batteries, tires and wheels. The shredding mill, transfer conveyors, dust collection systems, and processing classifiers were purged before shredding the test automobiles to remove residual metals and nonmetals hung up or trapped in the system during production operation. Paired automobiles were fed into the shredder (fig. 8), one behind the other. Two metal products and six reject stream discards were collected in containers, weighed, and taken to the Bureau of Mines for analysis. Products and rejects were dried, if required, and hand-picked to separate metals and nonmetals into categories. Two or more different metals, physically attached, that could not be readily separated were classified with the major metal.

All tires and batteries were disposed of in accordance to donors' stipulations.

A schematic of the shredder operation is presented in figure 9. The collection sites for all products and rejects are highlighted.

High-Strength, Low-Alloy Steel Melting Test

The 1982 Nissan Sentra is the only automobile in the completed study to contain HSLA steel in significant quantities as shown in figure 10. HSLA steel is used to reduce the weight of the automobile as well as increase the strength of the structural supports.

There is concern among some U.S. foundries that the alloys in HSLA steels from shredded automobile scrap could detrimentally affect ferrous scrap metal processing or the quality of the iron products. There is also the realization that a separated HSLA steel scrap could be a premium product for recycling. For these reasons, special attention was taken to locate, identify and determine the potential of concentrating HSLA steel during the dismantling and shredding of the Nissan Sentra automobiles. Each automobile contains from 186 to 206 lb HSLA steel. Detailed locations of the HSLA steels contained in the automobiles were provided by the Nissan Motor Corp.

The entire ferrous product from one shredded Sentra was melted in the Bureau's Albany Research Center furnace to determine if the HSLA steel additions would adversely affect recycling of scrap steel.

The melting test was conducted in a three-phase ac, 1-ton capacity, tiltable electric arc furnace. The furnace was filled with 1,197 lb magnetic metal scrap product from the Sentra; nonmetals physically attached to the ferrous product such as rubber, plastic and upholstery were first removed by hand picking. The metal scrap was then melted down in the furnace. The melt was sampled and analyzed using a direct reading spectrograph.

Subsequently, 49.3 lb quartz and 51.5 lb limestone were added to the melt and rabbled to form a suitable slag. Then, 5 lb FeMn was added to determine if the carbon and manganese levels could be increased. The melt was again sampled and analyzed.

The bath temperature was then increased from 1,540° to 1,618° C to increase fluidity, and the furnace contents were tapped into a 1-ton capacity ladle.

The slag was decanted into a slag pot, and the metal was

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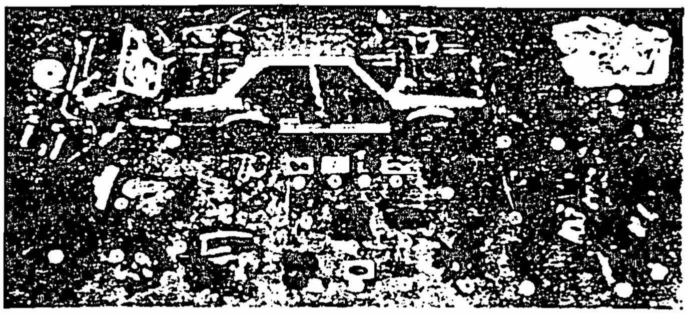
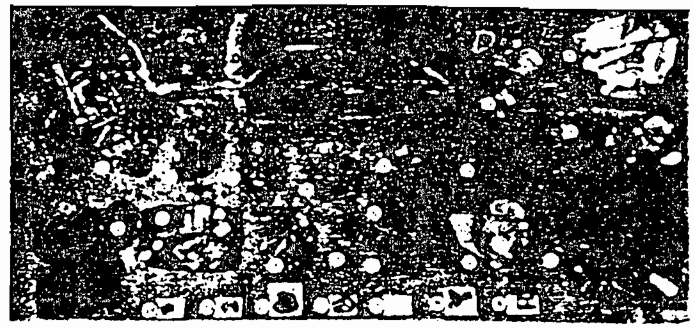


KEY

1. Light iron
2. Glass
3. Rubber
4. Vinyl
5. Combustibles
6. Aluminum
7. Catalytic converter
8. Zinc
9. Coated copper wire
10. Lead
11. Battery
12. Brass
13. Charcoal
14. Circuit boards
15. Stainless steel
16. Forged steel
17. Cast iron
18. Heavy iron
19. Chrome-plated steel
20. Hardened steel
21. Cast steel
22. Spring steel
23. Polyurethane foam
24. Plastic

FIGURE 3. - Dismantled and categorized 1981 Honda Accord.



KEY

1. Light iron
2. Rubber
3. Glass
4. Cast iron
5. Cast steel
6. Heavy iron
7. Chrome-plated steel
8. Hardened steel
9. Stainless steel
10. Copper and brass
11. Coated copper wire
12. Vinyl
13. Spring steel
14. Aluminum
15. Polyurethane foam
16. Combustibles
17. Plastics
18. Battery
19. Zinc
20. Lead
21. Asbestos
22. Carbon
23. Ceramic (catalytic converter)
24. Ceramic

FIGURE 4. - Dismantled and categorized 1981 Toyota Tercel.

poured into 60-lb pig molds. Metal and slag samples were taken.

DESCRIPTION OF AUTOMOBILES

Honda. Three 1981 Honda Accord deluxe models; four-cylinder, 1,600-cm^3 transverse engines; five-speed manual transmissions with front-wheel drive, equipped with power steering.

Toyota. Two 1981 Toyota Corolla Tercel models, including standard and deluxe two-door sedans; four-cylinder, 1,500-cm^3 transverse engines; five-speed manual transmissions with front-wheel drive, equipped with power steering.

One 1981 Toyota Corolla Tercel SR5 with a four-cylinder, 1,600-cm^3 transverse engine and five-speed transmission. Deluxe model with sunroof, air conditioning and power steering.

Datsun. Three 1981 Datsun 210 models, two-door hatchback coupes. Deluxe equipment package; four-cylinder, 1,500-cm^3 engines and five-speed manual transmissions.

Sentra. Three 1982 Nissan Sentra models, including two standard and one deluxe two-door sedans; four-cylinder,

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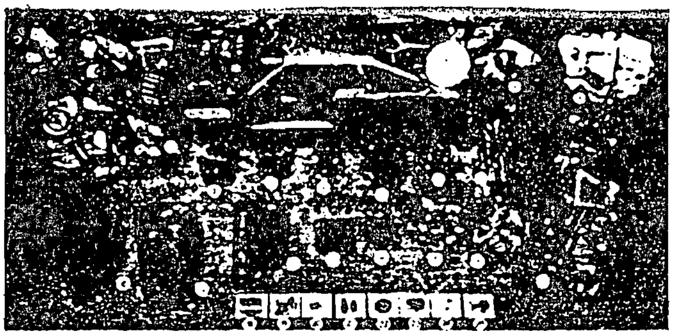


KEY

1. Light iron
2. Cast iron
3. Cast steel
4. Hardened steel
5. Spring steel
6. Stainless steel
7. Chrome-plated steel
8. Combustibles
9. Polyurethane foam
10. Rubber
11. Glass
12. Heavy iron
13. Brass and copper
14. Coated copper wire
15. Aluminum
16. Vinyl
17. Plastic
18. Battery
19. Electrical components
20. Ceramic
21. Ceramic (catalytic converter)
22. Carbon
23. Asbestos
24. Lead
25. Zinc

FIGURE 5. - Dismantled and categorized 1981 Datsun 210.

1,500-cm^3 engines; five-speed manual transmissions and front-wheel drive.

RESULTS

Hand Dismantling

Table 1 gives weights of the automobiles as received and as prepared for dismantling.

The completed hand dismantling study shows (see table 2)

TABLE 1. - Weights of the four Japanese automobiles as received and as prepared for hand dismantling, pounds

	Honda	Toyota	Datsun	Nissan
As received	2,183	2,000	2,010	1,975
Removed before dismantling:				
Coolant	10	11.9	12.1	15.1
Oil and grease	14	12.3	12.2	17.0
Gasoline	3.3	22.4	59.8	68.3
Battery	36	28.4	35.1	34.2
Tools and lift	7	4.6	5.4	5.7
Total	70.3	79.6	124.6	140.3
To be dismantled	2,112.7	1,920.4	1,885.4	1,834.7

TABLE 2. - Materials contained in four Japanese automobiles as determined by hand dismantling

Class of material	1981 Honda Accord		1981 Toyota Tercel		1981 Datsun 210		1982 Nissan Sentra		Combined average	
	lb	pct	lb	pct	lb	pct	lb	pct	lb	pct
Ferrous:										
Light iron	1,079.6	51.1	950.1	49.9	754.2	40.0	671.6	36.6	863.9	44.7
HSLA steel	0	0	0	0	0	0	169.3	9.2	42.3	2.2
Galvanized iron	0	0	.1	0	19.2	1.0	6.8	.4	6.5	.3
Chrome-plated steel	24.8	1.2	6.7	.4	31.1	1.6	2.6	.2	16.3	.8
Copper-coated iron	.1	0	.1	0	0	0	.2	0	.1	0
Spring steel	30.1	1.4	36.3	1.9	39.5	2.1	25.8	1.4	33.0	1.7
Steelplate	183.3	8.7	84.0	4.3	277.5	14.7	201.5	11.0	186.6	9.6
Hardened steel	85.2	4.0	91.0	4.7	135.3	7.2	50.0	2.7	90.4	4.7
Cast iron	128.0	6.1	101.7	5.3	146.4	7.8	113.5	6.2	122.4	6.3
Cast steel	92.9	4.4	104.7	5.5	54.0	2.9	139.8	7.6	97.6	5.1
Stainless steel	13.2	.6	13.7	.7	13.9	.7	5.7	.3	11.6	.6
Subtotal	1,637.2	77.5	1,396.6	72.7	1,471.1	78.0	1,386.8	75.6	1,472.9	76.0
Nonferrous:										
Aluminum	67.7	3.2	[1]141.3	7.4	52.5	2.8	76.7	4.2	84.6	4.4
Zinc	10.8	.5	5.4	.3	2.0	.1	2.9	.2	5.3	.3
Lead[2]	1.2	.1	.6	0	.9	0	.9	0	.9	0
Copper and brass	19.9	1.0	19.5	1.0	18.9	1.0	17.4	1.0	18.9	1.0
Copper (wire)[3]	7.2	.3	5.0	.3	5.1	.3	6.4	.3	5.9	.3
Subtotal	106.8	5.1	172.0	9.0	79.4	4.2	104.3	5.7	115.6	6.0
Combustibles:										
Plastic (wire)[3]	4.8	.2	3.3	.1	3.3	.2	4.2	.2	3.9	.2
Polyurethane foam	22.7	1.1	24.4	1.3	19.6	1.1	22.7	1.2	22.3	1.2
Vinyl	13.4	.6	14.0	.7	13.9	.7	8.8	.5	12.5	.6
Other plastics	82.5	3.9	75.1	3.9	64.8	3.4	67.0	3.7	72.4	3.8
Rubber[4]	144.7	6.9	101.3	5.3	103.2	5.5	117.3	6.4	116.6	6.0
Carbon	.6	0	1.8	.1	.7	0	.7	0	1.0	0
Other combustibles	32.3	1.5	45.2	2.4	52.2	2.8	56.2	3.1	46.5	2.4
Subtotal	301.0	14.2	265.1	13.8	257.7	13.7	276.8	15.1	275.2	14.2
Noncombustibles:										
Ceramics	2.9	.1	4.8	.2	3.3	.2	4.0	.2	3.8	.1
Glass	63.0	3.0	80.0	4.2	68.6	3.6	57.8	3.1	67.3	3.5
Asbestos	1.2	.1	1.5	.1	1.1	.1	1.1	.1	1.2	.1
Subtotal	67.1	3.2	86.3	4.5	73.0	3.9	62.9	3.4	72.3	3.7
Electric components[5]	.6	0	.4	Trace	4.2	.2	3.8	.2	2.3	.1
Total	2,112.7	100.0	1,920.4	100.0	1,885.4	100.0	1,834.7	100.0	1,938.3	100.0

[1]The high aluminum content of the Toyota is attributed to aluminum wheels.
[2]Excluding batteries, which were not used in composition calculations.
[3]The plastic-coated wire was stripped to obtain a 60 copper-40 coating weight ratio.
[4]The steel-belted radial tires were weighed as rubber; however, they can contain up to 30 pct steel wire.
[5]Electrical components such as circuit boards and relays were weighed as single units and forwarded to the Bureau of Mines Avondale Research Center for precious metal identification.

that the four models of Japanese automobiles averaged, in pounds:

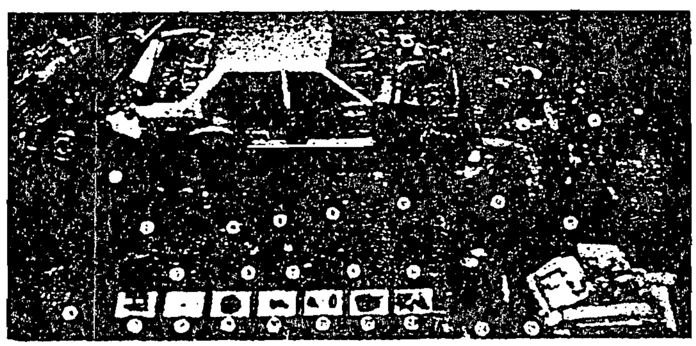
Ferrous metals	1,472.9
Nonferrous metals	115.6
Combustibles	275.2
Noncombustibles	72.3
Electrical components	2.3
Total	1,938.3

Light iron (less than 1/8 in. thick) was the largest single weight category in all of the bodies. The heavier ferrous metals were concentrated in the engines, transmissions, drive trains and suspensions. The ferrous metals comprised an average 76% of the automobiles' weight.

The nonferrous metal contents of the dismantled automobiles averaged, in pounds:

Aluminum	84.6
Copper and brass	24.8
Zinc diecast	5.3
Lead	.9
Total	115.6

Nonferrous metals averaged 6% of the automobiles' weight. Aluminum comprised over 73% of the nonferrous metals weight and was concentrated in the engines and transmissions. The Toyota Tercel also had aluminum wheels. Copper and brass were concentrated in dashboard and engine compartments as wiring and electrical components; however, they were found in smaller quantities throughout the entire automobile. The Honda Accord contained the greatest percentage of zinc diecast, mostly as knobs and switches with only



KEY

1. Light iron
2. Cast steel
3. Stainless steel
4. Heavy iron
5. Zinc
6. Spring steel
7. Chrome-plated steel
8. Hardened steel
9. Coated copper wire
10. Cast iron
11. Copper and brass
12. Aluminum
13. Vinyl
14. Plastic
15. Combustibles
16. Rubber
17. Battery
18. Lead
19. Carbon
20. Ceramic magnetic
21. Ceramic
22. Asbestos
23. Electrical components
24. Glass
25. Polyurethane foam

FIGURE 6. - Dismantled and categorized 1982 Nissan Sentra.

minor engine usage. Lead tire weights were on all the automobiles.

Rubber and plastics were the primary combustibles. Glass was the major noncombustible.

Spectrographic analysis of the electronic components removed from the four automobiles as analyzed at the Avondale Research Center showed gold, silver and palladium as alloying elements or trace contents. Indium was detected in several of the flasher units in the Datsun 210, which also contained more precious metals than the other automobiles. Soldered connections accounted for most of the silver detected.

Shredding

Collected shredded products and rejects from each pair of

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FIGURE 7. Removing gas tank of 1981 Toyota Tercel prior to shredding.

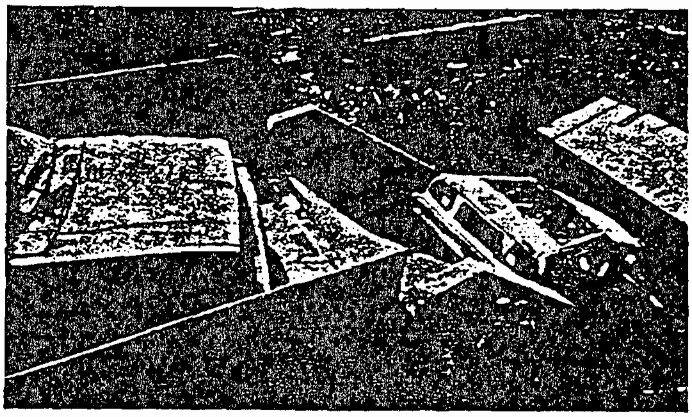

FIGURE 8. Shredding 1981 Datsun 210's.

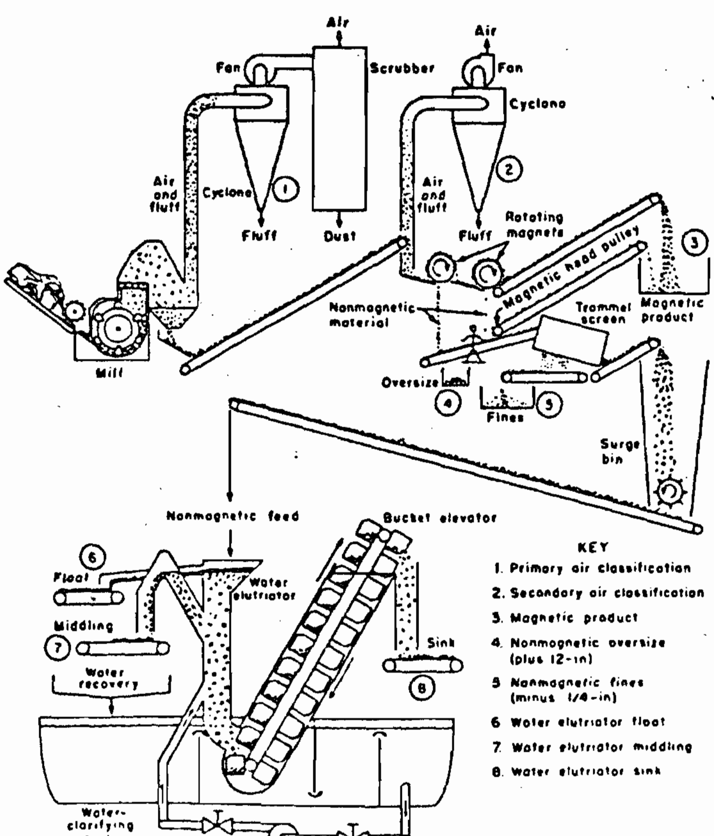

FIGURE 9. - Diagram of shredding and processing operation showing product and reject collection areas.

shredded automobi[illegible] varied in total weight from a 6.0% loss to a 9.2% gain of the prepared automobile weights, as shown in the shredded materials distribution in table 3. Losses and gains in weights are common in batch-type operations of the shredding process.

The distribution of products and rejects from processing shredded automobiles followed the typical pattern. The air classification systems collected most of the combustibles, and magnetic separation removed most of the iron. The fines collected from screening the non-magnetic material contained most of the noncombustibles. Screened nonmagnetics processed by water elutriation yielded a clean, mixed nonmagnetic metal sink product and two reject fractions. The float and middling reject fractions from water elutriation contained both combustibles and noncombustibles. Tables 4 through 7 show the analysis and weight distribution of the products and rejects from each of the shredded automobiles.

Data from table 8 show a ferrous metal recovery of 99.2% and a nonferrous metal recovery of 79%.

COMPARISON OF RECOVERED SHREDDED PRODUCTS AND HAND-DISMANTLED AUTOMOBILE CONTENTS

The Japanese automobiles contained a greater percentage of light gage steel than the previously dismantled automobiles[4], and the Sentra contained a significant amount of HSLA steel. The Japanese automobiles also contained a significantly higher percentage of aluminum, which comprised more than 73% of the nonferrous metal content. Tables 9 and 10 compare the materials collected from shredded automobiles with the corresponding materials in the dismantled automobiles. Metal losses after shredding were noted in both the ferrous and nonferrous metal categories, with some inconsistencies in the ferrous metal category when compared to the dismantling data. These were attributed to difficulties in identification of the shredded metals, which are discolored, squeezed together, and often not separable.

Apparent metal losses in material hangups occurred throughout the system when shredding only two automobiles at a time without purging the entire shredding system after

TABLE 3. - Material distribution of the collected products and rejects obtained from shredding and processing four Japanese automobiles

Shredder products and rejects	1981 Honda Accord	1981 Toyota Tercel	1981 Datsun 210	1982 Nissan Sentra	Average
Prepared weight to auto shredder..............lb..	1,900	1,670	1,790	1,570	1,732.5
Combined recovered weight................lb..	1,785.9	[1]1,822.8	[1]1,712.3	[1]1,579.1	1,725.0
Primary air classification.......pct..	6.2	11.6	8.2	6.2	8.0
Secondary air classification.......pct..	5.5	7.3	5.1	4.9	5.7
Magnetic product......pct..	73.2	78.7	73.6	76.7	75.6
Nonmagnetic oversize..pct..	.2	.2	.6	[2]5.5	[3]3.4
Nonmagnetic fines.....pct..	2.0	3.2	2.4	(2)	(3)
Water elutriator, pct:					
Float....................	2.5	1.6	1.4	.2	1.5
Middling.................	[4]Trace	1.5	1.2	1.2	.9
Sink.....................	4.4	5.1	3.4	6.0	4.7
Total............pct..	94.0	109.2	95.7	100.7	99.6
Material balance......pct..	-6.0	+9.2	-4.3	+.7	-.4

[1]Weight gains are attributed to materials missed when the system was purged prior to shredding the cars.
[2]A tertiary air classifier was substituted for screen sizing for the Nissan Sentra processing; rejects were collected as 1 unit.
[3]Average is for the combined oversize and fines from all automobiles, as air classifying the Sentra distorted the results.
[4]The minimal amount of middling product collected from processing the Hondas was combined with the float product.

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processing the cars. The losses appear excessive, but during operation the system is continuously purging so the losses would become insignificant compared to the total throughput. Other losses were attributed to brittle metals such as cast iron, aluminum and zinc diecast, which shattered and were lost to the fines, were removed as dirt in the air collection system, or became part of the sludge in the elutriation system.

The combustibles showed little difference between the dismantled contents and the shredded rejects. There were differences in noncombustibles because glass from the shredded

TABLE 4. - Analysis and weight distribution of metal products and rejects obtained from shredding a 1981 Honda Accord automobile,[1] pounds

Class of material	Metal products		Rejects					Combined totals
	Magnetic	Nonmagnetic	Primary air	Secondary air	Nonmagnetic oversize (>12 in)	Minus 1/2-in fines	Water elutriator float and middling	
Ferrous:								
Light iron	901.2	0.6	3.0	1.9	0	0.4	Trace	909.1
Chrome-plated steel	.7	0	0	0	0	0	0	.7
Spring steel	30.3	Trace	.3	.2	0	.7	Trace	31.5
Steelplate	270.0	3.3	9.9	0	0	0	0	283.2
Hardened steel	ND	ND	ND	ND	ND	ND	ND	ND
Cast iron	133.7	8.5	0	1.8	0	1.7	Trace	167.7
Cast steel	ND	ND	ND	ND	ND	ND	ND	ND
Stainless steel	2.2	6.3	.1	.4	0	Trace	Trace	9.0
Minus 1/4 in	9.7	0	0	0	0	0	0	9.7
Subtotal	1,349.8	18.7	13.3	4.3	0	2.8	Trace	1,410.9
Nonferrous:								
Aluminum	2.1	41.9	.3	.3	0	4.0	.2	48.8
Zinc	0	3.1	0	0	0	.1	Trace	3.2
Lead	0	.1	0	0	0	Trace	Trace	.1
Copper and brass	4.4	8.9	.1	.2	0	1.2	.3	15.1
Copper-coated wire[2]	1.2	2.3	.6	.6	0	.3	2.0	7.0
Subtotal	7.7	56.3	1.0	1.1	0	5.6	2.5	76.2
Combustibles:								
Polyurethane foam	.1	Trace	13.2	7.5	0	.2	3.4	24.4
Vinyl	2.8	0	3.6	4.0	0	Trace	2.0	12.4
Other plastics	.5	.7	6.0	14.2	1.6	3.6	23.8	50.4
Rubber	6.2	3.5	2.8	1.7	1.7	3.0	11.9	30.8
Other combustibles	3.0	.1	40.4	30.8	0	3.8	4.2	81.3
Subtotal	12.6	6.5	64.0	58.2	3.3	7.6	45.3	199.3
Noncombustibles:								
Glass	0	.2	0	0	0	.1	.2	.5
Asbestos	0	0	0	0	0	0	0	0
Subtotal	0	.2	0	0	0	.1	.2	.5
Nonmagnetic:								
Minus 1/4 in	0	.2	34.8	40.9	0	22.6	.5	99.0
Total	1,390.1	83.7	117.1	104.5	3.3	38.7	48.5	1,785.9

ND Not determined.
[1]2 Honda Accords were shredded. The data shown have been adjusted to represent 1 automobile.
[2]Average analysis for coated copper wire: 60 pct copper, 40 pct coating.

automobiles was collected in the minus 1/4 in. rejects, which were not analyzed.

An averaged weight comparison of the metals recovered with the total metals contained in the shredded magnetic and nonmagnetic products is shown in table 8. A similar weight comparison of the averaged metals recovered from shredded automobiles with the metal content of similar dismantled automobiles is presented in table 11.

Metal recovery based upon the total collected shredded materials averaged 99.2% for ferrous and 79.0% for nonferrous metals. Compared to the dismantled automobile weights, the averaged recoveries were 93.1% for the ferrous metals and 62.2% for the nonferrous metals.

HIGH-STRENGTH, LOW-ALLOY STEEL

Hand Dismantling

HSLA steel is contained throughout the "white body"[5] of the Sentra automobiles and constitutes, by weight of the metals, 33.1% of the two-door and 35.8% of the four-door sedan. The major portions are used in the doors, hood and trunk lid, which are accessible for removal.

Structural and support applications throughout the body framework account for the remaining HSLA steel. The difficulty in identifying the HSLA steels and the welded construction of the unibody and components would deter practical hand recovery methods.

Recycling

Meltdown of the magnetic product from one of the shredded Sentras at the Albany Research Center produced a steel


FIGURE 10. HSLA steel application in 1982 Nissan Sentra.

One truck becomes a fleet!

When you're equipped with lugger-type Convertainers or Leav-a-Tainer roll-off units, you're equipped to handle many sizes and weights with a single vehicle! Lift hoists to 60,000 lbs. —each system custom-fitted to your chassis.

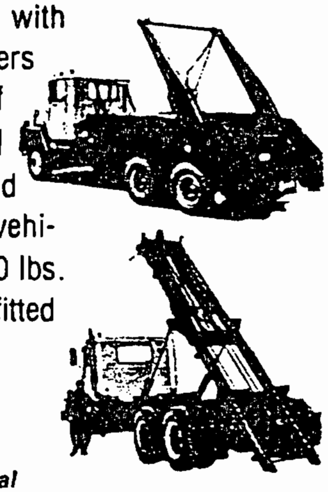

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TABLE 5. - Analysis and weight distribution of metal products and rejects obtained from shredding a 1981 Toyota Tercel automobile,[1] pounds

Class of material	Metal products: Magnetic	Metal products: Nonmagnetic	Rejects: Primary air	Rejects: Secondary air	Rejects: Nonmagnetic oversize (>12 in)	Rejects: Minus 1/2-in fines	Rejects: Water elutriator float	Rejects: Water elutriator middling	Combined totals
Ferrous:									
Light iron	812.9	1.8	3.9	0.3	0	<0.1	0.0	0.1	819.7
Chrome-plated steel	4.9	0	0	Trace	0	.1	0	0	5.0
Spring steel	35.0	0	.3	.3	0	<.1	0	0	35.7
Steelplate	154.7	0	.2	0	0	0	0	0	154.9
Hardened steel	58.1	0	.2	0	0	.2	0	0	58.5
Cast iron	77.8	0	.6	0	0	.4	0	0	78.8
Cast steel	120.2	0	0	0	0	0	0	0	120.2
Stainless steel	2.3	2.5	0	Trace	0	.2	Trace	Trace	5.0
Minus 1/4 in	35.3	0	0	0	0	0	0	0	35.3
Subtotal	1,301.7	4.3	5.2	.6	0	1.1	.6	.1	1,313.3
Nonferrous:									
Aluminum	2.0	61.7	<.1	.1	0	2.9	.2	.4	67.4
Zinc	0	2.9	0	0	0	<.1	0	0	3.0
Lead	0	.2	0	0	0	0	0	0	.2
Copper and brass	1.9	11.7	<.1	.1	.8	1.2	<.1	.3	16.2
Coated-copper wire[2]	1.3	.7	.1	.3	0	.3	1.1	1.3	5.1
Subtotal	5.2	77.3	.3	.5	.8	4.5	1.4	2.0	91.9
Combustibles:									
Polyurethane foam	.4	0	(3)	(3)	0	0	1.7	Trace	2.1
Vinyl	1.4	0	(3)	(3)	0	0	1.5	.1	3.0
Other plastics	.2	.9	(3)	(3)	2.1	7.0	13.6	5.2	29.1
Rubber	2.2	2.6	(3)	(3)	1.3	1.0	6.1	15.6	29.4
Other combustibles	.9	.3	87.6	62.5	0	2.6	1.6	1.0	156.5
Subtotal	5.2	3.8	87.6	62.5	3.4	10.6	24.5	22.0	219.1
Noncombustibles:									
Glass	Trace	Trace	Trace	.1	0	1.5	0	Trace	1.6
Asbestos	0	0	0	0	0	0	0	0	0
Subtotal	Trace	Trace	Trace	.1	0	1.5	0	Trace	1.6
Nonmagnetic:									
Minus 1/4 in	2.2	.1	100.8	57.6	0	35.3	.8	.5	197.1
Total	1,314.3	85.4	193.9	121.1	3.2	53.0	27.3	24.6	1,822.8

[1] 2 Toyota Tercels were shredded. The data shown have been adjusted to represent 1 automobile.
[2] Average analysis for coated copper wire: 60 pct copper, 40 pct coating.
[3] Combined with other combustibles.

TABLE 6. - Analysis and weight distribution of metal products and rejects obtained from shredding a 1981 Datsun 210 automobile,[1] pounds

Class of material	Metal products: Magnetic	Metal products: Nonmagnetic	Rejects: Primary air	Rejects: Secondary air	Rejects: Nonmagnetic oversize (>12 in)	Rejects: Minus 1/2-in fines	Rejects: Water elutriator float	Rejects: Water elutriator middling	Combined totals
Ferrous:									
Light iron	690.7	2.2	6.1	0.6	1.2	1.3	0.6	0.3	700.9
Chrome-plated steel	17.9	0	0	0	0	0	0	0	17.9
Spring steel	32.6	1.1	.2	.1	.1	Trace	Trace	.1	34.2
Heavy iron	234.6	.2	0	0	0	0	0	0	235.0
Hardened steel	60.4	.8	Trace	0	0	.2	0	0	61.4
Cast iron	112.4	1.6	.5	0	0	0	0	0	115.5
Cast steel	93.2	.2	0	0	0	0	0	0	93.4
Stainless steel	6.8	2.3	.4	Trace	0	.2	0	Trace	9.7
Minus 1/4 in	17.0	0	0	0	0	0	0	0	17.0
Subtotal	1,284.8	8.4	7.2	.7	1.3	1.7	.6	.3	1,305.0
Nonferrous:									
Aluminum	4.7	31.1	.3	Trace	0	1.6	.2	.4	38.3
Zinc	1.7	6.0	0	0	0	.3	0	0	8.0
Lead	0	.1	0	0	0	0	0	0	.1
Copper and brass	2.5	5.6	.1	.2	2.1	.5	.6	.3	11.7
Coated copper wire[3]	1.9	.9	.3	.5	Trace	.2	2.9	.9	7.8
Subtotal	10.8	43.7	.9	.7	2.1	2.6	3.5	1.6	65.9
Combustibles:									
Polyurethane foam	.6	0	(4)	(4)	.2	0	1.5	0	2.3
Vinyl	2.8	0	(4)	(4)	1.2	0	2.1	.8	6.9
Other plastics	1.7	1.0	(4)	(4)	3.0	5.2	9.0	3.5	24.2
Rubber	5.2	7.0	(4)	(4)	2.9	.7	3.7	9.8	29.2
Other combustibles	3.4	.2	99.5	52.0	.1	.6	2.7	2.4	161.4
Subtotal	14.3	8.2	99.5	52.0	8.0	6.5	19.0	16.5	224.0
Noncombustibles:									
Glass	0	.6	0	.1	0	.2	.9	.2	1.8
Asbestos	0	0	0	0	0	0	0	0	0
Subtotal	0	.6	0	.1	0	.2	.9	.2	1.8
Nonmagnetic:									
Minus 1/4 in	1.8	.1	41.1	36.8	0	33.2	1.7	.9	115.6
Total	1,313.7	60.8	146.7	90.3	11.4	42.2	25.7	21.5	1,712.3

[1] 2 Datsun 210's were shredded. The data shown have been adjusted to represent 1 automobile.
[3] Average analysis for coated copper wire: 60 pct copper, 40 pct coating.
[4] Combined with other combustibles.

TABLE 7. - Analysis and weight distribution of metal products and rejects obtained from shredding a 1982 Nissan Sentra automobile,[1] pounds

Class of material	Metal products: Magnetic	Metal products: Nonmagnetic	Rejects: Primary air	Rejects: Secondary air	Rejects: Tertiary air[2]	Rejects: Water elutriator float	Rejects: Water elutriator middling	Combined totals
Ferrous:								
Light iron	765.1	0.7	0.6	0.1	0	0	Trace	766.5
Chrome-plated steel	1.3	0	.1	Trace	0	0	0	1.4
Spring steel	35.6	.1	Trace	.2	Trace	0	0	35.9
Steelplate	152.2	0	0	0	0	0	0	152.2
Hardened steel	17.9	0	0	0	0	0	0	17.9
Cast iron	104.3	.2	Trace	0	0	0	Trace	104.5
Cast steel	93.8	0	0	0	0	0	0	93.8
Stainless steel	1.6	2.6	Trace	.1	.4	Trace	Trace	4.7
Minus 1/4 in	9.0	0	0	0	0	0	0	9.0
Subtotal	1,181.8	3.6	.7	.4	.4	Trace	Trace	1,186.9
Nonferrous:								
Aluminum	5.1	63.1	.3	.2	.3	.1	.4	69.4
Zinc	0	2.2	Trace	Trace	Trace	0	Trace	2.2
Lead	0	.5	0	0	0	0	0	.5
Copper and brass	2.9	12.1	.2	.2	1.4	Trace	Trace	16.8
Coated copper wire[3]	2.0	.6	.2	.4	5.0	Trace	.2	8.4
Subtotal	10.0	78.5	.5	.8	6.7	.1	.6	97.3
Combustibles:								
Polyurethane foam	.6	0	(4)	(4)	1.1	Trace	Trace	1.7
Vinyl	1.4	0	(4)	(4)	2.6	0	Trace	4.0
Other plastics	2.9	.5	(4)	(4)	27.6	.8	1.1	32.7
Rubber	4.4	0.9	(4)	(4)	9.3	4.7	16.7	35.2
Other combustibles	1.7	.6	73.7	49.5	5.5	.3	1.7	133.0
Subtotal	11.4	3.8	73.7	49.5	45.9	5.8	17.5	204.2
Noncombustibles:								
Ceramics	.3	0	0	0	0	0	0	.3
Glass	.1	.1	.1	.2	1.7	0	.1	2.3
Asbestos	0	0	0	Trace	0	0	0	Trace
Subtotal	.4	.1	.1	.2	1.7	0	.1	2.6
Nonmagnetic:								
Minus 1/4 in	0	8.7	20.1	26.6	22.1	.1	.2	85.7
Total	1,203.6	94.7	95.2	77.3	86.0	3.0	18.5	1,579.1

[1] 2 Nissan Sentras were shredded. The data shown have been adjusted to represent 1 automobile.
[2] Fines and oversize were not removed by screening. A 3d air classification was used.
[3] Average analysis for coated copper wire: 60 pct copper, 40 pct coating.
[4] Combined with other combustibles.

TABLE 8. - Metals recovered compared with total metals contained in the magnetic and nonmagnetic shredded products of Japanese automobiles[1]

Metals	Total metals collected, lb	Recovered metals,[2] lb	Shredded metal recovery versus collected shredded metals, pct
Ferrous metals	1,304.0	1,293.7	99.2
Nonferrous metals:			
Aluminum	56.0	49.4	88.2
Zinc	4.6	4.1	89.1
Lead	.2	.1	50.0
Copper and brass	15.0	9.6	64.0
Copper (coated wire)	4.2	0	0
Subtotal	80.0	63.2	79.0
Total	1,384.0	1,356.9	98.0

[1] The metal weights shown are average weights from the combined automobiles.
[2] Recovered metals are collected in the magnetic and elutriated products. Nonferrous metals in the collected magnetic product and copper from coated wire were not recovered.

TABLE 9. - Comparison of materials determined by hand dismantling and collected from shredding the Honda and Toyota automobiles[1]

Class of material	Honda Accord: Dismantled, lb	Dismantled, pct	Shredded, lb	Shredded, pct	1981 Toyota Tercel: Dismantled, lb	Dismantled, pct	Shredded, lb	Shredded, pct
Ferrous:								
Light iron	1,054.9	54.3	909.1	50.9	939.1	52.4	819.7	45.0
Galvanized iron	0	0	0	0	.1	Trace	0	0
Copper-coated iron	.1	0	0	0	6.7	.4	0	0
Chrome-plated steel	24.8	1.3	.7	Trace	.1	Trace	5.0	.3
Spring steel	30.1	1.6	31.5	1.8	36.4	2.0	35.7	2.0
Steelplate	181.2	9.3	283.2	15.9	69.2	3.9	154.9	8.5
Hardened steel	ND	ND	ND	ND	91.0	5.1	58.5	3.2
Cast iron	128.0	6.6	167.7	9.4	101.7	5.7	78.8	4.3
Cast steel	92.9	4.8	ND	ND	104.7	5.8	120.2	6.6
Stainless steel	13.2	.7	9.0	.5	13.7	.8	5.0	.3
Minus 1/4 in	0	0	9.7	.5	0	0	35.3	1.9
Subtotal	1,525.2	78.6	1,410.9	79.0	1,362.7	76.1	1,313.1	72.1
Nonferrous:								
Aluminum	67.7	3.5	48.8	2.7	87.5	4.9	67.4	3.7
Zinc	10.8	.6	5.2	.3	5.4	.3	3.0	.1
Lead	.6	Trace	.1	Trace	.4	Trace	.2	Trace
Copper and brass	19.9	1.0	15.1	.9	19.4	1.1	16.2	.9
Copper (coated wire)	7.2	.4	4.2	.2	5.0	.3	3.1	.2
Subtotal	106.2	5.5	73.4	4.1	117.7	6.6	89.9	4.9
Combustibles:								
Plastic (coated wire)	4.8	.3	2.8	.2	3.3	.2	2.0	.1
Polyurethane foam	22.7	1.2	24.6	1.4	24.6	1.4	2.1	.1
Vinyl	13.4	.7	12.4	.7	14.0	.8	3.0	.2
Other plastics	82.5	4.2	50.4	2.8	74.7	4.2	28.1	1.5
Rubber	62.2	3.2	30.8	1.7	36.4	2.0	29.4	1.6
Carbon	.6	Trace	0	0	1.8	.1	0	0
Other combustibles	32.9	1.7	81.3	4.6	45.6	2.5	[2]156.5	8.6
Subtotal	219.1	11.3	202.1	11.4	200.2	11.2	221.1	12.1
Noncombustibles:								
Ceramics	2.9	.1	0	0	4.8	.2	0	0
Glass	63.0	3.2	.5	Trace	80.0	4.5	1.6	.1
Asbestos	1.2	.1	0	0	1.5	.1	0	0
Subtotal	67.1	3.4	.5	Trace	86.3	4.8	1.6	.1
Nonmagnetic:								
Minus 1/4 in	0	0	99.0	5.5	0	0	197.1	10.8
Fluids	24.2	1.2	ND	ND	24.2	1.3	ND	ND
Total	1,941.8	100.0	1,785.9	100.0	1,791.1	100.0	1,822.8	100.0

ND Not determined separately—included with steelplate.
[1] The weights of the shredded materials are representative of 1 automobile.
[2] Includes the weight of all combustibles from the air classification system.

TABLE 10. - Comparison of materials determined by hand dismantling and collected from shredding the Datsun and Sentra automobiles[1]

Class of material	1981 Datsun 210: Dismantled, lb	Dismantled, pct	Shredded, lb	Shredded, pct	1982 Nissan Sentra: Dismantled, lb	Dismantled, pct	Shredded, lb	Shredded, pct
Ferrous:								
Light iron	727.9	41.4	700.9	40.9	821.1	48.4	766.5	48.6
Galvanized iron	19.2	1.1	0	0	6.8	.4	0	0
Copper-coated iron	0	0	0	0	.2	Trace	0	0
Chrome-plated steel	31.1	1.8	17.9	1.1	2.6	.2	1.4	.1
Spring steel	39.5	2.3	34.2	2.0	25.8	1.5	35.9	2.3
Heavy iron	214.4	12.2	255.0	14.9	122.4	7.2	153.2	9.7
Hardened steel	135.3	7.7	61.4	3.6	50.0	3.0	17.9	1.1
Cast iron	146.4	8.3	115.5	6.6	113.5	6.7	104.5	6.6
Cast steel	54.0	3.1	93.4	5.5	139.8	8.2	93.8	5.9
Stainless steel	13.9	.8	9.7	.6	4.6	.3	4.7	.3
Minus 1/4 in	0	0	17.0	1.0	0	0	9.0	.6
Subtotal	1,381.7	78.7	1,305.0	76.2	1,286.8	75.9	1,186.9	75.2
Nonferrous:								
Aluminum	52.5	3.0	38.3	2.2	76.7	4.5	69.4	4.4
Zinc	2.0	.1	8.0	.5	2.9	.2	2.2	.1
Lead	.9	.1	.1	Trace	Trace	Trace	.5	Trace
Copper and brass	18.7	1.0	11.7	.7	17.4	1.0	16.8	1.1
Copper (coated wire)	5.1	.3	4.7	.3	6.4	.4	5.0	.3
Subtotal	79.2	4.5	62.8	3.7	103.4	6.1	93.9	5.9
Combustibles:								
Plastic (coated wire)	3.3	.2	3.1	.2	4.2	.3	3.4	.2
Polyurethane foam	19.6	1.1	2.3	.1	22.7	1.3	1.7	.1
Vinyl	13.9	.8	6.9	.4	8.8	.5	4.0	.3
Other plastics	64.8	3.7	24.2	1.4	67.0	4.0	32.7	2.1
Rubber	39.5	2.3	29.2	1.7	47.7	2.8	35.2	2.2
Carbon	.7	Trace	0	0	.7	Trace	0	0
Other combustibles	56.4	3.2	[2]161.4	9.4	60.0	3.5	[2]133.0	8.4
Subtotal	198.2	11.3	227.1	13.2	211.1	12.4	210.0	13.3
Noncombustibles:								
Ceramics	3.3	.1	0	0	4.0	.2	.3	0
Glass	68.6	3.9	1.8	.1	57.8	3.4	2.3	.2
Asbestos	1.1	.1	0	0	1.1	.1	Trace	Trace
Subtotal	73.0	4.1	1.8	.1	62.9	3.7	2.6	.2
Nonmagnetic:								
Minus 1/4 in	0	0	115.6	6.8	0	0	85.7	5.4
Fluids	24.3	1.4	ND	ND	32.0	1.9	ND	ND
Total	1,756.4	100.0	1,712.3	100.0	1,696.2	100.0	1,579.1	100.0

ND Not determined separately—included with steelplate.
[1] The weights of the shredded materials are representative of 1 automobile.
[2] Includes the weight of all combustibles from the air classification system.

TABLE 11. —Metals recovered from shredded Japanese automobiles compared with metals contained in similar dismantled automobiles[1]

Metals	Dismantled metals, lb	Recovered shredded metals,[2] lb	Shredded metal recovery versus dismantled content, pct
Ferrous metals	[3]1,389.1	1,293.7	93.1
Nonferrous metals:			
Aluminum	71.1	49.4	69.5
Zinc	5.3	4.1	77.4
Lead	.5	.1	20.0
Copper and brass	18.8	9.6	51.1
Copper (coated wire)	5.9	0	0
Subtotal	101.6	63.2	62.2
Total	1,490.7	1,356.9	91.0

[1] The metal weights shown are averages from the combined automobiles.
[2] Recovered metals are collected in the magnetic and elutriated products. Nonferrous metals in the collected magnetic product and copper from coated wire were not recovered.
[3] The dismantled automobile weights excluded 79.5 lb and 13.3 lb of ferrous metals from the wheels and gas tanks, which are not shredded.

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with the following analysis (weight percent):

Al = < 0.01	Ni = 0.064
C = 0.019	P = 0.033
Cr = 0.013	S = 0.019
Cu = 0.31	Si = < 0.01
Mn = < 0.01	Sn = < 0.01
Mo = < 0.01	V = < 0.01

Addition of quartz and limestone to the furnace to form a suitable slag and FeMn addition to increase the carbon and manganese levels produced a melt having the following analysis (weight percent):

Al = 0.020	Ni = 0.072
C = 0.048	P = 0.041
Cr = 0.017	S = 0.024
Cu = 0.45	Si = < 0.01
Mn = 0.040	Sn = 0.01
Mo = < 0.01	V = < 0.01

After 30 min, the melt was tapped, sampled and analyzed. The analysis of the final steel product follows (weight percent):

Al = < 0.01	Ni = 0.075
C = 0.021	P = 0.037
Cr = 0.018	S = 0.012
Cu = 0.39	Si = < 0.01
Mo = < 0.01	Sn = < 0.01
Mn = < 0.01	V = < 0.01

The slag analysis (weight percent) was:

Al_2O_3 = 3.82	Mo = 0.001-0.01
B = 0.01-0.1	Ni = ND
C = ND	P = ND
CaO = 10.8	S = 0.034
Cr = 0.03-0.3	SiO_2 = 18.0
Cu = 0.001-0.01	Sn = ND
Fe = 51.0	Ti = 0.003-0.03
MgO = 0.91	V = 0.003-0.03
Mn = 0.03-0.3	(ND = Not detected)

In all three metal samples, elements not detected by the spectrographic qualitative analysis were As, B, Ba, Be, Ca, Cb, Cd, Co, Hf, Mg, Na, Pb, Sb, Ta, Ti, W, Zn and Zr.

The analysis represents a standard carbon steel that conforms to AISI grade 1005 and shows that a standard steel can be melted directly from this scrap material. Any number of steel compositions can be prepared therefrom with suitable alloy additions.

Spectrographic analyses demonstrated that undesirable tramp elements were not present at levels above our detection limits in any of the metal samples. This indicates that HSLA steel from these automobiles should not adversely affect the quality of ferrous products prepared therefrom.

CONCLUSIONS

The average weight of the four hand-dismantled Japanese automobiles was 1,938.3 lb, including 1,472.9 lb ferrous metals, 115.6 lb nonferrous metals, 275.2 lb combustibles, 72.3 lb noncombustibles, and 2.3 lb electrical components. The respective weight percents were 76.0% ferrous metals, 6.0% nonferrous metals, 14.2% combustibles, 3.7% noncombustibles, and 0.1% electronic components. Compared to previously dismantled circa 1960 U.S. automobiles, the four Japanese-manufactured automobiles were smaller and contained less ferrous metal, more nonferrous metals, and a higher percentage of nonmetals. More than 60% of the ferrous metals were light gage steel, including HSLA steel, and of the 6% nonferrous metal content, more than 73% was aluminum.

Shredding of the Japanese automobiles, less tires, fluids, tools, wheels, batteries and gas tanks, yielded average ferrous metal recoveries of 1,293.7 lb and nonferrous metal recoveries of 63.2 lb per automobile. There was also 223.2 lb of reject materials to be landfilled. This calculated to 99.2% ferrous metal recovery based upon total collected products, or 93.9% recovery based upon the projected shredder input from dismantling data. The major difference in loss is shredding mill and transfer equipment, which would be ultimately recovered in continuous operation.

Nonferrous metal recovery from the shredded automobiles was 79%. There was an 8.2% nonferrous metal loss during magnetic separation which reported with the ferrous product, and 12.8% was lost in the combined rejects. The nonferrous metal loss from shredding is excessive, and continued emphasis on nonferrous metal recovery appears to be warranted. Automobile shredder rejects, presently landfilled, will be of future concern when shredding the smaller automobiles. There will be a one-third increase in the amount of rejects for landfill to maintain the current shredded ferrous scrap production.

The HSLA steels used in the manufacture of the Sentra automobile, which are 12.2% of the total ferrous metals content, appear to be amenable to steel and foundry usage in recycling ferrous scrap. Total separation of a HSLA steel product by hand dismantling or from the shredded automobile does not appear to be feasible. No materials used in the manufacture of the Japanese automobiles would pose problems in present recycling technology. □

[1]Callahan, J.M., and R. Hartley, Jr. *Why Japan's Ahead. Automotive Industries, March 1982, pp. 34-37.*

[2]Chindgren, C.J., K. Dean, and L. Peterson. *Recovery of the Nonferrous Metals From Auto Shredder Rejects by Air Classification. BuMines TPR 31, 1971, 11 pp.*

[3]Steele, D.K., and J. Sterner. *A Water Elutriation System for Recovering Nonmagnetic Metals From Automobile Shredder Rejects. BuMines RI 8771, 1983, 22 pp.*

[4]Dean, K.C., and J.W. Sterner. *Dismantling a Typical Junk Automobile to Product Quality Scrap. BuMines RI 7350, 1969, 17 pp.*

The authors are associated with the Salt Lake City Research Center, Bureau of Mines, Salt Lake City, Utah. Sterner is group supervisor; Steele is metallurgist, and Shirts is research

Materials Usage in New Cars, 1975-85

Pounds Dryweight						
Model Year	1975		1980		1985	
Total Weight	3,970		3,080		2,400	
Material Mix	Pct	Lbs	Pct	Lbs	Pct	Lbs
High Strength Steel	2.7	106	5.4	165	12.5	300
Plain Carbon Steel	58.3	2,315	54.2	1,669	44.0	1,056
Iron	15.8	626	14.9	458	9.0	216
Aluminum	2.2	86	4.0	124	6.5	156
Copper	0.9	37	0.8	25	1.0	24
Lead	0.7	29	0.7	22	1.0	24
Zinc	1.3	53	0.6	19	0.5	12
Glass	2.4	94	2.6	80	3.0	72
Rubber	4.0	160	4.0	124	4.5	180
Other Plastics	4.2	168	6.0	184	10.5	252
Other	7.5	297	6.8	212	7.5	180

Source: The U.S. Automobile Industry, 1980: Report to the President from the Secretary of Transportation.
Note: Dry weight does not include fuel, oil, water and other liquids.

smaller radiator that will be efficient; who can come up with a plastic fender that will really save half the weight, look like sheet metal, and be paintable. It will probably lead to significant shakeout in suppliers."

"If it makes sense to source outside the automakers," says Maryann N. Keller, the analyst with Wall Street's Paine Webber Mitchell Hutchins, Inc., "it makes no difference whether it's sourced to the United States or Japan. The U.S. parts companies are in competition with the rest of the world and they won't get preferential treatment.

"I see diversification being attempted by every company I know. Diecasters are looking at frames for computers, foundries at construction and agricultural equipment.

"The auto industry is nothing more or less than a cash cow. If the suppliers can't make money on it, they'll take their business elsewhere. There's quite a metamorphosis occurring." Automotive's cyclicality, smaller, more standardized products, and moves to foreign sourcing will all mean less business for American suppliers, she says.

In particular, "suppliers that are narrower in scope and don't have proprietary products could have problems with overseas competition," says Philip K. Fricke, an analyst with Goldman, Sachs & Co., the Wall Street firm.

"There will be a gradual increase in the amount of foreign sourcing," says Ford's Mr. Chicoine, "as business tends to migrate toward the most efficient areas, but at the same time I don't think that the domestic auto parts and machine tool business is so deficient versus foreign competition that there is any risk that they won't be around for a very long time to come. I think some of our auto parts suppliers and machine tool suppliers have already demonstrated in face-to-face competition that they may very well be the most efficient source."

Machine tool orders for Ford's Mexican engine plant, for instance, went to Lamb, LaSalle, and Cross. Favorable financing arrangements induced Cross to build most of the machines in its English plant, some in its West German plant, and about 10 pct here.

"We don't have any particular inhibitions about sourcing to qualified suppliers anywhere in the world," says Mr. Chicoine. "We are in a very dynamic period where everything is in a state of change and the predicting is uncertain at best and right now it's hazardous indeed. Opportunities for complementation, however, are coming to the forefront in certain parts of the world where you will produce engines in one country, transmissions in a second, and vehicles in a third, and sell vehicles in all three countries."

Mr. Busch of Bendix evinces some frustration at the volatile climate in sourcing. Bendix, he says, is prepared to source parts on a long-term basis from whichever of its worldwide plants the automakers prefer, but so far the automakers have given Bendix no clear instructions.

"If the OEMs come to us and say 'Hey, we want the lowest cost product we can get, we don't care where in the world you get it for us, but get it for us,' we can do that through the Bendix system. If they said, 'We want to buy 30 pct of our master cylinders offshore and 70 pct at home, or 50-50, or whatever,' we could say 'Okay, we'll supply you 50 pct from the U.S. and 50 pct from our facility in Japan and have 100 pct capability in the U.S. in case there's a catastrophe on the oceans or something keeps you from getting your supply from Japan. We'll save you the trouble of trying out all the cylinders made around the world, and we'll assure you quality, engineering, and everything else.' That's the philosophy we've been preaching to the automakers, but we're not getting very far with that. I don't know what their philosophy is. They haven't told us, they won't tell us.

"The way they're doing it now is: Today they'll buy from Brazil because the exchange rate is right and the government gives them an incentive. Tomorrow the government changes its policy and they say, 'Forget that, I'll go somewhere else.' So they go to another facility, and all they're doing is running around and causing suppliers to respond to a very short-term contract, and we're saying, 'Hey! Why don't we get together and do it on a longterm basis?'"

Some customers, says Mr. Busch, have asked Bendix to quote prices based on its different international plants, pitting them against one another. Some have even wanted to source Bendix proprietary products from non-Bendix plants. "They want to take our innovation, our technology and do it somewhere else. That's ridiculous! That's what we're in business for."

Automotive sourcing to foreign plants and affiliates of American-based multinationals means the loss of American blue collar jobs but the retention of at least some American profits and employment. American auto companies seem to be making an effort to source overseas through these American multinationals. In some cases, they have encouraged the American suppliers to affiliate with companies in the foreign country of choice. Ford is encouraging such affiliation with Mexico so that it can meet the local content law there.

In these cash-short times, cost is automotive's primary consideration. Chrysler's debts are large, and where Ford and GM will get the cash necessary for their planned retooling is still unclear.

General Motors projects self-confidence about the future and promises to spend $32 billion of its $40 billion capital expenditures within the U.S. "We're fully expecting sourcing of our domestically built vehicles to be domestic," says one spokesman. GM Chairman Roger B. Smith recently predicted that U.S. retail sales of cars and trucks will be nearly

AN INDUSTRYWIDE HAZARDOUS WASTE IDENTIFICATION STUDY OF THE FERROUS SCRAP PROCESSING INDUSTRY

Prepared For

THE INSTITUTE OF SCRAP IRON AND STEEL, INC.
Washington, D.C.

By

Clayton Environmental Consultants, Inc.
November 10, 1980

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ABBREVIATIONS

Ag =	silver
As =	arsenic
B =	baler
Ba =	barium
Cd =	cadmium
CEC =	Clayton Environmental Consultants, Inc.
Cr =	chromium
E =	Endrin
EP =	Extraction Procedure
EP TOX =	Extraction Procedure Toxicity
EPA =	United States Environmental Protection Agency
Hg =	mercury
HWM =	hazardous waste management
IS =	shredder (from a CEC field survey)
ISIS =	The Institute of Scrap Iron and Steel, Inc.
ISS =	shredder scrubber (from a CEC field survey)
L =	Lindane
M =	Methoxychlor
mg/L =	milligrams per liter
Pb =	lead
PBB =	Patton, Boggs & Blow
RCRA =	Resource Conservation and Recovery Act
ret =	rotary extractor technique
S =	shredder
s =	standard deviation

Se = selenium

SH = shear

SS = shredder scrubber

st = stirrer technique

SW = sweat furnace

T = Toxaphene

UCL = Upper Confidence Level

$\bar{x}$ = average

2,4-D = 2,4-Dichlorophenoxyacetic acid

2,4,5-TP= Silvex

$<$ = less than

$>$ = greater than

$\geq$ = greater than or equal to

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AN INDUSTRYWIDE HAZARDOUS WASTE
IDENTIFICATION STUDY OF THE
FERROUS SCRAP PROCESSING INDUSTRY
FOR
THE INSTITUTE OF SCRAP IRON AND STEEL, INC.
Washington, D.C.

JOB NO. 10355-0780-WMS

I. INTRODUCTION

On February 26, 1980 and May 19, 1980, the U.S. Environmental Protection Agency (EPA) promulgated hazardous waste management regulations under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), as amended. Essentially, each potential generator of hazardous waste must notify the EPA by August 18, 1980 if they know or believe they are a generator of hazardous waste. The methodology, criteria, etc. by which one determines whether a waste is hazardous are specified in Part 261 of the regulations.

No waste produced by the ferrous scrap iron and steel industry was listed under Sections 261.31 or 261.32 so that no waste produced by this industry was listed as hazardous. Nevertheless, perhaps the most salient characteristic of this industry is its highly heterogeneous materials input and its highly variable production rates. For that reason, it was unclear how or with what frequency individual scrap processors would be required to sample and analyze their wastes.

Thus, the Institute of Scrap Iron and Steel, Inc. (ISIS), which is an industry association serving the ferrous scrap processing industry, contracted for a statistically sound industrywide hazardous waste management (HWM) identification study to:

1. Ascertain whether each of the various types of waste produced by members of the ferrous iron and steel industry (SIC 5093) are hazardous as defined by the U.S.E.P.A. regulations promulgated on May 19, 1980

(exclusive of ignitability, corrosivity, and reactivity).

2. Report the EP Toxicity and other contaminant data in both tabular and summary formats which will permit generalizations conerning the characteristics of each type of waste.

II. EXECUTIVE SUMMARY

Essentially five categories of waste from ferrous scrap processing plants were evaluated for their EP Toxicity as a result of this study. They were:

1. Balers (B)
2. Shears (SH)
3. Shredders (S)
4. Shredder Scrubbers (SS)
5. Sweat Furnaces (SW)

Our findings, based upon EPA's EP Toxicity procedure (from SW-846, based upon the Stirrer technique), are that:

1. Waste from Balers is not hazardous.[1] However, waste generated during "atypical" baling operations (i.e., the processing of radiators exclusively) apparently are hazardous due to their lead (Pb) content.
2. Waste from Shears is not hazardous.
3. Waste from Shredders is not hazardous.
4. Waste from Shredder Scrubbers is not hazardous.
5. Waste from Sweat Furnaces is hazardous due to its lead (Pb) content.

Consolidated EP Toxicity results for each of these categories are presented in Tables 2.1 through 2.9.

1 As of the date of this report, CEC has not completed its analyses of all samples of waste from balers. However, based upon the samples thus far analyzed, CEC has concluded with 95% confidence that waste from typical baler operations is not hazardous.

TABLE 2.1

SUMMARIZED EP TOXICITY RESULTS FOR BALERS WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
x̄ *	.011	17.2	.136	.311	3.18	.011	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	
s	0	24.2	.297	.070	6.85	0	0	0	0	0	0	0	0	0	
UCL	.011	20.9	.182	.322	4.24	.011	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	
x̄ **	.011	16.5	.138	.311	7.20	.011	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	
s	0	23.7	.289	.068	17.1	0	0	0	0	0	0	0	0	0	
UCL	.011	20.1	.181	.321	9.77	.011	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	

* Typical Balers

** Includes "Atypical" Balers (B-5, B-8, B-9, B-54)

TABLE 2.2

SUMMARIZED EP TOXICITY RESULTS FOR SHEARS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
$\bar{x}$	<.01	16.6	.293	.31	1.93	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	
s	0	22.0	.375	.078	4.24	0	0	0	0	0	0	0	0	0	
UCL	<.01	19.9	.349	.32	2.57	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 2.3

SUMMARIZED EP TOXICITY RESULTS FOR ALL SHREDDERS WASTE

	EP CONTAMINANTS (mg/L)													
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
$\bar{x}$	<0.01	12.9	.496	<0.3	3.47	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
s	0	18.0	.265	<0.3	4.04	0	0	0	0	0	0	0	0	0
UCL	<0.01	15.5	.303	<0.3	4.05	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 2.4

SUMMARIZED EP TOXICITY RESULTS FOR "BETWEEN-SITE" SHREDDERS WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
$\bar{x}$	<.01	15.9	.573	.3	3.79	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	
s	0	19.0	.317	0	3.81	0	0	0	0	0	0	0	0	0	
UCL	<.01	19.8	.637	.3	4.53	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 2.5

SUMMARIZED EP TOXICITY RESULTS FOR "WITHIN-SITE" SHREDDERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
$\bar{x}$	<.01	9.72	.427	.3	3.15	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	
s	0	16.5	.157	0	4.30	0	0	0	0	0	0	0	0	0	
UCL	<.01	13.1	.449	.3	4.03	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 2.6

SUMMARIZED EP TOXICITY RESULTS FOR ALL SHREDDER SCRUBBERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
$\bar{x}$	.03	38.7	.255	.319	1.88	<.01	<.01	.054	<.002	<0.04	<1.0	<0.05	<10	<1	
s	0	67.6	.226	.088	2.29	0	0	.025	0	0	0	0	0	0	
UCL	.03	52.9	.303	.338	2.36	<.01	<.01	.059	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 2.7

SUMMARIZED EP TOXICITY RESULTS FOR "BETWEEN-SITE" SHREDDER SCRUBBERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
$\bar{x}$	<.01	29.5	.283	.3	2.23	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	
s	0	28.9	.201	0	2.09	0	0	0	0	0	0	0	0	0	
UCL	<.01	37.0	.335	.3	2.77	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 2.8

SUMMARIZED EP TOXICITY RESULTS FOR "WITHIN-SITE" SHREDDER SCRUBBERS WASTE

	EP CONTAMINANTS (mg/L)													
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
$\bar{x}$	<.01	56.1	.211	.329	1.46	<.01	<.01	.059	<.002	<0.04	<1.0	<0.05	<10	<1
s	0	96.1	.209	.121	2.27	0	0	.036	0	0	0	0	0	0
UCL	<.01	87.3	.279	.368	2.20	<.01	<.01	.071	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 2.9

SUMMARIZED EP TOXICITY RESULTS FOR SWEAT FURNACES WASTE

	EP CONTAMINANTS (mg/L)													
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
$\bar{x}$	.013	22.2	.357	.307	53.4	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
s	.007	27.1	.431	.026	101	0	0	0	0	0	0	0	0	0
UCL	.015	28.9	.464	.313	78.5	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1

III. LITERATURE REVIEW AND INITIAL INSPECTIONS

As described in IV.A, a literature review was conducted to identify and evaluate all available information concerning wastes from ferrous scrap processing plants. Over twenty sources were found to contain valuable information for a profile of the industry, the materials processed, and its expected wastes. A wide variety of processing equipment is used, however, the major types of ferrous scrap processing equipment fell into eight categories.

Three randomly-chosen site surveys were then conducted to validate the previous findings as well as to obtain an in-depth practical understanding of the industry as a whole. At one site, a shredder was the principal scrap processing equipment and a shredder waste sample was acquired in anticipation of conducting the effort described in Section VI.C. of this report. Two other sites, one with a baler and the other with a shear, were also surveyed prior to beginning the effort described in this report. The efforts reported herein were then undertaken after consultation and review of the protocol of this industrywide hazardous waste identification study of the ferrous scrap processing industry with the U.S.E.P.A. on July 8, 1980.

IV. STUDY PROTOCOL

This study's protocol was divided into two distinct sections (sampling strategy and analytical protocol). Statistical evaluations of analytical data were conducted in accordance with EPA's Guidance Document SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," Section 1.0, distributed by EPA on July 2, 1980. Discussion of these statistical evaluations occurs in IV.B. "Analytical Protocol."

A. Sampling Strategy

A wide variety of sampling strategies and approaches exist for accurately defining [with a high degree of confidence (95%)] any sample population. An extremely useful statistical approach to determine the minimum number of samples to be acquired for development of representative data from an expected heterogeneous population has now been in use by another U.S. governmental agency for some time.[2] Extrapolated to this study, the following tabular summary appears to be the best approach.

TABLE 1

Number of Same Kind of Waste Generating Equipment	Minimum Number of Samples to be Acquired
1-20	50% of the total number of pieces of same kind of equipment
21-100	10 plus 25% of the excess over 20 pieces of equipment
Over 100	30 plus 5% of the excess over 100 pieces of equipment

[2] Leidel, N.A., Busch, K.A., Lynch, J.R., Occupational Exposure Sampling Strategy Manual, U.S. Dept. of Health, Education, and Welfare, NIOSH, Cincinnati, OH 45226, January, 1977, Contract CEC-99-74-75.

Based upon a research report prepared for the Metal Scrap Research and Education Foundation,[3] the major types of scrap processing equipment fall into the following categories:

- Balers
- Alligator Shears
- Guillotine Shears
- Shredders
- Turnings Crushers
- Briquettes
- Motor Block Breakers
- Other (torches, rail breaking, cast iron breaking, etc.)

However, of these eight categories of processing equipment, only four (balers, guillotine shears, shredders and motor block breakers) are expected to have any significant amount of waste production, based upon a review of recent literature in the scrap processing field. Further, because the primary waste from motor block breakers is waste oil, for which at the time of this study EPA had not yet specified appropriate analytical procedures, this potential hazardous waste source was excluded from the conduct of this study. Summarizing the total number of pieces of each of the three remaining types of waste-generating processing equipment (Number of units in 1974 + Number of units installed or on order through 1980) yields the following table.

TABLE 2

	Number of Units in 1974	Number of Units Installed or on Order 1975-1980	Total
Balers	1040	130	1170
Guillotine Shears	830	235	1065
Shredders	120	80	200

[3]Battelle Columbus Laboratories, The Processing Capacity of the Ferrous Scrap Industry, Metal Scrap Research and Education Foundation, 1627 K Street, N.W., Washington, D.C. 20006, 1976.

Thus, based on Tables 1 and 2, we proposed to sample thirty-five (35) shredders, seventy-seven (77) guillotine shears, and eighty-four (84) balers. Sites were chosen at random first from a list of shredders, and then from ISIS 1980 Directory of Members. Essentially then, this sampling strategy defined the "between-site" variations. Written Sampling Procedures were sent to each randomly chosen site for sample acquisition, and sample containers to be followed by analysis in our laboratory. Later, when it became clear that two other potential waste generating sources from ferrous scrap processing plants existed, ISIS in consultation with CEC, decided to acquire and analyze a minimum of 29 samples for both shredder scrubbers and aluminum sweat furnaces.

Additionally, it was necessary to define the "within-site" variation. Based upon the same statistical procedure outlined above, 14 sites were sampled for "within-site" variations. We chose three additional samples per shredder as being sufficient to characterize the "within-site" variation. This sampling was performed exclusively by Clayton personnel to validate the accuracy of both the EPA SW-846 procedures, and the "between-site" versus the "within-site" sampling programs, and determine if there is a significant contaminants concentration variation with time.

Sampling and analytical procedures conformed to Appendix I (including SW-846) of the EPA HWM regulations where appropriate and applicable, and to Clayton-specified methodologies where no federal guidelines existed (see Appendix B). Sampling, analytical and statistical procedures were reviewed with U.S.E.P.A. personnel on July 8, 1980 and subsequently (see Appendix D) approved.

The actual "within-site" sampling program was conducted by various Clayton staff (from our headquarters in Southfield, Michigan, plus one of our branch offices, Atlanta). Rigorous chain-of-custody procedures were utilized for shipping samples from a site to our laboratories in Southfield, Michigan.

B. Analytical Protocol

All samples reported were analyzed according to the U.S.E.P.A.'s Analytical Protocol for EP Toxicity, which has been described in the May 19, 1980 Federal Register (pgs. 33127-33131) and EPA Document No. SW-846. "Test Methods for Evaluating

Solid Waste, Physical/Chemical Methods," dated May, 1980, distributed July 2, 1980.

The EPA Analytical Protocol specifies that each waste be subjected to the following procedure:

A. Separation (solid and liquid phases)

B. Structural Integrity/Particle Size Reduction

C. Extraction of Solid Material

D. Final Separation of the Extraction from the Remaining Solid

E. Testing (Analysis) of the EP Extract.

In addition, it should be noted that SW-846 provides for two different acceptable extractors (under item C. above): 1) Stirrers and 2) Tumblers. Clayton Environmental Consultants, Inc. utilized both extraction techniques during the conduct of this study. All data in the body of this report is reported on the basis of the "Stirrer" technique.

V. SUMMARY OF FINDINGS

The following eleven tables summarize all of the EP Toxicity Waste analyses for the five principal categories of waste produced by the ferrous scrap processing industry. Review of the data indicates that the pesticide and herbicide contaminant concentrations were universally below detectable limits, and thus federal regulatory limits as well.

Furthermore, with a few minor exceptions, concentrations of 5 of the remaining 8 metal EP Toxicity contaminants (arsenic - As, chromium - Cr, mercury - Hg, selenium - Se, and silver - Ag) were below detectable levels in the wastes from all five processes.

None of the wastes produced by the five scrap processing sources evaluated in this study was found to be in excess of the federal EPA EP Toxicity limits (with 95% confidence) with the exception of the sweat furnaces and "atypical" baling operations (i.e., processing of radiators exclusively), the wastes from both of which were determined to be hazardous on the basis of lead.

TABLE 5.1

CONSOLIDATED EP TOXICITY RESULTS FOR BALERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
B-1	<0.01	4.1	.01	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-2	<0.01	5.6	.14	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-3	<0.01	1.9	.08	<0.3	1.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-4	<0.01	20	.12	<0.3	1.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-5	<0.01	3.3	.10	<0.3	55	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-6	<0.01	1.3	.09	<0.3	0.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-7	<0.01	34	.16	<0.3	27	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-8	<0.01	1.1	.31	<0.3	89	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-9	<0.01	19	.07	<0.3	85	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-10	<0.01	5.6	.04	<0.3	2.5	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.1

CONSOLIDATED EP TOXICITY RESULTS FOR BALERS WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
B-11	<0.01	2.9	.06	<0.3	1.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-12	<0.01	40	.18	0.6	1.6	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-13	<0.01	1.5	.07	<0.3	.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-14	<0.01	25	.04	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-15	<0.01	15	.65	0.8	8.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-16	<0.01	1.9	.02	<0.3	0.6	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-17	<0.01	1.3	.06	<0.3	10	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-18	<0.01	1.2	.05	<0.3	1.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-19	<0.01	1.5	.06	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-20	<0.01	8.5	.03	<0.3	1.8	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.1

CONSOLIDATED EP TOXICITY RESULTS FOR BALERS WASTE

ISIS Company	EP CONTAMINANTS (mg/L)													
	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
B-21	0.04	97	.04	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-22	<0.01	4.6	.02	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-23	<0.01	11	.05	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-24	<0.01	22	.18	<0.3	2.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-25	<0.01	120	.09	<0.3	.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-26	<0.01	52	.10	<0.3	.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-27	<0.01	57	.11	<0.3	1.4	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-28	<0.01	1.0	.24	<0.3	1.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-29	<0.01	17	.01	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-30	<0.01	10	.01	<0.3	.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.1

CONSOLIDATED EP TOXICITY RESULTS FOR BALERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
B-31	<0.01	43	.05	<0.3	.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-32	<0.01	7.9	.08	<0.3	2.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-33	<0.01	32	.16	<0.3	7.6	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-34	<0.01	3.3	.07	<0.3	2.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-35	<0.01	1.4	.02	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-36	<0.01	1.8	.11	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-37	<0.01	1.9	.03	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-38	<0.01	28	.05	<0.3	2.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-39	<0.01	1.6	.03	<0.3	27	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-40	<0.01	2.4	.02	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.1

CONSOLIDATED EP TOXICITY RESULTS FOR BALERS WASTE

	EP CONTAMINANTS (mg/L)													
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
B-41	0.02	0.85	.01	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-42	<0.01	3.2	.04	<0.3	3.4	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-43	<0.01	7.9	.14	<0.3	12	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-44	<0.01	1.9	.42	<0.3	3.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-45	<0.01	35	.06	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-46	<0.01	2.7	.34	<0.3	0.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-47	<0.01	61	.11	<0.3	1.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-48	<0.01	1.8	.04	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-49	<0.01	2.8	.34	<0.3	2.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
B-50	<0.01	4.4	.09	<0.3	1.5	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.1

CONSOLIDATED EP TOXICITY RESULTS FOR BALERS WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
B-51	<0.01	1.6	.07	<0.3	3.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-52	<0.01	91	.06	<0.3	1.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-53	<0.01	24	<0.01	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-54	<0.01	1.6	.22	<0.3	50	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-55	<0.01	59	.07	<0.3	11	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-56	<0.01	3.7	.09	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-57	<0.01	4.8	2.4	<0.3	8.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-58	<0.01	3.8	.04	<0.3	0.5	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-59	<0.01	15	.02	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-60	<0.01	3.3	.07	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.1

CONSOLIDATED EP TOXICITY RESULTS FOR BALERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
B-61	<0.01	12	.08	<0.3	1.8	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-62	<0.01	1.7	.10	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-63	<0.01	2.5	.08	<0.3	1.6	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-64	<0.01	1.5	.12	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-65	<0.01	3.0	.08	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-66	<0.01	17	.31	<0.3	2.5	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-67	<0.01	22	.07	<0.3	22	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-68	<0.01	4.8	.10	<0.3	5.5	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-69	<0.01	6.7	.08	<0.3	5.5	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-70	<0.01	4.5	.23	<0.3	2.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.1

CONSOLIDATED EP TOXICITY RESULTS FOR BALERS WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
B-71	<0.01	27	.08	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-72	<0.01	32	.23	<0.3	37	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-73	<0.01	28	.06	<0.3	2.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.2

CONSOLIDATED EP TOXICITY RESULTS FOR SHEARS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SH-1	<0.01	44	.42	<0.3	2.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-2	<0.01	34	.35	<0.3	2.5	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-3	<0.01	44	.38	<0.3	2.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-4	<0.01	110	<.02	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-5	<0.01	2.2	<.02	<0.3	.34	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-6	<0.01	2.4	.19	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-7	<0.01	1.8	.21	<0.3	.90	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-8	<0.01	18	<.02	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-9	<0.01	13	.16	<0.3	.38	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-10	<0.01	1.2	.72	<0.3	2.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.2

CONSOLIDATED EP TOXICITY RESULTS FOR SHEARS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SH-11	<0.01	1.9	.05	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-12	<0.01	56	.19	<0.3	.81	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-13	<0.01	.72	.05	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-14	<0.01	32	.23	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-15	<0.01	37	.55	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-16	<0.01	1.1	<.02	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-17	<0.01	10	.59	<0.3	25	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-18	<0.01	15	.02	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-19	<0.01	7.6	<.02	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-20	<0.01	8.0	.26	<0.3	3.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.2

CONSOLIDATED EP TOXICITY RESULTS FOR SHEARS WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SH-21	<0.01	1.4	.51	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-22	<0.01	11	.10	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-23	<0.01	13	.24	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-24	<0.01	4.4	.27	<0.3	1.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-25	<0.01	37	.13	<0.3	.41	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-26	<0.01	.96	.22	<0.3	.34	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-27	<0.01	33	.16	<0.3	3.4	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-28	<0.01	1.3	2.2	<0.3	.20	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-29	<0.01	1.7	.38	<0.3	17	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-30	<0.01	17	.19	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.2

CONSOLIDATED EP TOXICITY RESULTS FOR SHEARS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SH-31	<0.01	.60	.01	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-32	<0.01	84	.19	<0.3	2.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-33	<0.01	.88	.30	<0.3	.34	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-34	<0.01	35	.29	<0.3	1.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-35	<0.01	32	2.2	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-36	<0.01	2.9	.47	<0.3	1.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-37	<0.01	1.0	.08	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-38	<0.01	37	.68	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-39	<0.01	36	<.02	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-40	<0.01	17	.24	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.2

CONSOLIDATED EP TOXICITY RESULTS FOR SHEARS WASTE

ISIS Company	EP CONTAMINANTS (mg/L)														
	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SH-41	<0.01	1.8	.37	<0.3	1.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-42	<0.01	.44	.33	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-43	<0.01	33	.38	<0.3	20	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-44	<0.01	24	.29	<0.3	9.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-45	<0.01	1.0	.06	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-46	<0.01	3.2	.38	<0.3	2.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-47	<0.01	3.9	.18	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-48	<0.01	23	.10	<0.3	.38	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-49	<0.01	20	.06	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-50	<0.01	2.4	.19	<0.3	2.6	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.2

CONSOLIDATED EP TOXICITY RESULTS FOR SHEARS WASTE

ISIS Company	EP CONTAMINANTS (mg/L)													
	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
SH-51	<0.01	.48	.03	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SH-52	<0.01	1.7	.20	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SH-53	<0.01	2.6	.08	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SH-54	<0.01	5.2	.05	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SH-55	<0.01	2.4	.24	<0.3	1.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SH-56	<0.01	72	.55	<0.3	2.4	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SH-57	<0.01	34	<.02	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SH-58	<0.01	1.8	.42	<0.3	3.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SH-59	<0.01	.44	.11	<0.3	2.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SH-60	<0.01	1.2	.28	<0.3	3.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.2

CONSOLIDATED EP TOXICITY RESULTS FOR SHEARS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SH-61	<0.01	1.2	.93	<0.3	4.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-62	<0.01	2.3	.08	<0.3	.55	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-63	<0.01	1.3	.13	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-64	<0.01	30	.19	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-65	<0.01	2.4	.04	<0.3	.51	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-66	<0.01	20	.11	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-67	<0.01	1.3	.47	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-68	<0.01	1.8	.18	<0.3	1.8	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-69	<0.01	31	.13	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-70	<0.01	68	.11	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.2

CONSOLIDATED EP TOXICITY RESULTS FOR SHEARS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SH-71	<0.01	.80	.37	<0.3	4.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-72	<0.01	8.0	.55	<0.3	2.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SH-73	<0.01	1.0	.40	<0.3	.30	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.3

CONSOLIDATED EP TOXICITY RESULTS FOR "BETWEEN-SITE" SHREDDERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
S-1	<0.01	1.0	.38	<0.3	.50	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-2	<0.01	2.4	.48	<0.3	.30	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-3	<0.01	2.7	.42	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-4	<0.01	4.1	1.1	<0.3	10	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-5	<0.01	1.2	.44	<0.3	4.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-6	<0.01	25	.66	<0.3	.96	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-7	<0.01	1.5	.53	<0.3	4.6	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-8	<0.01	1.1	1.2	<0.3	10	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-9	<0.01	43	.70	<0.3	.59	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-10	<0.01	3.4	.62	<0.3	1.8	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.3

CONSOLIDATED EP TOXICITY RESULTS FOR "BETWEEN-SITE" SHREDDERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
S-11	<0.01	3.4	1.1	<0.3	6.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-12	<0.01	18	.37	<0.3	.33	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-13	<0.01	31	.44	<0.3	8.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-14	<0.01	47	.57	<0.3	3.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-15	<0.01	26	.53	<0.3	5.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-16	<0.01	2.5	1.1	<0.3	13	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-17	<0.01	1.3	.34	<0.3	5.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-18	<0.01	2.9	.48	<0.3	1.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-19	<0.01	2.7	.40	<0.3	.81	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-20	<0.01	37	.40	<0.3	2.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.3

CONSOLIDATED EP TOXICITY RESULTS FOR "BETWEEN-SITE" SHREDDERS WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
S-21	<0.01	1.8	1.8	<0.3	5.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-22	<0.01	10.4	.48	<0.3	1.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-23	<0.01	4.1	.27	<0.3	.63	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-24	<0.01	22	.75	<0.3	2.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-25	<0.01	4.3	.48	<0.3	5.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-26	<0.01	3.8	.57	<0.3	6.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-27	<0.01	94	.48	<0.3	8.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-28	<0.01	26	.22	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-29	<0.01	20	.24	<0.3	3.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-30	<0.01	30	.37	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.3

CONSOLIDATED EP TOXICITY RESULTS FOR "BETWEEN-SITE" SHREDDERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
S-31	<0.01	16	.15	<0.3	.46	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-32	<0.01	9.4	.66	<0.3	.30	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-33	<0.01	24	.48	<0.3	2.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-34	<0.01	17	.30	<0.3	3.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-35	<0.01	1.1	.38	<0.3	.42	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-36	<0.01	9.9	.79	<0.3	12	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-37	<0.01	1.9	.40	<0.3	2.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-38	<0.01	29	.75	<0.3	.31	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-39	<0.01	50	.70	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-40	<0.01	6.7	.60	<0.3	10.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.4

CONSOLIDATED EP TOXICITY RESULTS FOR "WITHIN-SITE" SHREDDERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
1S-1	<0.01	2.0	.37	<0.3	.59	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-2	<0.01	24	.36	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-3	<0.01	32	.36	<0.3	0.30	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-4	<0.01	32	.40	<0.3	.67	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-5	<0.01	2.4	.44	<0.3	.80	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-6	<0.01	2.5	.53	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-7	<0.01	2.1	.26	<0.3	.63	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-8	<0.01	21	.18	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-9	<0.01	1.6	.20	<0.3	.89	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-10	<0.01	4.9	.29	<0.3	3.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.4

CONSOLIDATED EP TOXICITY RESULTS FOR "WITHIN-SITE" SHREDDERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
1S-11	<0.01	3.0	.66	<0.3	1.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-12	<0.01	3.4	.70	<0.3	.59	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-13	<0.01	3.3	.44	<0.3	4.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-14	<0.01	1.3	.53	<0.3	1.4	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-15	<0.01	2.0	.66	<0.3	.50	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-16	<0.01	11	.23	<0.3	.81	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-17	<0.01	.99	.21	<0.3	16	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-18	<0.01	55	.35	<0.3	.96	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-19	<0.01	2.8	.28	<0.3	14	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-20	<0.01	84	.70	<0.3	2.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.4

CONSOLIDATED EP TOXICITY RESULTS FOR "WITHIN-SITE" SHREDDERS WASTE

	EP CONTAMINANTS (mg/L)													
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
1S-21	<0.01	4.3	.48	<0.3	3.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-22	<0.01	2.4	.30	<0.3	1.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-23	<0.01	3.0	.33	<0.3	.50	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-24	<0.01	1.5	.30	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-25	<0.01	3.7	.42	<0.3	2.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-26	<0.01	8.9	.37	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-27	<0.01	4.2	.35	<0.3	1.8	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-28	<0.01	7.5	.57	<0.3	.89	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-29	<0.01	1.2	.29	<0.3	1.8	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-30	<0.01	1.6	.75	<0.3	10	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.4

CONSOLIDATED EP TOXICITY RESULTS FOR "WITHIN-SITE" SHREDDERS WASTE

EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
1S-31	<0.01	6.0	.53	<0.3	5.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-32	<0.01	19	.44	<0.3	5.5	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-33	<0.01	1.5	.53	<0.3	18	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-34	<0.01	1.8	.24	<0.3	2.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-35	<0.01	.75	.34	<0.3	5.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-36	<0.01	3.1	.48	<0.3	.38	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-37	<0.01	6.0	.70	<0.3	1.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-38	<0.01	6.0	.44	<0.3	2.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-39	<0.01	5.5	.57	<0.3	4.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.5

CONSOLIDATED EP TOXICITY RESULTS FOR "BETWEEN-SITE" SHREDDER SCRUBBERS WASTE

	EP CONTAMINANTS (mg/L)													
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
SS-1	.03	25	.29	<.3	.88	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-2	.03	.70	.31	<.3	6.8	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-3	.03	6.6	.16	<.3	<.3	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-4	.05	1.1	<.02	.5	<.3	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-5	.03	22	.73	<.3	5.4	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-6	.03	29	.11	<.3	.44	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-7	.03	26	.51	<.3	4.4	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-8	.03	15	.07	<.3	.37	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-9	.03	26	.29	<.3	2.3	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-10	.03	19	<.02	<.3	1.3	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.5

CONSOLIDATED EP TOXICITY RESULTS FOR "BETWEEN-SITE" SHREDDER SCRUBBERS WASTE

EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
SS-11	.03	55	<.02	<.3	1.5	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-12	.03	12	.41	<.3	3.4	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-13	.03	28	.67	<.3	1.6	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-14	.03	19	.23	<.3	1.6	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-15	.03	36	.66	<.3	4.0	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-16	.03	24	.14	<.3	.30	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-17	.03	14	.18	<.3	.34	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-18	.03	15	.54	<.3	8.1	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-19	.03	55	<.02	<.3	1.1	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1
SS-20	.03	18	.48	<.3	.34	<.01	<.01	<.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.5

CONSOLIDATED EP TOXICITY RESULTS FOR "BETWEEN-SITE" SHREDDER SCRUBBERS WASTE

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SS-21	<0.03	140	.38	<0.3	1.4	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SS-22	<0.03	36	.35	<0.3	.98	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SS-23	<0.03	110	.25	<0.3	2.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SS-24	<0.03	12	.57	<0.3	4.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SS-25	<0.03	11	.44	<0.3	2.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SS-26	<0.03	16	.51	<0.3	2.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.6

CONSOLIDATED EP TOXICITY RESULTS FOR "WITHIN-SITE" SHREDDER SCRUBBERS WASTE

ISIS Company	EP CONTAMINANTS (mg/L)														
	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
1SS-1	.03	400	<.02	<0.3	.54	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1SS-2	.03	13	<.02	<0.3	.34	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1SS-3	.03	12	.16	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1SS-4	.03	164	.15	<0.3	.37	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1SS-5	.03	28	.25	<0.3	.68	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1SS-6	.03	28	.20	<0.3	<.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1SS-7	.03	73	.10	<0.3	.54	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1SS-8	.03	59	.16	<0.3	.51	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1SS-9	.03	40	.19	<0.3	1.7	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1SS-10	.03	21	<.02	<0.3	.54	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.6

CONSOLIDATED EP TOXICITY RESULTS FOR "WITHIN-SITE" SHREDDER SCRUBBERS WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
1SS-11	.03	14	.48	<0.8	3.4	<0.01	<0.01	<0.02	<.002	<0.04	<1.0	<0.05	<10	<1
1SS-12	.03	30	.41	<0.3	1.0	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1SS-13	.03	13	.86	<0.3	4.4	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1SS-14	.03	8.1	.21	<0.3	.51	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1SS-15	.03	6.2	.11	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1SS-16	.03	3.4	.22	<0.3	8.8	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1SS-17	.03	1.7	<.02	<0.3	.74	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.7

CONSOLIDATED SUMMARY OF EP TOXICITY RESULTS FOR SWEAT FURNACES WASTE

	EP CONTAMINANTS (mg/L)													
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
SW-1	<0.01	140	.30	<0.3	11	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SW-2	<0.01	19	.12	<0.3	34	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SW-3	<0.01	27	.12	<0.3	110	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SW-4	<0.01	2.9	.11	<0.3	12	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SW-5	<0.01	6.1	.22	<0.3	17	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SW-6	<0.01	18	.02	<0.3	26	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SW-7	<0.01	17	.75	<0.3	40	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SW-8	<0.01	10	.30	<0.3	30	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SW-9	<0.03	21	1.2	<0.3	130	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
SW-10	<0.03	18	.33	<0.3	31	<0.01	<0.02	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.7

CONSOLIDATED SUMMARY OF EP TOXICITY RESULTS FOR SWEAT FURNACES WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SW-11	<0.01	21	.33	<0.3	16	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-12	<0.01	14	.28	<0.3	44	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-13	<0.01	23	.68	<0.3	73	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-14	<0.01	6.5	<0.02	<0.3	1.6	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-15	<0.01	19	.46	<0.3	19	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-16	<0.01	6.9	.27	0.4	12	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-17	<0.01	71	2.1	<0.3	16	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-18	<0.01	8.4	.05	<0.3	9.8	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-19	<0.01	8.3	.29	<0.3	16	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-20	<0.01	29	.32	<0.3	9.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.7

CONSOLIDATED SUMMARY OF EP TOXICITY RESULTS FOR SWEAT FURNACES WASTE

	EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
SW-21	<0.01	6.1	.45	<0.3	54	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-22	<0.01	15	.20	<0.4	23	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-23	<0.01	4.6	<.02	<0.3	2.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-24	<0.01	50	.05	<0.3	23	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-25	<0.03	17	.34	<0.3	140	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-26	<0.01	21	<.02	<0.3	15	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-27	<0.01	3.8	.07	<0.3	540	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-28	<0.01	18	.48	<0.3	39	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.8

CONSOLIDATED SUMMARY OF EP TOXICITY RESULTS FOR REPLICATE SAMPLES

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
B-18A	<0.01	1.3	0.05	<0.3	1.1	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
*B-18B	<0.01	1.1	0.05	<0.3	1.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
B-49A	<0.01	2.9	0.34	0.3	3.9	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
*B-49B	<0.01	2.7	0.34	<0.3	0.60	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-22A	<0.01	3.8	0.48	<0.3	1.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
*S-22B	<0.01	17	0.48	<0.3	1.2	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
S-40A	<0.01	12	0.40	<0.3	13	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
*S-40B	<0.01	1.4	0.80	<0.3	8.4	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-1	<0.01	2.0	0.37	<0.3	0.59	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
*1S-2	<0.01	24	0.36	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.8

CONSOLIDATED SUMMARY OF EP TOXICITY RESULTS FOR REPLICATE SAMPLES

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
1S-3	<0.01	32	0.36	<0.3	0.30	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
*1S-4	<0.01	32	0.40	<0.3	0.67	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
1S-5	<0.01	2.4	0.44	<0.3	0.80	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
*1S-6	<0.01	2.5	0.53	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
SW-19A	<0.01	8.2	0.28	<0.3	16	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
*SW-19B	<0.01	8.4	0.30	<0.3	16	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
UCL	.01	13.2	.383	.3	7.74	.01	.01	.05	<.002	<0.04	<1.0	<0.05	<10	<1	
*UCL	.01	16.5	.516	.3	6.61	.01	.01	.05	<.002	<0.04	<1.0	<0.05	<10	<1	

TABLE 5.9

CONSOLIDATED SUMMARY OF EP TOXICITY RESULTS FOR SITE-SPECIFIC LONG-TERM VARIATION AT A SHREDDING OPERATION

EP CONTAMINANTS (mg/L)														
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP
1S-24	<0.01	1.5	.30	<0.3	<0.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
S-30	<0.01	30	.37	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-1	<0.01	2.0	.37	<0.3	.59	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-2	<0.01	24	.36	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-3	<0.01	32	.36	<0.3	.25	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-4	<0.01	32	.40	<0.3	.67	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-5	<0.01	2.4	.44	<0.3	.80	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-6	<0.01	2.5	.53	<0.3	1.3	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1
1S-23	<0.01	3.0	.33	<0.3	.50	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1

TABLE 5.9

CONSOLIDATED SUMMARY OF EP TOXICITY RESULTS FOR SITE-SPECIFIC LONG-TERM VARIATION AT A SHREDDING OPERATION

EP CONTAMINANTS (mg/L)															
ISIS Company	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	E	L	M	T	2,4-D	2,4,5-TP	
$\bar{x}$	<.01	4.74	.383	0.3	.77	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	
s	0	9.65	.067	0	.424	0	0	0	0	0	0	0	0	0	
UCL	<.01	9.5	.416	0.3	.984	<0.01	<0.01	<0.05	<.002	<0.04	<1.0	<0.05	<10	<1	

VI. ADDITIONAL FINDINGS

Discussion of the results of this study will be divided into the following categories:

A. "Between-site" vs. "Within-site" Variation

B. Replicate Samples

C. Site-Specific Long-Term Variation at a Shredding Operation

D. Homogeneity of Sample Results

A. "Between-site" vs. "Within-site" Variation

As a means of insuring that samples mailed into the laboratory for analysis ("between-site" data) were representative, additional sampling was conducted by experienced environmental professionals, with subsequent analysis in the same laboratory ("within-site" data). It is clear from the results of this effort that there is no statistically significant difference between the two procedures. In fact, the "between-site" or "mailing" procedure tends to give slightly higher concentrations than sampling conducted by experienced environmental professionals. This may be due to strict adherence of Clayton personnel to acquiring integrated samples, or just a "blip" in the data base.

Additionally, this "between-site" vs. "within-site" effort was conducted to determine if there was any significant variation in contaminant concentrations over time. The "within-site" procedure provides a time-series analysis to complement the cross-sectional analysis of the "between-site" procedure. Based upon the data, there was no significant variation over time in the concentrations of contaminants.

B. Replicate Samples

Although not part of the contracted effort of this study, CEC acquired replicate samples during the conduct of this study. Some were due to the enthusiasm and "willingness-to-cooperate" of ISIS members who simply took duplicate samples and sent them to the CEC laboratory for analysis. Additionally CEC deliberately structured one of the field site surveys so that two persons performed "separate" field studies at the same site. The results of these efforts indicate that the sampling and analytical protocol provides reproducible results based upon averages or upper confidence levels.

C. Site-Specific Long-Term Variation at a Shredding Operation

Again, although not part of the contracted effort of this study, CEC acquired samples over a "long" (3-month) period of time at one site to qualitatively ascertain the variation in results which might occur over time. Long term fluctuations of no more than 10^2 would be expected at a given shredder.

D. Homogeneity of Sample Results

It should also be noted that, in general, the data per scrap processing waste category are much more homogeneous than originally expected. Initially, it was expected that results for a given contaminant per waste category would routinely vary by greater than a factor of 10,000, and this study has shown the factor of variation to generally be much less than 10,000. Because the data are much more homogeneous than originally expected, it is likely that more waste samples were analyzed than were necessary for the various scrap processing waste categories, especially balers and shears, to support statistically valid (95%) conclusions.

TYPICAL MATERIALS PROCESSED BY BALERS

#2 tin

aluminum

misc. scrap

aluminum cans and sheet metal

light iron

white goods

misc. copper

auto bodies and fenders

misc. galvanized

fencing

wire

factory clips

304 stainless steel

concrete reinforcing wire

ATYPICAL MATERIALS PROCESSED BY BALERS

radiators exclusively

TYPICAL MATERIALS PROCESSED BY SHEARS

misc. steel

tin

pipe

farm machinery

iron scrap

auto parts

appliances

brass and copper pipe

hot water tanks, boiler tanks

industrial scrap iron

misc. aluminum

reinforcing rods

railroad scrap

#2 heavy melting steel

light sheet iron

truck frames

railroad cars

coal mine cars

car shock absorbers

TYPICAL MATERIALS PROCESSED BY SHREDDERS

autos

white goods

sheet iron

hot water tanks

tin

grab pile

autos with seats and motors

TYPICAL MATERIALS PROCESSED BY SWEAT FURNACES

irony aluminum

auto motor block aluminum

aluminum spills, general yard breakage

dross

contaminated sheet aluminum

ballmill tailings

zinc alloy die cast blocks

skim chunks

HERSCHEL CUTLER
Executive Director

INSTITUTE OF SCRAP IRON & STEEL, INC.
1627 K STREET, NORTHWEST
WASHINGTON, D. C. 20006

AREA CODE 202
TEL. 466-4050

ATTACHMENT 5

Best Available Copy

CROSS/TESSITORE & ASSOCIATES, P.A.
4759 S. CONWAY ROAD, SUITE D
ORLANDO, FLORIDA 32812
305/851-1484

DER
MAR 20 1985
BAQM

March 21, 1985

Mr. Ralph Maloy, P.E.
Industrial Waste Engineering
FDER-St. Johns River District
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803

SUBJECT: OSJ-IW-85-0093
Brevard County, York Doliner & Company

Dear Mr. Maloy:

Enclosed are copies of letters from Texas Shredder Parts, Inc., and Newell Industries, Inc., in connection with subject source.

Sincerely,

Frank L. Cross, Jr., P.E.
President

FLC:kim

Enc.a/s

cc: Mr. Clair Fancy
Mr. Dan Smith

Texas Shredder Parts, Inc.

10622 SENTINEL
SAN ANTONIO. TEXAS 78217
512/654-1098

March 13, 1985

Mr. Dan Smith
Yorke DolinerCo.
P. O. Box 1659
Cocoa, Florida 32922

Dear Dan:

For your information, all conveyors supplied by Texas Shredder Parts for your new shredder system shall have belt speeds of 250 feet per minute.

Please let us know if you require additional information.

Yours truly,

Jim Schwartz

Jim Schwartz

JS/ss

Best Available Copy

Newell Industries Inc.

March 13, 1984

Yorke-Doliner Company
P. O. Box 2053
Daytona Beach, Florida 32015

Attn: Mr. Dan Smith

Dear Dan:

With reference to our recent telephone conversation about the production capacity of our 80104 TBD machine, it has been our experience that this machine will average approximately 65 tons per hour of shredded production. This translates into approximately 65 car bodies per hour or a mixture of car bodies and other shreddable material.

You also asked about the water recirculation system and if there was any build up of oil in the water. We have seven of these wet systems operating through out the world and this has not occurred in any of these systems.

I hope this answers your questions. Please do not hesitate to contact me if you have any other questions or comments.

Sincerely,

Paul D. Popovich
Vice-President

530 Steves Ave. P.O. Box 10629 □ San Antonio, Texas 78210 □ (512)227-9090