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08-38133

RIVER METALS RECYCLING LLC

ISO 9001:2000
ISO 14001:2004
Certified

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Chemetco
SF Hect

June 25, 2008

Via Federal Express

Mr. Erin J. Rednour, Remedial Project Manager
Illinois Environmental Protection Agency
Bureau of Land
Division of Remediation Management
Mailcode 24
P.O. Box 19276
Springfield, IL 62794-9276

IEPA-BOL-FSRS
JUN 26 2008
RECEIVED

Techlaw
Attn: Ann Anderson
205 West Wacker Drive
Suite 1622
Chicago, IL 60606

FILE COPY

RECEIVED
JUN 26 2008
IEPA-BOL-FSRS

Re: Chemetco Site
1198010003-Madison County
ILD 048 843 809
Response to February 22, 2008 Information Request by
River Metals Recycling LLC and Request to Delete
River Metals Recycling LLC from IEPA's PRP List

Dear Mr. Rednour and Ms. Anderson:

This confirms our receipt of an extension through June 27, 2008, in which to respond to the February 22, 2008 Illinois EPA Information Request concerning Chemetco, Inc. in Hartford, Illinois.

A. Request for Deletion from IEPA's PRP List.

As described in more detail in the responses provided herein, River Metals Recycling LLC ("RMR") is exempt from liability under CERCLA, and is not liable under RCRA, TSCA, Illinois law or any other law for its scrap metal recycling activities (see, e.g., 42 U.S.C. §9627). RMR at no time arranged for the transport or disposal of any type of waste or a hazardous substance at Chemetco. RMR only sold valuable, recyclable scrap nonferrous metal to Chemetco for its use in manufacturing new products. Based upon its responses herein and upon 42 U.S.C. §9627 as well as the useful product defense, RMR requests that the Agency delete River Metals Recycling LLC from its PRP list and from any future investigations and response actions related to the Chemetco Site.

Jim Becker
President

2136 Chamber Center Drive • Ft. Mitchell, KY 41017
Phone 859.292.8400 • Fax 859.292.8495

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B. General Objections to All Requests.

RMR denies any and all liability pursuant to CERCLA, RCRA, TSCA, Illinois law, or any other law. RMR objects to any information request that seeks documents privileged by attorney-client, attorney work product or any other privilege.

RMR submits this response subject to a general objection that the Request seeks information beyond that which is required to be disclosed pursuant to Section 4(e) of the Illinois Environmental Protection Act and Section 104 (e) of CERCLA. The Request seeks information unrelated to the identification, nature and quantity of material which have been or are generated, treated, stored, or disposed of at, or transported to, a facility. RMR further objects to the extent the Request infringes upon the attorney-client and/or attorney-work product privileges. RMR reserves the right to supplement its response should additional or different information become available to it at a later date. Nothing in this response is or shall be deemed to be a waiver of these objections nor should anything stated herein be deemed an admission that RMR generated any hazardous substances which may be involved in any alleged release or threat of a release at the Site. RMR expressly reserves any and all objections it may have to any person or entitles' ability to obtain or use the information contained herein as an admission in any matter in which RMR is or may become a party.

RMR objects in general to the Instructions in the Request as they are beyond the scope of information required to be submitted pursuant to section 4(e) of the Illinois Act and 104(e) of CERCLA. In addition, RMR raises the following specific objections to the Instructions:

Instruction 3: Provide the Best Information Available. RMR objects to this instruction to the extent that it requires submission of information of documents not in the possession of RMR or not based on RMR's personal knowledge, and to the extent it infringes on RMR's attorney-client and/or attorney work product privileges.

Instruction 5: Continuing Obligation to Provide/Correct Information. While RMR reserves the right to supplement its response should additional or different information become available to it at a later date RMR objects to this instruction, as it purports to require RMR to submit a supplemental response.

Without waiving any of the foregoing objections, RMR responds to the Request as follows:

Chemetco operated from about 1970 until November 1, 2001. Because of the thirty years of operations at Chemetco, the Agency's information request should be sent to all appropriate potentially responsible parties, and not the smaller group receiving this Information Request.

RMR sold scrap metal to Chemetco for a very short time, approximately 1-1/2 years. The responses, below, reflect RMR's brief customer relationship with Chemetco.

C. Responses to the Information Requests in Attachment B.

RMR responds as follows to each Information Request. Please refer to the referenced Tab for associated documents.

1. Identify all person(s) answering this Information Request on behalf of the Respondent.

Response: Mr. M. Damp
Mr. A. Couch
Mr. E. Logsdon

Persons identified may be contacted through counsel, C. Bedell, Esq. at 513-621-8770.

2. Identify all person(s) consulted in the preparation of the answers to these questions.

Response: Mr. M. Damp
Mr. A. Crouch
Mr. E. Logsdon
Mr. G. Gromek
Mr. B. Holden, P.E.
Mr. M. Carr
Mr. M. Oliveira
Mr. G. Muzzillo
Mr. T. Rath
Ms. M. Colebrook
J. Nijman, Esq.

Persons identified may be contacted through counsel, C. Bedell, Esq. at 513-621-8770.

3. Identify the parent corporation and all subsidiaries of the Respondent.

Response: RMR has no subsidiaries. The parent corporation of RMR is The David J. Joseph Company.

4. Identify all documents consulted, examined, or referred to in the preparation of the answers to these questions, and provide copies of all such documents.

   Response: RMR objects to Request 4 as overbroad and burdensome to the extent it requires the identity of all documents consulted determined to have no relation to the Chemetco Site. We have excluded, as duplicative, information we received from IEPA in response to our FIOA request. Documents responsive to Request No. 16 are attached at Tab 2. Without waiving its objection, see documents located at Tab 1.

   (a) RMR SREA file: letter from RMR to Chemetco; letter from Chemetco to RMR confirming its environmental compliance.

   (b) RMR SAI shipment spreadsheet

   (c) ISRI "Scrap Specifications Circular 1998"

   (d) Summary report from Access Database

   (e) River Metals Recycling LLC, "Environmental, Safety & Health Policy Manual" (5/06/1999 as revised); RMR Quality and Environmental Management Policy; Permits

   (f) Copper statistics and market information from several sources

5. If you have reason to believe that there may be persons able to provide a more detailed or complete response to any question or who may be able to provide additional responsive documents, identify such persons. Provide the current or most recent known address and telephone number of each individual identified.

   Response: Because of the length of operations of Chemetco, the Agency's information request should be sent to all appropriate entities identified by the Agency or by others as PRPs. We assume that the Agency has investigated the owners and operators of Chemetco.

6. Describe your company's business activities which resulted in sending material to the Chemetco Site.

Response: RMR was incorporated in July, 1998. During the short period of its relationship with Chemetco, RMR's business was to purchase scrap nonferrous metal, process it (e.g., sort, bale) and sell it for material feedstock to Chemetco. RMR also purchased scrap metal from Chemetco.

7. Identify all persons having knowledge or information about the generation, transportation to, treatment, disposal, or other handling of hazardous substances (including materials containing lead, cadmium, boron, copper, iron, manganese, mercury, nickel, selenium, sulfate, zinc or other heavy metals), by you, your contractors, subcontractors or by prior owners and/operators which relates or may relate to the Chemetco Site, including but not limited to persons who arranged for disposal of or transported hazardous substances to the Chemetco Site.

   Response: Not applicable. At no time did RMR arrange for the transport or disposal of hazardous substances or waste at Chemetco.

8. Describe your policies and procedures for the handling, treatment, storage and/or disposal of hazardous substances encountered in the course of your activities at the Site. Provide copies of records relating to this policy as well as to its implementation.

   Response: Not applicable. At no time did RMR conduct "activities at the Site." At no time did RMR arrange for the "handling, treatment, storage and/or disposal of hazardous substances" at the Site.

9. Identify all individuals who currently have, or who previously had, responsibility for your company's environmental matters (e.g., responsibility for the disposal, treatment, storage, recycling, or sale of your company's wastes, scrap materials and/or recyclable materials). For each, indicate the dates of the individual's employment and the nature of the individual's duties and responsibilities, and a description of the type of environmental information that the individual would possess.

   Response: Mr. Holden has been responsible for all of RMR's environmental matters and its environmental management systems since RMR was formed in July, 1998. He would have environmental information, such as operating

permits, for RMR. As to sales of recyclable nonferrous scrap, see Response No. 18(a), below.

10. Provide all information in your possession that shows that you were in compliance with applicable federal environmental regulations or standards regarding the recycling of materials, particularly Section 127 of CERCLA, 42 U.S.C. 9627, sent to the Chemetco Site.

Response: RMR objects to Request No. 10 to the extent it calls for legal conclusion and argument. Without waiving its objection, RMR has had an environmental management system since its formation in July, 1998. RMR has all required operating and environmental permits. During the short period it shipped recyclable materials to Chemetco, it did not receive any notices of violations of applicable federal, state or local environmental regulations or standards regarding the recycling of materials sent to the Chemetco site, including Section 127 of CERCLA, 42 U.S.C. 9672. RMR's policy is to be in compliance with all applicable environmental regulations or standards. It is currently ISO 14001 certified. The scrap metal sold to Chemetco was of commercial specification grade, and a market existed for the recyclable material. RMR continued to sell the scrap metal to other purchasers after Chemetco. The material was used by Chemetco to replace virgin metal and/or used to make a new product. (See Responses to Request No. 21, below). Chemetco, on request of RMR, assured RMR of its compliance with applicable requirements. (See Response to Request No. 25, below).

11. Was any shipment of material sent to the Chemetco Site ever refused and/or returned? If so, describe this event in detail, including its cause and outcome.

Response: We have no recollection that any RMR shipment of scrap metal sent to Chemetco was refused and/or returned.

12. Was any material shipment sent to the Chemetco Site ever subject of a change in payment terms because of increase of handling costs or any problem with the material sent to the Site? If so, describe this event in detail, including its cause and outcome.

Response: We have no recollection that RMR's shipment of scrap metal to Chemetco was the subject of a change in payment terms. It was common practice to invoice based on shipped weights but be paid based on mill weights.

13. Provide copies of the Material Data Safety Sheets for any materials disposed of or shipped to or stored at the Chemetco Site.

Response: Not applicable. At no time did RMR dispose of or store any materials or waste at Chemetco. RMR only shipped scrap metal that had been purchased by Chemetco as a substitute for virgin metal.

14. Have you ever received a formal Information Request [similar to this one] from local, state or federal government concerning the recycling of materials at other scrap yards? Provide a copy of the Request and your response.

Response: We have no recollection of any such Information Requests.

15. Specify whether your company was ever the subject of legal action by any party, including the government, by virtue of your transportation of hazardous substances or other waste materials to the Site. If so, describe in detail and provide any records associated with such legal action.

Response: Not applicable. At no time did RMR arrange for the transport or disposal of hazardous substances or other waste materials at Chemetco.

16. Identify all liability insurance policies held by Respondent from the period you transported materials or other waste materials to the Site. In identifying such policies, state the name and address of each insurer and of the insured, the amount of coverage under each policy, the commencement and expiration date for each policy, whether or not the policy contains a "pollution exclusion" clause, and whether the policy covers or excludes sudden, non-sudden, or both types of accidents. Provide complete copies of all relevant insurance policies.

Response: At no time did RMR transport "other waste materials" to Chemetco. RMR objects to Request No. 16 on the grounds that it goes beyond the requirements of CERCLA. Without waiving its objection, RMR states that, if required and appropriate (given its lack of liability in light of its sale of scrap metal for recycling), RMR will provide relevant copies of insurance policies, which are voluminous and which contain pollution exclusions, upon request. A summary of its insurance policies is provided at Tab 2.

17. List all USEPA, RCRA and State of Illinois Identification Number(s) of your company.

Response: None for Illinois. For RMR's former Lexington Rd., Louisville, KY facility, there was an EPA number of KYD 024067977. For RMR's Owensboro, KY location: KYR 000044115. For RMR's Xenia, OH location: OHR 000130302.

18. Identify all transactions or agreements for disposal in which your company disposed of, arranged for the disposal or treatment of, transported, or arranged for the transportation of any material or item, scrap materials, waste materials to the Site (including but not limited to drosses, slags, sludges, powders, or combustible materials). In addition:

Response: At no time did RMR enter transactions, agreements or arrange for the disposal, transport, or treatment of any waste or waste materials, including but not limited to drosses, slags, sludges, powders, or combustible materials. As

provided elsewhere in this Response, RMR sold scrap metal to, and purchased scrap metal from, Chemetco for a short period.

(a) Identify whether the materials were sent pursuant to a contractual arrangement and, if so, describe the terms of that arrangement.

Response: RMR typically assigned a contract number to each sale or purchase of scrap metal. RMR could not locate a copy of a contract with Chemetco, therefore, we are unable to describe the contractual terms of the sale or purchase of scrap metal.

(b) Identify whether the materials were delivered directly to the Chemetco site or were trans-shipped there from another intermediate delivery point. If applicable, describe each such delivery point.

Response: RMR shipped nonferrous scrap metal directly to Chemetco by common carrier.

(c) Identify the persons involved in sending such material to the Site.

Response: Mitch Damp was the RMR employee responsible for sales of nonferrous scrap metal to, and purchase of scrap metal from, Chemetco during the relevant period.

(d) State the dates on which each such persons may have transported or delivered for transport such material.

Response: RMR arranged for the sale of scrap metal to Chemetco during a short period as reflected in Tab 1.

(e) Describe the source of or the process that produced the materials.

Response: RMR would purchase nonferrous scrap metal from various entities. RMR would sort, grade, bale, shred, if applicable, and weigh the scrap metal, as appropriate, then ship it to a consumer who had purchased it, such as Chemetco. RMR did not melt the scrap.

(f) Describe the materials or items, including type of material, chemical content, physical state, quantity by volume and weight, and other characteristics.

Response: At no time did RMR sell liquid scrap metal to Chemetco; RMR only sold solid scrap metal. Chemetco purchased specification-grade copper and specification-grade brass scrap metal from RMR, such as brass radiators or Ocean, #2 Copper or Birch Cliff, #1 Copper or Berry/Candy, and Copper-bearing shredded electric motors. Very small quantities of specification-grade leaded tin or straight tin were sold infrequently. See Tab 1.

(g) Describe the nature, including the chemical content, characteristics, physical state (e.g., solid, liquid) and quantity (volume and weight) of all hazardous substances involved in each such arrangement.

Response: Not applicable. At no time did RMR arrange for the sale, transport, treatment, or disposal of any hazardous substance.

(h) State whether any of the material was ever tested by your company and if so, whether the hazardous substances exhibited any of the characteristics of a hazardous waste identified in 35 Illinois Administrative Code 721, Subpart C or 40 C.F.R. 261, Subpart C.

Response: Not applicable. The scrap metal was not intended to be discarded, nor was it a special waste, solid waste, hazardous waste, or a hazardous substance. Occasionally, RMR performed testing on its scrap metal to determine its grade.

(i) Describe what was done to materials once they were brought to the Chemetco Site, including any further processing of the materials.

Response: Chemetco was a consumer of nonferrous scrap metal, and it produced new copper anodes and cathodes using scrap metal as feedstock. In response to RMR's letter requesting that Chemetco confirm its compliance with all applicable environmental laws, Chemetco stated in its March 10, 2000 letter from Chemetco's environmental manager, Heather Young, "Chemetco recycles all the materials sent to it, does not burn the materials for fuel or energy recovery, does not add hazardous waste to the recyclable materials and handles the recyclable materials in accordance with customary industry practices." See Letter from Chemetco at Tab 1.

(j) Describe as precisely as possible any and all of the locations at which each hazardous material involved in such transactions actually was disposed or treated.

Response: Not applicable. At no time did RMR arrange for the transport, treatment, or disposal of hazardous material at Chemetco.

(k) Describe any measures taken by the Respondent prior to or during each arrangement to determine the compliance history of the Site where the treatment or disposal would actually take place.

Response: Not applicable. At no time did RMR arrange for the treatment or disposal of any waste or hazardous substances at Chemetco. RMR objects to the unwarranted assumption in the question that measures should be taken for "each arrangement." Neither the law nor the legislative history to SREA support that assumption. However, RMR sent a letter to Chemetco in February 2000, requesting Chemetco ensure its compliance with all applicable environmental laws. Chemetco responded in its March 10, 2000, letter, assuring RMR of its compliance. See Tab 1.

19. Describe in general detail the types of material that your company arranged for the transportation of or transported for recycling at Chemetco. In your response, please provide answers to the following questions:

(a) Give the generic name of each type of materials shipped to Chemetco (e.g., scrap metal, batteries, scrap paper, scrap plastic, scrap textile (scrap material), scrap electronic equipment, etc.).

Response: See Response No. 18, above, and Tab 1. RMR sold scrap nonferrous metal to Chemetco for a short period.

(b) Specify the quantity (volume and weight) of materials your company sent to Chemetco for recycling on a year by year basis.

Response: See Response No. 18, above, and Tab 1.

20. Provide any additional information and all documents that you believe relate to the type, nature and characteristics of the materials your company sent to the Chemetco Site.

Response: Not applicable.

Questions and Requests for Documents Related to Scrap Metal

21. For the following questions which relate to transactions involving scrap metals, provide the requested information, and also provide copies of any documents that contain any information that is related to the response:

(a) List the years in which your company sent scrap metal to Chemetco and/or broker for recycling. In this list state the type and approximate quantity, volume and weight of scrap metal sent for each year.

Response: 1999, 2000. Please see Tab 1.

(b) Did a market exist for the scrap metal listed in your response to 21 (a) above? If so, describe the nature of such a market at the time of the transaction (possible uses, possible consumers, etc.) and the source of that commercial specification grade (e.g., Institute of Scrap Recycling Industries, Inc. (ISRI), Department of Defense, or wherever your company would find the grade published).

Response: Yes, Chemetco was a competitive consumer in the scrap metal market. Scrap was sold to Chemetco under a variety of commercial specification grades. See Response to Question 21 (c), below, and see Tab 1.

(c) What commercial specification grade did the scrap metal listed in your response to question 21(a) meet? Identify/list the commercial specification grades that each scrap metal identified in 21(a) met.

Response: Tab 1 lists the commonly used material description grade. The ISRI grades include:

Berry Candy – No. 1 Copper
Birch – No. 2 Copper
Drove – Copper-bearing Scrap
Honey – Yellow Brass
Ocean – Mixed unsweated auto radiators

(d) At the time of the transaction(s) what was the intended disposition of the scrap metal listed in your response to question 21(a)? Did this include burning as fuel, or for energy recovery, or incineration?

Response: RMR sold scrap metal that was expected to be used in place of virgin metal and/or used to make a new product. RMR did not at any time sell scrap metal with the intent that it be discarded or burned for fuel, energy recovery, or incineration. In fact, Chemetco's environmental manager confirmed to RMR in writing that "Chemetco recycles all the materials sent to it, does not burn the materials for fuel or energy

recovery, does not add hazardous waste to the recyclable materials and handles the recycle materials in accordance with customary industry practices." See Tab 1.

(e) After sale, transfer, delivery, or disposal, what portion of the scrap metal listed in your response to question 21(a) was to be made available for use as a feedstock for manufacturing of new saleable products? Explain how the portion identified in this answer was derived or calculated.

Response: After sale, all of the scrap metal sold was expected to be used to replace virgin metal and/or used to make a new product based on RMR's knowledge of Chemetco's business and the information contained in the letter from Chemetco's environmental manager referenced in Response No. 21(d), above.

(f) Could the scrap metal listed in your response to question 21(a) have been used as a replacement or substitute for a virgin raw material? If so, provide details.

Response: Yes. It is well known and common knowledge that scrap copper is used as a replacement or substitute for virgin copper. See, various market reports at Tab 1, including, e.g., USGS, "Copper Statistics and Information," and USEPA, "EPA Office of Compliance Sector Notebook Project–Profile of the Nonferrous Metals Industry." All scrap grades sold by RMR to Chemetco were also used as replacement for virgin raw materials.

(g) Could any products made from the scrap metal listed in your response to question 21(a) have been used as a replacement or substitute for a product made, in whole or in part, from a virgin raw material? If so, provide details.

Response: Yes. See Tab 1.

(h) Did your company melt the scrap metal listed in your response to question 21(a) before it was transported/delivered to the Site'? If yes, describe the process used for melting the scrap metal. In addition, explain whether Chemetco ever received for processing "dross" or "skimmings" or "sludges" at the Site.

Response: No.

(i) Was the transaction between your company and Chemetco: I) an outright sale; 2) subject to a written or verbal "tolling" agreement between the companies; or 3) reflected the "banking" of the transacted material in a metal account at the request of your company for return or other disposition at a later date?

Response: All transactions between RMR and Chemetco were outright sales.

(j) Describe the source of or the process that produced the materials.

Response: See Response No. 18(e), above. RMR purchased nonferrous scrap. The scrap was sorted, graded, baled, shredded, as appropriate, and weighed for sale.

22. Did any of the scrap material sent to Chemetco contain other material(s) incident to or adhering to the scrap? If so, describe in detail.

Response: No, not to our knowledge.

23. Did any of the material sent to Chemetco contain wire or wiring? If so, was the wire's insulation first stripped before being shipped to or accepted at Chemetco, after being received at the Site, or was the wire not stripped?

Response: Number 2 Copper and shredded motors typically contained metal wire. Number 2 Copper and shredded motors do not contain insulated wire, therefore there is no need to strip the wire because no insulation is present.

24. Did the material shipped include drums or shipping containers? If so, specify the generators of the drums or shipping containers, the capacity of such drums or containers and whether such containers ever contained liquid of any sort. If so, specify the type of liquid and whether such liquids contained wastes of any kind.

Response: During the period in question, the scrap metal generally was shipped loose. Occasionally, the metal was shipped in a cardboard box or in an empty, punctured, 55-gallon steel drum. When RMR shipped scrap metal in a steel drum, the steel drum was always punctured at the bottom to ensure that no liquids of any type could accumulate in the drum. No liquids of any sort would have been included in a punctured drum of scrap metal.

25. Describe all efforts (i.e., site visits) taken by your company to determine what would be done with the scrap metal identified in your response to question 21(a).

Response: After the passage of the Superfund Recycling Equity Act in late 1999, RMR began the process of identifying all scrap metal consumers and sending them letters. In February 2000, letters were sent to RMR's consumers, including Chemetco, requesting that the facility disclose any compliance issues with substantive provisions of federal, state and local laws and regulations or standards related to scrap metal. Chemetco responded in a letter dated March 10, 2000, and signed by its environmental manager, that it handled the recycled scrap metal in full compliance with applicable environmental laws relating to scrap metal. See Tab 1.

26. What steps (e.g., internal procedures, federal, state, and local compliance inquiries) were taken by your company to ensure that Chemetco was in compliance with applicable Federal, State, or local environmental regulations or standards, and any amendments, with respect to scrap metal?

Response: See Response to Question 18(k) and 25, above. See Tab 1.

27. Describe the efforts your company undertook with respect to the management and handling of the scrap metal listed in your response to question 21(a), including the extent to which you complied with customary industry practices current at the time of the transaction designed to minimize contamination of the Site and/or releases of hazardous substances at the Site.

Response: RMR objects to Request 27 to the extent it suggests that recycling of scrap metals contributed to contamination of the Site and/or releases of hazardous substances for which RMR is responsible. Without waiving its objection, RMR used rigorous procedures, such as an inbound scrap source control program that included notices to suppliers, signage, inspections, weighing, radiation detectors, etc., when the scrap metal is purchased. During processing and storage, RMR had all applicable environmental permits, and the facilities were managed by Mr. Holden, P.E. for compliance with company environmental policies and procedures (see Tab 1). The scrap was carefully sorted, graded, baled, shredded, if applicable, packaged, if necessary, and inspected (including radiation detectors) prior to shipping to meet commercial specifications.

28. Provide all information in your possession that shows that your company was in compliance with applicable Federal, State, and local environmental regulations or standards regarding the storage, transport, management, or other activities associated with the recycling of scrap metal listed in your response to question 21(a)

Response: RMR objects to Request No. 28 to the extent it calls for legal conclusion and argument. See Response to Questions No. 10 and 27, above, and Tab 1.

Questions and Request for Documents Related to Batteries

29. For the following questions which relate to transactions involving batteries (lead-acid batteries, nickel-cadmium batteries, reject batteries, lithium, and other spent batteries), provide the requested information, and also provide copies of any documents that contain any information that is related to the response:

(a) Provide an estimate of all shipments of whole batteries sent to the Site on an annual basis. In this list, provide an approximation of number of batteries, type of battery (e.g., lead-acid, nickel-cadmium, lithium, reject, or other) and quantity sent.

Response: At no time did RMR arrange for the transport, handling, disposal or recycling of batteries of any type to be shipped to Chemetco.

(b) What commercial specification grade did the batteries listed in your response to question 29(a) meet? Identify/list the commercial specification grades that each type of battery identified in question 29(a) met.

Response: Not applicable.

(c) Did a market exist for the batteries listed in your response to question 29(a)? If so, describe the nature of such market at the time of the transaction (possible uses, possible consumers, etc.) and the source of that commercial specification grade (e.g., Institute of Scrap Recycling Industries, Inc. (ISRI), Department of Defense, or wherever your company would find the grade published).

Response: Not applicable.

(d) At the time of the transaction, what was the intended disposition of the batteries listed in your response to question 29(a)?

Response: Not applicable.

(e) What portion of the batteries listed in your response to question 29(a) were to be made available for use as a feedstock for manufacturing new saleable products? Explain how the portion identified in this answer was derived or calculated.

Response: Not applicable.

(f) Could the batteries listed in your response to question 29(a) have been used as a replacement or substitute for a virgin raw material? H' so, provide details.

Response: Not applicable.

(g) Could any products to be made from the batteries listed in your response to question 29(a) have been used as a replacement or substitute for a product made, in whole or in part, from a virgin raw material? If so, provide details.

Response: Not applicable.

(h) Was the transaction between your company and Chemetco: 1) an outright sale; 2) subject to a written or verbal "tolling" agreement between the companies; or 3) reflected the "banking" of the transacted material in a

metal account at the request of your company for return or other disposition at a later date.

Response: Not applicable.

(i) What, if any, components of the whole batteries listed in your response to question 29(a) were removed before transport to the Site? Describe what was removed, and where such removal occurred. Include in your description any attempt to remove any hazardous substances (e.g., battery paste/mud, battery acid) from the components.

Response: Not applicable.

(j) Were the components of the whole batteries removed once delivered to the Chemetco Site? Describe the method used to recover the components. Include in your description any attempt to remove any hazardous substances (e.g., battery paste/mud, battery acid) from the components.

Response: Not applicable.

(k) Describe the source of or the process that produced the materials.

Response: Not applicable.

30. Describe all efforts (i.e., site visits) taken by your company to determine what would be done with the batteries identified in your response to question 29(a).

Response: Not applicable.

31. What steps (e.g., internal procedures, federal, state, and local compliance inquiries) were taken by your company to ensure that Chemetco was in compliance with applicable Federal, State, or Local environmental regulations or standards, and any amendments with respect to batteries?

Response: Not applicable.

32. Describe the efforts your company undertook with respect to the management and handling of the batteries listed in your response to question 29(a), including the extent to which you complied with customary industry practices current at the time of the transaction, designed to minimize contamination of the Site and/or releases of hazardous substances at the Chemetco Site.

Response: Not applicable.

33. Provide all information in your possession that shows that you were in compliance with applicable Federal environmental regulations or standards regarding the storage, transport, management, or other activities associated with the recycling of batteries listed in your response to question 29(a).

Response: Not applicable.

34. For the following questions which relate to transactions involving scrap paper, plastic, glass, textiles or rubber (scrap material), provide requested information, and also provide copies of any documents that contain any information that is related to the response:

(a) Provide an estimate of all shipments of scrap paper, plastic, glass, textile or rubber your company sent to Chemetco on an annual basis. In this list, include the type and an estimate of the quantity, volume and weight of scrap material sent to the Site each year.

Response: Not applicable. At no time did RMR arrange for the transport, handling, disposal or recycling of scrap paper, plastic, glass, textiles, or rubber to Chemetco.

(b) What commercial specification grade did the scrap material listed in your response to question 36(a) meet? List/Identify the commercial specification grades that each scrap material identified in 36(a) met.

Response: Not applicable.

(c) Did a market exist for the scrap materials listed in your response to question 34(a) above? If so, describe the nature of such market at the time of the transaction (possible uses, possible consumers, etc.) and the source of that commercial specification grade (e.g., Institute of Scrap Recycling Industries, Inc. (ISRI), Department of Defense, or wherever your company would find the grade published).

Response: Not applicable.

(d) At the time of the transaction(s), what was the intended disposition of the scrap material listed in your response to question 34(a)? Did the intended disposition include burning as a fuel, or for energy recovery or incineration?

Response: Not applicable.

(e) After sale, transfer, delivery, or disposal, what portion of the scrap material listed in your response to question 36(a) was to be made available for use as a feedstock for manufacturing of new saleable products? Explain how the portion identified in this answer was derived or calculated.

Response: Not applicable.

(f) Could the scrap material listed in your response to question 34(a) have been used as a replacement or substitute for a virgin raw material? If so, provide details.

Response: Not applicable.

(g) Could any products to be made from the scrap material listed in your response to question 34(a) have been used as a replacement or substitute for a product made, in whole or in pail, from a virgin raw material? If so, provide details.

Response: Not applicable.

(h) Describe the source of or the process that produced the materials.

Response: Not applicable.

35. Describe all efforts (i.e., site visits) taken by your company to determine what would be done with the scrap material identified in your response to Question 34(a).

Response: Not applicable.

36. What steps (e.g., internal procedures, federal, state, and local compliance inquiries) were taken by your company to ensure that Chemetco was in compliance with applicable Federal, State, or Local environmental regulations or standards, and any amendments with respect to scrap material?

Response: As to the scrap material referenced in Question 34, not applicable.

37. Describe the efforts of your company undertook with respect to the management and handling of the scrap material listed in your response to question 34(a), including the extent to which you complied with customary industry practices current at the time of the transaction designed to minimize contamination of the Site and/or releases of hazardous substances at the Site.

Response: Not applicable.

38. Provide all information in your possession that shows that you were in compliance with applicable Federal environmental regulations or standards regarding the storage, transport, management, or other activities associated with the recycling of scrap material listed in your response to question 34(a).

Response: Not applicable.

Questions and Request for Documents Related to Electrical and Electronic Equipment

39. For the following questions which relate to transactions involving electrical and electronic equipment (e.g., transformers, capacitors, white goods, computers or other electrical equipment), provide the requested information, and also provide

copies of any documents that contain any information that is related to the response:

Response: Not applicable. RMR did not at any time ship power company transformers, capacitors, white goods, computers or electrical equipment. RMR sold some small shredded motors and some small, dry and shredded transformers (for responses related to these items, please see above and Tab 1).

(a) List an estimated number of shipments of electrical and electronic equipment your company sent to Chemetco on an annual basis. In this list, include the following:

i. the type and quantity, volume and weight of electrical and electronic equipment sent;

Response: Not applicable.

ii. the amount paid or collected in connection with the transaction for each category of electrical and electronic equipment and the method of payment.

Response: Not applicable.

(b) At the time of the transaction(s), what was the intended deposition of the electrical and electronic equipment listed in your response to question 39(a)? Did the intended disposition include burning as fuel or for energy recovery or incineration?

Response: Not applicable.

(c) Describe the source of or the process that produced the materials.

Response: Not applicable.

40. Describe all efforts (i.e., site visits) taken by your company to determine what would be done with the electrical and electronic equipment identified in your response to question 39(a).

Response: Not applicable. See Response to Question No. 39.

41. What steps (e.g., internal procedures, federal, state, and local compliance inquiries) were taken by your company to ensure that Chemetco was in compliance with applicable Federal, State, or Local environmental regulations or standards, and any amendments with respect to electrical and electronic equipment?

Response: Not applicable. See Response to Question No. 39.

42. Describe the efforts your company undertook with respect to the management and handling of the electrical and electronic equipment listed in your response to question 39(a), including the extent to which your company complied with customary industry practices current at the time of the transaction designed to minimize contamination of the Site and/or releases of hazardous substances at the Site.

Response: Not applicable. See Response to Question No. 39.

43. Provide all information in your possession that shows that you were in compliance with applicable Federal environmental regulations or standards regarding the storage, transport, management, or other activities associated with the recycling of the electrical and electronic equipment listed in your response to question 39(a).

Response: Not applicable. RMR objects to Request No. 43 to the extent it calls for legal conclusion and argument. See Response to Question No. 39.

Based upon its responses herein and its lack of liability under any federal or state law, RMR respectfully requests that the Agency delete RMR from its PRP list as well as from any future investigations and response actions related to the Chemetco Site. Please contact in-house counsel, Christopher J. Bedell (513-621-8770), should you have any further questions.

Sincerely,

James K. Becker, President
River Metals Recycling LLC

Chemetco
FIRST IN PEOPLE — QUALITY — SERVICE
P.O. Box 67 • Hartford, IL 62048
618-254-4381 • 800-444-5564

RECEIVED
MAR 28 2000
By

March 10, 2000

Mr. Eric Logsdon
River Metals Recycling
515 Monmouth Street, Suite 300
Newport, KY 41071

Re: Superfund Recycling Equity Act

Dear Mr. Logsdon:

Chemetco believes that it is currently in compliance with the substantive provisions of any Federal, State, or local environmental law or regulation, or compliance order or decree issued pursuant thereto, applicable to the handling, processing, reclamation or other management activities associated with recyclable materials. Chemetco recycles all the materials sent to it, does not burn the materials for fuel or energy recovery, does not add hazardous waste to the recyclable materials and manages and handles the recyclable materials in accordance with customary industry practices. Chemetco sells the products it derives from the recycled materials through established markets.

Very truly yours,
CHEMETCO, INC.

By: Heather Young
Environmental Manager
CHEMETCO, INC.

Cc: George von Stamwitz, Armstrong & Teasdale
Joe Leahy, Chemetco Chicago Warehouse

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RIVER METALS
RECYCLING LLC

515 Monmouth Street, Suite 300
Newport, KY 41071-1808
606.292.8400
606.292.8495

February 2, 2000

Admetco, Inc.
Environmental Department
P.O. Box 10089
Fort Wayne, IN 46850

Dear Sir/Madam:

On November 29, 1999, President Clinton signed into law the Superfund Recycling Equity Act (Pub. Law 106-113). This law clarifies Superfund to state that recycling is not disposal and shipping for recycling is not arranging for disposal.

To comply with the requirements of the new law, River Metals Recycling must ensure that your facility is in compliance with substantive (not procedural or administrative) provisions of any federal, state, or local environmental laws or regulations or compliance orders or decrees issued pursuant thereto, applicable to the handling, processing, reclamation, or other management activities associated with scrap metal. See 42 U.S.C.A. §127(c)(5).

In order to satisfy this requirement, River Metals Recycling is requesting a statement from your company documenting or certifying compliance with all necessary environmental laws and regulations. Please provide such statement by February 10, 2000 to the following address:

River Metals Recycling
ATTN: Eric Logsdon
515 Monmouth Street, Suite 300
Newport, KY 41071

Thank you for your assistance in this matter.

Sincerely,

RIVER METALS RECYCLING LLC

Alan J. Crouch
President

AJC/kbb

Superfund letter sent to the following RMR consumers on 2/2/00:

Admetco, Inc. - Ft. Wayne, IN
Al-Chem Aluminum - Coldwater, MI; Shelbyville, TN
All American - Louisville, KY
Annaco - Akron, OH
Ansam Metals - Baltimore, MD
Audubon Metals - Henderson, KY
Behr Iron & Steel - Rockford, IL
Birmingham Steel - Birmingham, AL; Cartersville, GA; Memphis, TN
Camden Castings Center - Camden, TN
Chemetco - Hartford, IL
Colonial Metals - Columbia, PA
Commonwealth Aluminum - Lewisport, KY
Cronimet - Rochester, PA
E & J Metals - Rock Island, IL
Easco Aluminum - Ahoskie, NC
Electric Steel Castings - Indianapolis, IN
ELG Metals - Louisville, KY
Fligeltaub, Henry - Evansville, IN
Freedman, Joseph - Springfield, MA
General Motors - Sharonville, OH
Global Recycling - Setauket, NY
HRH Metals - Moody, AL
Holman, Gus, Co. - Sheboygan, WI
Huron Valley Steel - Belleville, MI
Inco Recycling - Chicago Heights, IL; Irving, TX
J.W. Aluminum - Mt. Holly, SC
Jupiter Aluminum - Hammond, IN
K & F Industries - Indianapolis, IN
Keystone - Mars, PA
Keywell - West Miffin, PA
M. Kimerling and Sons - Birmingham, AL
Kobelco Metal Powder - Seymour, IN
Kornet Ent. - Skokie, IL
Legends - Newark, OH
Louisville Scrap Material - Louisville, KY
M C Aluminum - Columbus, IN
Mervis Trading - St. Louis, MO
Metal Commodities - St. Louis, MO
Metal Exchange - St. Louis, MO
Moskowitz Bros. - Cincinnati, OH
Most - Troy, MO
Newco Metals - Pendleton, IN
Nichols-Homeshield Casting - Davenport, IA
Noblesville Casting - Noblesville, IN
NSA/Southwire - Hawesville, KY
Mercury Waste Solutions, Inc.

RMR
78 letters
List + Copy of letter
Feb 10
Eric at their address

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Oak Hill Foundry - Oak Hill, OH
Ohio Valley Aluminum - Shelbyville, KY
Omega Metals Company - Moraga, CA
Owens Corning - Bellwood, VA
Pechiney World Trade - Greenwich, CT
Peninsula Copper - Hubbell, MI
The Peregrine Company - Louisville, KY
Profile Extrusions - Boonville, IN
Progress Rail Services - Albertville, AL
QRS - New Albany, IN
Quantum Metals - Cincinnati, OH
RSR Corporation - Dallas, TX
Sadoff I & M - Fond Du Lac, WI
Schmidt, Karl, Unisia - Marinette, WI
I. Schumann & Co. - Bedford, OH
SKW - Prospect, KY
Smurfit Recycling - Columbus, OH
J. Solotken & Co. - Indianapolis, IN
Stalloy Metals - Cleveland, OH
Steel of West Virginia - Huntington, WV
Superior Aluminum - New Haven, IN
Trialco - Chicago Heights, IL
J. Trockman & Sons - Evansville, IN
U.S. Pipe - Birmingham, AL
Wabash Alloys - Cleveland, OH; Richmond, VA
Waupaca Foundry - Waupaca, WI
Wilmington Iron & Metal - Wilmington, OH
Wise Metals - Baltimore, MD

The acquisition in fee of these three large parcels within Kodiak NWR now requires the U.S. Fish and Wildlife Service to make payments in lieu of taxes to the Kodiak Island borough in accordance with the Revenue Sharing Act of 1935. The act directs the agency to make such payments based on the fair market value of acquired lands.

The service is currently using the federally approved appraisals estimating fair market value of these three large parcels as the basis for computing the revenue sharing payment to the borough. The borough has rightly challenged the service's determination of fair market value based on the unique circumstances of these acquisitions and the findings made by the trustee council in approving funds for these acquisitions.

A plain reading of the Revenue Sharing Act (which authorizes the Secretary of the Interior to make refuge revenue sharing payments) requires that the determinations of fair market value be made in a manner that "the Secretary considers to be equitable and in the public interest." Clearly, the public interest associated with these unique acquisitions has been well documented in the findings of the trustee council.

The Revenue Sharing Act imposes no legal impediment for the Secretary to make a determination of fair-market value that incorporates the unique circumstances of these acquisitions and the specific findings and actions taken by the trustee council. Thus, I urge the Secretary to review the Kodiak Island borough's appeal to the service's determinations for making revenue sharing payments and do what is fair and equitable as called for by the act.

These are unique circumstances that exist nowhere else in the United States and are limited in Alaska to lands acquired in the Exxon Valdez spill zone with settlement funds. Thus, there should be no consequences for how revenue sharing payments are computed for service acquired lands in other parts of Alaska or throughout the rest of the country.

At this opportunity, upon the passage of another year's funding for the Federal and Indian lands management agencies, I must call to the attention of my colleagues and to the attention of the President of the United States, an issue that troubles me deeply. Over the years, our Government has made commitments to native Americans which it has not kept. Many Americans thought that practice ended with the new, more enlightened self-determination approach to Indian policy. But as one of Alaska's representatives in the Senate, members of the President's staff made personal promises to me just last fall on behalf of the native people of the Chugach region which have not been kept.

In 1971 Congress passed the Alaska Native Claims Settlement Act (ANCSA). The act cleared the way for Alaska native people, including the Chugach natives, to receive title to a small portion of their traditional lands as settlement of their aboriginal land claims. The act also cleared the way for the additional millions of acres to our national parks, wildlife refuges, forests, and wilderness areas. Allowing native people to develop their lands freed them from economic bondage to the Federal Government. No longer would they have to depend exclusively on the benevolence of the Federal Government for hand-outs. They could create their own jobs, generate their own income, and determine their own destiny. But only if they had access to their lands.

Both the administration and the Congress recognized the lands would be virtually valueless if there was no way to get to them. The Claims Act recognized that native lands were to be used for both traditional and economic development purposes. Alaska natives were guaranteed a right of access, under law, to their lands across the vast new parks, refuges, and forests that would be created.

In 1971 and again in 1982, under the terms of the Chugach Native Inc. settlement agreement, the Federal Government made a solemn vow to ensure the Chugach people had access to their aboriginal lands. Now, a quarter of a century later, that commitment has not been fulfilled. Many of the native leaders who worked with me to achieve the landmark Native Land Claims Settlement Act have died after waiting for decades without seeing that promise honored. Last year, Congressman DON YOUNG, chairman of the House Resources Committee, added a provision to the House Interior appropriations bill that required, by a date certain, the Federal Government to live up to the access promises it made to the Chugach natives decades ago. In the conference last fall on the omnibus appropriations bill, the administration spoke passionately and repeatedly against the provision.

Why? They fully admitted the obligation to grant an access easement exists. They acknowledged further that access delayed is access denied and that further delays were harmful to the Chugach people. They opposed the provision on the grounds that it was not necessary since they were going to move with all due haste to finalize the easement before the end of 1999. Katie McGinty, then head of the President's Council on Environmental Quality sat across from me, looked me in the eye, and promised me they would fulfill this long overdue promise before the end of the year.

She even offered to issue a "Presidential proclamation" promising once again to do what had already been promised and promised and promised. My staff worked with OMB on the content of such a proclamation, but I told them it would not be necessary. I would take her at her word and believed the administration would live up to the personal commitment she made to me.

Here we are a year later. Chugach still has not received its easement. Ms. McGinty is gone, but her commitment on behalf of this administration remains. It is now the responsibility of others to ensure the promises she made to me and to Alaska's native people are kept.

Congressman YOUNG's House resources Committee has reported a bill, H.R. 2547, to address this issue legislatively, in the hope of forcing the administration to do what it has promised to do. Senator MURKOWSKI has been tireless in his efforts to get the Federal Government to live up to the promises made to Alaskans concerning access to our State and native lands. I support those efforts.

But I take the time today to say clearly to this administration that the promises made by our Government to the Chugach people for access to their lands—and to me personally as their representative—must be honored. Make no mistake, if the promises made to me by officials in this administration last fall are not lived up to soon, if they oppose the efforts of Congressman YOUNG and Senator MURKOWSKI on this issue, if they continue to obfuscate and "slow roll" this commitment, it will be clear to all that his administration does not perceive the true meaning of Robert Service's memorable phrase: "A promise made is a debt unpaid!"

Mr. LOTT. Mr. President. On behalf of myself and my cosponsor, Minority Leader DASCHLE, I would like to insert in the RECORD a legislative history which describes the purpose of each section of S. 1528, the Superfund Recycling Equity Act of 1999. Throughout the negotiations of this language there has been quite a bit of misrepresentation of the purpose of this bill. I hope this will be useful in clearing the confusion.

Mr. President, I ask unanimous consent that the legislative history be inserted in the RECORD at this point.

LEGISLATIVE HISTORY FOR S. 1528

SECTION 127—RECYCLING TRANSACTIONS

Summary

The Superfund Recycling Equity Act of 1999 (the language of S. 1528) seeks to correct the unintended consequence of CERCLA that actually discourages legitimate recycling. The Act recognizes that recycling is an activity distinct from disposal or treatment, thus sending material for recycling is not the same as arranging for disposal or treatment, and recyclable materials are not a waste. Removing the threat of CERCLA liability for recyclers will encourage more recycling at all levels.

The Act has three major elements. First, it creates a new CERCLA §127 which clarifies liability for recycling transactions. Second, it defines those recycling transactions for which there is no liability by providing that only those persons who can demonstrate that they "arranged for the recycling of recyclable material" as defined by the criteria in section 127(c) through (e) are not liable under section 107(a)(3) or (a)(4). The specific definition of "arranged for recycling" varies depending upon the recyclable material involved. Third, a series of exclusions from the liability clarification are specified such that

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persons who arranged for recycling as defined above may still be liable under CERCLA sections 107(a)(3) or (4) if the party bringing an action against such person can prove one of a number of criteria specified in § 127(f). Lastly, new CERCLA §§ 127(g) through 127(l) clarify several miscellaneous issues regarding the proper application of the liability clarification.

Discussion

§ 127(a)(1) is intended to make it clear that anyone who, subject to the requirements of § 127(b), (c), (d) and (e) arranged for the recycling of recyclable materials is not held liable under §§ 107(a)(3) or (4) of CERCLA. § 127 provides for relief from liability for both retroactive and prospective transactions.

§ 127(a)(2) is intended to preserve the legal defenses that were available to a party prior to enactment of this Act for those materials not covered by either the definition of a recyclable material in § 127(b) or the definition of a recycling transaction within the bill. It is not Congress' intent that the absence of a material or transaction from coverage under this Act create a stigma subjecting such material or transaction to Superfund liability.

§ 127(b)(1) is meant to include the broad spectrum of materials that are recycled and used in place of virgin material feedstocks. Whole scrap tires have been excluded from eligibility under this provision because of concerns about the environmental and health hazards associated with stockpiles of whole scrap tires. Processed tires including material from tires that have been cut or granulated, are eligible for the benefits of this provision.

The term "recyclable materials" is defined to include "minor amounts of material incident to or adhering to the scrap material . . ." This is because in the normal course of scrap processing various recovered materials may be commingled. An appliance may, for example, be run though a shredder that also shreds automobiles. As a result, the metal recovered from the appliance may come into contact with oil that entered the shredded incident to an automobile. Numerous other examples exist.

§ 127(b)(1)(A) is intended to exclude from the definition of recyclable material shipping containers between 30 and 3800 liters capacity which have hazardous substances other than metal bits and pieces in them. The terms "contained in" or "adhering to" do not include any metal alloy, including hazardous substances such as chromium or nickel, that are metallurgically or chemically bonded in the steel to meet appropriate container specifications.

§ 127(b)(1)(B) means that any item of material which contained PCBs at a concentration of more than 50 parts per million ("ppm") at the time of the transaction does not qualify as recyclable material. Material, which previously held a concentration of PCBs in excess of 50 ppm, but has been cleaned to levels below 50 ppm, would still qualify for exempt treatment. Item, in this context, is meant to apply only to a distinct unit of material, not an entire shipment.

This legislation builds a test to determine what are recycling transaction that should be encouraged under the legislation and what are recycling transactions that are really treatment or disposal arrangements cloaked in the mantle of recycling. The test specified in (27(c) applies to transactions involving scrap paper, plastic, glass, textiles, or rubber. Transactions can be a sale to a consuming facility; a return for recycling, whether or not accompanied by a fee; or other similar agreement.

§ 127(c), (d) and (e), the term "or otherwise arranging for the recycling of recyclable material" recognizes that while recyclables have intrinsic value they may not always be sold for a net positive amount. Thus a transaction in which one who arranges for recycling does not receive any remuneration for the material but rather pays an amount, less than the cost of disposal, still qualifies for the protection afforded by this § 127.

A commercial specification grade as referred to in § 127(c)(1), can include specifications as those published by industry trade associations, or other historically or widely utilized specifications are acceptable. It is also recognized that specifications will continue to evolve as market conditions and technologies change.

For purposes of Sec. 127(c)(2), evidence of a market can include, but is not limited to: a third-party published price (including a negative price), a market with more than one buyer or one seller for which there is a documentable price, and a history of trade in the recyclable material.

§ 127(c)(3) means that for a transaction to be deemed arranging for recycling, a substantial portion, but not all, of the recyclable material must have been sold with the intention that the material would be used as a raw material, in place of a virgin material, in the manufacture of a new product. The fact that the recyclable material was not, for some reason beyond the control of the person who arranged for recycling, actually used in the manufacture of a new product should not be evidence that the requirements of this § 127 were not met.

Additionally, no single benchmark or recovery rate is appropriate given variable market conditions, changes in technology, and differences between commodities. Instead, a common sense evaluation of how much of the material is recovered is appropriate. For example, in order to be economically viable as a recycling transaction a relatively high volume of the inbound material is expected to be recovered for feedstocks of relatively low per unit economic value (such as paper or plastic), while a dramatically lower volume of material is expected to be recovered to justify the recycling of a feedstock of very high economic value (such as gold or silver).

It is not necessary that the person who arranged for recycling document that a substantial portion of the recyclable material was actually used to make a new product. Instead, the person need only be prepared to demonstrate that it is common practice for recyclable materials that he handles to be made available for use in the manufacture of a new saleable product. For example, if recyclable stainless steel is sold to a stainless steel smelter, it is presumptive that recycling will occur.

The first part of § 127(c)(4) acknowledges the fact that modern technology has developed to the point were some consuming facilities exclusively utilize recyclable materials as their raw material feedstock and manufacture a product that, had it been made at another facility, may have been manufactured using virgin materials. Thus, the fact that the recyclable material did not directly displace a virgin material as the raw material feedstock should not be evidence that the requirements of § 127 were not met.

Secondary feedstocks may compete both directly and indirectly with virgin or primary feedstocks. In some cases a secondary feedstock can directly substitute for a virgin material in the same manufacturing process. In other cases, however, a secondary feedstock used at a particular manufacturing plant may not be a direct substitute for a virgin feedstock, but the product of that plant competes with a product made elsewhere from virgin material. For example aluminum may be utilized at a given facility using either virgin or secondary feedstocks meeting certain specifications. In this case, the virgin and secondary feedstock materials compete directly. A particular steel mill, however, may only utilize scrap iron and steel as a feedstock because of the design restrictions of the facility. If that mill makes a steel product that competes with the steel product of another mill, which utilizes a virgin feedstock, the conditions of this paragraph have been met. In this example, the two streams of feedstock materials do not directly compete, but the product made from them do. It is the intent of this paragraph that the person be able to demonstrate the general use for which the feedstock material was utilized. It is not the intent that the person show that a specific unit was incorporated into a new product.

Section 127 provides for relief from liability for both retroactive and prospective transactions. However, an additional requirement is placed on prospective transactions in this paragraph such that persons arranging for such transactions take reasonable care to determine the environmental compliance status of the facility to which the recyclable material is being sent. Reasonable care is determined using a variety of factors, of which no one factor is determinant. The clause "not procedural or administrative" is included to protect one who arranges for recycling from losing the protection afforded by § 127 due to a record keeping error, missed deadline or similar infraction by the consuming facility which is out of control of the person arranging for recycling. For transactions occurring prior to, or during the 90 days after, enactment of § 127 the requirements of § 127(c)(5) shall not be considered in determining whether § 127 shall apply.

The person arranging for the transaction must exercise reasonable care at the time of the transaction (i.e., at the time when the buyer and seller reach a meeting of the minds). Should a consuming facility's compliance record indicate past non-compliance with the environmental laws, but at the time the person arranged for the transaction the person exercised reasonable care to determine that the consuming facility was in compliance with all applicable laws, the transaction would qualify for relief under § 127.

In addition, the person must only determine the status of the consuming facility's compliance with laws, regulations, or orders, which directly apply to the handling, processing, reclamation, storage, or other management activity associated with the recyclable materials sent by the person. Thus, for example, a person who arranges for the recycling of scrap metal to a consuming facility would not be responsible for determining the consuming facility's compliance with regulations governing the consuming facilities production of its product, just the consuming facility's compliance with management of the scrap metal as an in-feed material.

It is common practice in the industry for scrap processors to otherwise arrange for the recycling of a secondary material through a broker. The broker chooses to which consuming facility the secondary material will be sold. In such cases, it is the responsibility of the broker, not the original person who entered into the transaction with the broker, to take reasonable care to determine the compliance status of the consuming facility. Likewise, a scrap processor may sell material to a consuming facility which in turn arranges for recycling of all or part of that material to another consuming facility. It is only the responsibility of the scrap processor to inquire into the compliance status of the party he arranged the transaction with, not subsequent parties.

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In determining whether a person exercised reasonable care, the criteria to be applied should be considered in the context of the time of the transaction. Thus, when looking at "the price paid in the recycling transaction" in § 127(c)(5)(A) one should look not only at whether the price bore a reasonable relationship to other transactions for similar materials at the time of the transaction in question but should also take into account the circumstances surrounding the individual transaction such as whether it was part of a long term deal involving significant quantities. In addition, market conditions vary considerably over any given time period for any given commodity. Thus, when determining whether the price paid was reasonable, general market conditions, and variations should be considered.

Congress recognizes that small businesses often have less resources available to them than large businesses. Thus, § 127(c)(5)(B) acknowledges the fact that a small company may be able to determine less information about the consuming facility's operations than a large company. The size of an individual facility may be an important factor in the facility's ability to detect the nature of the consuming facility's operations.

§ 127(c)(6)(c) requires a responsible person who arranges for the recycling of a recyclable material to inquire of the appropriate environmental agencies as to the compliance status of the consuming facility. Federal, State, and local agencies may not respond quickly (or respond at all) to inquiries made regarding a specific facility's compliance record. § 127(c)(5) only requires a person to make *reasonable* inquiries; inquiries need not be made before every transaction. Inquiries need only be made to those agencies having primary responsibilities over environmental matters related to the handling, processing, etc. of the secondary materials involved in the recycling transaction.

§ 127(d)(1)(B) provides that a person who arranges for the recycling of scrap metal must meet all of the criteria set forth in § 127(c) as they relate to scrap metal and be in compliance with federal regulations or standards associated with scrap metal recycling that were in effect at the time of the transaction in question (not regulations promulgated or standards issued sequent to the time of the transaction). In addition, compliance must only be shown with Solid Waste Disposal Act regulations, which were promulgated and came into effect subsequent to enactment of § 127.

Section 127(d)(1)(C) as modified by § 127(d)(2) is not intended to exclude from liability relief such activities as welding, cutting metals with a torch, "sweating" iron from aluminum or other similar activities.

Section 127(d)(3) defines scrap metal using the regulatory definition found at 40 CFR 261.1 The Administrator is given the authority to exclude, by regulation, scrap metals that are determined not to warrant the exclusion from liability. Because § 127 grants relief from liability both prospectively and retrospectively, any exclusion by the Administrator would only apply to transactions occurring after notice, comment and the final promulgation of a rule to such effect.

Persons who arrange for the recycling of spent batteries must meet the criteria specified in § 127(a), in addition to the criteria already discussed above and laid out in § 127(c) for transactions involving scrap paper, plastic, glass, textiles, or rubber.

The act of recovering the valuable components of a battery refers to the breaking (or smelting) of the battery itself in order to reclaim the valuable components of such battery. The generation, transportation, and collection of such batteries by persons who arrange for their recycling is an activity distinct from recovery. Thus, a person who generates, transports, and/or collects a spent battery, but does not themselves break or smelt such battery, is not liable under §§ 107(a)(3) and (4) provided all other requirements set out in this Section are met.

Section 127(e)(2)(A) provides that for spent lead-acid batteries, the party seeking the exemption must show that it met the federal environmental regulations or standards in effect at the time of the transaction in question (not regulations or standards issued subsequent to the time of the transaction).

Persons who arrange for recycling as defined by the criteria specified in sections 127(a)-(e) and discussed above may be liable under CERCLA §§ 107(a)(3) or (4) if the party bringing an action against such a person can demonstrate that one of the exclusions provided for in section 127(f) apply. Thus, the burden is on the government or other complaining party to demonstrate the criteria specified in section 127(f).

§ 127(f)(1)(A) is intended to mean that an "objectively reasonable basis for belief" is not equivalent to the reasonable care standard. The objectively reasonable basis for belief standard is meant to be a more rigorous standard than the reasonable care standard.

§ 127(f)(1)(A)(i) means that in order for the government to show that a recycling transaction should not receive the benefit of § 127, it would have to prove that a person knew that the material would not be recycled. Moreover, it is not necessary that every component of the recyclable material be recycled and actually find its way into a new product in order to meet this requirement.

For the purposes of § 127(f)(1)(A)(ii), smelting, refining, sweating, melting, and other operations which are conducted by a consuming facility for purposes of materials recovery are not considered incineration, nor would they be categorized as burning as fuel or for energy recovery. However, nothing in this bill shall be construed to limit the definition of recycling so as to restrict, inhibit, or otherwise discourage the recovery of energy through pyroprocessing from scrap rubber and other recyclable materials by boilers and industrial furnaces (such as cement kilns).

§ 127(f)(1)(A)(iii) sets forth certain obligations upon one who arranges for a recycling transaction which occurs within the first 90 days after enactment and had an objectively reasonable basis to believe that the consuming facility was not in substantive compliance with environmental laws and regulations. This is the corollary to § 127(c)(5). The clause "not procedural or administrative" is included to protect one who arranges for recycling from losing the protection afforded by § 127 due to record keeping error, missed deadline or similar infraction by the consuming facility which is out of control of the person arranging for recycling. There is no expectation that the person who arranged for recycling would necessarily have carried out any type of records search or made any extensive inquiries of administrative agencies.

The provision in § 127(f)(1)(B) is intended to apply to persons who intentionally add hazardous substances to the recyclable material in order to dispose or otherwise rid themselves of the substance.

§ 127(f)(1)(C) is intended to mean that reasonable care is to be judged based on industry practices and standards at the time of the transaction. Thus, in order to determine if a person failed to exercise reasonable care with respect to the management and handling of the recyclable material, one should look to the usual and customary management and handling practices in the industry at the time of the transaction.

In enacting § 127(i) Congress clearly intends that the exemptions from liability granted by § 127 shall not affect any concluded judicial or administrative action. Concluded action means any lawsuit in which a final judgment has been entered or any administrative action, which has been resolved by consent decree, which has been filed in a court of law and approved by such court. Furthermore, § 127 shall not affect any pending judicial action brought by the United States prior to enactment of this section. Any pending judicial action, whether it was brought in a trial or appellate court, by a private party shall be subject to the grant of relief from liability. For purposes of this section, Congress intends that any third party action or joinder of defendants brought by a private party shall be considered a private party action, regardless of whether or not the original lawsuit was brought by the United States. Additionally, any administrative action brought by any governmental agency but not yet concluded as set forth above, shall be subject to the grant of relief from liability set forth in this § 127.

§ 127(i)(1) preserves the rights of a person to whom § 127(a)(1) does not apply to raise any defenses that might otherwise be raised under CERCLA. This is consistent with the explanation for § 127(a)(2).

By adding § 127(i)(2) Congress intended to make certain that no presumption of liability is created against a person solely because that person is not afforded the relief granted by § 127(a)(1).

Mr. DASCHLE. This past Wednesday—the day we finally produced a fragile budget agreement—marked the 199th anniversary of the first time Congress ever met in Washington, DC. They met that day in what was then an unfinished Capitol. Several times during the negotiations, the thought occurred to me that, if the same people who are running this Congress were in charge back then, the Capitol might still be unfinished.

These negotiations took longer, and were more difficult, than they needed to be. The good news is: We finally have a budget that will keep America moving in the right direction. Many longtime members and observers of Congress say this has been perhaps the most confusing, convoluted budget process they can remember.

There have been a lot of technical questions these last few weeks about accounting methods, economic growth projections, and CBO versus OMB scoring. But the big question—the fundamental question that was at the heart of this budget debate—is quite simple: Are we going to move forward—or backward?

We have chosen, thank goodness, to move forward. This budget continues the progress we've made over the last seven years. It maintains our hard-won fiscal discipline. It invests in America's future. And it honors our values.

This budget will put more teachers in our children's classrooms, and more police on our streets. It will enable us to honor our commitments to our parents, and fulfill America's obligations as a world leader. And, it will enable us to protect our environment and preserve precious wilderness areas for generations not yet born.

I want to thank the Majority Leader, my Democratic colleagues, especially Senator HARRY REID, our whip, and

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Senator ROBERT BYRD, ranking member of the Appropriations Committee. I also want to thank some of my colleagues on the other side of the aisle, particularly Senator STEVENS, chairman of the Appropriations Committee.

In addition, I want to acknowledge and thank President Clinton and Vice President GORE, as well as the incredibly skillful, patient White House negotiating team, especially Chief of Staff John Podesta, Deputy Chief of Staff Sylvia Matthews, OMB Director Jack Lew; Larry Stein and Chris Jennings.

I also want to thank my own staff, and the staff of Appropriations Committee, who have worked many weekends, many late nights, to turn our ideas and debate into a workable budget document.

Finally, I want to acknowledge our dear friend, the late Senator John Chafee. Losing Senator Chafee so suddenly was one of the saddest moments in this difficult year. He embodied what is best about the Senate. He was a reasonable, honorable man who cared deeply about people. Completing the budget process was a major challenge. But in the end, I believe we have produced a budget John Chafee would have approved of.

This budget invests in our children's education - the best investment any nation can make. It maintains our commitment to reduce class size by hiring 100,000 teachers. It contains money to help communities repair old schools and build new ones. It will enable more children to get a Head Start in school, and in life. And it will allow more young people to attend after-school programs where they will be safe, and where they will have responsible adult supervision.

This budget protects Medicare beneficiaries by providing fair payments to the hospitals, clinics, home health care providers and nursing homes they rely on.

This budget will make our communities safer by putting 50,000 more police officers on the street—in addition to the 100,000 who have already been hired—and by investing in youth crime prevention.

This budget will help keep Americans healthy . . . by reducing hunger and malnutrition among pregnant women, infants and young children . . . and by increasing funding for the National Institute of Health and the national Centers for Disease Control.

This budget protects our environment. We took out riders that would have harmed our environment, and put in money to fund the President's Lands Legacy program.

This budget will help working families find affordable housing.

It will help farm and ranch families weather these hard times.

This budget protects our national security . . . by increasing military pay and readiness . . . and by reducing the nuclear threat at home and around the world.

This budget will help us fulfill our responsibilities as the world's only superpower. It provides money to pay our UN arrears and fund the Wye Accord to promote peace to the Middle East. It will also enable us to ease the crushing burden of debt on some of the world's poorest countries, so those nations can begin to invest in their own futures.

At the beginning of the year, our Republican colleagues proposed an $800 billion tax cut. For months, we all heard a lot of debate about what such a huge tax cut would mean. This budget makes it clear. There is no way we could have paid for an $800 billion tax cut without exploding the deficit again, or raiding Medicare, education, and other programs working families depend on.

Instead of moving backwards on taxes, we're moving forward. We're cutting taxes the right way. We're widening the circle of opportunity . . . by extending the R&D tax credit, and other tax credits that stimulate the economy . . . and by empowering people with disabilities by allowing them to maintain their Medicare and Medicaid coverage when they return to work.

There is one other point I want to make about the budget: For every dollar Democrats succeeded in restoring these last few weeks . . . for teachers, and police officers and other critical priorities . . . we have provided a dollar in offsets. Dollar for dollar, every one of our priorities is paid for. If CBO determines that this budget exceeds the caps, the overspending is in the basic budget our Republican colleagues drafted—on their own.

THE UNFINISHED AGENDA

As I said, Mr. President, this budget does move the country in the right direction—but only incrementally. My great regret and frustration with this Congress, is that we have achieved so little beyond this budget.

Look what we are leaving undone! In a year in which gun violence horrified America . . . a year in which gun violence invaded our schools and even a day care center . . . the far right has prevented this Congress from passing even the most modest gun safety measures—measures that would make it harder for children and criminals to get guns.

The far right has prevented this Congress—so far—from passing a Patients' Bill of Rights. More than 80 percent of Americans—Democrats and Republicans—support a real Patients' Bill of Rights that holds HMOs accountable. So does the AMA, the American Nurses Association—and 200 other health care and consumer organizations. And so does a bipartisan majority in both the House and Senate. Yet the Republican leaders in this Congress continue to use parliamentary tricks to deny patients their rights. As we leave here for the year, HMO reform, like gun safety, has been stuck for months in the black hole of conference committees.

The Republican leadership clearly is hoping that we will forget about all the shootings . . . forget about the families who have been injured because some HMO accountant overruled their doctor and denied needed medical treatment. I am here to tell them: The American people will not forget. And neither will Senate Democrats.

We will fight to close the gun show loophole. And we will fight to pass a real Patients' Bill of Rights next year. We will continue the fight for meaningful campaign finance reform. We will continue the fight to preserve and strengthen Medicare—including adding a prescription drug benefit. We will resume the fight for a decent minimum wage increase. We will fight for a fair resolution of the dairy-pricing issue. And, we will restore the rural loan guarantee program for satellite TV service, so rural Americans aren't left with second-class service.

It's taken a long time, but we finally have a budget that keeps America moving in the right direction. That is a relief, and a victory for the American people. But we still have a long way to go. We are leaving here with too many urgent needs unmet. We must do better next year.

Mr. LOTT. Mr. President, today the Superfund Recycling Equity Act, S. 1528, is being sent to the President as part of H.R. 3194. This is a great day for environmental law—this is the day that the public policy restores recycling as a rewarded, rather than punished activity.

This is a great day because partisan feuding was set aside so that the Congress could find a realistic, incremental, and common sense environmental fix. The freestanding Superfund Recycling Equity Act has strong bipartisan support with 68 cosponsors—68 Senators who have worked together to advance a fix to a small piece of the Superfund debate.

In this controversial world of environmental legislation it is rare that the leaders of the two parties in either Congressional body would agree on a piece of legislation. Well, here in the Senate we do. I wish to thank Minority Leader DASCHLE who understood the merits of recycling and twice joined with me to sponsor this legislation. Without his leadership, this legislation would not have been possible.

Mr. President, I would also like to commend the Senators who originally joined Senator DASCHLE and me in introducing this legislation. Senators WARNER and LINCOLN, who sponsored this measure in a previous Congress, have long exhibited their enthusiasm for fixing recycling rules. They are true leaders—leaders who have fostered this reasonable, workable, environmental proposal. Senator BAUCUS, the Ranking Minority Member of the Environment and Public Works Committee, has also been an avid supporter of recycling by including a version of the Superfund Recycling Equity Act in his comprehensive Superfund reform bill in the 106th Congress. His six years of leadership in trying to fix public policy for recyclers is appreciated.

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Mr. President, this bill would not be where it is at today, on the cusp of becoming law, had it not been for the active support of the late Senator John Chafee—a dear friend to me and many of our colleagues. John Chafee was a respected leader of the Environment and Public Works Committee. His advice and counsel helped shape my bill and he was an original cosponsor. I am proud to have been associated with him on this bill and its legislative process. I consider it a tribute that this bipartisan bill, negotiated with the Administration, representatives of the national environmental community, and the recycling industry, was supported by John Chafee, a man for whom consensus was so important. I believe this is not a footnote to John Chafee's legacy; rather I believe that he made this kind of cooperation possible.

The former mayor of Warwick, Rhode Island, is now the newly appointed Senator from Rhode Island. I have already had an opportunity to hear our newest senator—Senator LINCOLN CHAFEE—tell me about what Warwick has done with regards to recycling. It is a proud record—a record that would be extended and enhanced by this bill. I find it a credit to John Chafee's legacy that his son would be working with me on this legislation. Less than a month in the Senate and already LINCOLN's voice is being heard in ways that will directly help Rhode Island.

Mr. President, I also must recognize the vision of trade associations like American Petroleum Institute and National Federation of Independent Businesses for supporting an incremental solution. It would have been easier for these groups to oppose the bill because it did not address all the fixes for which they have been advocating. However, API and NFIB recognized that this increment would not jeopardize their efforts; rather it exemplifies the efforts of various stakeholders to accomplish something positive for the environment albeit it incremental.

And finally, I must thank the various staff members who have diligently worked toward the passage of this legislation: Eric Washburn and Peter Hanson of Senator DASCHLE's staff, Tom Gibson and Barbara Rogers of the Environment and Public Works committee staff, Charles Barnett of Senator LINCOLN's staff, Ann Loomis of Senator WARNER's staff, and my former staffer, Kristy Simms, who set the stage for this years success.

While too often Senators have seen various interest groups tell Congress why we cannot achieve some worthy environmental goal, the history of the Superfund Recycling Equity Act is replete with evidence of people coming together to correct a problem. Everyone, including myself, realizes that comprehensive reform is necessary to fix the vast array of problems in many different sectors of the environmental community. Unfortunately, we do not live in a perfect world, so Congress must do what is achievable whenever it is possible. This is good public policy—increments will show all parties there is a bridge for bipartisan environmental fixes. Recycling is the first of many necessary fixes, and I would bet my colleagues that it will not be the last fix.

This is a great day for many environmental groups who saw a change that they supported, not be taken hostage by the debate that has for so many years paralyzed reforms to Superfund. The original negotiation that resulted in the basis of the bill was tough and long—but it was fair. Each of the negotiating partners left items on the table that they would have wanted in an otherwise perfect world. Their collective approach was always bipartisan—they never pitted one party against another by pledging one group of interests against another. They remained loyal to their agreement for an unheard of five years—an eternity in Washington. Though this legislation was a long time in coming, I am grateful for its passage.

Mr. President, this is a great day for my good friend and fellow Mississippian, Phillip Morris. It is also a great day for the thousands of mom-and-pop recycling firms across America, like the one owned by Phillip Morris. This legislation protects the legacy of these firms which in most cases have been handed down through generations—often started by new immigrants to America nearly a hundred years ago. This ends the long Superfund nightmare that our nation's recyclers have suffered. Each time they sold their recyclable products they were, unintentionally, exposing themselves to costly Superfund liability. Removing Superfund as an impediment to recycling is a predicate to higher recycling rates throughout the nation.

The Superfund Equity Act is not about special interests getting a fix. No, this bill is about representing constituent interests throughout America and promoting the public interest. That is why Senator DASCHLE and I have 68 cosponsors—cosponsors that range completely across the liberal and conservative political spectrum, and range across all regions of America.

Mr. President, let me be clear, the Superfund Recycling Equity Act corrects a mistake nobody intended to make. When the Comprehensive Emergency Response, Compensation and Liability Act (CERCLA) was enacted in 1980, there was no suggestion that traditional recyclables—paper, plastic, glass, metal, textiles, and rubber were ever intended to be subject to Superfund liability. As a result of court interpretations, however, the sale of recyclables as manufacturing feedstock was considered to be arranging for the disposal of the material and, therefore, subject to Superfund's liability scheme. However, as we have all come to know as a matter of public policy, recycling is not disposal; it is the exact opposite of disposal.

Mr. President, let me say that again—recycling is not disposal, and a law is needed to remove this confusion. Sad, but true.

Enactment of this legislation clarifies this point and corrects the misinterpretations that have cost recyclers—primarily small family-owned businesses—millions and millions of dollars for problems they did not cause. With passage of the Superfund Recycling Equity Act, the costs of cleanup at sites that utilize recyclable materials as feedstock will be borne, rightfully, by those persons who actually cause or contribute to the pollution. As a result, those facilities will be less likely to cause contamination because they will no longer have recyclers to help them pay for Superfund cleanup. That's a powerful market incentive and will cause the consuming facility to become more environmentally conscientious.

Let me be clear, this legislation will not alter the basic tenants of environmental law—polluters will still pay. This legislation does not relieve recyclers of Superfund liability where they have polluted their own facilities. It also does not protect these businesses when they have sent materials destined for disposal to landfills or other facilities where those materials contributed, in whole or in part, to the pollution of those facilities. Furthermore, the public can expect recyclers to continue to be environmentally vigilant because they must operate their businesses in an environmentally sound manner, in order to be relieved of Superfund liability.

Today is a victory for coalition building that avoids the attack strategies that are so often employed by trade associations in DC. I hope they see the wisdom in building coalitions around achievable increments. This is how Congress can move forward. This is how Congress shows that it not only hears from its constituents but it acts successfully. Hostage taking, distortion, and scorch the earth approaches are not productive legislative strategies or lobbying tactics. Trade associations need to seek achievable solutions, develop responsible legislative goals, and avoid Beltway attack politics. I am extremely pleased that Congress has been able to take this tiny but very important step forward in reforming the Superfund law. I hope this accomplishment will inspire others to work for sensible, incremental solutions that help both our environment and our nation's economy.

I am proud that today Congress leveled the playing field and created equity in the statutory treatment of recycled material and virgin materials. I am proud to have removed the disincentives to recycling without loosening any existing liability laws for polluters. I am proud to have represented the mom and pop recyclers across America. I'm especially proud of the fact that this was all done in a bipartisan manner.

Chemetco #CHEHAR

Yard	Material Code	Mat Desc	RMR Contract	RMR Shipment	Cust Wgt Tick	Cust Unload Date	RMR Invoice #	RMR Invoiced $$	RMR Net Wgt	Customer A/R Check#	Supplier	PO/Mat req
NewPort	N6050	#2 Copper	RSMD0295	50019		6/9/1999	4400	21,345.25	38,599	9309905	RMRNPO	RSMD0295-N
NewPort	N6050	#2 Copper	RSMD0295	50080		6/24/1999	5600	21,078.70	38,117	8319905	RMRNPO	RSMD0295-N
NewPort	6060	#2 Copper	RSMD0295	50114		6/30/1999	1200	14,776.66	22,577	43853	RMRNPO	RSMD0295-N
NewPort	6055	Light Copper	RSMD0295	50115		6/30/1999	1202	4,469.07	7,393	43853	RMRNPO	RSMD0295-N
NewPort	N6050	#2 Copper	RSMD0296	50400		7/21/1999	16300	22,995.85	36,157	9309905	RMRNPO	RSMD0296-N
NewPort	N6050	#2 Copper	RSMD0296	50518		7/28/1999	16500	18,234.78	28,671	5220	RMRNPO	RSMD0296-N
NewPort	N6055	Light Copper	RSMD0296	50519		7/28/1999	16501	2,441.86	4,187	5220	RMRNPO	RSMD0296-N
NewPort	4000	Copper Bearing	RSMD0407	51305		8/16/1999	8028500	3,657.60	45,720	5470	RMRNPO	RSMD0407-N
NewPort	4000	Copper Bearing	RSMD0407	51343		8/17/1999	8029400	3,640.00	45,500	11229905	RMRNPO	RSMD0407-N
NewPort	N1890	Copper Bearing	RSMD0417	51850		8/31/1999	8035500	9,464.00	33,800	5292	RMRNPO	RSMD0417-N
NewPort	N6050	#2 Copper	RS00494NML	52839		9/21/1999	9022100	27,620.96	42,331	5574	RMRNPO	RS00494NNP
NewPort	N6060	#2 Copper	RS00494NML	53101		9/29/1999	9040100	23,517.41	36,042	12099905	RMRNPO	RS00494NNP
NewPort	N6055	Light Copper	RS00494NML	53102		9/29/1999	9040101	2,651.60	4,401	12099905	RMRNPO	RS00494NNP
NewPort	N1890	Copper Bearing	RS00532FNP	54070		10/20/1999	10016200	8,584.00	29,800	12289906	RMRNPO	RS00532FNP
NewPort	N6050	#2 Copper	RS00785NML	56440		12/9/1999	12013200	24,520.53	38,815	1250006	RMRNPO	RS00785NNP
NewPort	N6055	Light Copper	RS00785NML	56441		12/9/1999	12013201	1,762.61	3,013	1250005	RMRNPO	RS00785NNP
NewPort	N6050	#2 Copper	RS00785NML	56883		12/21/1999	12022600	21,937.98	34,548	2230005	RMRNPO	RS00785NNP
NewPort	N6055	Light Copper	RS00785NML	56884		12/21/1999	12022601	3,940.56	6,736	6134	RMRNPO	RS00785NNP
NewPort	N6050	#2 Copper	RS00785NML	57092		12/29/1999	12043400	21,530.31	33,906	2220006	RMRNPO	RS00785NNP
NewPort	N6050	#2 Copper	RS00908NML	57645		1/17/2000	1012700	24,714.94	35,949	2290005	RMRNPO	RS00908NNP
NewPort	N6055	Light Copper	RS00908NML	57646		1/17/2000	1012701	2,792.25	4,360	2290005	RMRNPO	RS00908NNP
NewPort	N6050	#2 Copper	RS00908NML	57859		1/24/2000	1023600	25,775.06	37,491		RMRNPO	RS00908NNP
NewPort	N6055	Light Copper	RS00908NML	57860		1/24/2000	1023601	1,985.81	3,115	6210	RMRNPO	RS00908NNP
NewPort	N6050	#2 Copper	RS00908NML	58023		1/27/2000	1034500	23,113.75	33,620	3230006	RMRNPO	RS00908NNP
NewPort	N6055	Light Copper	RS00908NML	58024		1/27/2000	1034501	1,208.70	1,896	3230005	RMRNPO	RS00908NNP
NewPort	N6700	Brass Radiators w/iron	RS00943NML	57905		1/27/2000	1034600	17,568.12	39,923	3230005	RMRNPO	RS00943NNP
NewPort	N6050	#2 Copper	RS01023NML	58784		2/21/2000	2022200	25,161.73	36,887	6618	RMRNPO	RS01023NNP
NewPort	N6055	Light Copper	RS01023NML	58785		2/21/2000	2022202	3,184.64	5,035	6618	RMRNPO	RS01023NNP
NewPort	N6050	#2 Copper	RS01023NML	59252		3/6/2000	3001800	27,621.81	40,325	4300005	RMRNPO	RS01023NNP
NewPort	N6055	Light Copper	RS01023NML	59253		3/6/2000	3001801	946.22	1,496	6877	RMRNPO	RS01023NNP
NewPort	N6050	#2 Copper	RS01329NML	62739		6/21/2000	6024400	28,819.31	41,919	7420	RMRNPO	RS01329NNP
NewPort	N6050	#2 Copper	RS01329NML	63056		6/29/2000	6040300	27,110.88	39,434	7579	RMRNPO	RS01329NNP
NewPort	N6055	Light Copper	RS01329NML	63059		6/29/2000	6040301	1,468.80	2,304	7576	RMRNPO	RS01329NNPe
NewPort	N6050	#2 Copper	RS01141NML	63369		7/12/2000	7010200	26,558.10	38,020	8310006	RMRNPO	RS01141NNP
NewPort	N6055	Light Copper	RS01141NML	63370		7/12/2000	7010201	477.35	789	7648	RMRNPO	RS01141NNP
NewPort	N6050	#2 Copper	RS01411NNP	63784		7/27/2000	7033400	28,378.85	40,270	9260006	RMRNPO	RS01411NNP
NewPort	N6700	Brass Radiators w/iron	RS01606NML	65618		10/26/2000	10034000	18,826.92	40,488	12220006	RMRNPO	RS01606NNP
NewPort	N1890	Copper Bearing	RS01821FML	66822		11/1/2000	11000300	2,949.70	46,380	12220006	RMRNPO	RS01821FNP
NewPort	N6060	#2 Copper	RS01882NML	67610		11/29/2000	11043000	10,317.40	15,800	1190106	RMRNPO	RS01882NNP
NewPort	N6700	Brass Radiators w/iron	RS01882NML	67609		11/29/2000	11043001	12,237.88	26,038	1190106	RMRNPO	RS01882NNP
NewPort	N6050	#2 Copper	RS01882NML	67663		11/30/2000	11043200	25,325.95	38,784	1190106	RMRNPO	RS01882NNP
								$ 591,609.67				
Audubon	6000B	Shredd Copper	RSMD0295	50585	10,278	7/1/1999	18200	20,728.44	36,720	4965	AUDUOO	RPMD0143
Audubon	6500B	Shredded Brass	RSMD0341	50320	2,397	7/1/1999	4700	20,000.40	47,620	4927	AUDUOO	RPMD0138
Audubon	6500B	Shredded Brass	RSMD0341	50517	8,993	7/1/1999	10300	20,437.20	48,680	43853	AUDUOO	RPMD0138

Yard	Material Code	Mat Desc	RMR Contract	RMR Shipment	Cust Wgt Tick	Cust Unload Date	RMR Invoice #	RMR Invoiced $$	RMR Net Wgt	Customer A/R Check#	Supplier	PO/Mat req
RMR	K6050	#2 Copper	RSMD0296	50156		7/12/1999	4800	22,971.82	41,640	5048	RMRKB0	RSMD0296-K
Audubon	6500B	Shredded Brass	RSMD0378	50429	443	7/19/1999	4900	20,784.30	47,780	5096	AUDU00	RPMD0158
RMR	K6050	Shredded Brass	RSMD0378	50680	1,254	7/29/1999	10400	20,723.40	47,640	5174	AUDU00	RPMD0158
Audubon	6000B	#2 Copper	RSMD0296	50433		7/29/1999	18400	21,588.56	33,960	5220	RMRKB0	RSMD0296-K
Audubon	6500B	Shredd Copper	RSMD0296	50836	7,951	8/3/1999	8003400	29,173.76	47,380	5265	AUDU00	RPMD0171
RMR	K6050	Shredded Brass	RSMD0413	51019	1,780	8/11/1999	8009100	20,288.40	46,640	10229905	AUDU00	RPMD0173
RMR	K6050	#2 Copper	RSMD0418	50913		8/12/1999	8005200	28,858.30	41,480	11229905	RMRKB0	RSMD0418-K
RMR	K6050	#2 Copper	RSMD0418	50996		8/16/1999	8006700	26,838.15	41,140	5319	RMRKB0	RSMD0418-K
RMR	K6055	Light Copper	RSMD0418	51066		8/18/1999	8009200	11,194.63	17,289	11229905	RMRKB0	RSMD0418-K
DJJ	4000B	Copper Bearing	RSMD0432	51065		8/18/1999	8009201	10,259.67	17,171	11229905	RMRKB0	RSMD0418-K
DJJ	4000B	Copper Bearing	RSMD0432	52291		8/23/1999	9006900	2,768.00	34,800	5420	DJJJ00	RPMD0185
DJJ	4000B	Copper Bearing	RSMD0432	52292		8/25/1999	9007000	2,608.00	32,800	5420	DJJJ00	RPMD0185
Audubon	6500B	Copper Bearing	RSMD0432	52293		8/25/1999	9007001	2,540.80	31,760	5420	DJJJ00	RPMD0185
Audubon	6500B	#2 Copper	RSMD0440	52188		8/30/1999	9007200	28,169.80	46,180	5470	AUDU00	RPMD0191
Audubon	6550B	Shredded Brass	RSMD0413	52189		8/30/1999	9007100	21,071.40	46,440	11229905	AUDU00	RPMD0173
RMR	4000	Yellow Brass	RSMD0441	55298	2,987	8/30/1999	11014301	20,026.80	47,680	8300911	AUDU00	RPMD00192
RMR	K6050	Copper Bearing	RSMD0388	51691		8/30/1999	8037500	3,761.80	47,020	10229905	RMRHE0	RSMD0388-H
RMR	K6050	#2 Copper	RSMD0418	52404		9/9/1999	9011200	22,377.80	34,560	11229905	RMRKB0	RSMD0418-K
Audubon	6550B	#2 Copper	RS00494NML	52678		9/16/1999	9017200	23,737.95	36,380	5532	RMRKB0	RS00494NKB
DJJ	6050B	Yellow Brass	RSMD0441	55297	2,967	9/21/1999	11014400	20,076.00	47,800	10079911	AUDU00	RPMD00192
DJJ	6600B	#2 Copper	RS00505NBN	53461		9/22/1999	10024102	4,954.52	8,594	11299905	DJJR00	RP00214NBN
DJJ	6700B	Mill/Hard Brass	RS00505NBN	53460		9/22/1999	10024101	1,502.80	4,624	11299905	DJJR00	RP00214NBN
RMR	K6050	Brass/Copper Radiators	RS00505NBN	53459		9/22/1999	10024100	9,133.12	28,541	5617	DJJR00	RP00214NBN
RMR	K6055	#2 Copper	RS00494NML	52851		9/23/1999	9022200	8,494.23	12,972	11299905	RMRKB0	RS00494NKB
Audubon	6500B	Light Copper	RS00494NML	52849		9/22/1999	9022201	10,150.92	16,848	5617	RMRKB0	RS00494NKB
RMR	4000	Shredded Brass	RS00518NBN	53463		9/27/1999	10024200	20,115.40	46,780	5652	AUDU00	RP00219NBN
RMR	H401	Copper Bearing	RS00531FRC	53035		9/28/1999	9044200	3,669.60	46,120	12029905	RMRRC0	RS00531FRC
Audubon	6500B	Copper Bearing	RSMD0407	53158		9/30/1999	9040200	3,716.80	46,480	12029905	RMRHE0	RSMD0407
RMR	K6050	Shredded Brass	RS00518NBN	53464		10/1/1999	10024300	20,038.00	46,600	5708	AUDU00	RP00219NBN
Audubon	6000B	#2 Copper	RS00494NML	53802		10/11/1999	10006300	25,656.30	39,320	12239905	RMRKB0	RS00494NKB
Audubon	6000B	#1-ICW #2 Copper	RS00673NBN	55739	7,360	11/18/1999	11033900	20,756.20	47,720	5868	AUDU00	RP00279NBN
Audubon	6000B	#1-ICW #2 Copper	RS00673NBN	55738	7,360	11/18/1999	11034000	21,080.10	48,480	5868	AUDU00	RP00279NBN
Audubon	6000B	Shredd Copper	RS00748NBN	56159	8,527	11/30/1999	12001100	28,453.15	47,080		AUDU00	RP00314NBN
Audubon	6500B	Shredded Brass	RS00747NBN	56158	6,528	11/30/1999	12029700	20,201.40	46,440	5936	AUDU00	RP00313NBN
Audubon	6500B	Shredded Brass	RS00747NBN	56613	6,528	12/6/1999	12029900	21,924.00	50,400	6023	AUDU00	RP00313NBN
RMR	K6050	#2 Copper	RS00785NML	56559		12/13/1999	12013300	26,771.80	42,180	6108	RMRKB0	RS00785NKB
RMR	K6050	#2 Copper	RS00785NML	57040		12/27/1999	12036200	25,391.11	39,986	6192	RMRKB0	RS00785NKB
RMR	K6500	Lead	RS00785NML	57037		12/27/1999	12036201	195.00	1,300	6192	RMRKB0	RS00785NKB
RMR	K6500	Lead	RS00785NML	57038		12/27/1999	12036202	543.55	1,553	2220005	RMRKB0	RS00785NKB
RMR	K6500	Lead	RS00785NML	57039		12/27/1999	12036203	399.00	1,596	6192	RMRKB0	RS00785NKB
RMR	K6050	#2 Copper	RS00906NML	57526		1/11/2000	1004100	27,500.00	40,000	6356	RMRKB0	RS00906NKB
Audubon	6000B	Shredd Copper	RS00906NML	57745	1,119	1/17/2000	1012702	32,144.50	46,520	6252	AUDU00	RP00361NBN
RMR	K6050	#2 Copper	RS00906NML	57758		1/19/2000	1023500	26,695.00	39,120	3230005	RMRKB0	RS00906NKB
RMR	K6050	#2 Copper	RS00940NKB	58088		1/31/2000	1037500	18,741.09	27,161	3270005	RMRKB0	RS00940NKB
RMR	K6055	Light Copper	RS00940NKB	58087		1/31/2000	1037601	6,199.04	9,666	3270005	RMRKB0	RS00940NKB
RMR	K6050	#2 Copper	RS00940NKB	58464		2/10/2000	2008200	23,529.00	34,100	4200005	RMRKB0	RS00940NKB

Yard	Material Code	Mat Desc	RMR Contract	RMR Shipment	Cust Wgt Tick	Cust Unload Date	RMR Invoice #	RMR Invoiced $$	RMR Net Wgt	Customer A/R Check#	Supplier	PO/Mat req
Audubon	6000B	Shredd Copper	RS00906NML	58874	1,119	2/15/2000	2025500	31,641.00	47,760	6589	AUDU00	RP00381NBN
RMR	K8050	#2 Copper	RS01023NML	58791		2/21/2000	2022201	25,888.76	37,900	4200005	RMRKB0	RS01023NKB
RMR	K8050	#2 Copper	RS01023NML	58880		2/23/2000	2027900	8,884.13	12,724	5010005	RMRKB0	RS01023NKB
RMR	K8505	Light Copper	RS01023NML	58876		2/23/2000	2027901	3,487.37	5,462	5010005	RMRKB0	RS01023NKB
RMR	K8700	Brass/Copper Radiators	RS00943NML	58876		2/23/2000	2027601	1,424.84	2,794	5010005	RMRKB0	RS00943NKB
RMR	K8750	Heater Cores	RS00943NML	58877		2/23/2000	2027800	7,340.96	16,884	5010005	RMRKB0	RS00943NKB
Audubon	6500B	Mill/Hard Brass	RS01102NBN	58875		2/23/2000	2027802	945.28	2,954	5010005	RMRKB0	RS00943NKB
Audubon	6000B	Shredd Copper	RS01101NBN	59544	5,005	3/8/2000	3017700	23,212.80	46,360	6711	AUDU00	RP00435NBN
Audubon	6500B	Mill/Hard Brass	RS01102NBN	59542	5,004	3/13/2000	3017800	29,600.00	47,360	6736	AUDU00	RP00434NBN
RMR	K8050	#2 Copper	RS01023NML	59543	5,005	3/13/2000	3017900	22,282.40	46,380	6736	AUDU00	RP00435NBN
RMR	K8050	#2 Copper	RS01023NML	59641		3/20/2000	3021800	30,671.56	44,940	5150005	RMRKB0	RS01023NKB
RMR	K8050	#2 Copper	RS01150NKB	59696		3/21/2000	3028700	26,999.70	39,560	5190005	RMRKB0	RS01023NKB
RMR	K8050	#2 Copper	RS01150NKB	60148		4/3/2000	4000200	26,261.34	40,340	6834	RMRKB0	RS01150NKB
RMR	K8050	#2 Copper	RS01150NKB	60370		4/10/2000	4005600	26,040.00	40,000	6150006	RMRKB0	RS01150NKB
RMR	K8050	#2 Copper	RS01150NKB	60713		4/18/2000	4021600	25,258.60	38,800	6150006	RMRKB0	RS01150NKB
TMR	5000B	Brass Alum Radiators	RS01253NKB	61036		4/27/2000	4038700	20,352.00	31,800	7069	RMRKB0	RS01253NKB
RMR	K8050	#2 Copper	RS01226NBN	62871	7,119	5/8/2000	5031000	22,514.63	42,885	1237	TRAD00	RP00480NBN
RMR	K8055	Light Copper	RS01253NKB	61428		5/9/2000	5007600	18,039.04	28,186	6300006	RMRKB0	RS01253NKB
DJJ	5000B	Brass Alum Radiators	RS01253NKB	61427		5/9/2000	5007601	7,911.90	13,410	6300006	RMRKB0	RS01253NKB
DJJ	5000B	Brass Alum Radiators	RS01299NBN	61642	8,644	5/10/2000	5016600	19,823.36	30,974	7186	DJJR00	RP00499NBN
RMR	K8050	#2 Copper	RS01299NBN	61643	8,544	5/10/2000	5016601	2,571.24	9,183	7186	DJJR00	RP00499NBN
RMR	K8050	#2 Copper	RS01253NKB	61567		5/16/2000	5016900	25,267.20	39,480	7210006	RMRKB0	RS01253NKB
Audubon	6000B	Shredd Copper	RS01329NML	62047		5/31/2000	5040200	22,577.60	32,840	7280006	RMRKB0	RS01329NKB
RMR	K8000	Shredd Copper	RS01287NBN	62357	8,517	6/1/2000	6004600	30,334.50	48,150	7241	AUDU00	RP00494NBN
RMR	K8050	#2 Copper	RS01329NML	62306		6/7/2000	6004701	7,889.08	12,375	6150006	RMRKB0	RS01329NKB
RMR	K8050	#2 Copper	RS01329NML	62309		6/7/2000	6004700	17,493.44	25,445	6150006	RMRKB0	RS01329NKB
RMR	K8050	#2 Copper	RS01141NML	62574		6/16/2000	6016600	30,746.70	46,940	7420	RMRKB0	RS01411NKB
TMR	6050B	#2 Copper	RS01141NML	62810		6/22/2000	6027600	27,064.50	41,320	6150006	RMRKB0	RS01411NKB
RMR	K8050	#2 Copper	RS01141NML	63486	1,189	6/22/2000	7017500	27,743.18	42,356	9280006	TRAD00	RP00543NBN
Audubon	6000B	Shredd Copper	RS01445NML	62884		6/27/2000	6035200	29,212.00	43,800	7535	RMRKB0	RS01445NKB
Audubon	6050B	#2 Copper	RS01288NBN	63255	5,518	6/29/2000	7001000	23,222.40	46,380	7676	AUDU00	RP00495NBN
RMR	K8050	#2 Copper	RS01452NBN	63254	2,173	6/29/2000	7001100	30,953.00	47,820	7648	AUDU00	RP00560NBN
RMR	K8050	#2 Copper	RS01445NML	63112		6/30/2000	6043300	10,159.88	16,164	9260006	RMRKB0	RS01445NKB
TMR	6050B	#2 Copper	RS01445NML	63111		6/30/2000	6043301	5,798.24	9,352	9260006	RMRKB0	RS01445NKB
TMR	6050B	#2 Copper	RS01141NML	63376	1,189	7/3/2000	7006000	21,264.56	32,465	7648	TRAD00	RP00543NBN
TMR	5000B	Brass Alum Radiators	RS01141NML	63378	1,189	7/3/2000	7006001	6,169.19	10,197	7648	TRAD00	RP00543NBN
TMR	5000B	Brass Alum Radiators	RS01490NBN	63934	2,623	7/14/2000	7038601	2,654.60	40,780	3626	TRAD00	RP00574NBN
TMR	5000B	Brass Alum Radiators	RS01490NBN	63933	2,623	7/15/2000	7038700	2,626.84	41,812	3626	TRAD00	RP00574NBN
TMR	6050B	#2 Copper	RS01490NBN	63940	2,623	7/17/2000	7038900	2,833.00	41,900	3626	TRAD00	RP00574NBN
TMR	5000B	Brass Alum Radiators	RS01445NML	63891	2,069	7/17/2000	7038800	29,456.56	43,986	7701	TRAD00	RP00559NBN
RMR	K8050	#2 Copper	RS01490NBN	63937	2,623	7/18/2000	7039000	2,630.80	40,440	3626	TRAD00	RP00574NBN
TMR	5000B	Brass Alum Radiators	RS01513NKB	63541		7/19/2000	7021200	30,940.80	46,180	9260006	RMRKB0	RS01513NKB
TMR	5000B	Brass Alum Radiators	RS01490NBN	63936	2,623	7/20/2000	7039100	2,682.40	38,920	3626	TRAD00	RP00574NBN
TMR	5000B	Brass Alum Radiators	RS01490NBN	63941	2,623	7/24/2000	7039200	2,902.20	41,460	3632	TRAD00	RP00574NBN
TMR	K8050	#2 Copper	RS01491NBN	63835	2,624	7/24/2000	7039300	2,789.10	41,320	3632	TRAD00	RP00576NBN
			RS01513NKB	63806		7/26/2000	7036200	24,778.60	36,980	9260006	RMRKB0	RS01513NKB

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Yard	Material Code	Mat Desc	RMR Contract	RMR Shipment	Cust Wgt Tick	Cust Unload Date	RMR Invoice #	RMR Invoiced $$	RMR Net Wgt	Customer A/R Check#	Supplier	PO/Mat req
TMR	5000B	Brass Alum Radiators	RS01490NBN	63899	2,623	7/28/2000	7039400	3,022.60	43,180	3632	TRAD00	RP00574NBN
TMR	5000B	Brass Alum Radiators	RS01490NBN	63961	2,623	7/28/2000	7039401	3,014.20	43,060	3638	TRAD00	RP00574NBN
TMR	5000B	Brass Alum Radiators	RS01491NBN	63898	2,624	7/28/2000	7039500	2,883.35	42,420	3632	TRAD00	RP00575NBN
TMR	6050B	#2 Copper	RS01445NML	64232	2,069	7/28/2000	8009000	26,772.53	38,869	7766	TRAD00	RP00559NBN
TMR	6050B	#2 Copper	RS01446NML	64233	2,069	7/28/2000	8009001	3,868.02	6,271	7766	TRAD00	RP00559NBN
TMR	5000B	Brass Alum Radiators	RS01490NBN	63962	2,623	7/31/2000	7039600	3,047.60	43,540	3638	TRAD00	RP00574NBN
TMR	5000B	Brass Alum Radiators	RS01491NBN	64234	2,624	8/1/2000	8009100	2,938.95	43,540	3638	TRAD00	RP00575NBN
RMR	K6050	#2 Copper	RS01513NKB	64424		8/17/2000	8024500	25,754.80	38,440	9260006	RMRKB0	RS01513NKB
TMR	5000B	Brass Alum Radiators	RS01491NBN	65066	2,624	8/22/2000	8047800	2,866.05	42,460	3638	TRAD00	RP00575NBN
RMR	K6060	#2 Copper	RS01513NKB	64662		8/25/2000	8036700	33,138.20	49,460	10240006	RMRKB0	RS01513NKB
RMR	H1890	Copper Bearing	RS01638FHE	64792		8/28/2000	8035800	3,187.80	45,640	11300006	RMRHE0	RS01638FHE
TMR	6050B	#2 Copper	RS01513NKB	64966		8/31/2000	8047900	25,634.20	38,260	10240006	RMRKB0	RS01513NKB
TMR	6050B	#2 Copper	RS01655NML	65427	6,331	9/1/2000	9014500	26,080.21	40,983	7949	TRAD00	RP00646NBN
TMR	6050B	#2 Copper	RS01655NML	65428	6,331	9/1/2000	9014501	24,061.10	34,373	8000	TRAD00	RP00646NBN
RMR	K6050	#2 Copper	RS01655NML	65429	6,331	9/1/2000	9014502	5,239.00	8,060	8000	TRAD00	RP00646NBN
RMR	K6050	#2 Copper	RS01655NML	65112		9/5/2000	9002800	22,426.00	32,040	10310006	RMRKB0	RS01655NKB
TMR	5000B	Brass Alum Radiators	RS01490NBN	65386		9/15/2000	9014800	19,938.00	28,480	8079	RMRKB0	RS01656NKB
RMR	K6050	#2 Copper	RS01721NKB	65790	2,623	9/20/2000	9028000	3,050.60	43,580	11160006	TRAD00	RP00574NBN
RMR	K6055	Light Copper	RS01721NKB	65883		9/29/2000	9040800	22,806.60	30,820	11210006	RMRKB0	RS01721NKB
RMR	K6050	#2 Copper	RS01721NKB	65884		9/29/2000	9040801	7,666.74	11,545	11210006	RMRKB0	RS01721NKB
RMR	K6055	Light Copper	RS01721NKB	66060		10/9/2000	10003000	23,696.50	32,025	11300006	RMRKB0	RS01721NKB
TMR	5000B	Brass Alum Radiators	RS01490NBN	66058		10/9/2000	10003001	1,400.01	2,029	11300006	RMRKB0	RS01721NKB
TMR	5000B	Brass Alum Radiators	RS01490NBN	68341	2,623	10/11/2000	12022200	3,098.20	44,260	3759	TRAD00	RP00574NBN
TMR	6500B	Shredded Brass	RS02121NML	68342	2,623	10/13/2000	12022300	2,998.00	42,400	12290006	TRAD00	RP00574NBN
TMR	6700B	Brass/Copper Radiators	RS02121NML	68850	8,829	10/13/2000	10041801	6,533.70	11,265	8311	TRAD02	RP00817NBN
TMR	6050B	#2 Copper	RS02120NBN	68849	8,829	10/13/2000	10041900	11,169.35	32,430	8341	TRAD02	RP00817NBN
TMR	6050B	#2 Copper	RS02120NBN	68851	8,825	10/16/2000	10042000	26,623.03	37,235	8341	TRAD02	RP00815NBN
RMR	H1890	Copper Bearing	RS01821FML	68852	8,825	10/16/2000	10042001	1,738.31	2,614	8341	TRAD02	RP00815NBN
RMR	K6050	#2 Copper	RS01807NKB	66508		10/24/2000	10025600	3,040.70	46,780	12220006	RMRHE0	RS01821FHE
TMR	6000B	#2 Copper/Light	RS02130NBN	68842		10/27/2000	10042100	31,931.90	44,860	12220006	RMRKB0	RS01807NKB
TMR	6000B	#2 Copper/Light	RS02130NBN	67686	9,340	10/27/2000	11038700	2,806.00	43,200	3771	TRAD02	RP00827NBN
TMR	6060B	#2 Copper	RS02120NBN	67687	9,340	10/27/2000	11038701	2,806.70	43,180	3759	TRAD02	RP00827NBN
TMR	6000B	#2 Copper/Light	RS02130NBN	67677	8,825	10/30/2000	11038800	29,037.58	40,612	8481	TRAD02	RP00815NBN
TMR	6000B	#2 Copper/Light	RS02140NBN	67885	9,340	11/1/2000	11038900	2,897.70	44,580	3771	TRAD02	RP00827NBN
RMR	K6050	#2 Copper	RS01807NKB	67644	9,860	11/2/2000	11039000	2,813.20	43,260	3771	TRAD01	RP00839NBN
RMR	K6050	#2 Copper	RS01807NKB	67119		11/10/2000	11005700	16,518.50	25,900	12290006	RMRKB0	RS01807NKB
DJJ	6500B	Shredded Brass	RS02121NML	67121		11/10/2000	11023900	5,105.10	7,140	12290006	RMRKB0	RS01807NKB
DJJ	6500B	Shredded Brass	RS02121NML	67681	8,829	11/13/2000	11039101	11,989.18	20,871	8512	DJJR00	RP00616NBN
DJJ	6700B	Brass/Copper Radiators	RS02121NML	67680	8,829	11/13/2000	11039102	4,947.80	9,516	8512	DJJR00	RP00616NBN
RMR	K6050	#2 Copper	RS01807NKB	67676	8,829	11/13/2000	11039100	4,148.21	12,016	8512	DJJR00	RP00616NBN
TMR	6050B	#2 Copper	RS02188NML	67323		11/16/2000	11021100	26,312.00	38,800	1310106	RMRKB0	RS01807NKB
TMR	6700B	Brass/Copper Radiators	RS02188NML	67683	808	11/16/2000	11039200	28,329.10	43,383	8530	TRAD02	RP00868NBN
TMR	5000B	Brass Alum Radiators	RS01490NBN	67684	808	11/16/2000	11039201	20,699.96	44,468	1190106	TRAD02	RP00868NBN
RMR	K6050	#2 Copper	RS01745NKB	68344	2,623	11/21/2000	12022400	3,112.20	44,480	1190106	TRAD00	RP00874NBN
TMR	6060B	#2 Copper	RS02188NML	67643		11/30/2000	11043100	27,491.20	38,720	1190106	RMRKB0	RS01745NKB
				68510	808	12/6/2000	12033100	23,562.20	38,083	8716	TRAD02	RP00868NBN

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Yard	Material Code	Mat Desc	RMR Contract	RMR Shipment	Cust Wgt Tick	Cust Unload Date	RMR Invoice #	RMR Invoiced $$	RMR Net Wgt	Customer A/R Check#	Supplier	PO/Mat req
TMR	6050B	#2 Copper	RS02168NML	68511	806	12/8/2000	12033101	4,280.09	7,098	8716	TRAD02	RP00858NBND
RMR	K6050	#2 Copper	RS01807NKB	67981		12/13/2000	12004300	32,832.60	45,640	2260106	RMRKB0	RS01807NKB
								2,262,454.33				

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Institute of Scrap Recycling Industries, Inc.

Scrap Specifications Circular 1998

Guidelines for Nonferrous Scrap Ferrous Scrap Glass Cullet Paper Stock Plastic Scrap

1325 G Street, N.W.
Washington, D.C. 20005

ISRI
SCRAP SPECIFICATIONS
CIRCULAR 1998

GUIDELINES FOR:

NONFERROUS SCRAP
FERROUS SCRAP
GLASS CULLET
PAPER STOCK
PLASTIC SCRAP

Issued by:

Institute of Scrap Recycling Industries
1325 G Street, N.W.
Washington, D.C. 20005

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PREFACE

The standard specifications included in this Circular are intended to assist members in the buying and selling of their materials and products.

These specifications are derived from many sectors of the metals, paper stock, and plastics industries and are constructed to represent the quality or composition of the materials bought and sold in the industry. The specifications are internationally accepted, and are used throughout the world in metals, paper stock, and plastics trading.

Parties to a transaction may specify particular variations or additions to these specifications, as are suited for their specific transactions and for their individual convenience. Any deviation from the standard specifications, however, should be mutually agreed to, and so stipulated in writing, by the parties to the transactions.

ISRI maintains an Arbitration Service as a means of enabling members to settle differences between themselves, or between one of them and a non-member.

In addition, the "Guidelines for Metals Transactions" contain supplementary information which will aid members in completing their business transactions. It is recommended that these Guidelines be reviewed and that members employ them, in conjunction with the actual specifications, in the conduct of their business.

The specifications of scrap materials are subject to negotiation between buyer and seller. Specifications vary according to the requirements of individual consumers.

CIRCULAR 1998 BECOMES EFFECTIVE FEBRUARY 25, 1998, AND PREVAILS UNTIL SUPERSEDED.

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ISRI

Scrap Specifications Circular 1998

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RMR 0016

RULES GOVERNING THE PROCEDURES FOR THE ADDITION, AMENDMENT OR WITHDRAWAL OF SPECIFICATIONS

1.0. *Initiation of Request.* Any person may file a request to add, amend or withdraw a specification by submitting such request in writing to the Executive Director.

2.0. The Executive Director shall refer such request to the Chairman of the Specifications Committee (the "Committee"), with copies to:

A. The Officers;

B. The chairman of any Division and/or Committee which might be affected by the specification.

3.0. *Notice.* Following its receipt, notice of the request shall be inserted in the ISRI FOCUS and a daily national trade publication such as the *American Metal Market Magazine.* Such notice shall state:

A. The date, time and place at which the request will be considered by the Committee;

B. That the proceeding at which the request will be considered shall be open to the public;

C. That interested parties may participate in the proceeding by personal appearance or by submitting written comments.

D. A summary of the specification and the matter to be considered at the hearing.

4.0 *Committee Action.* Following presentation by all interested parties, the Committee shall review the request and:

A. Act upon it immediately, as set forth in Section 4.1; or

B. Refer it to a subcommittee for review and recommendation for action by the full Committee at its next meeting.

4.1. The Committee shall summarize the positions advocated by the various parties interested in the request and recommend to the Board of Directors what action should be taken.

5.0. *Board of Directors Action.* The Board of Directors, at its quarterly meeting at which the report and recommendation of the Committee has been made, shall adopt, amend or reject the recommendation or table it pending further review and recommendation by the Committee.

5.1. Notice of the action taken by the Board shall be given to all interested parties who actively participated in the Committee proceeding and any other persons who have requested in writing notice of the Board's action. Notice of said action also shall be inserted in the ISRI FOCUS following the Board meeting at which said action was taken.

6.0. *Appeal.* On or before thirty days after the date of the notice required in Section 5.1, any party may appeal the decision of the Board by written notice to the Executive Director. Said appeal shall state the reasons

therefor and the requested action to be taken. Notice of said appeal shall be given in accordance with Section 3.0.

6.1. The appeal shall be heard by the Board at its next quarterly meeting following receipt thereof.

6.2. The appellant and all interested parties shall be given at least twenty days notice of the date, time and place of the hearing, and like notice shall be inserted in the ISRI FOCUS at least twenty days prior to the hearing.

6.3. At the hearing, the appellant and any other interested party may appear either in person or by written presentation and state their reasons for the appeal.

6.4. The Board, following said hearing, shall review and act upon the appeal request. Notice of the Board's action shall be given in accordance with Section 5.1.

7.0. *Records.* ISRI shall maintain for not less than five years following the date of termination of the proceedings, records of the original request, summaries of the deliberations and recommendations of the Committee, action of the Board, summaries of the appeal and final decision, if any, of the Board, together with the positions of interested parties, copies of notices sent to interested parties and inserted in the ISRI FOCUS and national trade publications, written statements, and the reasons for recommendation and final action by the Committee and the Board.

7.1. Said records shall be available for review by the public upon reasonable notice.

ISRI ARBITRATION SERVICE

ISRI has established an arbitration service as a means to enable members to utilize arbitration to resolve disputes.

ISRI arbitration is a voluntary procedure, and must be agreed upon by both parties in the dispute. The arbitration procedure can only be initiated by a member of the Association. It is not required that both parties to the dispute be ISRI members.

The complete procedure for arbitration is set forth in ISRI's "Rules for Arbitration," which are available from Association Headquarters in Washington, DC. The rules contain the necessary form which must be completed to initiate arbitration. ISRI treats all filings, awards and proceedings as confidential.

The rules are highlighted below:

1. Any member of the Association may propose arbitration in a dispute with another member or non-member. Both parties must agree to the arbitration by signing a "Submission to Arbitrate" form and agreeing to abide by the applicable Arbitration Rules.

2. A Panel of Arbitrators has been established by the Association. The arbitrators serve without compensation, except for reasonable expenses. The arbitration parties must draw their arbitrators from this Panel. A maximum of three arbitrators issued in any proceeding; the parties are encouraged to use a single arbitrator.

3. There is a specific schedule of fees listed in the "Rules of Arbitration." Each party must deposit with the Association in advance $500 plus $500 for each arbitrator. The total deposit for each party thus is either $1,000 or $2,000, depending on whether one arbitrator is to be used or three. A portion of the fee is refundable if not required to defray arbitrators' costs. The arbitrators may require the losing party to reimburse the prevailing party for its share of these costs.

4. The arbitration procedure usually includes a hearing, at which time the parties involved are required to appear, present their respective cases, and be available for questioning by the arbitrators. All physical evidence (contracts, correspondence, relevant comments, etc.) may be required to be submitted in advance to the arbitrators. A party in the arbitration may be accompanied by counsel, but must inform the other party in advance and receive permission from the arbitrators. Witnesses may also be called to an arbitration hearing. There is also an optional procedure for conducting the arbitration without an oral hearing.

5. An award by the arbitrators will be made promptly, within twenty days after hearings have been completed or final briefs submitted. The award is made in writing, and it is certified.

6. The Rules state that the parties to the dispute shall be deemed to have consented that a judgment upon the award be entered in any court having jurisdiction over an action to enforce the award.

Members who wish to provide an automatic basis for the settlement of any disputes arising from a transaction are encouraged to provide in their contracts that the ISRI Arbitration Procedure shall prevail in the event of any ensuing controversy, and that each party will take all necessary steps to initiate such arbitration. Members are urged to obtain and carefully read the "Rules for Arbitration" before proceeding.

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Scrap Specifications Circular 1998

Guidelines for Nonferrous Scrap: NF-98

RMR 0020

NONFERROUS SCRAP

Note: When the individual scrap grades in this Circular, denoted by the various code words, are used, an agreement between parties is also bound by the terms of "Apple" as it appears below, unless the terms and conditions of a specific contract provide otherwise, in which case the specific contractual provisions shall govern.

ISRI Code Word — **Base**

Apple—Nonferrous Terms

a. Delivery of more or less of the specified quantity up to 3 per cent is permissible.

b. A ton shall be understood to be 2000 pounds, unless otherwise specified.

c. If any portion of the goods covered by a contract are unshipped or undelivered within the time specified in a contract, then that portion is subject to cancellation by the buyer, and/or the buyer has the right to hold the seller responsible for substantiated damages.

If, because of embargo and/or other conditions of force majeure, a delivery or shipment cannot be made by the time specified, the contract shall remain valid and shall be completed promptly upon lifting of the embargo, and/or conditions of force majeure and the terms of said contract shall not be changed.

d. If for any portion of a contract the buyer fails in a timely manner to open a Letter of Credit, and/or fails to provide proper conveyance and/or shipping instructions as specified in the contract, then that portion is subject to cancellation by the seller and/or the seller has the right to hold the buyer responsible for substantiated damages.

If, because of embargo and/or other conditions of force majeure, a delivery or shipment cannot be made by the time specified, the contract shall remain valid and shall be completed promptly upon lifting of the embargo, and/or conditions of force majeure and the terms of said contract shall not be changed.

e. If a significant weight or quality difference is apparent, the seller should be notified promptly and, if requested, another weight or quality determination should be taken. Seller and/or buyer should be given the opportunity to appoint an independent surveyor or a representative to verify weights and/or quality.

For purposes of this section, the meaning of the word "significant" shall be determined by agreement between buyer and seller, depending on the commodities and their values.

f. If it is mutually determined that goods delivered do not conform to the description specified in the contract, then the shipment is subject to rejection or downgrade.

Disposition of, replacement of, and/or financial adjustment for rejected material shall be subjected to mutual agreement between buyer and seller. Seller is responsible for freight costs.

Buyer is expected, however, to exert every effort to limit rejections only to that portion of the shipment which is unsortable and to return the rejected portion promptly upon request, if government regulations permit.

Barley—No. 1 COPPER WIRE

Shall consist of No. 1 bare, uncoated, unalloyed copper wire, not smaller than No. 16 B & S wire gauge. Green copper wire and hydraulically compacted material to be subject to agreement between buyer and seller.

Barry—No. 1 COPPER WIRE

Shall consist of clean, untinned, uncoated, unalloyed copper wire and cable, not smaller than No. 16 B & S wire gauge, free of burnt wire which is brittle. Hydraulically briquetted copper subject to agreement.

ISRI Code Word	Item

Birch—No. 2 COPPER WIRE

Shall consist of miscellaneous, unalloyed copper wire having a nominal 96% copper content (minimum 94%) as determined by electrolytic assay. Should be free of the following. Excessively leaded, tinned, soldered copper wire; brass and bronze wire; excessive oil content, iron, and non-metallics; copper wire from burning, containing insulation; hair wire; burnt wire which is brittle; and should be reasonably free of ash. Hydraulically briquetted copper subject to agreement.

Candy—No. 1 HEAVY COPPER

Shall consist of clean, unalloyed, uncoated copper clippings, punchings, bus bars, commutator segments, and wire not less than 1/16 of an inch thick, free of burnt wire which is brittle; but may include clean copper tubing. Hydraulically briquetted copper subject to agreement.

Cliff—No. 2 COPPER

Shall consist of miscellaneous, unalloyed copper scrap having a nominal 96% copper content (minimum 94%) as determined by electrolytic assay. Should be free of the following: Excessively leaded, tinned, soldered copper scrap; brasses and bronzes; excessive oil content, iron and non-metallics; copper tubing with other than copper connections or with sediment; copper wire from burning, containing insulation; hair wire; burnt wire which is brittle; and should be reasonably free of ash. Hydraulically briquetted copper subject to agreement.

Clove—No. 1 COPPER WIRE NODULES

Shall consist of No. 1 bare, uncoated, unalloyed copper wire scrap nodules, chopped or shredded, free of tin, lead, zinc, aluminum, iron, other metallic impurities, insulation, and other foreign contamination. Minimum copper 99%. Gauge smaller than No. 16 B & S wire and hydraulically compacted material subject to agreement between buyer and seller.

Cobra—No. 2 COPPER WIRE NODULES

Shall consist of No. 2 unalloyed copper wire scrap nodules, chopped or shredded, minimum 97% copper. Maximum metal impurities not to exceed 0.50% aluminum and 1% each of other metals or insulation. Hydraulically compacted material subject to agreement between buyer and seller.

Cocoa—COPPER WIRE NODULES

Shall consist of unalloyed copper wire scrap nodules, chopped or shredded, minimum 99% copper. Shall be free of excessive insulation and other non-metallics. Maximum metal impurities as follows:

Aluminum	—	.05%
Tin	—	.25%
Nickel	—	.05%
Antimony	—	.01%
Iron	—	.05%

ISRI Code Word	Item

Hydraulically compacted material subject to agreement between buyer and seller.

Dream—LIGHT COPPER

Shall consist of miscellaneous, unalloyed copper scrap having a nominal 92% copper content (minimum 88%) as determined by electrolytic assay and shall consist of sheet copper, gutters, downspouts, kettles, boilers, and similar scrap. Should be free of the following: Burnt hair wire; copper clad; plating racks; grindings; copper wire from burning, containing insulation; radiators, fire extinguishers; refrigerator units; electrotype shells; screening; excessively leaded, tinned, soldered scrap; brasses and bronzes; excessive oil, iron and non-metallics; and should be reasonably free of ash. Hydraulically briquetted copper subject to agreement. Any items excluded in this grade are also excluded in the higher grades above.

Drink—REFINERY BRASS

Shall contain a minimum of 61.3% copper and maximum 5% iron and to consist of brass and bronze solids and turnings, and alloyed and contaminated copper scrap. Shall be free of insulated wire, grindings, electrotype shells and non-metallics. Hydraulically briquetted material subject to agreement.

Drove—COPPER-BEARING SCRAP

Shall consist of miscellaneous copper-containing skimmings, grindings, ashes, irony brass and copper, residues and slags. Free of insulated wires; copper chlorides; unprepared tangled material; large motors; pyrophoric material; asbestos brake linings; furnace bottoms; high lead materials; graphite crucibles; and noxious and explosive materials. Fine powdered material by agreement. Hydraulically briquetted material subject to agreement.

Druid—INSULATED COPPER WIRE SCRAP

Shall consist of copper wire scrap with various types of insulation. To be sold on a sample or recovery basis, subject to agreement between buyer and seller.

ISRI Code Word — Item

Ebony—COMPOSITION OR RED BRASS

Shall consist of red brass scrap, valves, machinery bearings and other machinery parts, including miscellaneous castings made of copper, tin, zinc, and/or lead. Should be free of semi-red brass castings (78% to 81% copper); railroad car boxes and other similar high-lead alloys; cocks and faucets; closed water meters; gates; pot pieces; ingots and burned brass; aluminum, silicon, and manganese bronzes; iron and non-metallics. No piece to measure more than 12" over any one part or weigh over 100 lbs.

Ebony—RED BRASS COMPOSITION TURNINGS

Shall consist of turnings from red brass composition material and should be sold subject to sample or analysis.

Elder—GENUINE BABBITT-LINED BRASS BUSHINGS

Shall consist of red brass bushings and bearings from automobiles and other machinery, shall contain not less than 12% high tin base babbitt, and shall be free of iron-backed bearings.

Eland—HIGH GRADE—LOW LEAD BRONZE SOLIDS

It is recommended these materials be sold by analysis.

Elias—HIGH LEAD BRONZE SOLIDS AND BORINGS

It is recommended that these materials be sold on sample or analysis.

Engel—MACHINERY OR HARD BRASS SOLIDS

Shall have a copper content of not less than 75%, a tin content of not less than 6%, and a lead content of not less than 6%— nor more than 11%, and total impurities, exclusive of zinc, antimony, and nickel of not more than 0.75%; the antimony content not to exceed 0.50%. Shall be free of lined and unlined standard red car boxes.

Erin—MACHINERY OR HARD BRASS BORINGS

Shall have a copper content of not less than 75%, a tin content of not less than 6%, and a lead content of not less than 6%—nor more than 11%, and the total impurities, exclusive of zinc, antimony, and nickel of not more than 0.75%, the antimony content not to exceed 0.50%.

Fence—UNLINED STANDARD RED CAR BOXES (CLEAN JOURNALS)

Shall consist of standard unlined and/or sweated railroad boxes and unlined and/or sweated car journal bearings, free of yellow boxes and iron-backed boxes.

Ferry—LINED STANDARD RED CAR BOXES (LINED JOURNALS)

Shall consist of standard babbitt-lined railroad boxes and/or babbitt-lined car journal bearings, free of yellow boxes and iron-backed boxes.

ISRI Code Word — Item

Grape—COCKS AND FAUCETS

Shall consist of mixed clean red and yellow brass, including chrome or nickel-plated, free of gas cocks, beer faucets, and aluminum and zinc base die cast material, and to contain a minimum of 35% semi-red.

Honey—YELLOW BRASS SCRAP

Shall consist of brass castings, rolled brass, rod brass, tubing and miscellaneous yellow brasses, including plated brass. Must be free of manganese-bronze, aluminum-bronze, unsweated radiators or radiator parts, iron, excessively dirty and corroded materials.

Ivory—YELLOW BRASS CASTINGS

Shall consist of yellow brass castings in crucible shape, no piece to measure more than 12 inches over any one part; and shall be free of brass forgings, silicon bronze, aluminum bronze and manganese bronze, and not to contain more than 15% nickel plated material.

Label—NEW BRASS CLIPPINGS

Shall consist of the cuttings of new unleaded yellow brass sheet or plate, to be clean and free from foreign substances and not to contain more than 10% of clean brass punchings under ¼ inch. To be free of Muntz metal and naval brass.

Lace—BRASS SHELL CASES WITHOUT PRIMERS

Shall consist of clean fired 70/30 brass shell cases free of primers and any other foreign material.

Lady—BRASS SHELL CASES WITH PRIMERS

Shall consist of clean fired 70/30 brass shell cases containing the brass primers and which contain no other foreign material.

Lake—BRASS SMALL ARMS AND RIFLE SHELLS, CLEAN FIRED

Shall consist of clean fired 70/30 brass shells free of bullets, iron and any other foreign material.

Lamb—BRASS SMALL ARMS AND RIFLE SHELLS, CLEAN MUFFLED (POPPED)

Shall consist of clean muffled (popped) 70/30 brass shells free of bullets, iron and any other foreign material.

Bill Code Word — Item

[illegible]—YELLOW BRASS PRIMER

Shall consist of clean yellow brass primers, burnt or unburnt. Free of iron, excessive dirt, corrosion and any other foreign material.

Maize—MIXED NEW NICKEL SILVER CLIPPINGS

Shall consist of one or more nickel silver alloys and the range of nickel content to be specified, free of chrome or any other plating material. Leaded nickel silver clippings should be packed and sold separately. Not to contain more than 10% of clean punchings under ¼ inch.

Major—NEW NICKEL SILVER CLIPPINGS AND SOLIDS

Shall consist of new, clean nickel silver clippings, plate, rod and forgings, and other rolled shapes, free of chrome or any other plating material. Must be sold on nickel content specifications such as 10%—12%—15%—18%—20%. Leaded nickel silver clippings should be packed and sold separately. A description as to its physical characteristics should be made in offering all nickel silver material.

Malar—NEW SEGREGATED NICKEL SILVER CLIPPINGS

Shall consist of one specified nickel silver alloy. Not to contain more than 10% of clean punchings under ¼ inch.

Mallc—OLD NICKEL SILVER

Shall consist of old nickel silver sheet, pipe, rod, tubes, wire, screen, soldered or unsoldered. Must not be trimmed seams alone and it is also to be free of foreign substances, iron rimmed material and other metals.

[illegible]—BRASS PIPE

Shall consist of brass pipe free of plated and soldered materials or pipes with cast brass connections. To be sound, clean pipes free of sediment and condenser tubes.

Naggy—NICKEL SILVER CASTINGS

To be packed and sold separately.

Nicoc— NICKEL SILVER TURNINGS

To be sold by sample or analysis.

Night—YELLOW BRASS ROD TURNINGS

Shall consist of strictly rod turnings, free of aluminum, manganese, composition, Tobin and Muntz metal turnings; not to contain over 3% free iron, oil or other moisture; to be free of grindings and babbitts; to contain not more than 0.30% tin and not more than 0.15% alloyed iron.

Noble—NEW YELLOW BRASS ROD ENDS

Shall consist of new, clean rod ends from free turning brass rods or forging rods, not to contain more than 0.30% tin and not more than 0.15% alloyed iron. To be free of Muntz metal and naval brass or any other alloys. To be in pieces not larger than 12" and free of foreign matter.

Bill Code Word — Item

Nomad—YELLOW BRASS TURNINGS

Shall consist of yellow brass turnings, free of aluminum, manganese and composition turnings, not to contain over 3% of free iron, oil or other moisture; to be free of grindings and babbitts. To avoid dispute, to be sold subject to sample or analysis.

Ocean—MIXED UNSWEATED AUTO RADIATORS

Shall consist of mixed automobile radiators, to be free of aluminum radiators, and iron finned radiators. All radiators to be subject to deduction of actual iron. The tonnage specification should cover the gross weight of the radiators, unless otherwise specified.

Palas—ADMIRALTY BRASS CONDENSER TUBES

Shall consist of clean sound Admiralty condenser tubing which may be plated or unplated, free of nickel alloy, aluminum alloy, and corroded material.

Pallu—ALUMINUM BRASS CONDENSER TUBES

Shall consist of clean sound condenser tubing which may be plated or unplated, free of nickel alloy and corroded material.

Palms—MUNTZ METAL TUBES

Shall consist of clean sound Muntz metal tubing which may be plated or unplated, free of nickel alloy, aluminum alloy, and corroded material.

Parch—MANGANESE BRONZE SOLIDS

Shall have a copper content of not less than 55%, a lead content of not more than 1%, and shall be free of aluminum bronze and silicon bronze.

Racks—SCRAP LEAD—SOFT

Shall consist of clean soft scrap lead, free of other materials such as drosses, battery plates, lead covered cable, hard lead, collapsible tubes, foil, type metals, aluminum, zinc, iron and brass fittings, dirty chemical lead and radioactive materials. Review packaging specifications and regulatory status pertaining to shipping with buyer prior to sale.

Radio—MIXED HARD/SOFT SCRAP LEAD

Shall consist of clean lead solids, free of other materials, such as drosses, battery plates, lead covered cable, collapsible tubes, type metals, aluminum, zinc, iron and brass fittings, dirty chemical lead and radioactive materials. Review packaging specifications and regulatory status pertaining to shipping with buyer prior to sale.

ISRI Code Word	Item

Rails—LEAD BATTERY PLATES.

Specify whether automotive, industrial or mixed. Also whether they are groups or loose. The only other metallic that might be included could be lead connectors. To be free of non-metallics, i.e., plastic or rubber, with the exception that separators may be included. Material to be dry. May be bought on an assay basis or a flat price. Submarine plates subject to negotiation. Review packaging specifications and regulatory status pertaining to shipping with buyer prior to sale.

Rains—SCRAP DRAINED/DRY WHOLE INTACT LEAD BATTERIES

To be free of any liquid. Cases to be either plastic or rubber and be complete including caps. Non-lead (ni-cad, ni-fe, carbonaire, etc.) not acceptable. Industrial, steel cased, aircraft (aluminum cased) and partial, cracked or broken batteries and batteries without caps subject to special agreement. Review packaging specifications and regulatory status pertaining to shipping with buyer prior to sale.

Rakes—BATTERY LUGS

To be free of scrap lead, wheel weights, battery plates, rubber and/or plastic case material and other foreign material. A minimum of 97% metallic content is required. Review packaging specifications and regulatory status pertaining to shipping with buyer prior to sale.

Ranks—PEWTER

Shall consist of tableware and soda-fountain boxes but should contain a minimum of 84% tin. Siphon tops to be accounted for separately. Material must be free of brass, zinc, and other foreign metals.

Ranch—BLOCK TIN

Block Tin must assay minimum of 98% tin, and to be free of liquids, solder, and brass connections, pewter, pumps, pot pieces, dirt.

Raves—HIGH TIN BASE BABBITT

Shall contain a minimum of 78% tin and be free of brassy or zincy metals.

Relay—LEAD COVERED COPPER CABLE

Free of armored covered cable, and foreign material.

Rents—LEAD DROSS

Should be clean and reasonably free of other materials such as iron, dirt, harmful chemicals or other metals. To be free of radioactive materials, aluminum and zinc. May be bought on an assay basis or as agreed to by buyer and seller. Other metals present such as antimony, tin, etc., to be accounted for as agreed between buyer and seller. Material to be readily dumped from drums. An extra charge may be assessed if material has to be mechanically removed. Review packaging specification and regulatory status pertaining to shipping with buyer prior to sale.

ISRI Code Word	Item

Rink—SCRAP WET WHOLE INTACT LEAD BATTERIES

Consisting of SLI (starting, lighting & ignition), automotive, truck, 8-D and commercial golf cart and marine-type batteries. Cases to be either plastic or rubber and to be complete. Non-lead (i.e., ni-cad, ni-fe, carbonaire, etc.) not acceptable. Other types i.e. aircraft (aluminum) gel-cell, lawnmower, etc., and partial, cracked or broken batteries or batteries without caps and the amount of liquid content and any variations to the specification subject to special agreement. Review packaging specifications and regulatory status pertaining to shipping with buyer prior to sale.

Rono—SCRAP INDUSTRIAL INTACT LEAD CELLS

Consisting of plates enclosed by some form of complete plastic case. Partial, cracked or broken cells, cells without caps and the amount of liquid content and any variations to the specification subject to special agreement. Review packaging specifications and regulatory status pertaining to shipping with buyer prior to sale.

Roper—SCRAP WHOLE INTACT INDUSTRIAL LEAD BATTERIES

Consisting of bus, diesel, locomotive, telephone and/or steel cased batteries. Submarine batteries subject to negotiation. Partial, cracked, broken or batteries without caps and the amount of liquid content and any variations to the specification subject to special agreement. Review packaging specifications and regulatory status pertaining to shipping with buyer prior to sale.

Ropes—WHEEL WEIGHTS

To consist of lead tire balances with or without iron clips. Not to include scrap lead, lugs or plates unless specifically agreed to. To be free of foreign material. Review packaging specifications and regulatory status pertaining to shipping with buyer prior to sale.

Roses—MIXED COMMON BABBITT

Shall consist of lead base bearing metal containing not less than 8% tin, free from Allens metal, ornamental, antimonial and type metal. Must be free from all zincy and excessive copper in the alloy.

ISRI Code Word — Item

Scaves—OLD ZINC DIE CAST SCRAP

Shall consist of miscellaneous old zinc base die castings, with or without iron and other foreign attachments. Must be free of borings, turnings, dross pieces, chunks, melted pieces and skimmings. All unmetallics, dirt, foreign attachments, and volatile substances (such as rubber, cork, plastic, grease, etc.) are deductible. Material containing in excess of 30% iron will not constitute good delivery.

Scabs—NEW ZINC DIE CAST SCRAP

Shall consist of new or unused, clean, zinc base die castings. Castings to be unplated, unpainted, and free from corrosion.

Scops—NEW PLATED ZINC DIE CAST SCRAP

Shall consist of new or unused clean, plated zinc base die castings, free from corrosion.

Scoot—ZINC DIE CAST AUTOMOTIVE GRILLES

Shall consist of clean, old or used zinc base die cast automotive grilles, free from soldered material. All foreign attachments and extraneous materials are deductible.

Score—OLD SCRAP ZINC

Shall consist of clean dry scrap zinc, such as sheets, jar lids, clean unalloyed castings and anti-corrosion plates. Borings and turnings are not acceptable. Material must not be excessively corroded or oxidized. All foreign attachments and extraneous materials are deductible.

Screen—NEW ZINC CLIPPINGS.

Shall consist of any new pure zinc sheets or stampings free from corrosion. To contain no foreign material or attachments. Printers zinc, such as engravers zinc, lithograph sheets and addressograph plates subject to special arrangements. Printers zinc to be free of routings.

Scull—ZINC DIE CAST SLABS OR PIGS

Shall consist of melted zinc base die cast materials, in smooth clean solid slabs or pigs. Material to be free from drosses and to contain a minimum zinc content of 90%. To contain a maximum of 0.1% nickel and maximum of 1% lead. Blocks are acceptable upon mutual agreement.

Scribe—CRUSHED CLEAN SORTED FRAGMENTIZERS DIE CAST SCRAP, AS PRODUCED FROM AUTOMOBILE FRAGMENTIZERS

To be clean, free of dirt, oil, glass, rubber, and trash. To contain a maximum of 5% unmetallics such as free iron, copper, aluminum and other metals.

ISRI Code Word — Item

Scroll—UNSORTED ZINC DIE CAST SCRAP

Produced from automobile fragmentizers. Material to contain about 55% zinc-bearing scrap. Other nonferrous metals such as aluminum, stainless steel, red metal, etc., to be about 40%. Insulated copper wire about 1%. Trash, dirt, glass, rubber, oil, iron, not to exceed 5%. Any variations to be sold by special arrangement between buyer and seller.

Scrub—HOT DIP GALVANIZERS SLAB ZINC DROSS (Batch Process)

Shall consist only of galvanizers unsweated zinc dross in slab form from hot dip galvanizing (Batch Process) with a minimum zinc content of 92% and shall be free of skimmings and tramp iron. Broken pieces under 2" in diameter shall not exceed 10% of the weight of each shipment. Slabs shall not weigh over 100 pounds each. Heavier pieces acceptable upon mutual agreement between buyer and seller. Material from continuous galvanizing operation is not acceptable. Blocks are acceptable upon mutual agreement.

Seal—CONTINUOUS LINE GALVANIZING SLAB ZINC TOP DROSS

Shall consist of unsweated zinc dross removed from the top of a continuous line galvanizing bath, in slab form not weighing in excess of 100 pounds each, with a minimum zinc content of 90%. Heavier pieces acceptable upon mutual agreement between buyer and seller. Shall be free of skimmings. Broken pieces under 2" in diameter shall not exceed 10% of the weight of each shipment.

Seam—CONTINUOUS LINE GALVANIZING SLAB ZINC BOTTOM DROSS

Shall consist of unsweated zinc dross removed from the bottom of a continuous line galvanizing bath, in slab form not weighing in excess of 100 pounds each, with a minimum zinc content of 92%. Heavier pieces acceptable upon mutual agreement between buyer and seller. Shall be free of skimmings. Broken pieces under 2" in diameter shall not exceed 10% of the weight of each shipment.

ISRI Code Word — Item

Shelf—PRIME ZINC DIE CAST DROSS

Shall consist of metal skimmed from the top of pot of molten zinc die cast metal. Must be unsweated, unfluxed, shiny, smooth, metallic and free from corrosion or oxidation. Should be poured in molds or in small mounds weighing not over 75 pounds each. Zinc shall be minimum of 85%.

Tablet—CLEAN ALUMINUM LITHOGRAPHIC SHEETS

To consist of alloys 1100 and/or 3003, to be free of paper, plastic, excessively inked sheets and any other contaminants. Minimum of three inches in any direction.

Tabloid—NEW, CLEAN ALUMINUM LITHOGRAPHIC SHEETS

To consist of alloys 1100 and/or 3003, uncoated, unpainted, to be free of paper, plastic, ink, and any other contaminants. Minimum of three inches in any direction.

Taboo—MIXED LOW COPPER ALUMINUM CLIPPINGS AND SOLIDS

Shall consist of new, clean, uncoated and unpainted low copper aluminum scrap of two or more alloys and to be free of 7000 series, foil, hair wire, wire screen, dirt, and other foreign substances. Grease and oil not to total more than 1%. Also free from punchings less than ½" in size. New can stock subject to arrangement between buyer and seller.

Tabs/Tabor—CLEAN MIXED OLD ALLOY SHEET ALUMINUM

Shall consist of clean old alloy aluminum sheet and sheet utensil scrap of two or more alloys, free of 7000 alloy series, foil, venetian blinds, castings, hair wire, screen wire, food or beverage containers, pie plates, hub caps, radiator shells, airplane sheet foil, oil cans, bottle caps, plastic, dirt, and other foreign substances. Oil and grease not to total more than 1%. Up to 10% painted sheet, siding, and awnings permitted.

Take—NEW ALUMINUM CAN STOCK

Shall consist new low copper aluminum can stock and clippings, clean, lithographed or not lithographed, and coated with clear lacquer but free of lids with sealers, iron, dirt and other foreign contamination. Oil not to exceed 1%.

Talap—OLD CAN STOCK

Shall consist of clean old aluminum cans, decorated or clear, free of iron, dirt, liquid and/or other foreign contamination.

ISRI Code Word — Item

Talcred—SHREDDED ALUMINUM USED BEVERAGE CAN (UBC) SCRAP

Shall have a density of 12 to 17 pounds per cubic foot. Material should contain maximum 5% fines less than 4 mesh (U.S. standard screen size) and no more than 2.5% fines less than 12 mesh (U.S. standard screen size). Must be magnetically separated material and free of steel, lead, bottle caps, plastic cans and other plastics, glass, wood, dirt, grease, trash, and other foreign substances. Any free lead is basis for rejection. Any and all aluminum items, other than used beverage cans, are not acceptable. Items not covered in the specification, including moisture, are subject to special arrangement between buyer and seller.

Taldack—DENSIFIED ALUMINUM USED BEVERAGE CAN (UBC) SCRAP

Shall have a biscuit density of 35 to 45 pounds per cubic foot. Each biscuit not to exceed 60 pounds. Nominal biscuit size range from 10" to 13" × 10¼" to 20" × 6¼" to 9". Shall have banding slots in both directions to facilitate bundle banding. All biscuits comprising a bundle must be of uniform size. Size: Bundle range dimensions acceptable are 41" to 44" × 51" to 54" × 54" to 56" (height). The only acceptable tieing method shall be as follows: Using minimum ⅝" wide by .020" thick steel straps the bundles are to be banded with one vertical band per row and a minimum of two girth (horizontal) bands per bundle. Use of skids and/or support sheets of any material is not acceptable. Must be magnetically separated material and free of steel, lead, bottle caps, plastic cans and other plastic, glass, wood, dirt, grease, trash, and other foreign substances. Any free lead is basis for rejection. Any and all aluminum items, other than used beverage cans, are not acceptable. Items not covered in the specification, including moisture, and any variations in the specification are subject to special arrangement between buyer and seller.

ISRI Code Word	Item

Taddon—BALED ALUMINUM USED BEVERAGE CAN (UBC) SCRAP

Shall have a minimum density of 14 lbs. per cubic foot, and a maximum density of 17 lbs. per cubic foot for unflattened UBC and 22 lbs. per cubic foot for flattened UBC. Size: minimum 30 cubic feet, with bale range dimensions of 24" to 40" by 30" to 52" by 40" to 84". The only acceptable tieing method shall be as follows: four to six ⅝" x .020" steel bands, or six to ten #13 gauge steel wires (aluminum bands or wires are acceptable in equivalent strength and number). Use of skids and/or support sheets of any material are not acceptable. Must be magnetically separated material and free of steel, lead, bottle caps, plastic cans and other plastics, glass, wood, dirt, grease, trash and other foreign substances. Any free lead is basis for rejection. Any and all aluminum items, other than used beverage cans, are not acceptable. Items not covered in the specification are subject to special arrangement between buyer and seller.

Taldork—BRIQUETTED ALUMINUM USED BEVERAGE CAN (UBC) SCRAP

Shall have a briquette density of 50 pounds per cubic foot minimum. Nominal briquette size shall range from 12 to 24 inches x 12 to 24 inches in uniform profile with a variable length of 8 inches minimum and 48 inches maximum. Briquettes shall be bundled or stacked on skids and secured with a minimum of one vertical band per row and a minimum of one girth band per horizontal layer. Briquettes not to overhang pallet. Total package height shall be 48 inches maximum. Banding shall be at least ⅝" wide by .020" thick steel strapping or equivalent strength. The weight of any bundle shall not exceed 4000 pounds. Material must be magnetically separated and free of steel, plastic, glass, dirt and all other foreign substances. Any and all aluminum items, other than UBC are unacceptable. Any free lead is a basis for rejection. Items not covered in the specification, including moisture, and any variation in the specification are subject to special arrangement between buyer and seller.

Talo—PAINTED SIDING

Shall consist of clean, low copper aluminum siding scrap, painted one or two sides, free of iron, dirt, corrosion, fiber backing or other types of foreign contamination.

Talent—COATED SCRAP

Shall consist of awnings, venetian blinds, vinyl, plastic, etc. Shall be subject to special arrangements between buyers and sellers.

Talk—ALUMINUM COPPER RADIATORS

Shall consist of clean aluminum and copper radiators, and/or aluminum fins on copper tubing, free of brass tubing, iron and other foreign contamination.

ISRI Code Word	Item

Tall—E.C. ALUMINUM NODULES

Shall consist of clean E.C. aluminum, chopped or shredded, free of screening, hair-wire, iron, insulation, copper and other foreign contamination. Must be free of minus 20 mesh material. Must contain 99.45% aluminum content.

Talon—NEW PURE ALUMINUM WIRE AND CABLE

Shall consist of new, clean, unalloyed aluminum wire or cable free from hair wire, wire screen, iron, insulation and any other foreign substance.

Tann—NEW MIXED ALUMINUM WIRE AND CABLE

Shall consist of new, clean unalloyed aluminum wire or cable which may contain up to 10% 6000 series wire and cable free from hair wire, wire screen, iron, insulation and any other foreign substance.

Tasie—OLD PURE ALUMINUM WIRE AND CABLE

Shall consist of old, unalloyed aluminum wire and cable containing not over 1% free oxide or dirt and free from hair wire, wire screen, iron, insulation and any other foreign substance.

Tassel—OLD MIXED ALUMINUM WIRE AND CABLE

Shall consist of old, unalloyed aluminum wire and cable which may contain up to 10% 6000 series wire and cable with not over 1% free oxide or dirt and free from hair wire, wire screen, iron, insulation and any other foreign substance.

Tarry—ALUMINUM PISTONS

(a) Clean Aluminum Pistons
Shall consist of clean aluminum pistons to be free from struts, bushings, shafts, iron rings and any other foreign materials. Oil and grease not to exceed 2%.
(b) Aluminum Pistons with Struts
Shall consist of clean whole aluminum pistons with struts to be free from bushings, shafts, iron rings and any other foreign materials. Oil and grease not to exceed 2%.
(c) Irony Aluminum Pistons
Should be sold on recovery basis, or by special arrangements with purchaser.

Code Word	Item

Teens—SEGREGATED ALUMINUM BORINGS AND TURNINGS

Shall consist of clean, uncorroded aluminum borings and turnings of one specified alloy only and subject to deductions for fines in excess of 3% through a 20 mesh screen and dirt, free iron, oil, moisture and all other foreign materials. Material containing iron in excess of 10% and/or free magnesium or stainless steel or containing highly flammable cutting compounds will not constitute good delivery.

Telic—MIXED ALUMINUM BORINGS AND TURNINGS

Shall consist of clean, uncorroded aluminum borings and turnings of two or more alloys and subject to deductions for fines in excess of 3% through a 20 mesh screen and dirt, free iron, oil, moisture and all other foreign materials. Material containing iron in excess of 10% and/or free magnesium or stainless steel or containing highly flammable cutting compounds will not constitute good delivery. To avoid dispute should be sold on basis of definite maximum zinc, tin and magnesium content.

Tense—MIXED ALUMINUM CASTINGS

Shall consist of all clean aluminum castings which may contain auto and airplane castings but no ingots, and to be free of iron, dirt, brass, babbitt and any other foreign materials. Oil and grease not to total more than 2%.

Tepid—WRECKED AIRPLANE SHEET ALUMINUM

Should be sold on recovery basis or by special arrangements with purchaser.

Terse—NEW ALUMINUM FOIL

Shall consist of clean, new, pure, uncoated, unalloyed aluminum foil, free from anodized foil, radar foil and chaff, paper, plastics, or any other foreign materials. Hydraulically briquetted material by arrangement only.

Testy—OLD ALUMINUM FOIL

Shall consist of clean, old, pure, uncoated, unalloyed aluminum foil, free from anodized foil, radar foil and chaff, paper, plastics, or any other foreign materials. Hydraulically briquetted material by arrangement only.

Thigh—ALUMINUM GRINDINGS

Should be sold on recovery basis or by special arrangements with purchaser.

Thirl—ALUMINUM DROSSES, SPATTERS, SPILLINGS, SKIMMINGS AND SWEEPINGS

Should be sold on recovery basis or by special arrangements with purchaser.

Code Word	Item

Throb—SWEATED ALUMINUM

Shall consist of aluminum scrap which has been sweated or melted into a form or shape such as an ingot, pig or slab for convenience in shipping; to be free from corrosion, drosses or any foreign materials. Should be sold subject to sample or analysis.

Tooth—SEGREGATED NEW ALUMINUM ALLOY CLIPPINGS AND SOLIDS

Shall consist of new, clean, uncoated and unpainted aluminum scrap of one specified aluminum alloy only and to be free of foil, hair, wire, wire screen, dirt, and other foreign substances. Oil and grease not to total more than 1%. Also free from punchings less than ½" in size. New can stock subject to arrangement between buyer and seller.

Tough—MIXED NEW ALUMINUM ALLOY CLIPPINGS AND SOLIDS

Shall consist of new, clean, uncoated and unpainted aluminum scrap of two or more alloys free of 7000 series and to be free of foil, hair wire, wire screen, dirt, and other foreign substances. Oil and grease not to total more than 1%. Also free from punchings less than ½" in size. New can stock subject to arrangement between buyer and seller.

Tread—SEGREGATED NEW ALUMINUM CASTINGS, FORGINGS AND EXTRUSIONS

Shall consist of new, clean, uncoated aluminum castings, forgings, and extrusions of one specified alloy only and to be free from sewings, stainless steel, zinc, iron, dirt, oil, grease and other foreign substances.

Trump—ALUMINUM AUTO CASTINGS

Shall consist of all clean automobile aluminum castings of sufficient size to be readily identified and to be free from iron, dirt, brass, babbitt bushings, brass bushings, and any other foreign materials. Oil and grease not to total more than 2%.

Twang—INSULATED ALUMINUM WIRE SCRAP

Shall consist of aluminum wire scrap with various types of insulation. To be sold on a sample or recovery basis, subject to agreement between buyer and seller.

ISRI Code Word	Item

[illegible]—ALUMINUM AIRPLANE CASTINGS

Shall consist of clean aluminum castings from airplanes and to be free from iron, dirt, brass, babbitt bushings, brass bushings, and any other foreign materials. Oil and grease not to total more than 2%.

Twitch—FRAGMENTIZER ALUMINUM SCRAP (From Automobile Shredders)

The material, as received, must be dry and not to contain more than 3% maximum free zinc, 1% maximum free magnesium, and 1.5% maximum free iron and stainless. Not to contain more than a total 5% maximum of non-metallics, of which no more than 1% shall be rubber and plastics. To be free of excessively oxidized material. Any variations to be sold by special arrangement between buyer and seller.

Water—MAGNESIUM CLIPS

Shall consist of clean magnesium clips in crucible size, free of copper, aluminum, and zinc flashings and excessive oil and grease. To be free of all foreign attachments.

Walnut—MAGNESIUM SCRAP

Shall consist of magnesium castings, magnesium engine blocks and transmission casings, bomber and car wheels, extrusions, and sheet. Material to be free from brass and copper inserts and all foreign attachments. To be free of anodes, hollow castings and explosives. Percentages of and penalties for dirt, oil, grease, and iron to be subject to agreement between buyer and seller. Excessively large pieces to be negotiated between buyer and seller.

Wine—MAGNESIUM ENGRAVER PLATES

To be free of copper, aluminum, zinc, and electrotype plates. To be clean and free of all foreign attachments. Magnesium plates shipped loose by agreement between buyer and seller.

Wood—MAGNESIUM DOCKBOARDS

Shall consist of clean magnesium dockboard cut or broken to size agreed upon by buyer and seller. To be free of all foreign attachments.

World—MAGNESIUM TURNINGS

It is recommended that these materials be sold by special arrangement between buyer and seller.

ISRI Code Word	Item

ZORBA—RECYCLABLE CONCENTRATES OF SHREDDED MIXED NONFERROUS SCRAP METAL IN PIECES—DERIVED FROM FRAGMENTIZERS FOR FURTHER SEPARATION OF CONTAINED MATERIALS

Shall be made up of a combination of the nonferrous metals: aluminum, copper, lead, magnesium, stainless steel, nickel, tin, and zinc, in elemental or alloyed (solid) form. The percentage of each of these metals within the nonferrous concentrate shall be subject to agreement between buyer and seller, may vary from shredder to shredder and may, in some cases, be zero for a particular metal. Shall be obtained by air separation, flotation, screening, eddy current, other segregation technique(s) or a combination of the same. Shall have passed one or more magnets to reduce or eliminate free iron and/or iron attachments. Shall be free of radioactive material, dross or ash. May be screened to permit description by specific size ranges. May contain high density non-metallics such as rock, glass, rubber, plastic and wood. Items of exclusion, inclusion or limitation not set out in the above specifications, such as moisture and free iron and/or attachments or the presence or absence of other metals, are subject to agreement between buyer and seller. Material to be traded under this guideline shall be identified as ZORBA with a number to follow indicating the estimated percentage nonferrous metal content of the material (e.g. ZORBA 63 - means the material contains approximately 63% nonferrous metal content).

Aroma—NEW NICKEL SCRAP

Shall consist of clean new sheet, plate, bar, tube, and any other wrought nickel scrap solids. Nickel minimum 99%; Cobalt maximum 0.25%; Copper maximum 0.50%. Free of castings, as well as any foreign attachments or other contamination.

Burly—OLD NICKEL SCRAP

Shall consist of old and/or new sheet, plate, bar, tube, and any other wrought nickel scrap solids. Material to contain a minimum of 98% nickel; Copper maximum 0.50%. This grade to be free of castings, soldered, brazed, sweated, or painted material, other metallic coating, foreign attachments, and any other contamination.

Dandy—NEW CUPRO NICKEL CLIPS AND SOLIDS

Shall consist of clean, new, segregated (normally accepted analysis grades) either 70/30, 80/20, or 90/10 cupro nickel tube, pipe, sheet, plate, or other wrought solid forms. Must be free of foreign attachments or any other contamination.

ISRI Code Word	Item

Daunt—CUPRO NICKEL SOLIDS

Shall consist of old, and/or new, segregated (normally accepted analysis grades either 70/30, 80/20, 90,10 cupro nickel tube, pipe, sheet, plate, or other wrought solid forms. Maximum 2% sediment allowable. Any other forms of cupro nickel solids such as castings, gates, risers, spills, etc., packaged separately, may or may not be included, only upon agreement between buyer and seller. Must be free of foreign attachments and all other contamination. Other particulars concerning physical description, analysis and packaging to be agreed upon between buyer and seller.

Delta—SOLDERED CUPRO NICKEL SOLIDS

Shall consist of segregated (normally accepted analysis grades) either 70/30, 80/20, 90/10 cupro nickel solids, soldered, brazed, or sweated, must be free of trimmed seams and edges and all other contamination.

Decoy—CUPRO NICKEL SPINNINGS,TURNINGS, BORINGS

Shall consist of clean segregated (normally accepted analysis grades) either 70/30, 80/20, 90/10 cupro nickel spinnings, turnings, or borings. Particulars concerning physical description, analysis, packaging, to be agreed upon between buyer and seller.

Depth—MISCELLANEOUS NICKEL-COPPER AND NICKEL-COPPER IRON

Shall consist of miscellaneous scrap in which the basic elements, by weight, are nickel and copper, such as copper nickel peelings, plating racks, and hangers, and all nickel and copper in attached or combined form. In all cases, miscellaneous nickel copper scrap should be sold by description and analysis.

Hitch—NEW R-MONEL CLIPPINGS AND SOLIDS

Shall consist of clean, new, R-Monel sheet, plate, bar, rod, tube, pipe, or any other wrought scrap, free of any foreign attachments or any other contamination.

House—NEW MIXED MONEL SOLIDS AND CLIPPINGS

Shall consist of new, clean R and K-Monel solids and clippings. Free of cast material, foreign attachments and all other contamination.

Ideal—OLD MONEL SHEET AND SOLIDS

Shall consist of clean R and K-Monel solids such as sheet, plate, pipe, rods, forgings, screen and wire cloth. Must be free of soldered, brazed, welded, or sweated material, cast material, foreign attachments, and all other contamination.

Indian—K-MONEL SOLIDS

Shall consist of clean K-Monel solids.

ISRI Code Word	Item

Junto—SOLDERED MONEL SHEET AND SOLIDS

Shall consist of soldered and/or brazed miscellaneous grades of Monel alloys in either wrought or cast form. Must be free of trimmed seams and edges, non-metallic fitting, foreign attachments, and all other contamination. Particulars concerning physical description, assay, and packaging to be agreed upon between buyer and seller.

Lemon—MONEL CASTINGS

Shall consist of various types of clean Monel castings, assaying minimum 60% nickel. Must be free of foreign attachments or any other contamination.

Lemur—MONEL TURNINGS

Shall consist of mixed Monel turnings and borings containing a minimum of 60% nickel content, on a dry basis.

Pekoe—200 SERIES STAINLESS STEEL SCRAP SOLIDS

Shall consist of all types of clean AISI Series Stainless Steel Scrap Solids, which contain a maximum of .5% copper, free of foreign attachments and other contamination.

Sabot—STAINLESS STEEL SCRAP

Shall consist of clean 18-8 type stainless steel clips and solids containing a minimum 7% nickel, 15% chrome, and have a maximum of .50% molybdenum, .50% copper, .046% phosphorous, and .03% sulfur, and otherwise free of harmful contaminants. Particulars concerning physical description, grading, additional analysis, and preparation to be agreed upon between buyer and seller.

Ultra—STAINLESS STEEL TURNINGS

Shall consist of clean 18-8 type stainless steel turnings containing a minimum 7% nickel and 16% chrome, and to be free of nonferrous metals, nonmetallics, excessive iron, oil and other contaminants. Particulars concerning physical description, assay, packaging to be agreed upon between buyer and seller.

Vaunt—EDISON BATTERIES

Nickel-iron batteries to be sold free of crates, copper terminal connections, and excess liquid. Free of nickel cadmium batteries.

IDENTIFICATION CHECK LIST FOR PRECIOUS METALS

This Identification Check List for Precious Metals sets up a general basis for identifying types and grades of precious metals scrap by the scrap processor which will be familiar both to the precious metal refiner and to the plants generating precious metal scrap.

By checking this identification list, the scrap processor gives the refiner a fairly accurate conception of the material he has on hand and offers a basis for the refiner to quote an estimated price for the material.

Due to the high values and the constantly changing character of precious metal scrap, it is often the practice in the industry to require a sample to be submitted before giving refining schedules.

I. SCRAP SOURCES

REFINED SILVER METAL—99.9 MIN. PERCENT

SILVER BEARING MATERIALS:

Anodes
Assemblies—Electrical
Batteries
  Silver/Copper
  Silver/Cadmium
  Silver/Zinc
  Silver/Magnesium
Blanking Scrap—Punchings
Brazing Alloys
Brushes—Electric Motors
Bullion
Chemical Salts
Clad Bi-Metal Parts
Coin Silver
Contacts
Dental Amalgam
Film
  Industrial X-Ray
  Medical X-Ray
  Lithographic
  Photographic Negatives
Filters—Plating
Flake—From Hypo Solution Recovery Systems
Hooks—Plating—Nodules
Jewelry Sweeps
Paints—Paste
Paper-Reproduction
Plated Parts—Electrical—Electronic
Plated Serving Pieces
Plated Utensils
Plated Wire
Powders—Granulated
Punchouts
Relays—Electrical
Resins
Silver Lined Bearings—Diesel Locomotives and Aircraft
Sludges—Plating and Precipitates
Solutions—Plating
Sterling Silver
Tin Lead Alloys—Contaminated
Turnings
Wave Guides
Wiping Rags

REFINED GOLDMETAL—99.5 MIN. PERCENT
REFINED GOLD SPONGE—99.5 MIN. PERCENT

GOLD BEARING MATERIALS:

Brazing Alloys
Cladmetal Parts
Contacts
Dental Alloys
Dental Scrap
Dental Sweeps and Grindings
Diodes
Filled Scrap
Filters—Plating
Flakes
Flashings
Foil
Hooks—Plating—Nodules
Jewelry Scrap
Jewelry Sweeps and Grindings
Paints and Paste
Peelings
Placer Gold
Plated Parts—Electrical
Plated Wire
Powders
Printed Circuit Boards
Printed Circuit Boards with Components
Punchouts
Resins—Plating
Salts—Chemical
Sludges—Plating
Solutions
Sponge
Tin Lead Alloys—Contaminated
Transistors
Wiping Rags
Wire

REFINED PALLADIUM METAL—99.9 MIN. PERCENT
REFINED PALLADIUM SPONGES—99.9 MIN. PERCENT

PALLADIUM BEARING MATERIALS:

Catalysts
Clad Materials
Contact Points
Dental Alloys
Dental Scraps
Dental Sweeps
Jewelry Scrap (Sweeps)
Paste
Plated Parts
Powders
Relays—Electrical
Salts—Chemical
Sludges
Solutions
Wire

REFINED PLATINUM METAL—99.9 MIN. PERCENT
REFINED PLATINUM SPONGE—99.9 MIN. PERCENT

PLATINUM BEARING MATERIALS:

Catalysts
Chemicals
Clad Materials
Contacts
Dental Alloys
Dental Scrap
Dental Sweeps, Grindings
Jewelry Scrap
Jewelry Sweeps
Laboratory Ware
Magneto Points
Powders and Paste
Solutions—Plating
Spark Plugs—Aircraft
Thermocouple Wire

SCRAP CONTAINING COMBINATIONS OF PRECIOUS METALS (GOLD, SILVER, PLATINUM AND PALLADIUM)

Assemblies—Components
Bullion
Carbon
Catalysts
Chemicals
Chips
Drillings
Electronic Scrap
High Temperature Resistant Alloys
Paints
Paste
Powders
Relays—Electrical
Resins
Ribbons
Rings
Salts
Solutions
Sweeps
Telephone Switching Scrap
Thick Film
Wire

II. SCRAP CATEGORIES

A. Solution
1. Acid
2. Basic
3. Matrix if known

B. Resin

C. Sludges

D. Burnable Material
1. Carbon
2. Fillers
3. Film
4. Papers
5. Unprepared Sweeps
6. Others

E. Sweeps (Prepared)

F. Printed Circuit Board
1. Punch Outs
2. Non Assembled
3. Assembled
4. Other

G. Glass to metal Tubes, etc.
1. Solid Precious Metal Parts
2. Alloyed Metal Parts
3. Plated Metal Parts
4. Ceramics
5. Thick Film
6. Other . . . .

H. Metal Scrap
I. Non Magnetic
1. Impure Gold
2. Impure Silver
3. Copper Base
4. Aluminum Base
5. Brass Base
6. Bronze Base
7. Molybdenum Base
8. Beryllium Base
9. Lead Base
10. Tin Base
11. Other . . . .

II. Magnetic
1. Kovar Base
2. Stainless Steel Base
3. Iron Base
4. Nickel Base
5. Other . . . .

I. Catalyst
1. Carbon
2. Alumina
3. Rare Earth
4. Silica
5. Other . . .

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Scrap Specifications Circular 1998

Guidelines for Metals Transactions

RMR 0034

GUIDELINES FOR METALS TRANSACTIONS

These Guidelines are intended as a reference to assist members in carrying out their business obligations in a manner consistent with accepted industry practices. While the Guidelines are not obligatory, it is suggested that potential problems and misunderstandings may often be avoided by following these recommended procedures, in conjunction with ISRI's scrap descriptions.

At times, the respective parties to a transaction may be unaware of the differences in trading practices of the other party. This diversity of interpretation often leads to misunderstandings, disputes, and in some instances expensive lawsuits. It is with the objective of providing members the means of avoiding such friction that ISRI has published these Guidelines, which are based on those practices most common and current in the industry.

On these points where it is impractical to provide recommendations, it is advised that the points be mutually agreed upon by the parties involved.

PART I

GUIDELINES FOR CONTRACTS

A contract is an agreement between two or more parties to perform a legally enforceable act.

Therefore, all contracts should be in writing and set forth in specific terms. Before signing a contract, one should carefully read and understand all terms of it. No discrepancies or ambiguities should exist at the time the contract is executed. If you receive a contract with terms that are objectionable, you should immediately notify the other party in writing of your objections. An attorney should be consulted when legal advice is needed.

It should be kept in mind that if a dispute arises under a contract, and a court is called in to interpret its terms, certain general rules will be applied. First of all, contracts will be construed as a "whole," and specific clauses will be subordinated to the contract's general intent. Secondly, courts will construe words according to their "ordinary" meaning unless it is clearly shown that they were meant to be used in a technical sense. Also, where provisions appear to be inconsistent, the courts will determine whether some of the provisions are printed (indicating a form contract), as compared to others which are written or typed. The latter kinds of provisions will prevail.

It should be remembered that where you and a buyer (or seller) have reached verbal agreement on a transaction, your failure to sign and return a contract which is sent to you in confirmation of that verbal agreement may not relieve you of the obligations of the terms and conditions enumerated in that contract.

This Guideline was developed to cover routine transactions. It is essential that any unusual arrangements must be completely spelled out in a contract. With these factors in mind, the following list of items is enumerated as a **Checklist** for you to follow, either in the construction of a contract, or for the review of another party's contract proposal. We cannot overemphasize the need for accuracy and specificity.

Checklist Items
(Be specific at all times)

I. **Parties to Agreement:**
Indicate full name and address of buyer and seller. Include name of individual person or persons involved. Buyer's and seller's signatures are fundamental.

II. **Date of Contract:**
(a) Give date the initial agreement was reached.
(b) Give Contract Number.

III. **Description of Material:**
Use NF code names or clearly describe what is being traded. Any allowable quality variation to be so stated. Ex: "X percent moisture allowed" or "Minimum CU content to be X percent" or "X percent Painted Material allowed."

IV. **Quantity:**
State exact quantity expected and indicate allowable tolerances or minimum/maximum limitations. Ex: "40,000 lbs. (5% More/Less allowed)" or "38,000 to 42,000 lbs."

V. **Packing:**
State type of packing allowable and restrictions if such are required. Ex: "Bales not to exceed 60 inches"; "Bales not to exceed 3,500 lbs."

VI. **Delivery:**
Show complete address of shipping or delivery point, including where applicable, specific rail siding or junction, forwarding warehouse, and party to be notified. Ex: "FOB (Actual Point of Shipment) Chicago, Ill."; "FOB (Actual Point of Delivery) St. Louis, Mo."; "FAS Baltimore Container Yard"; "C & F Tokyo, Japan." If these details cannot be furnished at the time of writing of contract, it should state "shipping/delivery instructions to follow." State means of conveyance to be employed. State size and type of truck, rail car, container or number of shipments expected or permitted.

VII. **Shipment:**
Time allowed for shipment or delivery should be clearly stated. Ex: "Shipment by Jan. 15, 1989 LATEST"; or "delivery by Jan. 15, 1989." Indicate at whose option, buyer's or seller's, shipment shall be made in time period stated.

VIII. **Price:**
State price per unit. Ex: "$20.00/CWT"; "20.00 Cents/Pound"; "$400.00/Net Ton"; "$440.92/Metric Ton," and indicate where appropriate "Clean and Dry"; "Full Copper Content." If applicable, state exact processing, smelting, refining charge, or unit deductions for impurities. (Avoid the use of the word "penalties.")

IX. **Payment:**
Terms of payment should be explicit. Ex: "Net 30 days after shipment"; "Net 15 days after mill receipt." Avoid phrases such as "usual," "Net 30," "Net Cash." Documents required to effect payment to be clearly stated. Ex: "Bill of Lading, Invoice, Weight Certificate." State how payment shall be made. If there is discussion of compensation for delayed payments, it should be included in the contract. If Letter of Credit is called for as a means of payment, it would be advisable that the terms to be included in the Letter of Credit also be stated in the contract. When applicable, contract should state whether buyer or seller is responsible for payment of taxes, duties, or any other levies to which a shipment could be subjected. Contract should state whether the seller's or buyer's weights shall govern the basis of settlement.

X. **Assignment:**
The contract may state whether the buyer and/or the seller has the right to assign the contract. If it does, it should emphasize that the obligation arising under the contract shall be equally binding on his assignee.

XI. **Notice:**
The seller should specify how notice to be given under the contract should be received—i.e. by hand, by telegram, by certified or registered mail. One should also specify when notice is deemed to be received by the party to whom it is given.

XII. **Disclaimer of Warranties:**
Depending on the type of transaction, or the metal involved, the seller may want to limit his liability by disclaiming any warranties of merchantability or of fitness for a particular purpose.

XIII. **Default:**
The contract should contain a provision setting forth the events which would result in a default of the contract. This provision might also contain a clause stipulating damages and/or setting forth available remedies (i.e. specific performance) in the event a default does, in fact, occur.

XIV. **Force Majeure:**
This item is related to the item of default, as indicated in paragraph XIII. Seller or buyer may enumerate, either generally or specifically, what events (i.e. strikes, fires, accidents) constitute circumstances beyond its control and thereby absolve him of any liability for damages or delay.

XV. **Non-Waiver:**
The seller or buyer should state in the contract that his failure to insist upon strict performance in any given instance shall not be construed as a waiver or relinquishment for the future of any of the terms, covenants and conditions contained therein.

XVI. **Claims:**
The seller may specify that any claims involved in a metals transaction for contaminated materials, weight shortage, or for any other cause is waived by the buyer unless brought to the seller's attention within a certain number of days after delivery.

XVII. **Arbitration and Applicable Law:**
The contract should set forth which state's or country's law will apply in the event of a legal dispute under the contract. It should also provide for arbitration procedure. (If ISRI Arbitration is desired, the contract should so stipulate.)

XVIII. **Benefit:**
The contract should stipulate on whom it is binding. For instance, the seller or buyer may want to specify that the contract inures to the benefit of the parties, their legal representatives, successors and assigns.

XIX. **Entire Agreement:**

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This provision is especially important in the area of metals transactions, which frequently involve extensive preliminary negotiations. A clause may be inserted into the contract stating that the contract constitutes the parties' entire agreement and supersedes all prior agreements and understandings with respect to the subject matter of the contract.

XX. **Modification:**
A clause may be included in the contract stating that the contract's requirements can only be modified by a written instrument signed by the parties or their respective agents. This insures that the parties' informal discussions will not later be construed as effecting an alteration of the contract.

PART II

PACKING, WEIGHING, SHIPPING AND RECEIVING

It is recommended that strict adherence to contract terms will minimize many of the potential problems in this area. If there is a question about any item, one should communicate with his buyer/seller and clarify the situation prior to shipping. Listed below are some specific guidelines to be used in avoiding the most frequently reported problems.

PACKING (ALL SHIPMENTS)

Seller's Responsibility:

a. Pack in the manner and form agreed. Example: in sound bales, briquettes, boxes, pallets, drums, loose, etc.

b. Be sure that buyer agrees with your definition of words and phrases, i.e. Bale, Briquette, Coil, etc. as well as allowed dimensions and weights of such.

c. Material and packages should be securely tied or supported so that packages will hold in transit and normal handling.

Buyer's Responsibility:

a. Advise seller of any specific prohibitions, i.e. type or method of packing, size or weight of pieces, units or packages, etc.

b. Be sure that seller agrees with your definition of words and phrases, i.e. Bale, Briquette, Coil, etc., as well as allowed dimensions and weights of such.

WEIGHING, SHIPPING AND RECEIVING (TRUCK SHIPMENT)

Seller's Responsibility:

a. Each package should be individually weighed and the entire truckload should be checkweighted for comparison. Reconcile or explain any differences. If truck is weighed during inclement weather or wind, make note of this on weight ticket.

b. Trailers should be drop-weighed (both empty and loaded).

c. All equipment should be inspected before loading, and cleaned or repaired where necessary to avoid loss or spillage.

d. Open top trucks or trailers should be tarped or covered.

e. Vans and closed trailers should be sealed and seal numbers indicated on all documents.

f. If your customer requires appointments, make one in advance. Otherwise, as a courtesy, advise the buyer of your anticipated delivery schedules.

g. A complete manifest and packing list should accompany each shipment. This should clearly indicate the order number, items shipped, number and type of packages of each commodity, as well as the gross, tare and net weights of each package. This detailed information should be put into an envelope and attached to the inside wall of the truck or van. If this cannot be done, give a complete set of papers to the driver to deliver with the original Bill of Lading covering the shipment. At the very least, notify buyer, by telephone, telex or wire of these details on the day shipment leaves.

h. Different lots should always be properly segregated and bulkheaded to avoid comingling. Each package should be tagged or marked to aid in proper identification and segregation at the receiving point.

i. Be aware that someone at the delivery point will have to unload the shipment. Pay particular attention to door areas to assure that material is loaded safely. Proper care should be taken to insure that the material can be unloaded in a safe and expedient manner.

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Buyer's Responsibility:

a. If seller requires appointment prior to pickup, make one in advance. Otherwise, as a courtesy, advise the seller of your anticipated pickup schedule.

b. Trailers should be drop-weighed (both empty and loaded).

c. Carefully check shipment advices and compare package count, seal numbers, weights.

d. Prior to unloading, if a significant* weight difference is apparent, the seller should be notified promptly and if requested, another weight should be taken to determine if spillage or theft might have occurred.

e. After unloading, promptly advise seller of any significant* differences between advised and actual weights, segregation, classification or quality. (Note: Refer to Part IV of the circular for recommended procedures in handling quality problems.)

f. Truck or trailer should be completely unloaded including any spilled material which should be picked up, weighed and identified as spilled from original containers. Buyers should cooperate in every way to help minimize losses.

WEIGHING, SHIPPING AND RECEIVING (RAIL SHIPMENT)

Seller's Responsibility:

a. Each package should be individually weighed and the entire rail car should be checkweighed for comparison. Reconcile or explain any differences. If rail car is weighed during inclement weather or wind, make note of this on weight ticket.

b. Railroad cars should be uncoupled and at rest (if possible) before weighing.

c. All equipment should be inspected before loading, and cleaned or repaired where necessary to avoid loss or spillage.

d. Railroad cars should be sealed and seal numbers indicated on all documents.

e. A complete manifest and packing list should accompany each shipment. This should clearly indicate the order number, items shipped, number and type of packages of each commodity, as well as the gross, tare and net weights of each package. This detailed information should be put into an envelope and attached to the inside wall of the railroad car. If this cannot be done, mail a complete set of papers to the buyer on the day shipment leaves.

f. Different lots should always be properly segregated and bulkheaded to avoid comingling. Each package should be tagged or marked to aid in proper identification and segregation at the receiving point.

g. Be aware that someone at the delivery point will have to unload the shipment. Pay particular attention to door areas to assure that material can be unloaded in a safe and expedient manner.

Buyer's Responsibility:

a. Railroad cars should be uncoupled and at rest (if possible) before weighing.

b. Carefully check shipment advices and compare package count, seal numbers, weights.

c. Prior to unloading, if a significant* weight difference is apparent, the seller should be notified promptly and if requested, another weight should be taken to determine if spillage or theft might have occurred.

d. After unloading, promptly advise seller of any significant* differences between advised and actual weights, segregation, classification or quality. (Note: Refer to Part IV of the circular for recommended procedures in handling quality problems.)

e. Rail car should be completely unloaded including any spilled material which should be picked up, weighed and identified as spilled from original containers. Buyer should cooperate in every way to help minimize losses.

WEIGHING, SHIPPING AND RECEIVING (EXPORT/IMPORT SHIPMENT)

Seller's Responsibility:

a. Each package should be individually weighed and the entire container load should be checkweighed for comparison. If container is weighed during inclement weather or wind, make note of this on weight ticket.

b. Container and chassis should be drop-weighed, if possible, both empty and loaded.

c. Prepare and send to buyer a complete manifest and packing list indicating the order number, items shipped, number and type of packages of each commodity, as well as the gross, tare and net weights of each package and the seal numbers.

d. If shipment is against a Letter of Credit, pay strict attention to all terms.

e. Place seals on all container doors and indicate seal numbers on documentation.

f. Material and packages should be properly stowed and braced to prevent movement during shipment.

g. Be aware that someone at the delivery point will have to unload the shipment. Pay particular attention to door areas to assure that material is loaded safely. Proper care should be taken to insure that the material can be unloaded in a safe and expedient manner.

Buyer's Responsibility:

a. Container and chassis should be drop-weighed, if possible, both empty and loaded.

b. Carefully check shipment advices and compare package count, seal numbers, weights.

c. Prior to unloading, if a significant* weight difference is apparent, the seller should be notified promptly and if requested, another weight should

be taken to determine if spillage or theft might have occurred. Seller should be given opportunity to appoint surveyor or representative to verify weights.

d. After unloading, promptly advise seller of any significant* differences between advised and actual weights, segregation, classification or quality. (Note: Refer to Part IV of the circular for recommended procedures in handling quality problems.)

e. Container should be completely unloaded including any spilled material which should be picked up, weighed and identified as spilled from original containers. Buyer should cooperate in every way to help minimize losses.

*For purposes of this section, the meaning of the word "significant shall be determined by agreement between buyer and seller, depending on the commodities and their values.

PART III

TRANSPORTATION GUIDE

The mode and type of conveyance should be specified in the contract. If it has not been, then it is important that buyer and seller agree upon the mode and type to be used. These guidelines will assist in determining the appropriate means of transportation to employ.

A. Mode—Truck/Trailer

1. Type:
   a. Dump
   b. Removable sides
   c. Van—open or closed
   d. Dimensions of unit (20 ft., 40 ft., etc.)
   e. Determine if truck/trailer capacity meets minimum weight specified on contract.

B. Mode—Rail Car

1. Type:
   a. Box car or gondola
   b. Size of door opening, i.e. single or double door
   c. Special type D.F., Hi Cube, etc.
   d. Dimensions of car (40 ft., 50 ft., 60 ft., etc.)
   e. Determine if rail car capacity meets minimum weight specified on contract.

C. Export Shipments

1. Container:
   a. Type of container, i.e. closed, open-top, flat rack, hi-cube, etc.
   b. Size of container (20 ft., 35 ft., 40 ft., 45 ft., etc.)
   c. Determine if container capacity meets minimum weight specified on contract.
2. Breakbulk

PART IV

REJECTIONS—DOWNGRADES—CLAIMS

A brief explanation of these items will help one understand and implement the procedures recommended in this section.

Rejections: Rejections can occur when a buyer refuses to accept a shipment of material that does not conform to the description specified in the contract. Usually in such cases, the buyer cannot utilize the material and the seller is asked to remove the material from the buyer's place of delivery. A rejection can occur prior to unloading, but often the cause of the problem cannot be determined until the material has been offloaded and graded. Any part, or all of the shipment, may be subject to rejection.

Downgrades: Downgrades can occur when all, or part, of the material in a shipment is not in conformity with the description specified in the contract. Often, in such cases, the buyer can utilize the material and is willing to accept delivery of the material, subject to a price commensurate with its value.

Claims: This term is used mostly in export-import movements, and is used generically to encompass both rejections and downgrades, as well as weight shortages.

Strict adherence to contract terms can minimize the common causes of these difficulties. However, if a problem arises, it should be given prompt attention and settlement should be attempted as quickly as is practical. It is essential that both parties cooperate and keep communications open to minimize expenses and to preserve the relationship. Negotiations should not be conflicting but mutually beneficial and fair. Listed below are some recommended steps to be taken when a problem arises.

DOMESTIC SHIPMENTS

Buyer's Responsibilities:

a. In the event of a rejection buyer must notify seller immediately by telephone or telex. If seller fails to respond within two business days, buyer may return material in most prudent manner. Subject to contract provisions, buyer should promptly advise seller concerning replacement of rejected material.

b. In the event of a downgrade buyer must notify seller immediately by telephone or telex and afford seller an opportunity to inspect the material prior to its use. If material is to be inspected by seller or his representative, buyer should agree to a mutually convenient time to do so.

c. Buyer must give seller option of removing material if he does not agree to downgrade. (All costs of unloading and reloading are for seller's account.)

Seller's Responsibilities:

a. In the event of a rejection seller should respond promptly and advise buyer of his intentions. Seller must reply within two business days. Subject to contract provisions, he must advise buyer promptly concerning replacement of rejected material.

b. In the event of an unacceptable downgrade seller must advise buyer within two business days if he wishes to inspect material and agree upon a mutually convenient time to do so.

c. If seller wishes to remove downgraded material from buyer's delivery point, he must advise buyer promptly. (All costs of unloading and reloading are for seller's account.)

EXPORT-IMPORT SHIPMENTS

Buyer's Responsibility:

a. In the event of a claim, time is of the essence and notification should be given to seller within a reasonable period of time after arrival of vessel in receiving port.

b. In the event of a claim, the material should be held intact until agreement has been reached. The acceptable portion of the material may be consumed and/or arrangements may be made to sample a portion of material, i.e., 10%–25% with balance held intact pending resolution of claim.

Seller's Responsibility:

a. In the event of a claim, seller should respond to buyer's notification promptly by telephone, telex, wire, or cable.

b. When a claim settlement has been agreed upon, terms of settlement must be followed promptly.

JANUARY THRU JUNE, 1999 BROKERAGE VOLUME/MARGIN -

	January		February		March		April		May		June		Totals	
	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin
3RD PARTY CUST														
Barren County									3,860	57.90			3,860	57.90
Bluegrass Reg.					23,210	696.30	31,620	948.60	15,180	455.40	15,820	474.60	85,830	2,574.90
Chemetco	36,550	466.88	144,184	1,849.33	183,390	3816.45	194,552	3,703.24	72,770	1724.42	141,309	2899.17	772,765	14,459.49
DRMO														
Graham & Co.														
JLS Metals					14,700	696.80	13,780	620.10	14,020	630.90	7,160	323.10	49,660	2,270.90
LSM/Progress Rail														
Powercom							120,700	-					120,700	-
Riverside									18,000	1260.00			18,000	1260.00
Franklin Surplus			15,020	300.40							105,000	1395.15	120,020	1695.55
Keystone			201,980	1,009.90			43,260	324.60	364,660	2885.10			629,940	4,219.60
Ansara			33,402	446.01	104,626	1,558.19	71,979	1,458.52			39,929	831.23	249,936	4,292.95
Garden State														
Southern Recy.														
Baker Iron & Metal														
Eckhart America											47,592	4759.20	47,592	4759.20
Oldeon														
Volunteer Recy.														
Berg Recycling														
Crone														
Versatile							40,338	2,823.66					40,338	2823.66
CRS											13,040	782.40	13,040	782.40
Frank Toll			616,508	18,732.81									616,508	18,732.81
Oscar Bush			37,600	300.80									37,600	300.80
S&S Auto									73,700	1474.00			73,700	1,474.00
Trunnell Scrap									17,900	191.01	46,760	457.80	63,660	648.81
Portland			16,540	378.77	11,100	232.37			12,100	269.24			39,740	880.38
Sub Total	36,550	466.88	1,065,234	23,016.82	337,026	7,000.11	516,249	9,878.72	612,210	8947.97	415,650	11922.65	2,982,919	61,233.15
GROUP CUSTS.														
Audubon	48,740	731.10					231,660	3,186.70			181,860	2135.00	462,260	6,084.80
DJJ - Richmond	217,386	1,044.65	333,815	1,331.64	1,098,270	4,691.04	747,317	2,990.80	1,045,343	4161.39	940,279	3761.11	4,382,420	18,000.63
DJJ -Birmingham														
Trademark	677,710	4,323.65	982,510	7,203.48	518,180	4,549.44	825,472	7,947.45	292,240	2477.32	447,888	5821.77	3,723,800	32,323.11
DJJ - Jackson														
Western					44,973	562.18			44,420	2221.00	45,295	2151.51	134,688	4,934.67
Sub Total	943,846	6,099.40	1,266,325	8,535.12	1,661,423	9,802.64	1,804,469	14,136.95	1,382,003	8,879.71	1,615,122	13,869.39	8,703,168	61,323.21
GRAND TOTALS	980,396	6,566.28	2,361,559	31,551.94	1,998,449	16,802.75	2,320,718	24,015.67	1,994,213	17,827.68	2,030,772	25,792.04	11,686,107	122,556.36

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Audubon	00025	01/25/99	Chemetco	00045	Yellow Brass	01/26/99	48,740	$0.3950	$0.3800	Del	$0.0150	$731.10
Chemetco	00018	01/21/99	Nichols	00039	Clip	01/29/99	36,550	$0.4800	$0.4675	Del	$0.0125	$456.88
DJJ (Frank Noll)	00003	01/05/99	American I & M	00006	EC Chops	01/08/99	42,484	$0.5700	$0.5650	Del	$0.0050	$212.42
						01/20/99	37,822	$0.5700	$0.5650	Del	$0.0050	$189.11
DJJ (Frank Noll)	00004	01/05/99	Freedman, Joseph	00005	Alum Copper Units	01/19/99	48,667	$0.4500	$0.4450	Del	$0.0050	$243.34
						01/26/99	46,084	$0.4500	$0.4450	Del	$0.0050	$230.42
DJJ (Frank Noll)	00007	01/06/99	Schumann	00011	Red Brass	01/26/99	4,284	$0.5100	$0.5060	Del	$0.0040	$17.14
					Auto Radiators	01/26/99	16,254	$0.4000	$0.3960	Del	$0.0040	$65.02
					Heater Cores	01/26/99	2,275	$0.2900	$0.2860	Del	$0.0040	$9.10
					Semi Red Brass	01/26/99	1,664	$0.4300	$0.4260	Del	$0.0040	$6.66
						01/26/99	7,280	$0.4300	$0.4260	Del	$0.0040	$29.12
						01/26/99	3,638	$0.4300	$0.4260	Del	$0.0040	$14.55
					Nickel Silver Solids	01/26/99	1,748	$0.4200	$0.4160	Del	$0.0040	$6.98
					Nickel Silver Turning	01/26/99	3,758	$0.4100	$0.4060	Del	$0.0040	$15.03
					Lined Journals	01/26/99	1,440	$0.4000	$0.3960	Del	$0.0040	$5.76
							217,596					1044.65
Trademark	00002	01/05/99	Quantum	00007	Alum Wheels	01/13/99	42,154	$0.5300	$0.5200	Del	$0.0100	$421.54
Trademark	00006	01/07/99	Metal Commodities -	00010	Alum Copper Units	01/11/99	40,277	$0.4500	$0.4400	Del	$0.0100	$402.77
Trademark	00008	01/08/99	Schumann	00012	Red Brass	01/26/99	3,948	$0.5150	$0.5050	Del	$0.0100	$39.48
					Auto Radiators	01/26/99	39,888	$0.4000	$0.3900	Del	$0.0100	$398.88
Trademark	00010	01/11/99	Custom Alloys	00020	Cast Aluminum	01/27/99	43,600	$0.3950	$0.3800	FAS	$0.0150	$654.00
Trademark	00012	01/12/99	Essco	00023	#1 Extruation	01/13/99	43,210	$0.5200	$0.5150	Del	$0.0050	$216.05
						01/13/99	45,048	$0.5200	$0.5150	Del	$0.0050	$225.24
						01/18/99	44,586	$0.5200	$0.5150	Del	$0.0050	$222.93
						01/19/99	41,463	$0.5200	$0.5150	Del	$0.0050	$207.32
						01/20/99	12,640	$0.5200	$0.5150	Del	$0.0050	$64.20
						01/29/99	44,962	$0.5200	$0.5150	Del	$0.0050	$224.81

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Trademark	00017	)1/19/99	Easco	00033	#1 Extrustion	01/27/99	43,700	$0.5150	$0.5100	Del	$0.0050	$218.50
Trademark	00021	)1/21/99	Nichols	00039	Painted Siding	01/28/99	44,784	$0.4575	$0.4450	Del	$0.0125	$559.80
Trademark-Rockledg	00016	)1/13/99	Southwire	00027	Shredded Elec Motor	01/15/99	187,250	$0.0850	$0.0825	Del	$0.0025	$468.13
							67,710					4323.65
					Totals		980,396				$0.0067	$6,556.28
							05					

6556.28

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Ansam Metals	00022	01/21/99	Nichols	00041	Nichols Old Sheet	02/16/99	21,267	$0.4375	$0.4250	Del	$0.0125	$265.84
					Clip	02/16/99	8,473	$0.4800	$0.4650	Del	$0.0150	$127.10
						02/16/99	2,822	$0.4075	$0.3950	Del	$0.0125	$35.27
					Seg 3003	02/16/99	840	$0.5450	$0.5250	Del	$0.0200	$16.80
							33,402					445.01
Chemetco	00011	01/11/99	Nichols	00039	Clip	02/19/99	8,798	$0.4800	$0.4700	Del	$0.0100	$87.98
					Painted Siding	02/19/99	10,845	$0.4575	$0.4500	Del	$0.0075	$81.34
					Seg 3003	02/19/99	8,749	$0.5450	$0.5275	Del	$0.0175	$153.11
Chemetco	00013	01/12/99	Custom Alloys	00025	Cast Aluminum	02/03/99	43,404	$0.4000	$0.3875	FAS	$0.0125	$542.55
Chemetco	00018	01/21/99	Nichols	00039	Nichols Old Sheet	02/09/99	10,608	$0.4375	$0.4225	Del	$0.0150	$159.12
						02/09/99	3,631	$0.4375	$0.4225	Del	$0.0150	$54.47
						02/25/99	6,075	$0.4375	$0.4225	Del	$0.0150	$91.13
						02/25/99	11,483	$0.4375	$0.4225	Del	$0.0150	$172.25
					Clip	02/09/99	28,833	$0.4800	$0.4675	Del	$0.0125	$360.41
						02/25/99	3,721	$0.4800	$0.4675	Del	$0.0125	$46.51
					Painted Siding	02/09/99	8,037	$0.4575	$0.4450	Del	$0.0125	$100.46
							141,184					1848.35
DJJ (Frank Nott)	00004	01/05/99	Freedman, Joseph	00005	Alum Copper Units	02/15/99	42,648	$0.4500	$0.4460	Del	$0.0040	$170.59
DJJ (Frank Nott)	00007	01/05/99	Schumann	00011	Red Brass	02/22/99	6,864	$0.5100	$0.5000	Del	$0.0100	$68.64
					Auto Radiators	02/22/99	21,620	$0.4000	$0.3960	Del	$0.0040	$86.48
					Heater Cores	02/22/99	824	$0.2900	$0.2860	Del	$0.0040	$3.30
					Semi Red Brass	02/22/99	7,302	$0.4300	$0.4250	Del	$0.0050	$36.51
					Semi Red Brass Tur	02/22/99	5,210	$0.4200	$0.4260	Del	($0.0060)	($31.26)
						02/22/99	900	$0.4300	$0.4260	Del	$0.0040	$3.60
DJJ (Frank Nott)	00009	01/07/99	American I & M	00013	EC Chops	02/16/99	43,211	$0.5600	$0.5560	SP	$0.0040	$172.84
DJJ (Frank Nott)	00020	01/21/99	Owens Corning Pl. 4	00038	#1 Extrusion	02/23/99	39,470	$0.5150	$0.5110	Del	$0.0040	$157.88
DJJ (Frank Nott)	00031	02/02/99	Wabash - Richmond	00059	Decx Old Sheet	02/17/99	44,652	$0.4100	$0.4060	Del	$0.0040	$178.61

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00032	12/02/99	Wabash - Richmond	00060	Hi Grade Al Turnings	02/17/99	28,042	$0.3800	$0.3760	Del	$0.0040	$112.17
					Alum Bumpers	02/17/99	8,598	$0.4050	$0.4010	Del	$0.0040	$34.39
					7000 Series Alum	02/17/99	5,531	$0.4050	$0.4010	Del	$0.0040	$22.12
DJJ (Frank Nott)	00035	12/15/99	Audubon	00085	Deox Old Sheet	02/26/99	25,046	$0.4400	$0.4360	Del	$0.0040	$100.18
					Alum Turnings	02/26/99	16,997	$0.4100	$0.4060	Del	$0.0040	$67.99
DJJ (Frank Nott)	00040	12/23/99	Quantum	00105	Alum Wheels	02/26/99	15,000	$0.5400	$0.5360	Del	$0.0040	$60.00
						02/26/99	1,700	$0.5300	$0.5260	Del	$0.0040	$6.80
						~~02/26/99~~	~~15,000~~	~~$0.5400~~	~~$0.5360~~	~~Del~~	~~$0.0040~~	~~$60.00~~
						~~02/26/99~~	~~1,700~~	~~$0.5300~~	~~$0.5260~~	~~Del~~	~~$0.0040~~	~~$6.80~~
					Alum Turnings	02/26/99	16,468	$0.3350	$0.3310	Del	$0.0040	$65.87
					Hard Brass	02/26/99	3,732	$0.5425	$0.5385	Del	$0.0040	$14.93
Frank Toll	99997	11/01/99	Jupiter Aluminum	00080	Seg 6061	02/17/99	45,217	$0.5100	$0.4900	Del	$0.0200	$904.34
						02/22/99	48,063	$0.5100	$0.4900	Del	$0.0200	$961.26
						02/26/99	48,624	$0.5100	$0.4900	Del	$0.0200	$972.48
Frank Toll	99998	11/01/99	Alcoa	00078	PIG 3105	02/09/99	44,230	$0.5575	$0.5225	Del	$0.0350	$1,548.05
						02/10/99	45,650	$0.5575	$0.5225	Del	$0.0350	$1,597.75
						02/11/99	44,958	$0.5575	$0.5225	Del	$0.0350	$1,573.53
						02/12/99	44,722	$0.5575	$0.5250	Del	$0.0325	$1,453.46
						02/15/99	44,534	$0.5575	$0.5225	Del	$0.0350	$1,558.69
						02/16/99	41,356	$0.5575	$0.5225	Del	$0.0350	$1,447.81
						02/17/99	43,980	$0.5575	$0.5225	Del	$0.0350	$1,538.60
						02/18/99	45,016	$0.5575	$0.5225	Del	$0.0350	$1,575.56
						02/23/99	40,120	$0.5575	$0.5225	Del	$0.0350	$1,404.20
						02/24/99	39,726	$0.5575	$0.5225	Del	$0.0350	$1,390.48
Frank Toll	99999	11/01/99	Jupiter Aluminum	00028	6000 Series	02/05/99	40,320	$0.5050	$0.4850	Del	$0.0200	$806.40
Franklin Surplus	00034	12/03/99	Ohio Valley Aluminu	00062	#1 Extrusion	02/22/99	15,020	$0.5200	$0.5000	Del	$0.0200	$300.40

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Keystone	00030	12/02/99	DJJ	00055	Deox Pyramids	02/09/99	42,840	$0.6350	$0.6300	Del	$0.0050	$214.20
						02/10/99	40,320	$0.6350	$0.6300	Del	$0.0050	$201.60
						02/12/99	37,620	$0.6350	$0.6300	Del	$0.0050	$188.10
						02/15/99	39,560	$0.6350	$0.6300	Del	$0.0050	$197.80
						02/20/99	41,840	$0.6350	$0.6300	Del	$0.0050	$208.20
							201,980					10,09.90
Oscar Bush	00041	12/19/99	ELG	00106	400 Series Stainless	02/19/99	37,600	$0.0330	$0.0250	Del	$0.0080	$300.80
Portland	00042	12/26/99	Ohio Valley Aluminu	00107	6000 Series	02/26/99	16,540	$0.5350	$0.5121	Del	$0.0229	$378.77
Trademark	00002	11/05/99	Quantum	00007	Alum Wheels	02/18/99	42,460	$0.5300	$0.5200	Del	$0.0100	$424.60
					Seg 6061	02/19/99	65	$0.3500	$0.3400	Del	$0.0100	$0.65
Trademark	00005	11/05/99	Nichols	00001	Alum Radiators	02/23/99	44,186	$0.4300	$0.4100	Del	$0.0200	$883.72
Trademark	00006	11/07/99	Metal Commodities -	00010	Alum Copper Units	02/13/99	40,579	$0.4500	$0.4400	Del	$0.0100	$405.79
Trademark	00014	11/12/99	Custom Alloys	00025	Cast Aluminum	02/24/99	42,900	$0.4000	$0.3900	FAS	$0.0100	$429.00
Trademark	00017	11/19/99	Easco	00033	#1 Extrusion	02/01/99	43,696	$0.5150	$0.5100	Del	$0.0050	$218.48
						02/01/99	43,212	$0.5150	$0.5100	Del	$0.0050	$216.06
						02/04/99	44,788	$0.5150	$0.5100	Del	$0.0050	$223.94
Trademark	00021	11/21/99	Nichols	00039	Nichols Old Sheet	02/09/99	41,283	$0.4375	$0.4250	Del	$0.0125	$516.04
					Clip	02/02/99	42,022	$0.4800	$0.4675	Del	$0.0125	$525.27
						02/02/99	42,998	$0.4800	$0.4675	Del	$0.0125	$537.48
						02/03/99	40,700	$0.4800	$0.4675	Del	$0.0125	$508.75
Trademark	00027	12/02/99	J W Aluminum	00053	Clip	02/23/99	23,227	$0.4800	$0.4700	Del	$0.0100	$232.27
					Seg 3003	02/23/99	19,603	$0.5050	$0.5050	Del	$0.0000	$0.00
Trademark	00029	12/02/99	Easco	00054	#1 Extrusion	02/04/99	43,596	$0.5150	$0.5100	Del	$0.0050	$217.98
						02/08/99	44,669	$0.5150	$0.5100	Del	$0.0050	$223.35
						02/15/99	44,252	$0.5150	$0.5100	Del	$0.0050	$221.26
						02/24/99	43,940	$0.5150	$0.5100	Del	$0.0050	$219.70
Trademark	00036	12/17/99	Schumann	00090	Red Brass	02/23/99	15,378	$0.5300	$0.5150	Del	$0.0150	$230.67
					Auto Radiators	02/23/99	27,737	$0.4200	$0.4100	Del	$0.0100	$277.37

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Trademark	00043	02/25/99	Easco	00108	#1 Extrusion	02/25/99	44,919	$0.5150	$0.5100	Del	$0.0050	$224.60
Trademark-Rockledg	00016	01/13/99	Southwire	00027	Shredded Elec Motor	02/24/99	~~186,200~~ 962,510	$0.0850	$0.0825	Del	$0.0025	$465.50 7203.48
					Totals		~~2,378,259~~ 2,361,559	- 2,361,559			$0.0133	~~$34,648.79~~ 31,551.92 {31,551.94}

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Ansam Metals	00022	01/21/99	Nichols	00041	Nichols Old Sheet	03/01/99	2,275	$0.4175	$0.3975	Del	$0.0200	$45.50
						03/01/99	12,750	$0.4375	$0.4250	Del	$0.0125	$159.38
						03/15/99	13,410	$0.4375	$0.4250	Del	$0.0125	$167.63
					Clip	03/15/99	9,357	$0.4800	$0.4650	Del	$0.0150	$140.51
					Painted Siding	03/01/99	15,945	$0.4575	$0.4450	Del	$0.0125	$199.31
						03/15/99	8,243	$0.4575	$0.4450	Del	$0.0125	$103.04
					Seg 3003	03/01/99	10,192	$0.5450	$0.5250	Del	$0.0200	$203.84
Ansam Metals	00045	02/28/99	Nichols	00113	Nichols Old Sheet	03/29/99	3,468	$0.4600	$0.4300	Del	$0.0300	$104.64
					#1 Extrusion	03/29/99	15,278	$0.5100	$0.4850	Del	$0.0150	$229.17
					Clip	03/29/99	13,679	$0.4900	$0.4750	Del	$0.0150	$205.17
							109,416 ✓					1538.19
Bluegrass Reg.	00070	04/02/99	All American	00177	Alum Cans	03/11/99	7,480	$0.3700	$0.3400	SP	$0.0300	$224.40
						03/18/99	7,390	$0.3700	$0.3400	SP	$0.0300	$221.70
						03/22/99	8,340	$0.3700	$0.3400	SP	$0.0300	$250.20
							23,210 ✓					696.30
Chemetco	00026	01/27/99	Custom Alloys	00051	Cast Aluminum	03/11/99	44,400	$0.4150	$0.3900	FAS	$0.0250	$1,110.00
Chemetco	00033	02/02/99	J W Aluminum	00053	Clip	03/08/99	4,659	$0.4800	$0.4650	Del	$0.0150	$69.89
					Litho	03/08/99	35,931	$0.4900	$0.4750	Del	$0.0150	$538.97
Chemetco	00047	02/28/99	Nichols	00113	Nichols Old Sheet	03/16/99	6,513	$0.4600	$0.4300	Del	$0.0300	$195.39
						03/26/99	6,446	$0.4600	$0.4300	Del	$0.0300	$193.38
					Clip	03/16/99	11,943	$0.4900	$0.4700	Del	$0.0200	$238.86
						03/26/99	23,271	$0.4900	$0.4700	Del	$0.0200	$465.42
					Painted Siding	03/25/99	30,868	$0.4700	$0.4500	Del	$0.0200	$617.36
					Litho	03/16/99	19,359	$0.5000	$0.4800	Del	$0.0200	$387.18
							183,590					3816.45

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00007	11/06/99	Schumann	00011	Aluminum/Brass Tub	03/26/99	13,045	$0.4500	$0.4460	Del	$0.0040	$52.18
					Red Brass	03/10/99	6,590	$0.5100	$0.5040	Del	$0.0060	$39.54
						03/25/99	6,078	$0.5100	$0.5060	Del	$0.0040	$24.31
					Auto Radiators	03/25/99	15,432	$0.4000	$0.3960	Del	$0.0040	$61.73
					Heater Cores	03/25/99	2,257	$0.2900	$0.2860	Del	$0.0040	$9.03
					Semi Red Brass	03/10/99	4,996	$0.4300	$0.4250	Del	$0.0050	$24.98
						03/25/99	5,840	$0.4300	$0.4260	Del	$0.0040	$23.36
DJJ (Frank Nott)	00019	11/21/99	Nichols	00039	Nichols Old Sheet	03/25/99	43,422	$0.4375	$0.4335	Del	$0.0040	$173.69
					Clip	03/05/99	41,574	$0.4800	$0.4760	Del	$0.0040	$166.30
					Painted Siding	03/10/99	41,758	$0.4575	$0.4535	Del	$0.0040	$167.03
						03/17/99	35,796	$0.4575	$0.4535	Del	$0.0040	$143.18
					Litho	03/15/99	6,794	$0.4900	$0.4860	Del	$0.0040	$27.18
						03/17/99	6,414	$0.4900	$0.4860	Del	$0.0040	$25.66
						03/18/99	27,660	$0.4900	$0.4860	Del	$0.0040	$110.64
					Seg 3003	03/15/99	35,323	$0.5450	$0.5410	Del	$0.0040	$141.29
						03/16/99	15,362	$0.5450	$0.5410	Del	$0.0040	$61.45
DJJ (Frank Nott)	00020	11/21/99	Owens Corning Pl. 4	00038	#1 Extrusion	03/09/99	45,623	$0.5150	$0.5110	Del	$0.0040	$182.49
						03/18/99	40,633	$0.5150	$0.5110	Del	$0.0040	$162.53
					Clip	03/11/99	44,715	$0.4700	$0.4660	Del	$0.0040	$178.86
					Alum Cans	03/18/99	11,399	$0.4650	$0.4510	Del	$0.0140	$159.59
					E C Wire	03/16/99	1,916	$0.5550	$0.5510	Del	$0.0040	$7.66
					Road Signs	03/05/99	42,256	$0.4500	$0.4460	Del	$0.0040	$169.02
						03/18/99	33,154	$0.4550	$0.4460	Del	$0.0090	$298.39
DJJ (Frank Nott)	00035	12/15/99	Audubon	00064	Cast Aluminum	03/29/99	34,500	$0.4600	$0.4560	Del	$0.0040	$138.00
DJJ (Frank Nott)	00048	12/28/99	Nichols	00113	Painted Siding	03/30/99	32,780	$0.4700	$0.4660	Del	$0.0040	$131.12
					Litho	03/30/99	8,034	$0.5000	$0.4960	Del	$0.0040	$32.14
					Seg 5052	03/30/99	3,552	$0.5300	$0.5260	Del	$0.0040	$14.21
DJJ (Frank Nott)	00050	12/26/99	Audubon	00114	Deox Old Sheet	03/11/99	40,874	$0.4400	$0.4360	Del	$0.0040	$163.50

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00052	03/03/99	Owens Corning Pl. 4	00120	#1 Extrusion	03/22/99	40,673	$0.5050	$0.5010	Del	$0.0040	$162.69
						03/31/99	38,066	$0.5050	$0.5010	Del	$0.0040	$152.34
					Clip	03/25/99	38,649	$0.4700	$0.4660	Del	$0.0040	$154.60
					Painted Siding	03/26/99	17,027	$0.4550	$0.4510	Del	$0.0040	$68.11
					E C Wire	03/22/99	1,465	$0.5100	$0.5060	Del	$0.0040	$5.86
						03/25/99	6,075	$0.5100	$0.5060	Del	$0.0040	$24.30
					Road Signs	03/26/99	27,102	$0.4550	$0.4510	Del	$0.0040	$108.41
DJJ (Frank Nott)	00055	03/03/99	DJJ-Cinn.	00123	EC Chops	03/12/99	44,190	$0.5550	$0.5510	Del	$0.0040	$176.72
DJJ (Frank Nott)	00056	03/03/99	Schumann	00124	Auto Radiators	03/10/99	33,434	$0.4250	$0.4210	Del	$0.0040	$133.74
DJJ (Frank Nott)	00058	03/03/99	Metal Commodities -	00125	Alum Copper Units	03/11/99	44,054	$0.4500	$0.4460	Del	$0.0040	$176.22
						03/18/99	30,656	$0.4500	$0.4460	Del	$0.0040	$122.62
						03/29/99	41,528	$0.4500	$0.4460	Del	$0.0040	$166.11
					Al Cu Units w/steel	03/16/99	12,270	$0.3500	$0.3460	Del	$0.0040	$49.08
DJJ (Frank Nott)	00067	03/30/99	Wabash - Richmond	00167	Clip	03/30/99	18,837	$0.4800	$0.4760	Del	$0.0040	$75.35
					Alum Radiators	03/30/99	3,520	$0.4400	$0.4360	Del	$0.0040	$14.08
						03/31/99	11,564	$0.4400	$0.4360	Del	$0.0040	$46.26
					Alum Turnings	03/31/99	25,935	$0.3900	$0.3860	Del	$0.0040	$103.74
					Alum Bumpers	03/30/99	2,212	$0.4300	$0.4260	Del	$0.0040	$8.85
					Thermal Break	03/30/99	13,224	$0.4300	$0.4260	Del	$0.0040	$52.90
							1,098,270					4691.04
JSL Metals	00069	04/02/99	All American	00176	Alum Cans	03/24/99	7,060	$0.4150	$0.3850	SP	$0.0500	$353.00
						03/30/99	7,640	$0.4200	$0.3750	SP	$0.0450	$343.80
							14,700					696.80
Portland	00044	02/26/99	ELG	00111	304 Stainless	03/02/99	9,540	$0.2120	$0.1950	Del	$0.0170	$162.18
						03/02/99	1,500	$0.1897	$0.1450	Del	$0.0447	$67.05
						03/02/99	60	$0.1674	$0.1150	Del	$0.0524	$3.14
							11,100					232.37

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Nonferrous Brokerage Profit (based on shipment date) 02/09/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Trademark	00027	12/02/99	J W Aluminum	00053	Clip	03/08/99	44,421	$0.4800	$0.4700	Del	$0.0100	$444.21
						03/11/99	20,858	$0.4800	$0.4700	Del	$0.0100	$208.58
						03/23/99	44,626	$0.4800	$0.4700	Del	$0.0100	$446.26
					Litho	03/11/99	21,732	$0.4900	$0.4800	Del	$0.0100	$217.32
					Dealer Clips	03/23/99	37,637	$0.4700	$0.4600	Del	$0.0100	$376.37
Trademark	00043	12/25/99	Easco	00106	#1 Extrusion	03/04/99	44,279	$0.5150	$0.5100	Del	$0.0050	$221.40
						03/10/99	44,120	$0.5150	$0.5100	Del	$0.0050	$220.60
						03/24/99	44,311	$0.5150	$0.5100	Del	$0.0050	$221.56
Trademark	00046	12/28/99	Nichols	00113	Painted Siding	03/23/99	39,064	$0.4700	$0.4550	Del	$0.0150	$585.96
					E C Wire	03/23/99	4,618	$0.5400	$0.5250	Del	$0.0150	$69.27
Trademark	00051	13/02/99	Easco	00118	Seg 6061	03/18/99	41,034	$0.4950	$0.4900	Del	$0.0050	$205.17
Trademark	00057	13/03/99	Metal Commodities -	00125	Alum Copper Units	03/10/99	44,680	$0.4500	$0.4400	Del	$0.0100	$446.80
						03/30/99	43,866	$0.4500	$0.4400	Del	$0.0100	$438.66
Trademark-Tampa	00062	13/18/99	Schumann	00154	Red Brass	03/30/99	9,996	$0.5400	$0.5350	Del	$0.0050	$49.98
						03/30/99	1,116	$0.5400	$0.5350	Del	$0.0050	$5.58
					Auto Radiators	03/30/99	22,724	$0.4350	$0.4250	Del	$0.0100	$227.24
					Heater Cores	03/30/99	3,937	$0.3150	$0.3000	Del	$0.0150	$59.06
					Hard Brass Turnings	03/30/99	~~5,381~~ 5,318	$0.3400	$0.3200	Del	$0.0200	$107.62
Western Metals	00023	11/22/99	Nichols	00041	Painted Siding	03/18/99	44,973	$0.4575	$0.4150	SP	$0.0125	$562.16
					Totals		1,998,449				$0.0084	$16,802.69

~~$5,49.44~~

16,802.75

River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Ansam Metals	00045	12/28/99	Nichols	00113	Nichols Old Sheet	04/05/99	20,216	$0.4600	$0.4300	Del	$0.0300	$606.48
						04/27/99	5,039	$0.4600	$0.4300	Del	$0.0300	$151.17
					#1 Extrusion	04/27/99	6,230	$0.5100	$0.4950	Del	$0.0150	$93.45
					Clip	04/05/99	14,036	$0.4900	$0.4750	Del	$0.0150	$210.54
						04/27/99	3,574	$0.4900	$0.4750	Del	$0.0150	$53.61
					Painted Siding	04/05/99	3,517	$0.4700	$0.4550	Del	$0.0150	$52.76
						04/27/99	~~19,367~~ 21,999	$0.4700	$0.4550	Del	$0.0150	~~$290.51~~ 329.98
Audubon	00064	03/23/99	Chemetco	00157	Yellow Brass	04/01/99	46,960	$0.4050	$0.3950	Del	$0.0100	$469.60
						04/01/99	46,200	$0.4050	$0.3950	Del	$0.0100	$462.00
Audubon	00065	03/23/99	Chemetco	00158	#2 Copper	04/01/99	39,860	$0.5250	$0.5050	Del	$0.0200	$797.20
Audubon	00073	04/06/99	Chemetco	00181	Yellow Brass	04/15/99	48,620	$0.4050	$0.3900	Del	$0.0150	$729.30
						04/28/99	~~48,040~~ 23,680	$0.4050	$0.3900	Del	$0.0150	~~$720.60~~ 355.20
Bluegrass Reg.	00070	04/02/99	All American	00177	Alum Cans	04/04/99	7,360	$0.3800	$0.3500	SP	$0.0300	$220.80
						04/15/99	9,040	$0.4000	$0.3700	SP	$0.0300	$271.20
						04/15/99	7,480	$0.3900	$0.3600	SP	$0.0300	$223.80
						04/30/99	~~7,760~~ 3,620	$0.3900	$0.3600	SP	$0.0300	~~$232.80~~ 108.60
Chemetco	00001	11/04/99	Nichols	00001	Alum Radiators	04/07/99	27,333	$0.4300	$0.4100	Del	$0.0200	$546.66
Chemetco	00033	12/02/99	J W Aluminum	00053	Litho	04/19/99	25,026	$0.4900	$0.4750	Del	$0.0150	$375.39
					1100 Finn Stock	04/19/99	2,559	$0.5200	$0.5050	Del	$0.0150	$38.38
					Dealer Clips	04/19/99	7,155	$0.4700	$0.4550	Del	$0.0150	$107.33
Chemetco	00047	12/28/99	Nichols	00113	Nichols Old Sheet	04/05/99	23,967	$0.4600	$0.4300	Del	$0.0300	$719.01
						04/16/99	11,455	$0.4600	$0.4300	Del	$0.0300	$343.65
					Clip	04/16/99	13,631	$0.4900	$0.4700	Del	$0.0200	$272.62
					Seg 3003	04/16/99	7,458	$0.5300	$0.5150	Del	$0.0150	$111.87
Chemetco	00053	03/03/99	Owens Corning Pl. 4	00121	Alum Cans	04/12/99	42,190	$0.4500	$0.4400	Del	$0.0100	$421.90

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Chemetco	00082	04/09/99	Nichols	00201	Nichols Old Sheet	04/22/99	14,644	$0.4775	$0.4450	Del	$0.0325	$462.43
					Clip	04/22/99	3,123	$0.5150	$0.5000	Del	$0.0150	$46.84
					Painted Siding	04/22/99	15,811	$0.4950	$0.4800	Del	$0.0150	$237.16
							33,578					3703.24
DJJ (Frank Nott)	00048	02/28/99	Nichols	00113	Nichols Old Sheet	04/26/99	28,064	$0.4600	$0.4560	Del	$0.0040	$112.26
					Clip	04/26/99	16,478	$0.4900	$0.4860	Del	$0.0040	$65.91
						04/28/99	31,472	$0.4900	$0.4860	Del	$0.0040	$125.89
					Painted Siding	04/12/99	43,624	$0.4700	$0.4660	Del	$0.0040	$174.50
						04/21/99	31,336	$0.4700	$0.4660	Del	$0.0040	$125.34
						04/23/99	14,248	$0.4700	$0.4660	Del	$0.0040	$56.99
					Litho	04/21/99	12,031	$0.5000	$0.4960	Del	$0.0040	$48.12
						04/23/99	21,478	$0.5000	$0.4960	Del	$0.0040	$85.91
					Seg 5052	04/23/99	7,758	$0.5300	$0.5260	Del	$0.0040	$31.03
					E C Wire	04/28/99	12,812	$0.5400	$0.5360	Del	$0.0040	$51.25
DJJ (Frank Nott)	00052	03/03/99	Owens Corning Pl. 4	00120	#1 Extrusion	04/01/99	13,972	$0.5050	$0.5010	Del	$0.0040	$55.89
						04/19/99	35,901	$0.5050	$0.5010	Del	$0.0040	$143.60
					Clip	04/09/99	15,876	$0.4700	$0.4660	Del	$0.0040	$63.51
						04/19/99	4,590	$0.4700	$0.4660	Del	$0.0040	$18.36
					Painted Siding	04/22/99	4,764	$0.4550	$0.4510	Del	$0.0040	$19.05
					Alum Cans	04/01/99	6,202	$0.4450	$0.4410	Del	$0.0040	$24.81
					Road Signs	04/01/99	22,603	$0.4550	$0.4510	Del	$0.0040	$90.41
						04/09/99	29,425	$0.4550	$0.4510	Del	$0.0040	$117.70
						04/22/99	36,874	$0.4550	$0.4510	Del	$0.0040	$146.70
DJJ (Frank Nott)	00066	03/26/99	American I & M	00166	EC Chops	04/19/99	41,247	$0.5900	$0.5860	SP	$0.0040	$164.99
DJJ (Frank Nott)	00067	03/30/99	Wabash - Richmond	00167	Deox Old Sheet	04/16/99	26,567	$0.4300	$0.4260	Del	$0.0040	$106.27
						04/28/99	19,320	$0.4300	$0.4260	Del	$0.0040	$77.28
					Clip	04/16/99	2,968	$0.4800	$0.4760	Del	$0.0040	$11.87
						04/28/99	11,206	$0.4800	$0.4760	Del	$0.0040	$44.82
					Alum Radiators	04/16/99	4,934	$0.4400	$0.4360	Del	$0.0040	$19.74
						04/28/99	11,750	$0.4400	$0.4360	Del	$0.0040	$47.00

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00072	04/06/99	Schumann	00179	Red Brass	04/12/99	5,705	$0.5450	$0.5410	Del	$0.0040	$22.82
						04/29/99	5,692	$0.5450	$0.5410	Del	$0.0040	$22.77
					Auto Radiators	04/12/99	14,972	$0.4425	$0.4385	Del	$0.0040	$59.89
						04/29/99	24,450	$0.4425	$0.4385	Del	$0.0040	$97.80
					Heater Cores	04/12/99	1,803	$0.3225	$0.3185	Del	$0.0040	$7.21
						04/29/99	1,654	$0.3225	$0.3185	Del	$0.0040	$6.62
					Semi Red Brass Tur	04/12/99	872	$0.4750	$0.4710	Del	$0.0040	$3.49
						04/12/99	2,542	$0.4750	$0.4710	Del	$0.0040	$10.17
						04/29/99	3,004	$0.4750	$0.4710	Del	$0.0040	$12.02
						04/29/99	2,072	$0.4750	$0.4710	Del	$0.0040	$8.29
					EDM Wire	04/29/99	1,189	$0.4500	$0.4460	Del	$0.0040	$4.76
					M Metal Solids/Turns	04/12/99	14,176	$0.5900	$0.5860	Del	$0.0040	$56.70
						04/29/99	2,936	$0.5900	$0.5860	Del	$0.0040	$11.74
					G Metal Solids/Turns	04/29/99	1,508	$0.6100	$0.6060	Del	$0.0040	$6.04
					YB Turnings	04/12/99	2,734	$0.3400	$0.3360	Del	$0.0040	$10.94
DJJ (Frank Nott)	00077	04/08/99	Quanium	00193	Alum. Auto Rims	04/29/99	22,684	$0.5500	$0.5460	Del	$0.0040	$90.74
					Alum Bronze	04/29/99	1,962	$0.4200	$0.4160	Del	$0.0040	$7.85
					Mang Bronze - Low	04/29/99	1,530	$0.4000	$0.3960	Del	$0.0040	$6.12
DJJ (Frank Nott)	00088	04/23/99	Owens Corning Pl. 4	00216	#1 Extrusion	04/26/99	44,524	$0.5450	$0.5410	Del	$0.0040	$178.10
					Painted Siding	04/26/99	22,895	$0.5050	$0.5010	Del	$0.0040	$91.58
					Alum Cans	04/26/99	7,270	$0.4800	$0.4760	Del	$0.0040	$29.08
					Road Signs	04/26/99	14,268	$0.5050	$0.5010	Del	$0.0040	$57.07
DJJ (Frank Nott)	00095	03/19/99	Owens Corning Pl. 4	00152	EC Chops	04/30/99	39,573 ~~147,317~~	$0.5800	$0.5760	Del	$0.0040	$158.29 2990.80
JSL Metals	00069	04/02/99	All American	00176	Alum Cans	04/09/99	7,800	$0.4200	$0.3750	SP	$0.0450	$351.00
						04/23/99	5,980 13,780	$0.4400	$0.3950	SP	$0.0450	$269.10 620.10
Keystone	00084	04/15/99	DJJ	00206	Deox Pyramids	04/30/99	43,280	$0.6525	$0.6450	Del	$0.0075	$324.60

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Powercom	00068	03/30/99	DJJ-BIRMINGHAM	00168	EC Chops	04/08/99	40,220	$0.5800	$0.5800	Del	$0.0000	$0.00
						04/13/99	40,240	$0.5800	$0.5800	Del	$0.0000	$0.00
						04/15/99	40,240	$0.5800	$0.5800	Del	$0.0000	$0.00
							120700					
Trademark	00039	02/24/99	Intrametco	00104	Alum Wheels	04/30/99	43,040	$0.5300	$0.5200	Del	$0.0100	$430.40
Trademark	00046	02/28/99	Nichols	00113	Clip	04/06/99	27,524	$0.4900	$0.4750	Del	$0.0150	$412.86
						04/13/99	12,492	$0.4900	$0.4750	Del	$0.0150	$187.38
						04/16/99	43,002	$0.4900	$0.4750	Del	$0.0150	$645.03
					Painted Siding	04/06/99	13,675	$0.4700	$0.4550	Del	$0.0150	$205.13
						04/13/99	31,651	$0.4700	$0.4550	Del	$0.0150	$474.76
Trademark	00071	04/06/99	Schumann	00179	Auto Radiators	04/23/99	44,243	$0.4425	$0.4325	Del	$0.0100	$442.43
Trademark	00074	04/06/99	J W Aluminum	00163	Clip	04/28/99	27,935	$0.5100	$0.5000	Del	$0.0100	$279.35
					Dealer Clips	04/28/99	16,780	$0.5000	$0.4900	Del	$0.0100	$167.80
Trademark	00075	04/07/99	Easco	00184	#1 Extrustion	04/26/99	43,734	$0.5300	$0.5250	Del	$0.0050	$218.67
						04/30/99	35,240	$0.5300	$0.5250	Del	$0.0050	$176.20
					Seg 6061	04/30/99	7,287	$0.5000	$0.4900	Del	$0.0100	$72.87
Trademark	00079	04/05/99	Metal Commodites -	00197	Alum Copper Units	04/27/99	43,910	$0.4800	$0.4700	Del	$0.0100	$439.10
Trademark	00081	04/09/99	Nichols	00201	Clip	04/30/99	30,467	$0.5150	$0.5000	Del	$0.0150	$457.01
					Painted Siding	04/30/99	11,330	$0.4950	$0.4800	Del	$0.0150	$169.95
					Litho	04/30/99	21,599	$0.5250	$0.5100	Del	$0.0150	$323.99
					E C Wire	04/30/99	23,004	$0.5700	$0.5550	Del	$0.0150	$345.06
Trademark-Tampa	00059	03/05/99	Alchem Aluminum	00130	Shredded Alum	04/29/99	24,520	$0.4500	$0.4400	Del	$0.0100	$245.20
Trademark-Tampa	00061	03/18/99	Nichols	00153	Alum Radiators	04/01/99	43,840	$0.4550	$0.4400	Del	$0.0150	$657.60
						04/13/99	45,133	$0.4550	$0.4400	Del	$0.0150	$677.00
Trademark-Tampa	00062	03/19/99	Schumann	00154	Auto Radiators	04/07/99	44,286	$0.4350	$0.4250	Del	$0.0100	$442.66
Trademark-Tampa	00063	03/19/99	Southwire	00155	Shredded Elec Motor	04/30/99	190,800	$0.0850	$0.0825	Del	$0.0025	$477.00 794745
							125472					
Versatile	00060	03/16/99	NSA Southwire	00148	#1 Copper	04/15/99	40,336	$0.7350	$0.6650	Del	$0.0700	$2,823.66

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price	Margin	Profit
					Totals		2,320,718			$0.0103	$24,015.63

24,015.67

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Barren County	00087	04/15/99	CRS	00211	Alum Cans	05/24/99	3,860	$0.4600	$0.4450	Del	$0.0150	$57.90
Bluegrass Reg.	00070	04/02/99	All American	00177	Alum Cans	05/19/99	7,580	$0.4100	$0.3800	SP	$0.0300	$227.40
						05/28/99	7,600 15,180	$0.4000	$0.3700	SP	$0.0300	$228.00 455.40
Chemetco	00018	01/21/99	Nichols	00039	Nichols Old Sheet	05/13/99	30,808	$0.4600	$0.4225	Del	$0.0375	$1,155.22
					Clip	05/13/99	12,522	$0.4900	$0.4675	Del	$0.0225	$281.75
Chemetco	00052	04/09/99	Nichols	00201	Clip	05/26/99	13,111	$0.5150	$0.5000	Del	$0.0150	$196.68
					Seg 5052	05/25/99	15,418	$0.5350	$0.5300	Del	$0.0050	$77.09
					E C Wire	05/26/99	913 22,730	$0.5700	$0.5550	Del	$0.0150	$13.70 1784.19
DJJ (Frank Nott)	00019	01/21/99	Nichols	00039	Nichols Old Sheet	05/12/99	31,458	$0.4375	$0.4335	Del	$0.0040	$125.83
					Clip	05/12/99	8,838	$0.4800	$0.4760	Del	$0.0040	$35.36
						05/19/99	6,960	$0.4800	$0.4760	Del	$0.0040	$27.84
					Painted Siding	05/19/99	36,414	$0.4575	$0.4535	Del	$0.0040	$145.66
					Seg 5052	05/12/99	2,914	$0.5450	$0.5410	Del	$0.0040	$11.66
DJJ (Frank Nott)	00046	02/25/99	Nichols	00113	Painted Siding	05/14/99	42,710	$0.4700	$0.4660	Del	$0.0040	$170.84
DJJ (Frank Nott)	00066	03/25/99	American I & M	00166	EC Chops	05/10/99	30,365	$0.5900	$0.5860	SP	$0.0040	$121.54
DJJ (Frank Nott)	00076	04/08/99	Audubon	00231	Cast Aluminum	05/18/99	38,580	$0.4600	$0.4560	Del	$0.0040	$154.32
						05/25/99	36,640	$0.5000	$0.4960	Del	$0.0040	$146.56
DJJ (Frank Nott)	00078	04/08/99	Freedman, Joseph	00195	Alum Copper Units	05/05/99	44,922	$0.4750	$0.4710	Del	$0.0040	$179.69
						05/24/99	43,918	$0.4750	$0.4710	Del	$0.0040	$175.67
DJJ (Frank Nott)	00083	04/09/99	Nichols	00201	Painted Siding	05/26/99	41,584	$0.4950	$0.4910	Del	$0.0040	$166.34
					Litho	05/26/99	1,564	$0.5250	$0.5210	Del	$0.0040	$6.26

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00086	04/15/99	Keystone	00207	Deox Old Sheet	05/17/99	8,596	$0.4500	$0.4460	Del	$0.0040	$34.38
						05/25/99	23,024	$0.4500	$0.4460	Del	$0.0040	$92.10
					Clip	05/05/99	14,259	$0.5150	$0.5110	Del	$0.0040	$57.04
						05/17/99	13,770	$0.5150	$0.5110	Del	$0.0040	$55.08
						05/25/99	5,214	$0.5150	$0.5110	Del	$0.0040	$20.86
					Alum Radiators	05/17/99	19,996	$0.4675	$0.4635	Del	$0.0040	$79.98
						05/25/99	14,944	$0.4675	$0.4635	Del	$0.0040	$59.78
DJJ (Frank Nott)	00088	04/23/99	Owens Corning Pl. 4	00216	#1 Extrusion	05/10/99	42,510	$0.5450	$0.5410	Del	$0.0040	$170.04
					Alum Cans	05/14/99	18,073	$0.4800	$0.4760	Del	$0.0040	$72.29
					Road Signs	05/14/99	25,236	$0.5050	$0.5010	Del	$0.0040	$100.94
DJJ (Frank Nott)	00089	05/05/99	Alchem Aluminum	00234	Alum Turnings	05/07/99	23,390	$0.4200	$0.4160	Del	$0.0040	$93.56
					PIG 3105	05/07/99	3,551	$0.5100	$0.5060	Del	$0.0040	$14.20
					Zinc	05/07/99	1,477	$0.3300	$0.3260	Del	$0.0040	$5.91
					Zinc Face Plates	05/07/99	8,717	$0.3600	$0.3560	Del	$0.0040	$34.87
DJJ (Frank Nott)	00093	05/10/99	Owens Corning Pl. 4	00237	#1 Extrusion	05/17/99	44,314	$0.5650	$0.5610	Del	$0.0040	$177.26
						05/21/99	22,137	$0.5650	$0.5610	Del	$0.0040	$88.55
						05/24/99	35,952	$0.5650	$0.5610	Del	$0.0040	$143.81
						05/27/99	7,862	$0.5650	$0.5610	Del	$0.0040	$31.45
					Clip	05/21/99	21,160	$0.5500	$0.5460	Del	$0.0040	$84.64
						05/24/99	40,228	$0.5500	$0.5460	Del	$0.0040	$160.91
						05/24/99	4,810	$0.5500	$0.5460	Del	$19.24
						05/25/99	34,015	$0.5500	$0.5460	Del	$136.06
						05/27/99	24,450	$0.5500	$0.5460	Del	$97.80
					Painted Siding	05/20/99	7,380	$0.5300	$0.5260	Del	$29.52
					Alum Cans	05/20/99	12,248	$0.4900	$0.4860	Del	$48.96
						05/25/99	7,568	$0.4900	$0.4860	Del	$30.27
					Road Signs	05/20/99	30,720	$0.5300	$0.5260	Del	$122.88
						05/20/99	36,266	$0.5300	$0.5260	Del	$145.06
						05/27/99	6,088	$0.5300	$0.5260	Del	$24.35

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00098	05/14/99	Wabash - Richmond	00243	Deox Old Sheet	05/28/99	23,622	$0.4800	$0.4760	Del	$0.0040	$94.49
					Alum Turnings	05/28/99	14,438	$0.4500	$0.4460	Del	$0.0040	$57.75
					Alum Bumpers	05/28/99	1,904	$0.4800	$0.4760	Del	$0.0040	$7.62
					Thermal Break	05/28/99	2,152	$0.4800	$0.4760	Del	$0.0040	$8.61
DJJ (Frank Nott)	00101	05/17/99	Quantum	00250	Alum. Auto Rims	05/28/99	27,814	$0.5875	$0.5835	Del	$0.0040	$111.26
					Hard Brass	05/28/99	2,176	$0.6050	$0.6010	Del	$0.0040	$8.70
					Mang Bronze	05/28/99	5,884	$0.3700	$0.3660	Del	$0.0040	$23.54
DJJ (Frank Nott)	00105	05/18/99	Schumann	00254	Red Brass	05/20/99	8,575	$0.5800	$0.5760	Del	$0.0040	$26.30
					Auto Radiators	05/20/99	18,730	$0.4625	$0.4585	Del	$0.0040	$68.92
					Heater Cores	05/20/99	1,340	$0.3425	$0.3385	Del	$0.0040	$5.36
					Semi Red Brass	05/20/99	4,618	$0.5100	$0.5060	Del	$0.0040	$18.47
					M Metal Solids/Turns	05/20/99	12,566	$0.6300	$0.6260	Del	$0.0040	$50.26
					G Metal Solids/Turns	05/20/99	684	$0.6600	$0.6560	Del	$0.0040	$2.74
							104,543					4,181.39
JSL Metals	00069	04/02/99	All American	00176	Alum Cans	05/08/99	7,640	$0.4400	$0.3950	SP	$0.0450	$343.80
						05/21/99	6,380	$0.4500	$0.4050	SP	$0.0450	$287.10
							14,020					630.90
Keystone	00084	04/15/99	DJJ	00208	Deox Pyramids	05/04/99	43,420	$0.6525	$0.6450	Del	$0.0075	$325.65
						05/07/99	43,200	$0.6525	$0.6450	Del	$0.0075	$324.00
						05/11/99	42,200	$0.6525	$0.6450	Del	$0.0075	$316.50
						05/12/99	42,380	$0.6525	$0.6450	Del	$0.0075	$317.85
						05/13/99	44,240	$0.6525	$0.6450	Del	$0.0075	$331.80
						05/14/99	42,520	$0.6525	$0.6450	Del	$0.0075	$318.90
						05/18/99	42,820	$0.6525	$0.6450	Del	$0.0075	$321.15
						05/20/99	41,940	$0.6525	$0.6450	Del	$0.0075	$314.55
						05/21/99	41,980	$0.6525	$0.6450	Del	$0.0075	$314.70
							384,680					2882.10
Portland	00097	05/05/99	ELG	00222	304 Stainless	05/11/99	800	$0.2200	$0.1800	Del	$0.0400	$32.00
						05/11/99	60	$0.1700	$0.1500	Del	$0.0200	$1.20
						05/11/99	11,240	$0.2410	$0.2200	Del	$0.0210	$236.04
							12,100					269.24

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Nonferrous Brokerage Profit (based on shipment date) 02/09/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Riveside Recycling	00109	05/21/99	Ohio Valley Aluminu	00281	Seg 6061	05/25/99	6,760	$0.5800	$0.5100	Del	$0.0700	$473.20
						05/26/99	11,240 180.00	$0.5800	$0.5100	Del	$0.0700	$786.80 1260.
S&S Auto Supply	00103	05/18/99	Audubon	00231	Cast Aluminum	05/20/99	43,220	$0.5000	$0.4800	Del	$0.0200	$864.40
						05/27/99	30,480 8700	$0.5000	$0.4800	Del	$0.0200	$609.60 1474
Trademark	00071	04/08/99	Schumann	00179	Red Brass	05/21/99	9,826	$0.5450	$0.5300	Del	$0.0150	$147.39
					Auto Radiators	05/21/99	32,309	$0.4425	$0.4325	Del	$0.0100	$323.09
Trademark	00074	04/06/99	J W Aluminum	00183	Clip	05/11/99	34,353	$0.5100	$0.5000	Del	$0.0100	$343.53
						05/24/99	44,980	$0.5100	$0.5000	Del	$0.0100	$449.80
					Dealer Clips	05/11/99	8,109	$0.5000	$0.4900	Del	$0.0100	$81.09
Trademark	00075	04/07/99	Easco	00184	#1 Extrusion	05/20/99	36,509	$0.5300	$0.5250	Del	$0.0050	$182.54
					Seg 6061	05/20/99	6,453	$0.5000	$0.4900	Del	$0.0100	$64.53
Trademark	00080	04/08/99	Keystone	00207	Alum Radiators	05/19/99	43,968	$0.4675	$0.4600	Del	$0.0075	$329.76
Trademark	00099	05/14/99	Alchem Aluminum	00245	Road Signs	05/18/99	20,829	$0.5200	$0.5300	Del	($0.0100)	($208.29)
					PIG 3105	05/18/99	22,484	$0.5200	$0.5000	Del	$0.0200	$449.68
Trademark-Tampa	00108	05/21/99	Alchem Aluminum	00265	ASR	05/25/99	30,420	$0.5100	$0.5000	Del	$0.0100	$304.20 2977.32
Trunnell Scrap	00116	05/27/99	ELG	00222	304 Stainless	05/13/99	14,800	$0.2410	$0.2300	Del	$0.0110	$162.80
					400 Series Stainless	05/13/99	3,100 310/80	$0.0491	$0.0400	Del	$0.0091	$28.21 1940.01
Western Metals	00049	02/28/99	Nichols	00113	Painted Siding	05/10/99	44,420	$0.4700	$0.4200	Del	$0.0500	$2,221.00
					Totals		1,994,213				$0.0089	$17,827.67

17827.68

River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Ansam Metals	00120	05/28/99	Nichols	00275	Nichols Old Sheet	05/21/99	18,280	$0.5200	$0.4900	Del	$0.0300	$548.87
					#1 Extrusion	05/21/99	12,618	$0.5650	$0.5550	Del	$0.0100	$126.18
					Painted Siding	05/21/99	8,622	$0.5375	$0.5200	Del	$0.0175	$154.38
							39929					831.23
Audubon	00104	05/18/99	Chemetco	00255	Yellow Brass	06/02/99	48,300	$0.4300	$0.4200	Del	$0.0100	$483.00
Audubon	00138	06/23/99	Chemetco	00341	Yellow Brass	06/23/99	47,700	$0.4200	$0.4125	Del	$0.0075	$357.75
						06/29/99	48,700	$0.4200	$0.4125	Del	$0.0075	$365.25
Audubon	00143	06/25/99	Chemetco	00295	#2 Copper	06/29/99	37,160	$0.5645	$0.5395	Del	$0.0250	$929.00
							181,340					2185.
Bluegrass Reg.	00070	04/02/99	All American	00177	Alum Cans	05/06/99	7,620	$0.3800	$0.3500	SP	$0.0300	$228.60
						05/14/99	8,200	$0.3800	$0.3500	SP	$0.0300	$246.00
							15820					474.60
Chemetco	00082	04/09/99	Nichols	00201	Nichols Old Sheet	06/03/99	22,162	$0.4775	$0.4450	Del	$0.0325	$720.26
						06/06/99	12,440	$0.4775	$0.4450	Del	$0.0325	$404.30
					Clip	06/06/99	10,344	$0.5150	$0.5000	Del	$0.0150	$155.16
					Painted Siding	06/03/99	13,098	$0.4950	$0.4800	Del	$0.0150	$196.47
						06/09/99	10,423	$0.4950	$0.4800	Del	$0.0150	$156.35
					Seg 3003	06/03/99	3,633	$0.5550	$0.5400	Del	$0.0150	$54.49
Chemetco	00091	05/10/99	J W Aluminum	00236	Clip	06/28/99	36,714	$0.5625	$0.5450	Del	$0.0175	$642.50
Chemetco	00115	05/24/99	Nichols	00275	Nichols Old Sheet	06/14/99	16,442	$0.5200	$0.5000	Del	$0.0200	$328.84
					Clip	06/14/99	4,979	$0.5575	$0.5425	Del	$0.0150	$74.69
					Painted Siding	06/14/99	11,074	$0.5375	$0.5225	Del	$0.0150	$166.11
							141,309					2899.17

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00083	04/09/99	Nichols	00201	Nichols Old Sheet	06/17/99	16,744	$0.4775	$0.4735	Del	$0.0040	$66.98
						06/23/99	14,154	$0.4775	$0.4735	Del	$0.0040	$56.62
					Painted Siding	06/07/99	16,936	$0.4950	$0.4910	Del	$0.0040	$67.74
						06/09/99	43,464	$0.4950	$0.4910	Del	$0.0040	$173.86
						06/17/99	27,466	$0.4950	$0.4910	Del	$0.0040	$109.86
						06/23/99	7,432	$0.4950	$0.4910	Del	$0.0040	$29.73
					Litho	06/07/99	17,410	$0.5250	$0.5210	Del	$0.0040	$69.64
						06/23/99	21,810	$0.5250	$0.5210	Del	$0.0040	$87.24
					E C Wire	06/07/99	9,680	$0.5700	$0.5660	Del	$0.0040	$38.72
DJJ (Frank Nott)	00092	05/10/99	J W Aluminum	00236	Clip	06/18/99	42,810	$0.5625	$0.5585	Del	$0.0040	$171.24
DJJ (Frank Nott)	00095	03/19/99	Owens Corning Pl. 4	00152	EC Chops	06/10/99	40,084	$0.5800	$0.5760	Del	$0.0040	$160.34
						06/15/99	22,273	$0.5800	$0.5760	Del	$0.0040	$89.09
DJJ (Frank Nott)	00098	05/14/99	Wabash - Richmond	00243	Deox Old Sheet	06/15/99	41,806	$0.4800	$0.4760	Del	$0.0040	$167.22
					Alum Bumpers	06/15/99	1,250	$0.4800	$0.4760	Del	$0.0040	$5.00
					Thermal Break	06/15/99	1,086	$0.4800	$0.4760	Del	$0.0040	$4.35
DJJ (Frank Nott)	00100	05/17/99	Freedman, Joseph	00247	Alum Radiators	06/28/99	150	$0.3500	$0.3460	Del	$0.0040	$0.60
					Alum Copper Units	06/11/99	44,252	$0.5100	$0.5060	Del	$0.0040	$177.01
						06/28/99	43,836	$0.5100	$0.5060	Del	$0.0040	$175.34

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Nonferrous Brokerage Profit (based on shipment date) 02/08/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00105	05/18/99	Schumann	00254	Red Brass	06/08/99	8,552	$0.5800	$0.5760	Del	$0.0040	$38.21
						06/30/99	3,896	$0.5800	$0.5760	Del	$0.0040	$15.58
					Auto Radiators	06/08/99	23,612	$0.4625	$0.4585	Del	$0.0040	$94.45
						06/30/99	31,164	$0.4625	$0.4585	Del	$0.0040	$124.66
					Heater Cores	06/08/99	392	$0.3425	$0.3385	Del	$0.0040	$1.57
						06/30/99	635	$0.3425	$0.3385	Del	$0.0040	$2.54
					Semi Red Brass	06/08/99	4,043	$0.5100	$0.5060	Del	$0.0040	$16.17
						06/30/99	2,006	$0.5100	$0.5060	Del	$8.02
					Nickel Silver Solids	06/08/99	3,344	$0.4300	$0.4260	Del	$0.0040	$13.38
					Nickel Silver Turning	06/08/99	1,840	$0.3500	$0.3460	Del	$0.0040	$7.36
					EDM Wire	06/30/99	1,381	$0.4700	$0.4660	Del	$0.0040	$5.52
					M Metal Solids/Turns	06/30/99	2,818	$0.6300	$0.6260	Del	$0.0040	$11.27
DJJ (Frank Nott)	00114	05/24/99	Nichols	00275	Painted Siding	06/25/99	34,218	$0.5375	$0.5335	Del	$0.0040	$136.87
					Seg 3003	06/25/99	9,532	$0.5950	$0.5910	Del	$0.0040	$38.13
DJJ (Frank Nott)	00117	05/25/99	Owens Corning Pl. 4	00280	#1 Extrusion	06/17/99	42,944	$0.5650	$0.5610	Del	$0.0040	$171.78
						06/22/99	41,211	$0.5650	$0.5610	Del	$0.0040	$164.84
						06/25/99	21,738	$0.5650	$0.5610	Del	$86.95
					Clip	06/28/99	42,315	$0.5550	$0.5510	Del	$169.26
					Painted Siding	06/16/99	22,155	$0.5350	$0.5310	Del	$88.62
					Alum Cans	06/16/99	14,606	$0.5000	$0.4960	Del	$58.43
					Road Signs	06/25/99	19,499	$0.5360	$0.5310	Del	$78.00
DJJ (Frank Nott)	00118	05/25/99	Owens Corning Pl. 4	00281	EC Chops	06/23/99	39,832	$0.6300	$0.6260	Del	$0.0040	$159.33
						06/24/99	40,882	$0.6300	$0.6260	Del	$0.0040	$163.53
DJJ (Frank Nott)	00121	06/02/99	Audubon	00284	Old Sheet (Tense)	06/24/99	33,560	$0.5100	$0.5060	Del	$0.0040	$134.24
						06/30/99	39,540	$0.5100	$0.5060	Del	$0.0040	$158.16
DJJ (Frank Nott)	00127	06/11/99	Owens Corning Pl. 4	00315	EC Chops	06/29/99	~~40,916~~ 40,977	$0.6225	$0.6185	Del	$0.0040	~~$163.66~~ $163.91
Eckart America	00110	05/24/99	Newco	00305	PIG 3105	06/15/99	47,592	$0.6000	$0.5000	Del	$0.1000	$4,759.20

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Nonferrous Brokerage Profit (based on shipment date) 02/09/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Franklin Surplus	00141	06/25/99	ELG	00351	400 Series Stainless	06/28/99	37,600	$0.0626	$0.0737	Del	$0.0089	$336.42
						06/29/99	25,700	$0.0626	$0.0737	Del	$0.0089	$228.73
Franklin Surplus	00142	06/25/99	M & M Metals	00352	Yellow Brass	06/17/99	41,500 105,080	$0.4550	$0.4350	Del	$0.0200	$830.00 2,895.15
JSL Metals	00069	04/02/99	All American	00176	Alum Cans	06/04/99	7,160	$0.4200	$0.3750	SP	$0.0450	$323.10
QRS	00140	06/25/99	Ohio Valley Aluminu	00350	#1 Extrusion	06/29/99	13,040	$0.5850	$0.6250	Del	$0.0600	$782.40
Trademark	00075	04/07/99	Easco	00184	#1 Extrusion	06/01/99	40,650	$0.5300	$0.5250	Del	$0.0050	$203.25
Trademark	00081	04/09/99	Nichols	00201	Clip	06/10/99	34,815	$0.5150	$0.5000	Del	$0.0150	$522.23
					Litho	06/10/99	9,259	$0.5250	$0.5100	Del	$0.0150	$138.88
Trademark	00090	05/10/99	J W Aluminum	00236	Clip	06/16/99	30,947	$0.5625	$0.5500	Del	$0.0125	$386.84
						06/24/99	42,865	$0.5625	$0.5500	Del	$0.0125	$535.81
					Dealer Clips	06/16/99	13,407	$0.5500	$0.5400	Del	$0.0100	$134.07
Trademark	00094	05/12/99	Beck Aluminum	00248	Alum Copper Units	06/09/99	43,972	$0.5150	$0.4900	Del	$0.0250	$1,099.30
Trademark	00102	05/17/99	Quantum	00250	Alum. Auto Rims	06/11/99	38,220	$0.5875	$0.5775	Del	$0.0100	$382.20
Trademark	00112	05/24/99	Nichols	00274	Alum Radiators	06/11/99	41,277	$0.5200	$0.5050	Del	$0.0150	$619.15
Trademark	00113	05/24/99	Nichols	00275	Nichols Old Sheet	06/29/99	8,656	$0.5200	$0.5000	Del	$0.0200	$173.12
					Clip	06/29/99	29,450	$0.5575	$0.5450	Del	$0.0125	$368.13
					Painted Siding	06/29/99	5,936	$0.5375	$0.5250	Del	$0.0125	$74.20
Trademark	00122	06/07/99	Metal Commodities -	00302	Alum Copper Units	06/23/99	44,856	$0.5000	$0.4900	Del	$0.0100	$448.56
Trademark	00126	06/07/99	Schumann	00306	Red Brass	06/15/99	4,925	$0.5500	$0.5400	Del	$0.0100	$49.25
					Auto Radiators	06/15/99	33,883	$0.4550	$0.4450	Del	$0.0100	$338.83
					Heater Cores	06/15/99	4,118	$0.3350	$0.3250	Del	$0.0100	$41.18
Trademark	00134	06/18/99	Ohio Valley Aluminu	00328	Seg 6061	06/25/99	20,450 40,688	$0.5800	$0.5650	Del	$0.0150	$306.75 608.77
Trunnell Scrap	00124	06/04/99	Global Recycling	00299	Whole Motors	06/09/99	45,780	$0.0550	$0.0450	Del	$0.0100	$457.80
Western Metals	00107	05/19/99	Nichols	00276	Painted Siding	06/07/99	46,295	$0.5375	$0.4900	SP	$0.0475	$2,151.51
					Totals		2,030,772				$0.0127	$25,792.05

25,792.04

RMR 0064

+B + D + F – H – J – L

C E G I K M

Tony-Clemente

D 14 – + L 14

E 14 – M 14

D 15 – H J

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JULY-DECEMBER 1999 BROKERAGE VOLUME/MARGIN -

	July		August		September		October		November		December		Totals	
	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin
3RD PARTY CUST														
Barren County	9,440	141.60	10,860	162.9									20,300	304.50
Bluegrass Reg.	16,220	486.60	-	0									16,220	486.60
Chametco	100,395	1769.51	108,439	1819.63	150,727	3576.76	228,819	7809.61	156,291	2992.27	196,740	11764.24	941,411	29734.04
DRMO	40,360	2106.79	39,340	2053.55									79,700	4160.34
Graham & Co.	15,780	140.44	9,280	280.26									25,060	420.70
JLS Metals	20,500	922.5											20,500	922.50
LSM/Progress Rail	38,706	387.06			121,191	3386.28	220140	6196.59	220,709	10523.46	198,422	13471.4	799,168	33964.78
Powercom	82,602	313.88	43,498	165.29									126,100	479.17
Riverside	8,100	396.5	35,020	700.4					39,260	1378.03			80,380	2474.93
Franklin Surplus	-	-	26,560	297.47									26,560	297.47
Keystone	-	-	646,640	4010.4					383,440	3374.27	293,900	2586.32	1,324,180	9970.99
Ansam	-	-			40,345	1084.45	41,530	2090.97					81,875	3175.42
Garden State	-	-	-	0	42,636	1300.94	-	0.00					42,636	1300.94
Southern Recy.	-	-			43,910	1189.96	41,870	2554.07			42,720	3349.25	128,500	7093.28
Baker Iron & Metal	-	-					39,330	393.3					39,330	393.30
Eckhart America	-	-					27,083	11104.03					27,083	11104.03
Dideon	-	-							77,695	3440.32	52,297	2645.29	129,992	6085.61
Volunteer Recy.	-	-							34,480	337.9			34,480	337.90
Berg Recycling	-	-											-	0.00
Crone	-	-									38,530	1155.9	38,530	1155.90
QRS	-	-									30,360	2228.42	30,360	2228.42
Sub Total	330,103	6664.88	919,837	9489.9	398,809	10540.4	598,772	30148.66	911,875	22046.25	862,969	37200.82	4,012,365	116090.62
GROUP CUSTS.														
Audubon	143,120	2622.4	189,280	2839.2	140,860	2112.9			190,220	3090.9	50,200	753	713,580	11418.40
DJJ - Richmond	753,405	5252.57	1,133,068	7757.1	1,004,080	4439.09	921,594	6558.17	1,135,185	10357.02	1,049,267	4197.17	5,996,569	38561.12
DJJ -Birmingham	58,780	1913.18	78,188	273.49	127,200	1987.11							264,168	4173.78
Trademark	346,343	4173.92	300,260	3883.23	416,062	7016.54	650,160	10962.93	1,024,508	17356.64	734,475	16913.31	958,793.0	60306.57
DJJ - Jackson			104,160	781.2									104,160	781.20
Western			175,970	10390.84	40,200	2596.92	177,837	14264.66	92,798	7825.17	137,081	11919.69	3,471,808	46987.27
Sub Total	1,301,648	13962.1	1,980,916	25925.06	1,728,402	18152.6	1,749,591	31776.76	2,442,711	38629.73	1,971,023	33783.17	11,174,291	182,228.34
GRAND TOTALS	1,631,751	20626.95	2,900,753	35414.96	2,127,211	28692.97	2,348,363	61924.31	3,354,586	60875.98	2,823,992	70983.99	15,186,656	278,319.16

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Audubon	00156	07/15/99	Chemetco	00378	Yellow Brass	07/16/99	47,820	$0.4350	$0.4200	Del	$0.0150	$717.30
						07/22/99	47,740	$0.4350	$0.4200	Del	$0.0150	$716.10
Audubon	00171	07/29/99	Chemetco	00299	#1 Copper	07/30/99	47,560	$0.6160	$0.5910	Del	$0.0250	$1,189.00
							143,120					2,622.40
Barren County	00149	07/07/99	QRS	00362	Alum Cans	07/08/99	9,440	$0.4650	$0.4500	Del	$0.0150	$141.60
Bluegrass Reg.	00070	04/02/99	All American	00177	Alum Cans	07/01/99	8,460	$0.4300	$0.4000	SP	$0.0300	$254.40
						07/14/99	7,740	$0.4400	$0.4100	SP	$0.0300	$232.20
												486.60
Chemetco	00115	05/24/99	Nichols	00275	Nichols Old Sheet	07/14/99	14,867	$0.5200	$0.5000	Del	$0.0200	$297.34
					Clip	07/09/99	25,016	$0.5575	$0.5425	Del	$0.0150	$375.24
					Painted Siding	07/09/99	7,072	$0.5375	$0.5225	Del	$0.0150	$106.08
						07/14/99	18,151	$0.5375	$0.5225	Del	$0.0150	$272.26
							+5106					
Chemetco	00131	06/14/99	Nichols	00320	Clip	07/28/99	9,463	$0.5575	$0.5225	Del	$0.0350	$331.20
					Painted Siding	07/28/99	25,826	$0.5375	$0.5225	Del	$0.0150	$387.39
							+5,281					1769.51
D.R.M.O.	00144	06/28/99	Wabash - Richmond	00353	Deox Old Sheet	07/28/99	40,360	$0.4850	$0.4328	Del	$0.0522	$2,108.79
DJJ (Frank Nott)	00114	05/24/99	Nichols	00275	Nichols Old Sheet	07/14/99	41,202	$0.5200	$0.5160	Del	$0.0040	$164.81
						07/27/99	35,382	$0.5200	$0.5160	Del	$0.0040	$141.53
					Painted Siding	07/16/99	28,710	$0.5878	$0.5335	Del	$0.0543	$1,558.95
						07/21/99	26,928	$0.5375	$0.5335	Del	$0.0040	$107.71
						07/23/99	43,670	$0.5375	$0.5335	Del	$0.0040	$174.68
						07/27/99	7,178	$0.5375	$0.5335	Del	$0.0040	$28.71
					Litho	07/16/99	16,288	$0.6138	$0.5610	Del	$0.0528	$860.01
						07/21/99	8,108	$0.5650	$0.5610	Del	$0.0040	$32.43
					Seg 5052	07/14/99	900	$0.5950	$0.5910	Del	$0.0040	$3.60
						07/14/99	1,630	$0.5750	$0.5710	Del	$0.0040	$6.52
					E C Wire	07/21/99	9,006	$0.6100	$0.6060	Del	$0.0040	$36.02
DJJ (Frank Nott)	00123	06/07/99	Metal Commodities -	00302	Alum Copper Units	07/02/99	43,022	$0.5000	$0.4960	Del	$0.0040	$172.09

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Nonferrous Brokerage Profit (based on shipment data) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00125	06/07/99	Schumann	00306	Red Brass	07/23/99	6,315	$0.5500	$0.5460	Del	$0.0040	$25.26
					Hard Brass	07/23/99	6,372	$0.5800	$0.5760	Del	$0.0040	$25.49
					Auto Radiators	07/23/99	27,208	$0.4550	$0.4510	Del	$0.0040	$108.82
					Heater Cores	07/23/99	1,216	$0.3350	$0.3310	Del	$0.0040	$4.86
					Nickel Silver Solids	07/23/99	1,160	$0.4500	$0.4460	Del	$0.0040	$4.64
					G Metal Solids/Turns	07/23/99	428	$0.6100	$0.6060	Del	$0.0040	$1.71
DJJ (Frank Nott)	00127	06/11/99	Owens Corning Pl. 4	00315	EC Chops	07/07/99	20,325	$0.6225	$0.6185	Del	$0.0040	$81.30
DJJ (Frank Nott)	00128	06/11/99	Owens Corning Pl. 4	00316	#1 Extrusion	07/06/99	27,048	$0.5650	$0.5610	Del	$0.0040	$108.19
						07/21/99	17,498	$0.5650	$0.5610	Del	$0.0040	$69.99
					Clip	07/06/99	10,174	$0.5450	$0.5410	Del	$0.0040	$40.70
					Painted Siding	07/01/99	15,798	$0.5250	$0.5210	Del	$0.0040	$63.19
						07/06/99	26,035	$0.5250	$0.5210	Del	$0.0040	$104.14
						07/13/99	4,734	$0.5250	$0.5210	Del	$0.0040	$18.94
						07/29/99	35,080	$0.5250	$0.5210	Del	$0.0040	$140.32
					Alum Cans	07/01/99	6,369	$0.4900	$0.4860	Del	$0.0040	$33.46
						07/13/99	2,386	$0.4900	$0.4860	Del	$0.0040	$9.55
						07/29/99	1,771	$0.4900	$0.4860	Del	$0.0040	$7.08
					Road Signs	07/01/99	19,274	$0.5250	$0.5210	Del	$0.0040	$77.10
						07/06/99	5,196	$0.5250	$0.5210	Del	$0.0040	$20.78
						07/06/99	15,988	$0.5250	$0.5210	Del	$63.95
						07/13/99	36,789	$0.5250	$0.5210	Del	$147.16
						07/21/99	28,215	$0.5250	$0.5210	Del	$112.86
						07/29/99	5,561	$0.5250	$0.5210	Del	$22.24
DJJ (Frank Nott)	00150	07/08/99	Alcham Aluminum	00366	Alum Copper Units	07/22/99	44,199	$0.5300	$0.5260	Del	$0.0040	$176.80
DJJ (Frank Nott)	00153	07/08/99	Commonwealth-KY	00386	#1 Extrusion	07/28/99	41,751	$0.6050	$0.6010	Del	$0.0040	$167.00
					Clip	07/22/99	42,992	$0.5850	$0.5810	Del	$0.0040	$171.97
DJJ (Frank Nott)	00161	07/16/99	Wabash - Richmond	00381	Deox Old Sheet	07/30/99	10,820	$0.4700	$0.4660	Del	$0.0040	$43.28
					Alum Turnings	07/30/99	20,196	$0.4700	$0.4660	Del	$0.0040	$80.78

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00184	07/20/99	Wabash - Richmond	00387	Clip	07/30/99	7,677	$0.5700	$0.5660	Del	$0.0040	$30.71
					Alum Bumpers	07/30/99	804	$0.4750	$0.4710	Del	$0.0040	$3.22
DJJ(Birmingham)	00135	06/18/99	Nichols	00320	PIG 3105	07/29/99	40,560	$0.5800	$0.5362	Del	$0.0438	$1,776.53
DJJ(Birmingham)	00148	07/01/99	Audubon	00358	1100 Finn Stock	07/02/99	18,220	$0.6250	$0.6175	Del	$0.0075	$136.65
Graham & Co.	00168	07/23/99	ELG	00393	18/8 Stainless	07/29/99	15,760	$0.2875	$0.2589	Del	$0.0059	$140.44
JSL Metals	00069	04/02/99	All American	00176	Alum Cans	07/01/99	7,940	$0.4400	$0.3950	SP	$0.0450	$357.30
						07/06/99	6,260	$0.4700	$0.4250	SP	$0.0450	$282.60
						07/06/99	6,260	$0.4700	$0.4250	SP	$0.0450	$282.60
LSM/Progress Rail	00147	06/25/99	Nichols	00320	Nichols Old Sheet	07/19/99	38,706	$0.5200	$0.5100	Del	$0.0100	$387.06
Powercom	00106	05/19/99	DJJ-BIRMINGHAM	00258	EC Chops	07/27/99	42,480	$0.6538	$0.6500	Del	$0.0038	$161.42
						07/30/99	40,122	$0.6538	$0.6500	Del	$0.0038	$152.46
Riverside Recycling	00146	06/28/99	Ohio Valley Aluminu	00356	Seg 6061	07/19/99	8,100	$0.5900	$0.5250	Del	$0.0650	$396.50
Trademark	00090	05/10/99	J W Aluminum	00236	Clip	07/15/99	43,079	$0.5625	$0.5500	Del	$0.0125	$538.49
Trademark	00112	05/24/99	Nichols	00274	Alum Radiators	07/10/99	43,156	$0.5200	$0.5050	Del	$0.0150	$647.34
Trademark	00113	05/24/99	Nichols	00275	Clip	07/21/99	37,261	$0.5575	$0.5450	Del	$0.0125	$465.76
						07/30/99	37,360	$0.5575	$0.5450	Del	$0.0125	$467.00
					Painted Siding	07/16/99	43,210	$0.5375	$0.5250	Del	$0.0125	$540.13
						07/21/99	7,568	$0.5375	$0.5250	Del	$0.0125	$94.60
						07/30/99	6,514	$0.5375	$0.5250	Del	$0.0125	$81.42
Trademark	00159	07/09/99	Owens Corning PL 4	00379	Alum Cans	07/30/99	13,996	$0.5200	$0.5100	Del	$0.0100	$139.96
					Road Signs	07/30/99	29,614	$0.5500	$0.5350	Del	$0.0150	$444.21
Trademark	00165	07/21/99	Schumann	00391	Red Brass	07/22/99	18,019	$0.5800	$0.5700	Del	$0.0100	$180.19
					Auto Radiators	07/22/99	24,325	$0.4650	$0.4600	Del	$0.0050	$121.63
Trademark	00166	07/23/99	Schumann	00392	Red Brass	07/28/99	27,275	$0.5750	$0.5625	Del	$0.0125	$340.94
					Auto Radiators	07/28/99	14,966	$0.4600	$0.4525	Del	$0.0075	$112.25
					Totals		1,631,751				$0.0126	$20,526.97

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment data) 01/28/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Audubon	00173	08/05/99	Chemetco	00413	Yellow Brass	08/10/99	46,640	$0.4350	$0.4200	Del	$0.0150	$699.60
						08/27/99	48,440	$0.4350	$0.4200	Del	$0.0150	$726.60
Audubon	00191	08/24/99	Chemetco	00440	Sheet Copper	08/27/99	46,560	$0.6100	$0.5950	Del	$0.0150	$698.40
Audubon	00192	08/24/99	Chemetco	00441	Yellow Brass	08/27/99	47,640	$0.4200	$0.4050	Del	$0.0150	$714.60
Barren County	00198	08/27/99	QRS	00447	Alum Cans	08/25/99	10,860	$0.4950	$0.4800	Del	$0.0150	$162.90
Chemetco	00131	08/14/99	Nichols	00320	Nichols Old Sheet	08/05/99	38,607	$0.5200	$0.5000	Del	$0.0200	$772.14
					Clip	08/09/99	8,528	$0.5575	$0.5425	Del	$0.0150	$127.92
					Painted Siding	08/09/99	28,549	$0.5375	$0.5225	Del	$0.0150	$428.24
					E C Wire	08/09/99	1,159	$0.6000	$0.5850	Del	$0.0150	$17.39
Chemetco	00151	07/08/99	Commonwealth-KY	00368	Clip	08/17/99	12,826	$0.5850	$0.5700	Del	$0.0150	$192.39
					Painted Siding	08/17/99	18,770	$0.5650	$0.5500	Del	$0.0150	$281.56
D.J.J. Jackson	00185	08/20/99	Chemetco	00432	Shredded Elec Motor	08/20/99	35,300	$0.0800	$0.0725	Del	$0.0075	$264.75
						08/24/99	33,580	$0.0800	$0.0725	Del	$0.0075	$251.85
						08/25/99	35,260	$0.0800	$0.0725	Del	$0.0075	$264.50
D.R.M.O.	00144	08/26/99	Wabash - Richmond	00353	Deox Old Sheet	08/02/99	39,340	$0.4850	$0.4328	Del	$0.0522	$2,053.55
DJJ (Frank Nott)	00083	04/09/99	Nichols	00201	Nichols Old Sheet	08/06/99	28,200	$0.4775	$0.4735	Del	$0.0040	$112.80
					Painted Siding	08/06/99	15,358	$0.4950	$0.4910	Del	$0.0040	$61.43
DJJ (Frank Nott)	00114	05/24/99	Nichols	00275	Painted Siding	08/03/99	33,306	$0.5375	$0.5335	Del	$0.0040	$133.22
						08/12/99	43,460	$0.5375	$0.5335	Del	$0.0040	$173.84
					Seg 3003	08/03/99	9,269	$0.5750	$0.5710	Del	$0.0040	$37.08
DJJ (Frank Nott)	00127	06/11/99	Owens Corning Pl. 4	00315	EC Chops	08/18/99	20,856	$0.6225	$0.6185	Del	$0.0040	$83.42
DJJ (Frank Nott)	00128	06/11/99	Owens Corning Pl. 4	00316	#1 Extrusion	08/13/99	9,150	$0.6650	$0.6610	Del	$0.0040	$36.60
					Clip	08/13/99	22,946	$0.5450	$0.5410	Del	$0.0040	$91.78
					Litho	08/13/99	10,386	$0.5550	$0.5510	Del	$0.0040	$41.54

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00129	06/11/99	Nichols	00320	Nichols Old Sheet	06/27/99	35,306	$0.5200	$0.5160	Del	$0.0040	$141.22
					Clip	06/18/99	31,632	$0.5575	$0.5535	Del	$0.0040	$126.53
					Painted Siding	06/13/99	43,298	$0.5375	$0.5335	Del	$0.0040	$173.19
						06/24/99	28,536	$0.5375	$0.5335	Del	$0.0040	$114.14
						06/27/99	1,836	$0.5375	$0.5335	Del	$0.0040	$7.34
					Litho	06/16/99	12,257	$0.5650	$0.5610	Del	$0.0040	$49.03
						06/24/99	15,008	$0.5650	$0.5610	Del	$0.0040	$60.03
					Seg 3003	06/27/99	6,136	$0.5800	$0.5760	Del	$0.0040	$24.55
DJJ (Frank Nott)	00132	06/15/99	Quantum	00326	Alum Wheels	06/19/99	28,600	$0.5850	$0.5810	Del	$0.0040	$114.40
					Mang Bronze	06/19/99	450	$0.4000	$0.3960	Del	$0.0040	$1.84
					Mang Bronze - Low	06/19/99	1,730	$0.3500	$0.3460	Del	$0.0040	$6.92
					Meter Brass	06/19/99	3,396	$0.4800	$0.4760	Del	$0.0040	$13.58
DJJ (Frank Nott)	00153	07/08/99	Commonwealth-KY	00368	#1 Extrusion	06/12/99	44,488	$0.6050	$0.6010	Del	$0.0040	$177.95
						06/28/99	45,466	$0.6050	$0.6010	Del	$0.0040	$181.86
					Clip	06/30/99	43,280	$0.5850	$0.5810	Del	$0.0040	$173.12
					Painted Siding	06/10/99	39,104	$0.5650	$0.5610	Del	$0.0040	$156.42
DJJ (Frank Nott)	00161	07/16/99	Wabash - Richmond	00381	Deox Old Sheet	06/20/99	26,986	$0.4700	$0.4660	Del	$0.0040	$107.94
					Alum Turnings	06/20/99	16,844	$0.4700	$0.4660	Del	$0.0040	$67.38
						06/26/99	19,560	$0.4700	$0.4660	Del	$0.0040	$78.24
DJJ (Frank Nott)	00162	07/20/99	Owens Corning Pt. 4	00384	EC Chops	06/02/99	34,438	$0.6600	$0.6560	Del	$0.0040	$137.76
						06/18/99	20,856	$0.6600	$0.6560	Del	$0.0040	$83.42
						06/19/99	42,497	$0.6600	$0.6560	Del	$0.0040	$169.99
DJJ (Frank Nott)	00163	07/20/99	Freedman, Joseph	00386	Alum Copper Units	06/09/99	21,302	$0.5400	$0.5360	Del	$0.0040	$85.21
					Al Cu Units w/steel	06/08/99	21,098	$0.4400	$0.4360	Del	$0.0040	$84.39*
DJJ (Frank Nott)	00170	07/29/99	Audubon	00401	Old Sheet (Tense)	06/03/99	32,880	$0.5200	$0.5160	Del	$0.0040	$131.44
						06/30/99	17,100	$0.5200	$0.5160	Del	$0.0040	$68.40
DJJ (Frank Nott)	00174	08/05/99	Metal Exchange	00416	PIG 3105	06/28/99	79,042	$0.6575	$0.6127	SP	$0.0448	$3,541.08

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00176	08/05/99	Owens Corning PL 4	00411	E C Wire	08/26/99	2,542	$0.6450	$0.6410	Del	$0.0040	$10.57
					EC Chops	08/19/99	41,577	$0.6650	$0.6610	Del	$0.0040	$166.31
						08/24/99	40,780	$0.6650	$0.6610	Del	$0.0040	$163.12
						08/25/99	39,787	$0.6650	$0.6610	Del	$0.0040	$159.15
						08/26/99	17,823	$0.6650	$0.6610	Del	$0.0040	$71.29
DJJ (Frank Nott)	00188	08/24/99	Wabash - Richmond	00434	Deox Old Sheet	08/31/99	6,126	$0.4700	$0.4660	Del	$0.0040	$32.50
					Alum Radiators	08/31/99	33,361	$0.4900	$0.4860	Del	$0.0040	$133.44
DJJ (Frank Nott)	00242	08/25/99	Schumann	00442	Red Brass	08/24/99	25,000	$0.5800	$0.5760	Del	$0.0040	$100.00
						08/24/99	4,898	$0.5800	$0.5760	Del	$0.0040	$19.59
					Hard Brass	08/24/99	2,180	$0.6100	$0.6060	Del	$0.0040	$8.72
					Heater Cores	08/24/99	578	$0.3250	$0.3210	Del	$0.0040	$2.31
					Semi Red Brass	08/24/99	5,852	$0.5100	$0.5060	Del	$0.0040	$23.41
					Nickel Silver Solids	08/24/99	908	$0.5100	$0.5060	Del	$0.0040	$3.63
					EDM Wire	08/24/99	2,296	$0.4600	$0.4560	Del	$0.0040	$9.18
					Sloan	08/24/99	1,202	$0.4500	$0.4460	Del	$0.0040	$4.81
DJJ(Birmingham)	00175	08/05/99	Commonwealth-KY	00388	Seg 3003	08/23/99	12,117	$0.6050	$0.6025	Del	$0.0025	$30.29
					Seg 5052	08/23/99	13,122	$0.6250	$0.6225	Del	$0.0025	$32.81
					Seg 6061	08/23/99	15,604	$0.6100	$0.6025	Del	$0.0075	$117.03
DJJ(Birmingham)	00184	08/20/99	Commonwealth-KY	00388	Seg 3003	08/24/99	27,045	$0.6050	$0.6025	Del	$0.0025	$67.61
					6000 Series	08/24/99	10,300	$0.6250	$0.6225	Del	$0.0025	$25.75
Franklin Surplus	00200	08/27/99	ELG	00449	Nickel	08/30/99	26,560	$0.0938	$0.0826	Del	$0.0112	$297.47
Graham & Co.	00199	08/27/99	ELG	00448	18/8 Stainless	08/25/99	9,280	$0.2902	$0.2600	Del	$0.0302	$280.26

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Keystone	00139	06/23/99	DJJ-Charleston	00342	Deox Pyramids	08/03/99	41,620	$0.7062	$0.7000	Del	$0.0062	$259.04
						08/06/99	41,240	$0.7062	$0.7000	Del	$0.0062	$255.69
						08/06/99	43,860	$0.7062	$0.7000	Del	$0.0062	$271.93
						08/09/99	41,260	$0.7062	$0.7000	Del	$0.0062	$255.81
						08/10/99	46,680	$0.7062	$0.7000	Del	$0.0062	$289.20
						08/12/99	44,260	$0.7062	$0.7000	Del	$0.0062	$274.41
						08/13/99	41,560	$0.7062	$0.7000	Del	$0.0062	$257.67
						08/13/99	45,240	$0.7062	$0.7000	Del	$0.0062	$280.49
						08/17/99	43,900	$0.7062	$0.7000	Del	$0.0062	$272.18
						08/20/99	44,880	$0.7062	$0.7000	Del	$0.0062	$278.26
						08/24/99	41,460	$0.7062	$0.7000	Del	$0.0062	$257.05
						08/26/99	41,100	$0.7062	$0.7000	Del	$0.0062	$254.82
						08/27/99	44,300	$0.7062	$0.7000	Del	$0.0062	$274.66
						08/30/99	40,760	$0.7062	$0.7000	Del	$0.0062	$252.71
						08/31/99	44,740	$0.7062	$0.7000	Del	$0.0062	$277.39
							684,680					$010.4
Powercom	00106	05/19/99	DJJ-BIRMINGHAM	00258	EC Chops	08/23/99	43,498	$0.6538	$0.6500	Del	$0.0038	$165.29
Riveside Recycling	00145	06/28/99	Nichols	00320	Painted Siding	08/02/99	36,020	$0.5375	$0.5175	Del	$0.0200	$700.40
Trademark	00113	05/24/99	Nichols	00275	Clip	08/06/99	32,135	$0.5575	$0.5450	Del	$0.0125	$401.69
					Painted Siding	08/06/99	11,340	$0.5375	$0.5250	Del	$0.0125	$141.75
Trademark	00130	06/14/99	Nichols	00320	Clip	08/19/99	28,070	$0.5575	$0.5450	Del	$0.0125	$350.88
						08/27/99	21,921	$0.5575	$0.5450	Del	$0.0125	$274.01
						08/27/99	30,722	$0.5575	$0.5450	Del	$0.0125	$384.02
						08/31/99	24,941	$0.5575	$0.5450	Del	$0.0125	$311.76
					Painted Siding	08/18/99	15,485	$0.5375	$0.5250	Del	$0.0125	$193.56
						08/27/99	8,421	$0.5375	$0.5250	Del	$0.0125	$80.26
						08/27/99	18,341	$0.5375	$0.5250	Del	$0.0125	$229.26
						08/31/99	17,583	$0.5375	$0.5250	Del	$0.0125	$219.79
					Litho	08/27/99	6,419	$0.5650	$0.5500	Del	$0.0150	$96.28
						08/31/99	2,209	$0.5650	$0.5500	Del	$0.0150	$33.13

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price	Margin	Profit
Western Metals	00188	8/23/99	Nichols	00473	Painted Siding	09/21/99	40,200	$0.6046	$0.5400 Del	$0.0646	$2,596.92
					Totals		2,127,211			$0.0134	$28,592.98

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Ansam Metals	00201	09/07/99	Nichols	00473	Nichols Old Sheet	09/27/99	19,619	$0.5896	$0.5550	Del	$0.0346	$678.82
						09/27/99	9,786	$0.6246	$0.5950	Del	$0.0296	$289.67
					#1 Extrusion	09/27/99	10,940	$0.6306	$0.6200	Del	$0.0106	$116.96
							40,345					1084.45
Audubon	00192	08/24/99	Chemetco	00441	Yellow Brass	09/21/99	47,760	$0.4200	$0.4050	Del	$0.0150	$716.40
Audubon	00219	09/23/99	Chemetco	00518	Yellow Brass	09/27/99	46,560	$0.4300	$0.4150	Del	$0.0150	$698.40
						09/30/99	46,540	$0.4300	$0.4150	Del	$0.0150	$698.10
							140,860					2112.5
Chemetco	00131	06/14/99	Nichols	00320	Clip	09/09/99	25,383	$0.5575	$0.5425	Del	$0.0150	$380.75
					Seg 5052	09/09/99	17,897	$0.5900	$0.5800	Del	$0.0100	$178.97
Chemetco	00151	07/08/99	Commonwealth-KY	00368	Clip	09/10/99	11,192	$0.5850	$0.5700	Del	$0.0150	$167.88
					Painted Siding	09/10/99	23,049	$0.5850	$0.5500	Del	$0.0150	$345.74
Chemetco	00183	08/20/99	Nichols	00473	Nichols Old Sheet	09/23/99	32,314	$0.5896	$0.5525	Del	$0.0371	$1,198.85
					#1 Extrusion	09/10/99	4,032	$0.6306	$0.6000	Del	$0.0306	$123.38
					Clip	09/10/99	24,284	$0.6246	$0.5925	Del	$0.0321	$779.52
					Painted Siding	09/10/99	12,576	$0.6046	$0.5725	Del	$0.0321	$403.69
							150,227					3578.78
DJJ (Frank Nott)	00163	07/20/99	Freedman, Joseph	00396	Alum Copper Units	09/02/99	43,948	$0.5400	$0.5360	Del	$0.0040	$175.79
DJJ (Frank Nott)	00164	07/20/99	Wabash - Richmond	00387	Deox Old Sheet	09/10/99	17,154	$0.4760	$0.4710	Del	$0.0040	$68.62
					Clip	09/10/99	8,200	$0.5700	$0.5660	Del	$0.0040	$32.80
					Thermal Break	09/10/99	5,072	$0.4700	$0.4660	Del	$0.0040	$20.29

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00177	08/13/99	Owens Corning Pl. 4	00421	#1 Extrusion	09/07/99	20,698	$0.6200	$0.6160	Del	$0.0040	$83.59
						09/07/99	44,862	$0.6200	$0.6160	Del	$0.0040	$179.45
						09/08/99	27,658	$0.6200	$0.6160	Del	$0.0040	$110.62
					Clip	09/08/99	36,519	$0.6000	$0.5960	Del	$0.0040	$146.08
					Painted Siding	09/03/99	20,198	$0.5800	$0.5760	Del	$0.0040	$80.79
						09/03/99	29,019	$0.5800	$0.5760	Del	$0.0040	$116.08
						09/07/99	4,188	$0.5800	$0.5760	Del	$0.0040	$16.75
					Litho	09/08/99	16,692	$0.6100	$0.6060	Del	$0.0040	$66.77
					Alum Cans	09/03/99	12,490	$0.5350	$0.5310	Del	$0.0040	$49.96
					Road Signs	09/03/99	21,810	$0.5800	$0.5760	Del	$0.0040	$87.24
						09/07/99	16,734	$0.5800	$0.5760	Del	$0.0040	$66.94
DJJ (Frank Nott)	00188	08/24/99	Wabash - Richmond	00434	Deox Old Sheet	09/20/99	44,190	$0.4700	$0.4660	Del	$0.0040	$176.76
						09/28/99	3,374	$0.4700	$0.4660	Del	$0.0040	$13.50
					Alum Radiators	09/28/99	16,412	$0.4900	$0.4860	Del	$0.0040	$65.65
					Alum Turnings	09/28/99	15,152	$0.4500	$0.4460	Del	$0.0040	$60.61
DJJ (Frank Nott)	00190	08/24/99	Freedman, Joseph	00435	Alum Copper Units	09/20/99	43,240	$0.5300	$0.5260	Del	$0.0040	$172.96
						09/28/99	44,634	$0.5300	$0.5260	Del	$0.0040	$178.54

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00202	09/07/99	Nichols	00473	Nichols Old Sheet	09/22/99	6,870	$0.5896	$0.5856	Del	$0.0040	$27.48
						09/26/99	22,660	$0.5896	$0.5856	Del	$0.0040	$90.64
						09/27/99	40,646	$0.5896	$0.5856	Del	$0.0040	$162.58
					#1 Extrusion	09/22/99	34,178	$0.6306	$0.6266	Del	$0.0040	$136.71
						09/22/99	20,048	$0.6306	$0.6266	Del	$0.0040	$80.19
						09/26/99	19,014	$0.6306	$0.6266	Del	$0.0040	$76.06
					Clip	09/22/99	32,188	$0.6246	$0.6206	Del	$0.0040	$128.75
						09/26/99	21,937	$0.6246	$0.6206	Del	$0.0040	$87.75
					Painted Siding	09/17/99	42,938	$0.6046	$0.6006	Del	$0.0040	$171.75
						09/18/99	26,288	$0.6046	$0.6006	Del	$0.0040	$105.15
						09/22/99	43,872	$0.6046	$0.6006	Del	$0.0040	$175.49
						09/22/99	24,084	$0.6046	$0.6006	Del	$0.0040	$96.34
						09/26/99	10,370	$0.6046	$0.6006	Del	$0.0040	$41.48
						09/26/99	41,034	$0.6110	$0.6006	Del	$0.0104	$426.75
					Litho	09/22/99	8,926	$0.6306	$0.6266	Del	$0.0040	$35.70
						09/26/99	10,688	$0.6306	$0.6266	Del	$0.0040	$42.74
					Seg 3003	09/18/99	16,978	$0.6531	$0.6491	Del	$0.0040	$67.91
						09/22/99	4,275	$0.6531	$0.6491	Del	$0.0040	$17.10
DJJ (Frank Nott)	00213	09/10/99	Schumann	00501	Red Brass	09/23/99	6,850	$0.5850	$0.5710	Del	$0.0140	$95.90
					Hard Brass	09/23/99	2,236	$0.6150	$0.6160	Del	($0.0010)	($2.24)
					Auto Radiators	09/23/99	27,768	$0.4550	$0.4510	Del	$0.0040	$111.15
					Heater Cores	09/23/99	416	$0.3250	$0.3210	Del	$0.0040	$1.66
					Semi Red Brass	09/23/99	4,436	$0.5050	$0.5010	Del	$0.0040	$17.74
					90/10 Brass	09/23/99	498	$0.8000	$0.7960	Del	$0.0040	$1.99
					G Metal Solids/Turns	09/23/99	568	$0.6900	$0.6810	Del	$0.0090	$5.11
DJJ (Frank Nott)	00214	09/13/99	Chemetco	00505	Alum Bronze	09/21/99	4,592	$0.3250	$0.3210	Del	$0.0040	$18.37
					Auto Radiators	09/21/99	27,669	$0.3200	$0.3160	Del	$0.0040	$110.76
					#2 Copper	09/21/99	9,673	$0.5800	$0.5760	Del	$0.0040	$38.26
							1,004,080					4,539.09
DJJ(Birmingham)	00181	08/20/99	Nichols	00423	PIG 3105	09/24/99	45,260	$0.6213	$0.5955	Del	$0.0258	$1,167.71

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ(Birmingham)	00216	09/10/99	Alcham Aluminum	00437	Shredded Alum	09/16/99	45,540	$0.5650	$0.5550	Del	$0.0100	$455.40
						09/20/99	36,400	$0.5650	$0.5550	Del	$0.0100	$364.00
							72,200					1987.11
Garden Street I&M	00187	08/23/99	Nichols	00423	Painted Siding	09/02/99	23,380	$0.5878	$0.5600	Del	$0.0278	$649.41
					PIG 3105	09/02/99	19,276	$0.6238	$0.5900	Del	$0.0338	$651.53
							42,636					1300.94
LSM/Progress Rail	00204	09/03/99	Nichols	00473	Nichols Old Sheet	09/20/99	40,620	$0.5896	$0.5600	Del	$0.0296	$1,202.35
						09/23/99	40,377	$0.5896	$0.5600	Del	$0.0296	$1,195.16
LSM/Progress Rail	00206	09/07/99	Nichols	00541	Nichols Old Sheet	09/28/99	40,194	$0.5866	$0.5650	Del	$0.0246	$988.77
							121,191					3386.28
Southern Recycling	00205	09/07/99	Nichols	00473	Nichols Old Sheet	09/24/99	43,910	$0.5896	$0.5625	Del	$0.0271	$1,189.96
Trademark	00133	06/18/99	Quantum	00328	Alum Wheels	09/01/99	134	$0.4500	$0.4350	Del	$0.0150	$2.01
						09/01/99	42,778	$0.5850	$0.5725	Del	$0.0125	$534.73
Trademark	00152	07/08/99	Commonwealth-KY	00368	Clip	09/09/99	43,380	$0.5850	$0.5700	Del	$0.0150	$650.70
						09/22/99	42,650	$0.6100	$0.5700	Del	$0.0400	$1,706.00
					Painted Siding	09/27/99	29,495	$0.5900	$0.5500	Del	$0.0400	$1,179.80
					Seg 6061	09/27/99	13,824	$0.6200	$0.5900	Del	$0.0300	$414.72
Trademark	00178	08/13/99	Nichols	00423	#1 Extrusion	09/29/99	30,155	$0.5138	$0.5050	Del	$0.0088	$265.36
					Clip	09/27/99	20,641	$0.6078	$0.5900	Del	$0.0178	$367.41
					Painted Siding	09/27/99	6,680	$0.5878	$0.5700	Del	$0.0178	$118.90
					Litho	09/29/99	11,159	$0.6138	$0.6000	Del	$0.0138	$153.99
Trademark	00193	08/25/99	Schumann	00442	Auto Radiators	09/02/99	34,601	$0.4412	$0.4400	Del	$0.0012	$41.52
					Semi Red Brass	09/02/99	10,029	$0.5100	$0.4800	Del	$0.0300	$300.78
Trademark	00211	09/10/99	Alcham Aluminum	00500	Alum Radiators	09/20/99	43,726	$0.5300	$0.5200	Del	$0.0100	$437.26
Trademark	00212	09/10/99	Schumann	00501	Red Brass	09/30/99	7,768	$0.5850	$0.5600	Del	$0.0250	$194.20
					Auto Radiators	09/30/99	27,761	$0.4550	$0.4500	Del	$0.0050	$138.81
					Heater Cores	09/30/99	3,346	$0.3250	$0.3100	Del	$0.0150	$50.19
					Red Brass Turnings	09/30/99	3,845	$0.5750	$0.5700	Del	$0.0050	$19.23
							32,969					
Trademark	00221	09/24/99	Alcham Aluminum	00525	Alum Radiators	09/28/99	44,093	$0.5250	$0.5150	Del	$0.0100	$440.93

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Trademark	00152	07/08/99	Commonwealth-KY	00365	Painted Siding	08/06/99	17,516	$0.5650	$0.5500	Del	$0.0150	$262.74
					Seg 6061	08/06/99	23,253	$0.6100	$0.5900	Del	$0.0200	$465.06
Trademark	00167	07/23/99	Nichols	00274	Alum Radiators	08/30/99	43,904	$0.6200	$0.6100	Del	$0.0100	$439.04
Western Metals	00155	07/07/99	Nichols	00320	Painted Siding	08/02/99	44,200	$0.5375	$0.4950	SP	$0.0425	$1,878.50
Western Metals	00186	08/23/99	Nichols	00473	Painted Siding	08/25/99	44,560	$0.6046	$0.5400	Del	$0.0646	$2,878.58
						08/26/99	44,620	$0.6046	$0.5400	Del	$0.0646	$2,882.45
						08/30/99	42,590	$0.6046	$0.5400	Del	$0.0646	$2,751.31
					Totals		2,900,753				$0.0122	$35,415.02

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Ansam Metals	00250	10/15/99	Nichols	00541	Nichols Old Sheet	10/27/99	22,754	$0.5960	$0.6400	Del	$0.0560	$1,274.22
					Clip	10/27/99	12,047	$0.6310	$0.5875	Del	$0.0435	$524.04
					Painted Siding	~~10/27/99~~	~~6,729~~ 41,030	$0.6110	$0.5675	Del	$0.0435	$292.71 2090.97
Baker I&M	00220	09/24/99	J W Aluminum	00551	Shredded Alum	10/13/99	39,330	$0.5500	$0.5400	SP	$0.0100	$393.30
Chemetco	00183	08/20/99	Nichols	00473	Painted Siding	10/04/99	26,600	$0.6046	$0.5725	Del	$0.0321	$853.66
						10/07/99	42,695	$0.6046	$0.5725	Del	$0.0321	$1,370.51
					Litho	10/04/99	17,747	$0.6306	$0.6025	Del	$0.0281	$498.69
Chemetco	00227	09/30/99	Nichols	00541	Nichols Old Sheet	10/13/99	20,848	$0.5960	$0.5525	Del	$0.0435	$906.89
						10/14/99	20,392	$0.5960	$0.5525	Del	$0.0435	$887.05
						10/15/99	10,767	$0.5960	$0.5525	Del	$0.0435	$468.36
						10/26/99	34,720	$0.5728	$0.5525	Del	$0.0203	$704.82
					Clip	10/13/99	22,558	$0.6310	$0.5925	Del	$0.0365	$888.37
					Painted Siding	10/15/99	32,495 228819	$0.6110	$0.5725	Del	$0.0385	$1,251.06 7809.61
DJJ (Frank Nott)	00164	07/20/99	Wabash - Richmond	00387	Deox Old Sheet	10/13/99	35,642	$0.4750	$0.4710	Del	$0.0040	$142.57
					Clip	10/13/99	3,039	$0.5700	$0.5660	Del	$0.0040	$12.16
					Alum Radiators	10/13/99	2,874	$0.4750	$0.4710	Del	$0.0040	$11.50
					Alum Bumpers	10/13/99	2,822	$0.4750	$0.4710	Del	$0.0040	$11.29

Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00207	10/07/99	Owens Corning Pl. 4	00472	#1 Extrusion	10/04/99	2,102	$0.6200	$0.6160	Del	$0.0040	$8.41
						10/08/99	41,641	$0.6200	$0.6160	Del	$0.0040	$166.56
						10/11/99	3,502	$0.6200	$0.6160	Del	$0.0040	$14.01
						10/12/99	23,641	$0.6200	$0.6160	Del	$0.0040	$94.56
					Clip	10/11/99	39,479	$0.6050	$0.6010	Del	$0.0040	$157.92
					Painted Siding	10/04/99	40,908	$0.5850	$0.5810	Del	$0.0040	$163.63
						10/14/99	21,880	$0.5850	$0.5810	Del	$0.0040	$87.52
					Alum Cans	10/04/99	6,037	$0.5450	$0.5410	Del	$0.0040	$24.15
						10/14/99	3,088	$0.5450	$0.5410	Del	$0.0040	$12.35
					EC Chops	10/06/99	40,966	$0.6800	$0.6760	Del	$0.0040	$163.86
						10/08/99	41,384	$0.6800	$0.6760	Del	$0.0040	$165.54
						10/11/99	40,394	$0.6800	$0.6760	Del	$0.0040	$161.58
					Road Signs	10/04/99	36,461	$0.5850	$0.5810	Del	$0.0040	$145.84
						10/12/99	18,672	$0.5850	$0.5810	Del	$0.0040	$74.69
						10/14/99	15,672	$0.5850	$0.5810	Del	$0.0040	$62.69
DJJ (Frank Nott)	00217	10/14/99	Metal Commodities -	00508	Alum Copper Units	10/27/99	28,509	$0.5375	$0.5335	Del	$0.0040	$114.04
DJJ (Frank Nott)	00222	10/27/99	Alchem-Coldwater	00525	Alum Copper Units	10/14/99	34,760	$0.5300	$0.5260	Del	$0.0040	$139.04
					Magnesium	10/14/99	5,796	$0.5400	$0.5360	Del	$0.0040	$23.18
DJJ (Frank Nott)	00230	10/01/99	Nichols	00541	Nichols Old Sheet	10/29/99	44,826	$0.5901	$0.5920	Del	($0.0019)	($85.17)
					#1 Extrusion	10/22/99	28,768	$0.6370	$0.6330	Del	$0.0040	$115.07
					Clip	10/22/99	10,230	$0.6310	$0.6270	Del	$0.0040	$40.92
					Painted Siding	10/05/99	15,341	$0.6110	$0.6070	Del	$0.0040	$61.36
						10/12/99	21,944	$0.6110	$0.6070	Del	$0.0040	$87.78
						10/19/99	44,536	$0.6110	$0.6070	Del	$0.0040	$178.14
						10/25/99	43,268	$0.6110	$0.6070	Del	$0.0040	$173.07
					Litho	10/12/99	15,650	$0.6370	$0.6330	Del	$0.0040	$62.60
					E C Wire	10/08/99	21,086	$0.6770	$0.6730	Del	$0.0040	$84.26
					Mixed 3000 Series	10/08/99	6,838	$0.6770	$0.6730	Del	$0.0040	$27.35
						10/12/99	5,858	$0.6445	$0.6405	Del	$0.0040	$23.43
					Mixed 5000 Series	10/22/99	5,208	$0.6445	$0.6405	Del	$0.0040	$20.83

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00236	10/07/99	Wabash - Richmond	00583	Alum Turnings	10/14/99	4,620	$0.4600	$0.4560	Del	$0.0040	$18.48
DJJ (Frank Nott)	00237	10/07/99	Colonial	00584	Red Brass	10/12/99	7,376	$0.5500	$0.5460	Del	$0.0040	$29.50
					Auto Radiators	10/12/99	32,698	$0.4350	$0.4310	Del	$0.0040	$130.78
					Meter Brass	10/12/99	2,186	$0.4900	$0.4860	Del	$0.0040	$8.74
DJJ (Frank Nott)	00247	10/14/99	Newco	00607	Alum. Sows	10/14/99	37,204	$0.5150	$0.5267	Del	$0.0583	$3,285.11
DJJ (Frank Nott)	00253	10/15/99	Alchem Aluminum	00611	Cast Aluminum	10/29/99	39,160	$0.4800	$0.4760	Del	$0.0040	$156.64
DJJ (Frank Nott)	00250	10/26/99	Wabash - Richmond	00636	Deox Old Sheet	10/29/99	26,776	$0.4850	$0.4810	Del	$0.0040	$107.10
					Clip	10/28/99	2,864	$0.5500	$0.5460	Del	$0.0040	$11.46
					Alum Radiators	10/29/99	~~15,908~~ 924,594	$0.4900	$0.4860	Del	$0.0040	$63.63 6558.17
Eckart America	00241	10/08/99	Newco	00605	Aluminum Dross	10/11/99	27,083	$0.6200	$0.2100	Del	$0.4100	$11,104.03
LSM/Progress Rail	00178	10/13/99	Nichols	00423	Nichols Old Sheet	10/03/99	41,740	$0.5728	$0.5500	Del	$0.0228	$951.87
LSM/Progress Rail	00206	10/07/99	Nichols	00541	Nichols Old Sheet	10/04/99	44,608	$0.5896	$0.5650	Del	$0.0246	$1,097.36
						10/12/99	42,427	$0.5960	$0.5650	Del	$0.0310	$1,315.24
						10/18/99	46,551	$0.5960	$0.5650	Del	$0.0310	$1,443.06
						10/22/99	~~44,614~~ 220,140	$0.5960	$0.5650	Del	$0.0310	$1,383.23 6796.58
Southern Recycling	00235	10/07/99	Nichols	00541	Nichols Old Sheet	10/13/99	41,670	$0.5960	$0.5350	Del	$0.0610	$2,554.07
Trademark	00179	10/13/99	Nichols	00423	#1 Extrusion	10/11/99	43,598	$0.6138	$0.6050	Del	$0.0088	$383.68
Trademark	00196	10/26/99	Quantum	00443	Alum. Auto Rims	10/22/99	43,440	$0.6100	$0.6000	Del	$0.0100	$434.40
						10/27/99	56	$0.4500	$0.4350	Del	$0.0150	$0.84
Trademark	00203	10/07/99	Nichols	00473	#1 Extrusion	10/08/99	43,925	$0.6306	$0.6100	Del	$0.0206	$904.86
						10/20/99	44,552	$0.6370	$0.6100	Del	$0.0270	$1,202.90
					Clip	10/14/99	37,725	$0.6246	$0.6000	Del	$0.0246	$928.03
					Painted Siding	10/14/99	6,761	$0.6046	$0.5800	Del	$0.0246	$166.32
Trademark	00224	10/30/99	Alchem Aluminum	00539	Alum Copper Units	10/08/99	42,818	$0.5350	$0.5300	Del	$0.0050	$214.09
						10/15/99	43,515	$0.5350	$0.5300	Del	$0.0050	$217.57

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Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Trademark	00228	09/30/99	Nichols	00541	#1 Extrustion	10/13/99	33,456	$0.6370	$0.6100	Del	$0.0270	$903.31
						10/19/99	42,279	$0.6370	$0.6100	Del	$0.0270	$1,141.53
					Clip	10/06/99	17,984	$0.6310	$0.6000	Del	$0.0310	$557.50
					Painted Siding	10/06/99	24,518	$0.6110	$0.5800	Del	$0.0310	$760.09
						10/13/99	9,433	$0.6110	$0.5800	Del	$0.0310	$292.42
						10/25/99	43,197	$0.6110	$0.5800	Del	$0.0310	$1,339.11
Trademark	00252	10/15/99	Alchem Aluminum	00611	Alum Radiators	10/26/99	44,177	$0.5100	$0.5000	Del	$0.0100	$441.77
Trademark	00254	10/20/99	Alchem Aluminum	00627	Alum Copper Units	10/25/99	44,434	$0.5200	$0.5100	Del	$0.0100	$444.34
						10/27/99	41,747	$0.5200	$0.5100	Del	$0.0100	$417.47
Trademark	00257	10/22/99	Schumann	00632	Auto Radiators	10/25/99	42,544	$0.4444	$0.4394	Del	$0.0050	$212.72
							250,160					10,962.93
Western Metals	00226	09/30/99	Nichols	00541	Nichols Old Sheet	10/14/99	44,301	$0.5901	$0.5200	Del	$0.0701	$3,105.50
					Painted Siding	10/27/99	45,642	$0.6061	$0.5400	Del	$0.0651	$2,971.29
Western Metals	00248	10/15/99	Nichols	00541	Nichols Old Sheet	10/15/99	43,632	$0.5960	$0.5000	Del	$0.0960	$4,207.87
						10/26/99	44,082	$0.5901	$0.5000	Del	$0.0901	$3,969.99
							177,857					14,254.65
					Totals		2,346,363				$0.0264	$61,924.36

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 01/25/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Audubon	00279	11/03/99	Chemetco	00673	Yellow Brass	11/16/99	47,740	$0.4350	$0.4200	Del	$0.0150	$716.10
						11/17/99	48,540	$0.4350	$0.4200	Del	$0.0150	$728.10
Audubon	00313	11/23/99	Chemetco	00747	Yellow Brass	11/24/99	46,420	$0.4350	$0.4200	Del	$0.0150	$696.30
Audubon	00314	11/23/99	Chemetco	00746	Sheet Copper	11/24/99	47,520 170,240	$0.6050	$0.5850	Del	$0.0200	$950.40 3,042.90
Chemetco	00085	04/15/99	Keystone	00207	Clip	11/03/99	43,170	$0.5150	$0.5100	Del	$0.0050	$215.85
Chemetco	00169	07/23/99	Nichols	00661	Litho	11/16/99	41,763	$0.6311	$0.5990	Del	$0.0321	$1,340.59
Chemetco	00271	10/29/99	Nichols	00661	Nichols Old Sheet	11/19/99	1,264	$0.5901	$0.5300	Del	$0.0601	$75.97
Chemetco	00272	10/29/99	Commonwealth-KY	00691	Clip	11/11/99	15,423	$0.5950	$0.5600	Del	$0.0350	$539.80
						11/22/99	19,880	$0.5950	$0.5600	Del	$0.0150	$298.20
					Painted Siding	11/11/99	23,390	$0.5750	$0.5600	Del	$0.0150	$350.85
						11/22/99	10,911	$0.5750	$0.5600	Del	$0.0150	$163.66
					PIG 3105	11/22/99	490 156,271	$0.6200	$0.6050	Del	$0.0150	$7.35 2,772.29
Didion	00240	10/08/99	Nichols	00661	Clip	11/17/99	6,544	$0.6251	$0.5800	Del	$0.0451	$295.13
					Painted Siding	11/04/99	37,598	$0.6051	$0.5600	Del	$0.0451	$1,695.67
						11/17/99	17,621	$0.6051	$0.5600	Del	$0.0451	$794.71
					Litho	11/17/99	15,932	$0.6311	$0.5900	Del	$0.0411	$654.81
DJJ (Frank Nott)	00164	07/20/99	Wabash - Richmond	00387	Deox Old Sheet	11/11/99	13,254	$0.4750	$0.4710	Del	$0.0040	$53.02
					Alum Turnings	11/11/99	27,134	$0.4600	$0.4560	Del	$0.0040	$108.54

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Noll)	00223	10/30/99	Owens Corning Pl. 4	00536	#1 Extrusion	11/04/99	45,795	$0.6225	$0.6185	Del	$0.0040	$183.18
						11/10/99	18,326	$0.6225	$0.6185	Del	$0.0040	$73.30
						11/16/99	29,782	$0.6225	$0.6185	Del	$0.0040	$119.13
						11/23/99	25,638	$0.6225	$0.6185	Del	$0.0040	$102.55
					Clip	11/08/99	41,655	$0.5975	$0.5935	Del	$0.0040	$166.62
						11/10/99	19,388	$0.5975	$0.5935	Del	$0.0040	$77.55
						11/16/99	11,284	$0.5975	$0.5935	Del	$0.0040	$45.14
						11/18/99	36,204	$0.5975	$0.5935	Del	$0.0040	$144.82
						11/23/99	9,703	$0.5975	$0.5935	Del	$0.0040	$38.81
					Painted Siding	11/03/99	25,660	$0.5775	$0.5735	Del	$0.0040	$102.64
						11/10/99	19,353	$0.5775	$0.5735	Del	$0.0040	$77.41
						11/16/99	11,178	$0.5775	$0.5735	Del	$0.0040	$44.71
						11/19/99	28,222	$0.5775	$0.5735	Del	$0.0040	$112.89
					Litho	11/10/99	11,610	$0.6075	$0.6035	Del	$0.0040	$46.44
					Alum Cans	11/03/99	15,766	$0.5575	$0.5535	Del	$0.0040	$63.06
						11/18/99	8,461	$0.5575	$0.5535	Del	$0.0040	$33.92
					Road Signs	11/10/99	4,047	$0.5775	$0.5735	Del	$0.0040	$16.19
						11/10/99	12,756	$0.5775	$0.5735	Del	$0.0040	$51.03
						11/12/99	30,176	$0.5775	$0.5735	Del	$0.0040	$120.70
						11/19/99	7,754	$0.5775	$0.5735	Del	$0.0040	$31.02
DJJ (Frank Noll)	00253	10/15/99	Alchem Aluminum	00611	Cast Aluminum	11/19/99	35,980	$0.4800	$0.4760	Del	$0.0040	$143.84
DJJ (Frank Noll)	00280	10/26/99	Wabash - Richmond	00636	Decx Old Sheet	11/15/99	43,219	$0.4850	$0.4810	Del	$0.0040	$172.88
						11/18/99	41,394	$0.4850	$0.4810	Del	$0.0040	$165.58
						11/22/99	44,739	$0.4850	$0.4810	Del	$0.0040	$178.96
					Thermal Break	11/18/99	1,160	$0.4850	$0.4810	Del	$0.0040	$4.64

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00276	11/01/99	Nichols	00681	Clip	11/22/99	7,198	$0.6251	$0.6211	Del	$0.0040	$28.75
					Painted Siding	11/08/99	43,620	$0.6051	$0.6011	Del	$0.0040	$174.48
						11/10/99	42,661	$0.6051	$0.6011	Del	$0.0040	$170.64
						11/18/99	43,930	$0.6051	$0.6011	Del	$0.0040	$175.72
						11/22/99	29,371	$0.6051	$0.6011	Del	$0.0040	$117.48
						11/22/99	22,626	$0.6051	$0.6011	Del	$0.0040	$90.50
					Litho	11/22/99	11,566	$0.6311	$0.6271	Del	$0.0040	$46.26
					6063 Bare Clip/Ext.	11/22/99	5,828	$0.6536	$0.6496	Del	$0.0040	$23.31
						11/22/99	2,328	$0.6536	$0.6496	Del	$0.0040	$9.31
					Mixed 3000 Series	11/18/99	6,943	$0.6000	$0.5960	Del	$0.0040	$27.77
DJJ (Frank Nott)	00282	11/04/99	Owens Corning Pl. 4	00680	Painted Siding	11/30/99	42,050	$0.5800	$0.5760	Del	$0.0040	$168.20
					E C Wire	11/15/99	4,532	$0.6300	$0.6260	Del	$0.0040	$18.13
						11/23/99	5,774	$0.6300	$0.6260	Del	$0.0040	$23.10
DJJ (Frank Nott)	00284	11/04/99	Commonwealth-KY	00691	Painted Siding	11/29/99	44,968	$0.5750	$0.5710	Del	$0.0040	$179.87
DJJ (Frank Nott)	00298	11/12/99	Freedman, Joseph	00719	Alum Copper Units	11/22/99	43,715	$0.5250	$0.5210	Del	$0.0040	$174.86
						11/29/99	27,022	$0.5250	$0.5210	Del	$0.0040	$108.09
					ACSR	11/29/99	16,508	$0.3650	$0.3610	Del	$0.0040	$66.03
DJJ (Frank Nott)	00302	11/18/99	Alchem Aluminum	00735	Deox Old Sheet	11/22/99	43,637	$0.4600	$0.4560	Del	$0.0040	$174.55
DJJ (Frank Nott)	00316	11/24/99	Newco	00754	Aluminum Dross	11/24/99	71,278 1,135,186.	$0.6350	$0.5494	Del	$0.0856	$6,101.40 10,352.02
Keystone	00256	10/22/99	DJJ-Charleston	00531	Deox Pyramids	11/11/99	43,160	$0.7388	$0.7300	Del	$0.0088	$379.81
						11/15/99	42,840	$0.7388	$0.7300	Del	$0.0088	$376.99
						11/16/99	43,900	$0.7388	$0.7300	Del	$0.0088	$386.32
						11/17/99	42,420	$0.7388	$0.7300	Del	$0.0088	$373.30
						11/18/99	40,940	$0.7388	$0.7300	Del	$0.0088	$360.27
						11/19/99	42,360	$0.7388	$0.7300	Del	$0.0088	$372.77
						11/24/99	42,840	$0.7388	$0.7300	Del	$0.0088	$376.99
						11/29/99	42,540	$0.7388	$0.7300	Del	$0.0088	$374.35
						11/30/99	42,440	$0.7388	$0.7300	Del	$0.0088	$373.47

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
LSM/Progress Rail	00234	10/07/99	Nichols	00541	Nichols Old Sheet	11/08/99	41,867	$0.5901	$0.5500	Del	$0.0401	$1,678.87
						11/11/99	45,000	$0.5901	$0.5500	Del	$0.0401	$1,804.50
LSM/Progress Rail	00249	10/14/99	Nichols	00661	Nichols Old Sheet	11/11/99	44,575	$0.5901	$0.5375	Del	$0.0526	$2,344.65
						11/18/99	45,182	$0.5901	$0.5375	Del	$0.0526	$2,376.67
						11/23/99	44,085	$0.5901	$0.5375	Del	$0.0526	$2,318.67
Riverside Recycling	00239	10/07/99	Nichols	00661	Painted Siding	11/03/99	39,260	$0.6051	$0.5700	Del	$0.0351	$1,378.03
Trademark	00259	10/28/99	Quantum	00647	Alum. Auto Rims	11/17/99	55 ✓	$0.4500	$0.4350	Del	$0.0150	$0.82
						11/17/99	43,080 ✓	$0.6200	$0.6100	Del	$0.0100	$430.80
Trademark	00261	10/28/99	Wabash - Richmond	00636	Clip	11/02/99	31,795 ✓	$0.5500	$0.5400	Del	$0.0100	$317.95
					Alum Bumpers	11/02/99	10,615 ✓	$0.4850	$0.4750	Del	$0.0100	$106.15
Trademark	00268	10/28/99	Eaaco	00646	#1 Extrusion	11/06/99	43,939 ✓	$0.6150	$0.6000	Del	$0.0150	$659.09
						11/11/99	43,094 ✓	$0.6150	$0.6000	Del	$0.0150	$646.41
						11/17/99	40,226 ✓	$0.6150	$0.6000	Del	$0.0150	$603.39
						11/18/99	43,937*	$0.6150	$0.6000	Del	$0.0150	$659.05
						11/30/99	43,121	$0.6150	$0.6000	Del	$0.0150	$646.82
Trademark	00275	11/01/99	Nichols	00661	Clip	11/08/99	3,946	$0.6251	$0.5950	Del	$0.0301	$118.77
						11/12/99	43,334	$0.6251	$0.5950	Del	$0.0301	$1,304.35
					Painted Siding	11/08/99	43,405	$0.6051	$0.5750	Del	$0.0301	$1,306.49
						11/16/99	44,313	$0.6051	$0.5750	Del	$0.0301	$1,333.82
					Litho	11/08/99	32,507	$0.6311	$0.6000	Del	$0.0311	$1,010.97
					E C Wire	11/08/99	6,616	$0.6711	$0.6250	Del	$0.0461	$305.09
Trademark	00280	11/03/99	Alchem Aluminum	00713	Alum Radiators	11/11/99	43,591	$0.5100	$0.5000	Del	$0.0100	$435.91
Trademark	00283	11/04/99	Commonwealth-KY	00891	Clip	11/12/99	43,489	$0.5950	$0.5850	Del	$0.0100	$434.89
						11/18/99	42,910	$0.5950	$0.5850	Del	$0.0100	$429.10
					Painted Siding	11/17/99	42,393	$0.5750	$0.5650	Del	$0.0100	$423.93
						11/29/99	43,847	$0.5750	$0.5650	Del	$0.0100	$438.47
					Seg 6061	11/30/99	42,720	$0.6250	$0.6100	Del	$0.0150	$640.80

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Trademark	00293	11/11/99	Nichols	00773	Clip	11/30/99	22,575	$0.6459	$0.5900	Del	$0.0559	$1,287.53
					Painted Siding	11/30/99	20,779	$0.6259	$0.5700	Del	$0.0559	$1,161.55
Trademark	00294	11/10/99	Alchem Aluminum	00715	Alum Radiators	11/23/99	44,335	$0.5100	$0.5000	Del	$0.0100	$443.35
Trademark	00295	11/12/99	Omega Metals	00718	Alum Copper Units	11/24/99	46,360	$0.5125	$0.5025	Del	$0.0100	$463.60
						11/30/99	44,872	$0.5125	$0.5025	Del	$0.0100	$448.72
						11/30/99	43,312	$0.5125	$0.5025	Del	$0.0100	$433.12
Trademark	00304	11/18/99	Alchem Aluminum	00737	Alum Turnings	11/23/99	38,660	$0.5000	$0.4850	Del	$0.0150	$579.90
Trademark	00305	11/18/99	Alchem Aluminum	00738	Cast Aluminum	11/29/99	30,360	$0.4800	$0.4700	Del	$0.0100	$303.60
							1024509					17356.64
Volunteer Recycling	00292	11/10/99	ELG	00714	18/8 Stainless	11/11/99	34,480	$0.3348	$0.3250	Del	$0.0098	$337.90
Western Metals	00296	11/12/99	Nichols	00773	Painted Siding	11/17/99	45,098	$0.6051	$0.5300	Del	$0.0751	$3,388.71
						11/17/99	45,908	$0.6259	$0.5300	Del	$0.0959	$4,402.58
Western Metals	00344	12/22/99	E&J Metals	00850	Nichols Old Sheet	11/01/99	1,794	$0.4000	$0.3800	SP	$0.0200	$35.88
							72,298					2825.17
					Totals		3,354,[illegible]				$0.0181	$60,575.99

Off

1¢ off

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 02/03/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Audubon	00313	11/23/99	Chemetco	00747	Yellow Brass	12/06/99	50,200	$0.4350	$0.4200	Del	$0.0150	$753.00
Berg Recycling	00345	12/22/99	Alchem Aluminum	00655	Alum Copper Units	12/30/99	28,361	$0.5350	$0.5000	SP	$0.0350	$992.63
					Alum. Sows	12/30/99	12,484	$0.5700	$0.5500	SP	$0.0200	$249.68
Chemetco	00169	07/23/99	Nichols	00861	Litho	12/28/99	41,520	$0.6650	$0.6300	Del	$0.0350	$1,453.20
Chemetco	00271	10/29/99	Nichols	00861	Nichols Old Sheet	12/03/99	39,467	$0.5901	$0.5300	Del	$0.0601	$2,373.17
Chemetco	00291	11/11/99	Nichols	00773	Nichols Old Sheet	12/10/99	33,797	$0.6109	$0.5300	Del	$0.0809	$2,734.16
					Clip	12/07/99	27,408	$0.6459	$0.5800	Del	$0.0659	$1,806.06
						12/08/99	11,385	$0.6459	$0.5800	Del	$0.0659	$750.27
					Painted Siding	12/08/99	15,478	$0.6259	$0.5600	Del	$0.0659	$1,020.00
						12/10/99	6,305	$0.6259	$0.5600	Del	$0.0659	$415.50
					Seg 5052	12/08/99	7,670	$0.6919	$0.6325	Del	$0.0594	$455.60
					E C Wire	12/07/99	2,282	$0.6919	$0.6200	Del	$0.0719	$164.08
					3003/1100	12/07/99	11,410	$0.6744	$0.6225	Del	$0.0519	$592.18
Crone Scrap	00299	11/15/99	Commonwealth-KY	00891	E C Wire	12/20/99	38,530	$0.6600	$0.6300	Del	$0.0300	$1,155.90
Didion	00288	11/10/99	Nichols	00861	Clip	12/15/99	6,583	$0.6459	$0.5750	Del	$0.0709	$466.73
					Painted Siding	12/15/99	17,885	$0.6259	$0.5550	Del	$0.0709	$1,268.05
					Mixed 5000 Series	12/15/99	9,134	$0.6594	$0.6000	Del	$0.0594	$542.56
Didion	00289	11/10/99	Commonwealth-KY	00891	#1 Extrusion	12/10/99	4,853	$0.6050	$0.6000	Del	$0.0050	$24.27
					Seg 6061	12/10/99	4,456	$0.6250	$0.5900	Del	$0.0350	$155.96
					6063 Bare Clip/Ext.	12/10/99	9,368	$0.6500	$0.6300	Del	$0.0200	$187.72
D.J.J (Frank Nott)	00233	10/08/99	Owens Corning Pl. 4	00580	EC Chops	12/08/99	21,876	$0.6650	$0.6610	Del	$0.0040	$87.50
						12/28/99	46,512	$0.6650	$0.6610	Del	$0.0040	$186.05

Rejected

11,764.24

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Nonferrous Brokerage Profit (based on shipment date) 02/03/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00262	11/04/99	Owens Corning Pt. 4	00650	#1 Extrusion	12/14/99	16,863	$0.6200	$0.6160	Del	$0.0040	$67.45
						12/17/99	8,820	$0.6200	$0.6160	Del	$0.0040	$35.28
					Clip	12/09/99	31,776	$0.6000	$0.5960	Del	$0.0040	$127.10
						12/14/99	15,192	$0.6000	$0.5960	Del	$0.0040	$60.77
					Painted Siding	12/08/99	44,458	$0.5800	$0.5760	Del	$0.0040	$177.83
						12/29/99	41,500	$0.5800	$0.5760	Del	$0.0040	$166.00
					Litho	12/09/99	13,424	$0.6100	$0.6060	Del	$0.0040	$53.70
						12/14/99	8,120	$0.6100	$0.6060	Del	$0.0040	$32.48
						12/30/99	9,800	$0.6100	$0.6060	Del	$0.0040	$39.20
					Alum Cans	12/02/99	1,576	$0.5700	$0.5660	Del	$0.0040	$6.30
					Road Signs	12/17/99	32,628	$0.5800	$0.5760	Del	$0.0040	$130.51
						12/30/99	32,970	$0.5800	$0.5760	Del	$0.0040	$131.88
DJJ (Frank Nott)	00284	11/04/99	Commonwealth-KY	00891	#1 Extrusion	12/10/99	36,048	$0.6050	$0.6010	Del	$0.0040	$144.19
					Clip	12/17/99	42,199	$0.5850	$0.5810	Del	$0.0040	$168.80
					Seg 6061	12/10/99	1,124	$0.6250	$0.6210	Del	$0.0040	$4.50
					6063 Bare Clip/Ext.	12/10/99	6,596	$0.6500	$0.6460	Del	$0.0040	$26.38
DJJ (Frank Nott)	00298	11/12/99	Freedman, Joseph	00719	Alum Copper Units	12/15/99	43,554	$0.5250	$0.5210	Del	$0.0040	$174.22
DJJ (Frank Nott)	00318	12/01/99	Audubon	00768	Cast Aluminum	12/30/99	27,300	$0.5000	$0.4960	Del	$0.0040	$109.20

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Nonferrous Brokerage Profit (based on shipment data) 02/03/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00323	12/02/99	Nichols	00773	Nichols Old Sheet	12/08/99	19,718	$0.6109	$0.6069	Del	$0.0040	$78.87
						12/16/99	33,804	$0.6109	$0.6069	Del	$0.0040	$135.22
					Painted Siding	12/10/99	43,933	$0.6259	$0.6219	Del	$0.0040	$175.73
						12/13/99	43,226	$0.6259	$0.6219	Del	$0.0040	$172.90
						12/14/99	40,404	$0.6259	$0.6219	Del	$0.0040	$161.62
						12/16/99	9,398	$0.6259	$0.6219	Del	$0.0040	$37.59
						12/17/99	35,878	$0.6259	$0.6219	Del	$0.0040	$143.51
					Litho	12/17/99	8,622	$0.6519	$0.6479	Del	$0.0040	$34.49
					Mixed 3000 Series	12/06/99	22,873	$0.6594	$0.6554	Del	$0.0040	$91.49
					Mixed 5000 Series	12/06/99	1,332	$0.6594	$0.6554	Del	$0.0040	$5.33
					3003/1100	12/13/99	348	$0.6744	$0.6701	Del	$0.0043	$1.50
						12/14/99	2,234	$0.6744	$0.6704	Del	$0.0040	$8.94
DJJ (Frank Nott)	00325	12/02/99	Wabash - Richmond	00784	Decx Old Sheet	12/15/99	16,612	$0.4900	$0.4860	Del	$0.0040	$66.45
						12/27/99	6,558	$0.4900	$0.4860	Del	$0.0040	$26.23
					Clip	12/15/99	2,011	$0.5800	$0.5760	Del	$0.0040	$8.04
					Alum Radiators	12/15/99	24,182	$0.5100	$0.5060	Del	$0.0040	$96.73
						12/27/99	19,360	$0.5000	$0.4960	Del	$0.0040	$77.20
					Alum Turnings	12/27/99	18,580	$0.5000	$0.4960	Del	$0.0040	$74.32
					Alum Bumpers	12/15/99	330	$0.5000	$0.4960	Del	$0.0040	$1.32
					Thermal Break	12/15/99	1,348	$0.4900	$0.4860	Del	$0.0040	$5.39
DJJ (Frank Nott)	00326	12/02/99	Schumann	00787	Red Brass	12/15/99	16,326	$0.5699	$0.5659	Del	$0.0040	$65.31
					Hard Brass	12/15/99	3,082	$0.6050	$0.6010	Del	$0.0040	$12.33
					Heater Cores	12/15/99	5,568	$0.3090	$0.3050	Del	$0.0040	$22.27
					Semi Red Brass	12/15/99	1,342	$0.4950	$0.4910	Del	$0.0040	$5.37
						12/15/99	3,686	$0.4950	$0.4910	Del	$0.0040	$14.74
					EDM Wire	12/15/99	679	$0.4600	$0.4560	Del	$0.0040	$2.72
					M Metal Solids/Turns	12/15/99	4,276	$0.5450	$0.5410	Del	$0.0040	$17.10
					G Metal Solids/Turns	12/15/99	3,687	$0.5699	$0.5659	Del	$0.0040	$14.75
					Meter Brass	12/15/99	3,557	$0.4950	$0.4910	Del	$0.0040	$14.23

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Nonferrous Brokerage Profit (based on shipment date) 02/03/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nolt)	00339	12/17/99	Freedman, Joseph	00838	Alum Copper Units	12/29/99	38,088	$0.5500	$0.5460	Del	$0.0040	$152.35
					Al Cu Units w/steel	12/29/99	4,178	$0.4500	$0.4460	Del	$0.0040	$16.71
DJJ (Frank Nolt)	00340	12/17/99	Wabash - Richmond	00841	Deox Old Sheet	12/28/99	45,296	$0.4950	$0.4910	Del	$0.0040	$181.18
DJJ (Frank Nolt)	00346	12/22/99	Schumann	00856	Auto Radiators	12/30/99	34,480	$0.4350	$0.4310	Del	$0.0040	$137.92
						12/30/99	44,378	$0.4350	$0.4310	Del	$0.0040	$177.51
					Semi Red Brass	12/30/99	2,200	$0.5050	$0.5010	Del	$0.0040	$8.80
					Red Brass Turnings	12/30/99	832	$0.5750	$0.5710	Del	$0.0040	$3.33
					EDM Wire	12/30/99	850	$0.4700	$0.4660	Del	$0.0040	$3.40
					M Metal Solids/Turns	12/30/99	1,939	$0.6800	$0.6760	Del	$0.0040	$7.76
					HG Gears	12/30/99	1,894	~~$0.7500~~ 1049.367	$0.7460	Del	$0.0040	~~$6.76~~
Keystone	00256	10/22/99	DJJ-Charleston	00631	Deox Pyramids	12/01/99	43,240	$0.7388	$0.7300	Del	$0.0088	$380.51
						12/03/99	40,060	$0.7388	$0.7300	Del	$0.0088	$352.53
						12/07/99	42,200	$0.7388	$0.7300	Del	$0.0088	$371.36
						12/08/99	42,560	$0.7388	$0.7300	Del	$0.0088	$374.70
						12/09/99	42,460	$0.7388	$0.7300	Del	$0.0088	$373.85
						12/11/99	40,400	$0.7388	$0.7300	Del	$0.0088	$355.52
						12/13/99	42,960	$0.7388	$0.7300	Del	$0.0088	$378.05
LSM/Progress Rail	00249	10/14/99	Nichols	00661	Nichols Old Sheet	12/10/99	41,968	$0.6109	$0.5375	Del	$0.0734	$3,080.45
						12/13/99	38,340	$0.5901	$0.5375	Del	$0.0626	$2,016.68
LSM/Progress Rail	00297	11/12/99	Nichols	00773	Nichols Old Sheet	12/13/99	37,682	$0.6109	$0.5400	Del	$0.0709	$2,671.85
						12/14/99	40,260	$0.6109	$0.5400	Del	$0.0709	$2,854.43
						12/16/99	40,172	$0.6109	$0.5400	Del	$0.0709	$2,848.19
Ors	00275	11/03/99	Nichols	00773	Painted Siding	12/07/99	30,360	$0.6259	$0.5525	Del	$0.0734	$2,228.42
Southern Recycling	00306	11/19/99	Nichols	00773	Nichols Old Sheet	12/15/99	42,720	$0.6109	$0.5325	Del	$0.0784	$3,349.25
Trademark	00268	10/28/99	Essco	00548	#1 Extrusion	12/06/99	43,790	$0.6150	$0.6000	Del	$0.0150	$658.85 ✓
						12/17/99	43,043	$0.6150	$0.6000	Del	$0.0150	$646.64 ✓

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Nonferrous Brokerage Profit (based on shipment date) 02/03/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Trademark	00270	10/28/99	Schumann	00787	Red Brass	12/10/99	10,276	$0.5514	$0.5264	Del	$0.0250	$256.90
					Auto Radiators	12/10/99	32,825	$0.4314	$0.4364	Del	($0.0050)	($164.13)
Trademark	00293	11/11/99	Nichols	00773	Clip	12/08/99	44,002	$0.6459	$0.5900	Del	$0.0559	$2,459.71
						12/13/99	10,068	$0.6459	$0.5900	Del	$0.0559	$562.80
						12/14/99	18,086	$0.6459	$0.5900	Del	$0.0559	$1,011.01
						12/17/99	25,524	$0.6459	$0.5900	Del	$0.0559	$1,426.79
						12/20/99	22,094	$0.6261	$0.5900	Del	$0.0351	$775.50
					Painted Siding	12/13/99	23,365	$0.6259	$0.5700	Del	$0.0559	$1,306.10
						12/14/99	19,850	$0.6259	$0.5700	Del	$0.0559	$1,109.62
						12/17/99	17,882	$0.6259	$0.5700	Del	$0.0559	$999.60
						12/20/99	18,841	$0.6051	$0.5700	Del	$0.0351	$661.32
					Litho	12/13/99	8,444	$0.6519	$0.6000	Del	$0.0519	$438.24
						12/14/99	3,334	$0.6519	$0.6000	Del	$0.0519	$173.03
						12/20/99	4,482	$0.6311	$0.6000	Del	$0.0311	$139.39
Trademark	00295	11/12/99	Omega Metals	00718	Alum Copper Units	12/03/99	44,220	$0.5125	$0.5025	Del	$0.0100	$442.20
						12/20/99	44,791	$0.5125	$0.5025	Del	$0.0100	$447.91
Trademark	00301	11/17/99	Quanium	00728	Alum. Auto Rims	12/14/99	43,920	$0.6150	$0.6050	Del	$0.0100	$439.20
Trademark	00303	11/18/99	Alchem Aluminum	00735	Alum Radiators	12/27/99	44,688	$0.5100	$0.5000	Del	$0.0100	$446.88
Trademark	00320	12/01/99	Alchem Aluminum	00782	Alum Turnings	12/06/99	40,760	$0.5000	$0.4900	Del	$0.0100	$407.60
Trademark	00321	12/01/99	Alchem Aluminum	00783	Cast Aluminum	12/13/99	38,580	$0.5000	$0.4850	Del	$0.0150	$546.70
Trademark	00328	12/06/99	Metal Commodities	00809	Alum Copper Units	12/28/99	42,343	$0.5400	$0.5250	Del	$0.0150	$635.14
Trademark	00331	12/07/99	Schumann	00812	Red Brass	12/15/99	11,684	$0.4795	$0.4745	Del	$0.0050	$58.42
					Auto Radiators	12/15/99	33,067	$0.4329	$0.4279	Del	$0.0050	$165.34

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Nonferrous Brokerage Profit (based on shipment date) 02/03/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Trademark	00347	12/22/99	Schumann	00856	Red Brass	12/28/99	5,714	$0.5850	$0.6675	Del	$0.0275	$157.13
					Auto Radiators	12/28/99	9,004	$0.4350	$0.4275	Del	$0.0075	$67.53
					Heater Cores	12/28/99	1,894	$0.3150	$0.2875	Del	$0.0275	$52.09
					Red Brass Turnings	12/28/99	5,714	$0.5750	$0.5400	Del	$0.0350	$199.99
					EDM Wire	12/28/99	1,128	$0.4700	$0.4500	Del	$0.0200	$22.56
					YB Solids	12/28/99	13,432	$0.4200	$0.4100	Del	$0.0100	$134.32
					YB Turnings	12/28/99	9,197	$0.3350	$0.3100	Del	$0.0250	$229.93
					Brass Screen	12/28/99	433	$0.4600	$0.4600	Del	$0.0000	$0.00
							331,475					16,912.41
Western Metals	00327	12/02/99	Nichols	00773	Nichols Old Sheet	12/07/99	44,567	$0.6109	$0.5250	Del	$0.0859	$3,828.31
						12/10/99	45,924	$0.6109	$0.5250	Del	$0.0859	$3,944.87
					Painted Siding	12/29/99	46,590	$0.6390	$0.5500	Del	$0.0890	$4,146.51
												11,919.69
					Totals		2,864,837				$0.0252	$72,226.32
							2,823,992					70,984.01

-Less Berg - -

.2¢ difference

RMR 0093

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JANUARY THRU JUNE, 2000 BROKERAGE VOLUME/MARGIN -

	January		February		March		April		May		June		Totals	
	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin
3RD PARTY CUST														
Berren County			8,920	178.40			10,220	204.40	9,360	187.20			28,500	570.00
Bluegrass Recy.	28,530	854.90	17,250	517.50	37,170	1115.10							83,250	2497.50
Chemetco	42,318	604.04	89,211	2,198.10	121,404	4002.72	40,822	1,423.36	46,780	467.80	147,954	-208.84	488,289	8,686.38
Dumes									41,022	3006.43			41,022	3006.43
DRMO													-	
Graham & Co.							7,510	284.63					7,510	284.63
HRK									44,639	2354.05			44,639	2354.05
JSL Metals	6,100	384.50			19,820	626.47	5,800	261.00	7,340	330.30				1561.27
LSM/Progress Rail	240,825	15,209.60	347,250	22,678.78	302,125	7378.83	287,039	11,892.55	88,164	6533.71	179,290	6723.54	1,453,483	70,413.11
Powercom														
Riverside														
Franklin Surplus					9,030	181.5							9,030	181.50
Keystone														
Lincoln Scrap			39,580	1,187.40			39,880	997.20			35,984	1105.92	75,444	3,290.52
Ansam	37,224	2,972.97	38,173	1,601.76	36,251	1,681.27	36,628	1,360.69					151,274	6195.79
Garden State													-	
Southern Recy.			44,510	4,713.61	42,610	2,405.92	37,120	1,870.40	38,430	1728.35			162,670	10,519.28
Baker Iron & Metal									31,678	1900.74			31,678	1,900.74
Eckhart America							45,237	6,266.33					45,237	6,266.33
Dideon					72,090	438.73	75,692	2,463.63			75,338	1547.41	223,118	4,449.77
Volunteer Recy.													-	
Berg Recycling													-	
Crone			11,780	412.30									11,780	412.30
Versailles														
QRS											91,200	5164.85	91,200	5164.85
Frank Tell														
Oscar Bush														
S&S Auto														
Trynnell Scrap	17,680	388.04											17,680	388.04
Portland														
Gray Metals					45,580	305.39							45,580	305.39
Lanham Iron & Metal					40,425	808.50							40,425	808.50
Wallach					38,780	1,268.11							38,780	1268.11
Jasper Iron & Metal	26,840	238.88											26,840	238.88
Sub Total	410,617	20,842.03	577,674	33,865.85	767,691	20,409.64	585,736	26,826.19	307,604	18,511.58	530,546	14,332.08	3,179,868	132,787.37
GROUP CUSTS.														0.00
Audubon	46,280	503.50	47,920	599.00	142,000	1,858.25					95,980	966.60	334,180	3815.35
DJJ - Richmond	1,182,015	18,358.68	939,363	3,767.45	817,773	12,827.87	908,319	6,302.78	893,025	12045.48	742,030	4447.40	5,482,525	54,740.64
DJJ -Birmingham					48,380	1,208.50							48,380	1208.50
Trademark	730,437	20,518.24	391,516	10,012.78	963,380	14,158.50	1,098,921	14,480.22	1,124,774	22887.55	1,262,846	15880.27	5,556,576	97,735.56
DJJ - Jackson														
Wantam			44,791	2,882.98			90,177	5,631.98	136,849	9806.21	43,400	2621.00	315,217	20,942.15
Sub Total	1,960,732	37,478.40	1,423,682	17,052.21	1,991,533	29,852.12	2,096,417	25,414.98	2,154,648	44,738.34	2,143,936	25,905.27	11,738,948	176,443.20
GRAND TOTALS	2,371,349	58,321.43	2,001,356	50,918.06	2,759,124	50,261.76	2,680,153	52,241.15	2,462,252	61,250.92	2,674,482	38,237.35	14,918,716	311,230.57

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JANUARY THRU JUNE, 2000 BROKERAGE VOLUME/MARGIN -

	January		February		March		April		May		June	
	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Magin
3RD PARTY CUST												
Barren County			8,920	178.40			10,220	204.40	9,360	187.20		
Bluegrass Reg.	26,830	864.90	17,250	517.50	37,170	1115.10						
Chemetco	42,316	804.04	69,211	2,198.10	121,404	4002.72	40,622	1,423.36	46,780	487.80		
Dumas									41,022	3008.43		
DRMO												
Graham & Co.							7,510	284.63				
HRH									44,839	2354.05		
JSL Metals	8,100	364.50			19,920	625.47	5,800	261.00	7,340	330.30		
LSM/Progress Rail	249,625	15,209.60	347,250	22,676.78	302,125	7376.93	287,039	11,892.55	88,164	6533.71		
Powercom												
Riverside												
Franklin Surplus					9,030	181.5						
Keystone												
Lincoln Scrap			39,580	1,187.40			39,880	997.20				
Ansam	37,224	2,972.07	39,173	1,961.76	38,251	1,881.27	36,626	1,360.69				
Garden State												
Southern Recy.			44,510	4,713.81	42,810	2,405.92	37,120	1,670.40	38,430	1729.35		
Baker Iron & Metal									31,679	1900.74		
Eckhart America							45,237	6,268.33				
Oldson					72,098	438.73	76,682	2,463.63				
Volunteer Recy.												
Berg Recycling												
Crone			11,780	412.30								
Versatile												
QRS												
Frank Toll												
Oscar Bush												
S&S Auto												
Trunnell Scrap	17,680	386.04										
Portland												
Gray Metals					45,580	305.39						
Lanham Iron & Metal					40,425	808.50						
Wallach					38,780	1,268.11						
Jasper Iron & Metal	26,840	238.88										
Sub Total	410,617	20,842.03	577,674	33,885.85	767,591	20,409.64	685,736	28,626.19	307,604	18,511.58		
GROUP CUSTS.												
Audubon	48,280	603.50	47,920	599.00	142,000	1,666.26						
DJJ - Richmond	1,182,015	16,359.66	938,363	3,767.46	817,773	12,627.87	908,319	5,302.75	883,025	12045.46		
DJJ -Birmingham					48,380	1,209.50						
Trademark	730,497	20,516.24	391,518	10,012.78	953,380	14,168.50	1,095,921	14,480.22	1,124,774	22887.55		
DJJ - Jackson												
Western			44,791	2,552.88			90,177	5,631.96	136,849	9806.21		
Sub Total	1,960,732	37,479.40	1,423,592	17,052.21	1,961,533	29,682.12	2,094,417	25,414.96	2,154,648	44,739.24		
GRAND TOTALS	2,371,349	58,321.43	2,001,266	50,918.06	2,729,124	50,261.76	2,680,153	52,241.15	2,462,252	81,250.82		

JANUARY THRU JUNE, 2000 BROKERAGE VOLUME/MARGIN -

	January		February		March		April		May		June		Totals	
	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin	Volume	Margin
3RD PARTY CUST														
Saman County			8,920	178.40										
Bluegrass Reg.	28,830	884.90	17,250	517.50	37,170	1115.10								
Chemelco	42,316	804.04	69,211	2,199.10	121,404	4002.72								
DRMO														
Graham & Co.														
JSL Metals	8,100	364.50			19,920	625.47								
LSM/Progress Rail	249,625	15,209.60	347,250	22,676.78	302,125	7376.93								
Powercom														
Riverside														
Franklin Surplus					9,030	181.5								
Keystone														
Lincoln Scrap			39,580	1,187.40										
Ansam	37,224	2,972.07	39,173	1,951.75	38,251	1,861.27								
Garden State														
Southern Recy.			44,510	4,713.61	42,610	2,405.92								
Baker Iron & Metal														
Eckhart America														
Didgon					72,066	438.73								
Volunteer Recy.														
Berg Recycling														
Crone			11,780	412.30										
Versaille														
QRS														
Frank Toll														
Oscar Bush														
S&S Auto														
Trynnell Scrap	17,660	388.04												
Portland														
Gray Metals					45,580	305.39								
Lentham Iron & Metal					40,425	806.50								
Wellech					38,780	1,266.11								
Jasper Iron & Metal	26,840	238.88												
Sub Total	410,617	20,842.03	577,674	33,885.85	767,391	20,409.84								
GROUP CUSTS.														
Audubon	48,280	603.50	47,920	599.00	142,000	1,856.25								
DJJ - Richmond	1,152,015	18,359.88	939,383	3,757.45	817,773	12,827.87								
DJJ -Birmingham					48,380	1,209.50								
Trademark	730,437	20,516.24	391,518	10,012.75	953,380	14,158.50								
DJJ - Jackson														
Western			44,791	2,682.96										
Sub Total	1,960,732	37,479.40	1,423,882	17,052.21	1,961,533	29,852.12								
GRAND TOTALS	2,371,349	58,321.43	2,001,266	50,938.06	2,728,124	50,261.76								

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River Metals Recycling, LLC

Nonferrous Brokerage Profit (based on shipment date) 04/14/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Ansam Metals	00389	12/04/00	Nichols	00975	Nichols Old Sheet	03/06/00	18,268	$0.6584	$0.6000	Del	$0.0584	$961.22
					Clip	03/06/00	9,848	$0.6999	$0.6650	Del	$0.0349	$343.70
					Seg 6061	03/06/00	12,115	$0.7234	$0.6750	Del	$0.0484	$586.37
Audubon	00434	03/06/00	Chemetco	001101	Shredded Copper	03/10/00	47,300	$0.6250	$0.6050	Del	$0.0200	$946.00
Audubon	00435	03/06/00	Chemetco	001102	Shredded Brass	03/07/00	48,360	$0.4800	$0.4725	Del	$0.0075	$362.70
						03/10/00	46,340	$0.4800	$0.4725	Del	$0.0075	$347.55
Bluegrass Reg.	00378	01/21/00	All American	00951	Alum Cans	03/02/00	10,000	$0.5250	$0.4950	SP	$0.0300	$300.00
						03/13/00	9,610	$0.5250	$0.4950	SP	$0.0300	$288.30
						03/22/00	7,580	$0.5250	$0.4950	SP	$0.0300	$227.40
						03/30/00	9,980	$0.5250	$0.4950	SP	$0.0300	$299.40
Chemetco	00387	12/01/00	Nichols	00975	#1 Extrusion	03/27/00	9,312	$0.7059	$0.6925	Del	$0.0134	$124.78
					Clip	03/03/00	4,757	$0.6999	$0.6650	Del	$0.0349	$166.37
						03/03/00	2,819	$0.6550	$0.6200	Del	$0.0350	$98.67
						03/27/00	16,177	$0.6999	$0.6650	Del	$0.0349	$564.58
						03/29/00	32,082	$0.6999	$0.6650	Del	$0.0349	$1,119.66
					Painted Siding	03/03/00	32,597	$0.6799	$0.6450	Del	$0.0349	$1,137.64
						03/27/00	15,056	$0.6799	$0.6450	Del	$0.0349	$525.52
					Litho	03/29/00	8,592	$0.7059	$0.6750	Del	$0.0309	$265.49
Didion	00401	12/04/00	Nichols	00975	Clip	03/15/00	1,416	$0.6999	$0.6650	Del	$0.0349	$49.42
						03/29/00	9,897	$0.6529	$0.6650	Del	($0.0121)	($119.75)
					Painted Siding	03/15/00	26,122	$0.6799	$0.6450	Del	$0.0349	$911.66
						03/29/00	29,409	$0.6327	$0.6450	Del	($0.0123)	($361.73)
					Litho	03/15/00	946	$0.7059	$0.6750	Del	$0.0309	$29.29
						03/29/00	4,304	$0.6587	$0.6750	Del	($0.0163)	($70.16)

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00334	12/03/99	Owens Corning Pl. 4	00832	#1 Extrusion	03/29/00	19,208	$0.6300	$0.6260	Del	$0.0040	$76.83
					Painted Siding	03/06/00	12,852	$0.5950	$0.5910	Del	$0.0040	$51.41
						03/16/00	11,320	$0.5950	$0.5910	Del	$0.0040	$45.28
					Alum Cans	03/06/00	12,198	$0.5950	$0.5910	Del	$0.0040	$48.79
						03/16/00	5,259	$0.5950	$0.5910	Del	$0.0040	$21.04
					Road Signs	03/16/00	28,365	$0.5950	$0.5910	Del	$0.0040	$113.46
						03/24/00	42,775	$0.5950	$0.5910	Del	$0.0040	$171.10
						03/29/00	24,534	$0.5950	$0.5910	Del	$0.0040	$98.14
DJJ (Frank Nott)	00360	01/06/00	Wabash - Richmond	00900	Deox Old Sheet	03/21/00	34,166	$0.5150	$0.5110	Del	$0.0040	$136.66
					Alum Radiators	03/21/00	6,398	$0.5150	$0.5110	Del	$0.0040	$25.59
					Alum Turnings	03/03/00	25,040	$0.4900	$0.4860	Del	$0.0040	$100.16
					Alum Bumpers	03/21/00	906	$0.5200	$0.5160	Del	$0.0040	$3.63
					Thermal Break	03/21/00	1,152	$0.5200	$0.5160	Del	$0.0040	$4.61
DJJ (Frank Nott)	00371	01/14/00	Schumann	00939	Red Brass	03/22/00	4,153	$0.5950	$0.5910	Del	$0.0040	$16.61
					Hard Brass	03/22/00	3,116	$0.6250	$0.6210	Del	$0.0040	$12.46
					Auto Radiators	03/22/00	25,238	$0.4350	$0.4310	Del	$0.0040	$100.95
					Heater Cores	03/22/00	1,854	$0.3150	$0.3110	Del	$0.0040	$7.42
					Semi Red Brass	03/22/00	1,956	$0.5150	$0.5110	Del	$0.0040	$7.82
						03/22/00	2,678	$0.5150	$0.5110	Del	$0.0040	$10.70
						03/22/00	1,918	$0.5150	$0.5110	Del	$0.0040	$7.67
					Red Brass Turnings	03/22/00	1,082	$0.5850	$0.5810	Del	$0.0040	$4.33
					EDM Wire	03/22/00	384	$0.4700	$0.4660	Del	$0.0040	$1.54
DJJ (Frank Nott)	00380	01/26/00	Owens Corning Pl. 4	00960	#1 Extrusion	03/31/00	32,778	$0.7000	$0.6960	Del	$0.0040	$131.11
					E C Wire	03/31/00	12,794	$0.7200	$0.7160	Del	$0.0040	$51.18
DJJ (Frank Nott)	00382	01/26/00	Owens Corning Pl. 4	00961	EC Chops	03/06/00	14,620	$0.7900	$0.7860	Del	$0.0040	$58.48

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
DJJ (Frank Nott)	00395	12/03/00	Nichols	00975	Nichols Old Sheet	03/16/00	21,374	$0.6584	$0.6544	Del	$0.0040	$85.60
						03/23/00	28,186	$0.6584	$0.6544	Del	$0.0040	$112.74
					Painted Siding	03/10/00	40,744	$0.6799	$0.6759	Del	$0.0040	$162.98
						03/16/00	20,902	$0.6799	$0.6759	Del	$0.0040	$83.61
						03/23/00	13,498	$0.6799	$0.6759	Del	$0.0040	$53.99
						03/24/00	44,041	$0.6799	$0.6759	Del	$0.0040	$176.16
DJJ (Frank Nott)	00400	12/03/00	Alcoa Mill Products	001012	#1 Extrusion	03/15/00	43,940	$0.6950	$0.6910	Del	$0.0040	$175.76
					Litho	03/20/00	19,484	$0.6900	$0.6860	Del	$0.0040	$77.94
					Seg 3003	03/20/00	16,032	$0.7450	$0.7410	Del	$0.0040	$64.13
					Alum. 5052 Ingots	03/20/00	3,388	$0.7600	$0.7560	Del	$0.0040	$13.55
					Alum 5182 Ingots	03/20/00	5,064	$0.7400	$0.7360	Del	$0.0040	$20.26
DJJ (Frank Nott)	00415	12/17/00	Schumann	001036	Red Brass	03/01/00	7,130	$0.6000	$0.5960	Del	$0.0040	$28.52
					Auto Radiators	03/01/00	26,404	$0.4350	$0.4310	Del	$0.0040	$105.62
					Semi Red Brass	03/01/00	9,030	$0.5200	$0.5160	Del	$0.0040	$36.12
DJJ (Frank Nott)	00426	13/03/00	Beck Aluminum	001083	Alum. Sows	03/03/00	116,546	$0.7200	$0.8340	Del	$0.0860	$10,022.98
DJJ (Frank Nott)	00440	13/10/00	Freedman, Joseph	01118	Alum Copper Units	03/27/00	43,760	$0.5500	$0.5460	Del	$0.0040	$175.04
DJJ (Frank Nott)	00443	13/20/00	Alchem Aluminum	01126	Sheet Alum	03/24/00	31,506	$0.3500	$0.3460	Del	$0.0040	$126.02
DJJ(Birmingham)	00447	13/21/00	Audubon	001100	Alum Turnings	03/28/00	48,380	$0.5250	$0.5000	Del	$0.0250	$1,209.50
Franklin Surplus	00442	13/16/00	ELG	01127	18/8 Stainless	03/17/00	9,030	$0.4353	$0.4152	Del	$0.0201	$181.50
Gray Metals	00423	12/29/00	ELG	01114	18/8 Stainless	03/22/00	45,580	$0.4353	$0.4286	Del	$0.0067	$305.39
JSL Metals	00439	13/09/00	All American	01111	Alum Cans	03/07/00	8,540	$0.5650	$0.5200	SP	$0.0450	$384.30
						03/14/00	4,720	$0.5650	$0.5774	SP	($0.0124)	($58.53)
						03/29/00	6,560	$0.5650	$0.5200	SP	$0.0450	$295.20
Lanham I & M	00458	13/29/00	Peninsula Copper	01157	Copper Wire 6A 2&1	03/31/00	21,152	$0.4800	$0.4600	Del	$0.0200	$423.04
					Copper Wire 8A 2&1	03/31/00	19,273	$0.4000	$0.3800	Del	$0.0200	$385.46
LSM/Progress Rail	00397	12/03/00	Nichols	00975	Nichols Old Sheet	03/02/00	24,924	$0.6584	$0.6000	Del	$0.0584	$1,455.56
					Clip	03/02/00	918	$0.6999	$0.6300	Del	$0.0699	$64.17

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Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
LSM/Progress Rail	00398	12/03/00	Nichols	001071	Nichols Old Sheet	03/01/00	43,541	$0.6112	$0.5900	Del	$0.0212	$923.07
						03/07/00	36,358	$0.6112	$0.5900	Del	$0.0212	$770.79
						03/10/00	25,904	$0.6112	$0.5900	Del	$0.0212	$549.15
LSM/Progress Rail	00399	12/03/00	Nichols	001071	Nichols Old Sheet	03/09/00	43,972	$0.6112	$0.5900	Del	$0.0212	$932.21
						03/15/00	41,192	$0.6112	$0.5900	Del	$0.0212	$873.27
						03/20/00	38,986	$0.6112	$0.5900	Del	$0.0212	$826.50
						03/28/00	46,330	$0.6112	$0.5900	Del	$0.0212	$982.20
Southern Recycling	00426	03/02/00	Nichols	001071	Nichols Old Sheet	03/30/00	42,810	$0.6112	$0.5550	Del	$0.0562	$2,405.92
Trademark	00263	11/04/99	Commonwealth-KY	00691	Painted Siding	03/03/00	40,252	$0.5750	$0.5650	Del	$0.0100	$402.52
Trademark	00396	12/03/00	Nichols	00975	Clip	03/03/00	30,160	$0.6999	$0.6700	Del	$0.0299	$901.76
						03/10/00	20,799	$0.6999	$0.6700	Del	$0.0299	$621.89
						03/14/00	40,134	$0.6999	$0.6700	Del	$0.0299	$1,200.01
					Painted Siding	03/03/00	12,619	$0.6799	$0.6500	Del	$0.0299	$377.31
						03/10/00	23,642	$0.6799	$0.6500	Del	$0.0299	$706.90
						03/14/00	3,412	$0.6799	$0.6500	Del	$0.0299	$102.02
Trademark	00414	12/17/00	Quantum	001055	Alum. Auto Rims	03/21/00	41,840	$0.7100	$0.7000	Del	$0.0100	$418.40
Trademark	00419	12/23/00	Omega Metals	001053	#1 Extrusion	03/27/00	45,886	$0.5850	$0.5700	Del	$0.0150	$688.29
Trademark	00421	12/24/00	Alcham Aluminum	001058	Alum Radiators	03/21/00	43,300	$0.5500	$0.5300	Del	$0.0200	$866.00
Trademark	00425	03/02/00	Nichols	001071	Nichols Old Sheet	03/30/00	18,370	$0.6112	$0.5700	Del	$0.0412	$756.84
					Clip	03/17/00	10,638	$0.6527	$0.6350	Del	$0.0177	$188.29
					Painted Siding	03/17/00	32,284	$0.6327	$0.6150	Del	$0.0177	$571.43
						03/30/00	12,741	$0.6327	$0.6150	Del	$0.0177	$225.52
					Litho	03/30/00	12,142	$0.6587	$0.6450	Del	$0.0137	$166.35
Trademark	00432	03/06/00	Alcham Aluminum	001095	Cast Aluminum	03/22/00	45,720	$0.5200	$0.5100	Del	$0.0100	$457.20
					Alum Radiators	03/31/00	43,228	$0.5500	$0.5100	Del	$0.0400	$1,729.12
Trademark	00433	03/06/00	Alcham Aluminum	001097	ASR	03/28/00	45,140	$0.5200	$0.5100	Del	$0.0100	$451.40

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Nonferrous Brokerage Profit (based on shipment date) 04/14/00

Supplier	Purch #	Date	Consumer	Sale #	Grade	Shipped	Pounds	Sale Price	Purch Price		Margin	Profit
Trademark	00441	03/10/00	Easco	01125	#1 Extrusion	03/14/00	45,211	$0.6625	$0.6575	Del	$0.0050	$226.06
						03/17/00	44,777	$0.6625	$0.6575	Del	$0.0050	$223.88
						03/27/00	38,223	$0.6625	$0.6575	Del	$0.0050	$191.12
						03/28/00	43,721	$0.6625	$0.6575	Del	$0.0050	$218.60
					Seg 6061	03/27/00	4,872	$0.6525	$0.6400	Del	$0.0125	$60.90
Trademark	00444	03/21/00	Schumann	01135	Red Brass	03/23/00	10,116	$0.5850	$0.5600	Del	$0.0250	$252.90
					Auto Radiators	03/23/00	30,977	$0.4250	$0.4175	Del	$0.0075	$232.33
						03/31/00	41,236	$0.4250	$0.4175	Del	$0.0075	$309.29
					Heater Cores	03/23/00	1,084	$0.3050	$0.2800	Del	$0.0250	$27.10
					EDM Wire	03/23/00	677	$0.5100	$0.4900	Del	$0.0200	$13.54
Trademark	00445	03/20/00	J W Aluminum	01138	Clip	03/23/00	24,612	$0.6300	$0.6200	Del	$0.0100	$246.12
					Dealer Clips	03/23/00	18,036	$0.6200	$0.6000	Del	$0.0200	$360.72
Trademark	00450	03/22/00	Easco	01143	#1 Extrusion	03/24/00	43,060	$0.6625	$0.6575	Del	$0.0050	$215.30
						03/31/00	40,865	$0.6625	$0.6575	Del	$0.0050	$204.32
Trademark	00455	03/24/00	Commonwealth-KY	01151	Painted Siding	03/31/00	43,604	$0.6125	$0.6000	Del	$0.0125	$545.05
Wabash	00451	03/24/00	DJJ-BIRMINGHAM	01146	Deox Pyramids	03/23/00	44,168	$0.6000	$0.6000	Del	$0.0000	$0.00
Wallach Iron & Metal	00429	03/03/00	Nichols	001071	Clip	03/21/00	13,600	$0.6527	$0.6200	Del	$0.0327	$444.72
					Painted Siding	03/21/00	25,180	$0.6327	$0.6000	Del	$0.0327	$823.39
					Totals		2,773,292				$0.0181	$50,261.73

RIVER METALS RECYCLING, LLC
ENVIRONMENTAL, SAFETY & HEALTH POLICY MANUAL
ISSUE CONTROL FORM

MANUAL NO.:	18
ISSUED TO:	Mitch Damp
LOCATION:	RMR/Klempner
DATE:	5/06/99

THIS IS A CONTROLLED COPY OF THE MANUAL. TO ENSURE THAT FUTURE MANUAL REVISIONS CAN BE MADE, MANUAL HOLDERS MUST NOTIFY SAFETY & ENVIRONMENTAL SERVICES OF ANY LOCATION OR MANUAL HOLDER CHANGES. DO SO BY FILLING OUT THE INFORMATION BELOW AND SENDING THIS SHEET TO CORPORATE SAFETY & ENVIRONMENTAL SERVICES. A NEW ISSUE CONTROL FORM WILL THEN BE SENT TO THE MANUAL HOLDER.

INDICATE CHANGE (CHECK ONE OR BOTH)	☐ MANUAL HOLDER	_____ NEW MANUAL HOLDER
	☐ LOCATION	_____ NEW LOCATION

MANUAL CONTROL PROCEDURES:

- Keep this form ***with the manual*** until it is needed to notify Corporate Safety & Environmental Services of a change.
- If a manual is not in use and will not be transferred to a new user, return it to Corporate Safety & Environmental Services.
- This manual is the property of River Metals Recycling, LLC. It may be carried to a new location if the manual holder is reassigned, but must be returned if the manual holder leaves the Company.

RIVER METALS RECYCLING, LLC
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RIVER METALS RECYCLING, LLC
ENVIRONMENTAL, SAFETY & HEALTH POLICY

The Environmental, Safety & Health Policy of River Metals Recycling, LLC is to purchase, manufacture, process, sell, and dispose of all materials in such a manner as to protect the health and safety of its employees, customers, the public, and the environment. We seek to implement active programs for prevention of accidents and improvements in health and the environment. To that end, we will:

- Assure that products and facilities are in compliance with applicable federal, state, and local laws and regulations.
- Adopt safety and environmental standards, where necessary, to minimize employee, customer, and community exposure to risk where prevailing laws and regulations may not be adequate.
- Provide to requesting employees, customers, and neighbors, information concerning raw materials and products through the use of Material Safety Data Sheets or similar documentation.
- Support community awareness programs designed to answer legitimate community concerns about potential hazards that may be present.
- Produce the best value, best quality products and service, but never at the expense of the safety and health of our employees or the environment.

RIVER METALS RECYCLING, LLC

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SECTION	SAFETY & HEALTH	REVISION	DATE
1.1	Safety & Health Program	00	03/01/99
1.2	Responsibilities for Safety Program	00	03/01/99
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1.5	Substance Abuse Policy	00	03/01/99
1.6	Lockout Policy	00	03/01/99
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1.9	Bloodborne Pathogens Exposure Control Plan	00	03/01/99
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1.11	Personal Protective Equipment Policy	00	03/01/99
1.12	Hearing Conservation Program	00	03/01/99
1.13	Accident/Incident Reporting and Recordkeeping	00	03/01/99
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SECTION	ENVIRONMENTAL	REVISION	DATE
2.1	Environmental Program	00	03/01/99
2.2	Responsibilities for Environmental Program	00	03/01/99
2.3	Environmental Program - Standards	00	03/01/99
2.4	General Environmental Rules	00	03/01/99
2.5	Rules for Waste Disposal	00	03/01/99
2.6	Rules for Used Oil Management	00	03/01/99
2.7	CFC-Containing Material Policy	00	03/01/99
2.8	Radioactive Material Policy	00	03/01/99

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SECTION 1.1
SAFETY & HEALTH PROGRAM

It is the full intent of River Metals Recycling, LLC to provide all employees with the proper training and facilities, within the guidelines of state and federal laws, to properly protect their health and welfare through a strong and cooperative safety program.

All employees, without exception, are responsible for the safety of themselves and their co-workers. Injuries can only be eliminated by the full observance and cooperation of all employees.

We recognize that the responsibilities for safety and health are shared:

- The employer is responsible for leadership of this program, for its effectiveness and improvement, and for providing the guidelines and safeguards required to ensure safe conditions.

- Managers and supervisors are responsible for developing the proper attitudes toward safety and health in themselves and their subordinates. They are also responsible for ensuring that all operations are performed in a safe and healthy manner by all personnel involved.

- Employees are responsible for complete adherence to the program, including complying with all rules and regulations and performing their duties in a safe and healthy manner at all times.

Our safety and health program includes the following:

- Developing and enforcing safety and health rules and requiring that all employees cooperate with these rules as a condition of employment.

- Conducting a program of safety and health inspections to identify and remove unsafe working conditions and practices, control health hazards, and to comply fully with the safety and health rules for every job.

- Providing ongoing training for all employees in safety and health practices.

- Providing necessary personal protective equipment and instructions for its use and care.

- Investigating, promptly and thoroughly, every accident to determine its cause, and correct the deficiency so there is no recurrence.

- Monitoring accident frequency and severity for identification of unfavorable conditions or trends.

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SECTION 1.2
RESPONSIBILITIES FOR SAFETY PROGRAM

Corporate Safety Staff is responsible for:

All safety policies, procedures, and review of plant performance on the details of the Company's Safety Program, including:

A. Establishing and overseeing the implementation of the Safety Program in each Company yard/operation.

B. Tracking all safety meeting records.

C. Reviewing all accident reports.

D. Reviewing and approving all insurance company settlements over $5,000.

E. Making periodic safety inspections.

F. Ensuring regulations are understood and implemented.

G. Making applicable OSHA requirements available to the plants in written, but generalized, form.

H. Ensuring all documentation and recordkeeping is properly filled out according to each state's requirement.

I. Monitoring all "open" Workers' Compensation cases with respect to payments and reserves.

J. Maintaining a chronological accident log and Workers' Compensation file in Corporate Headquarters for each plant.

K. Reconciling insurance records quarterly with accounting records.

L. Publishing "new employee" and "habitual offender" accident report statistics to appropriate management for action.

M. Publishing an accident summary quarterly, by facility, showing frequency and types of accidents.

N. Personally investigating serious or fatal accidents.

O. Monitoring compliance with Substance Abuse Policy for employees involved in accidents at any operating plant.

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Divisional Management is responsible for:

A. Seeing that the Safety Program is implemented in each facility under his/her supervision.

B. Monitoring safety on all visits to facilities.

C. Recommending changes in the safety rules or safety policy when appropriate.

D. Ensuring recordkeeping procedures at the plants are sufficient to meet requirements.

E. Reviewing all accident reports and subsequent investigation reports from the plants.

F. Monitoring the quality and frequency of safety meetings.

Plant Operations Manager is responsible for:

I. Implementing and Administering the Company Safety Program

A. Enforcing all yard safety rules and regulations.

B. Monitoring and personally being involved in the Continuous Improvement Process.

C. Requiring supervisors to identify and guard or eliminate pinch point areas where injuries could occur.

D. Adopting a yard-wide housekeeping inspection program and participating monthly in the inspection.

E. Holding at least one safety meeting per month with the staff.

F. Being personally involved in investigation of all accidents.

G. Requiring a thorough safety inspection by maintenance and production personnel before new equipment is placed in operation.

H. Managing the fire protection program for facilities and mobile equipment.

II. Establishing Controls to Assure Compliance with Safety Program

A. Reviewing all accident reports and working with the core team to ensure a thorough investigation is conducted.

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B. Ensuring that all supervisory personnel meet the minimum requirements of the Safety Program.

C. Making yard inspections, checking safety practices and general housekeeping.

D. Ensuring that safety meetings are conducted on a regular basis and that topics are relevant to safety needs.

E. Overseeing and approving purchase of all safety supplies and equipment.

F. Ensuring that annual requirements for training and testing are met including, but not limited to, Lockout Training, Hazard Communication Training, and Hearing Conservation Testing.

G. Ensuring that procedures are in effect to comply with Company's substance abuse policy for any accident.

III. Establishing Necessary Training Programs

A. Developing a strong attitude of safety responsibilities among the employees.

B. Evaluating and providing staff with necessary guidance and training.

C. Ensuring new/transferred employees are properly trained to perform their new job safely.

Superintendent is responsible for:

I. The safety of assigned employees and the safe condition of the assigned work area and is accountable to the Plant Manager.

A. Instructing each employee in all safe job procedures pertaining to the assigned work.

B. Making at least one safety observation per day and observing each employee twice a month.

C. Enforcing safety rules and regulations at all times.

D. Reporting any safety violations as they occur.

E. Making daily inspections of the work area and taking immediate steps to correct safety deficiencies; managing employee task assignments and schedules to ensure timely correction of safety deficiencies.

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F. Ensuring maintenance routines are followed correctly and that proper housekeeping practices are followed.

G. Enforcing Company physician's recommendations with respect to employee's physical limitations.

H. Seeing that injured employees receive prompt medical attention and that facts surrounding the accident are properly reported.

I. Initialing all accident reports and noting steps taken to avoid future accidents.

II. Participating in Active Safety Program

A. Attending all safety meetings.

B. Participating in developing subjects for safety meetings.

C. Developing demonstrations, on-the-job training techniques, and other necessary activities pertaining to the safe conduct of business.

D. Giving safety talks as part of regular safety meeting.

All employees are responsible for:

I. Participating actively as members of Continuous Improvement functional teams.

A. Identifying safety deficiencies in the workplace, reporting them, and working with the team to develop solutions to fix the deficiencies.

B. Leading team meetings on a rotating basis.

II. Participating actively as members of Continuous Improvement Core Teams (on a rotating basis).

A. Investigating workplace accidents and incidents and identifying and solving safety deficiencies that contributed.

B. Leading core team activities on a rotating basis.

III. Complying with all Company safety requirements.

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SECTION 1.3
SAFETY PROGRAM - STANDARDS

I. Safety Meetings

A. A minimum of one (1) all-plant meeting per month will be held to discuss safety performance issues, present OSHA Annual Training, or address other relevant safety topics. Minutes of these meetings will be maintained at the plant.

B. Emergency meetings will be called as needed.

C. Functional team meetings will be held at least once per month. These may be combined with the monthly all-plant safety meeting for plants with only one functional team. Functional team meetings will include a safety topic, review of open deficiencies, and discussion of any new deficiencies. Other agenda items may be added at the discretion of the functional teams.

D. Attendance at safety meetings is mandatory.

II. First Aid Training and Supplies

A. A minimum of one person per shift will be trained in emergency first aid, including CPR. First-aid-trained employees will be retrained and recertified annually. A copy of current training certifications will be kept on file.

B. A first aid supply will be maintained at the plant which is satisfactory for on-site first aid.

C. Hospital and emergency phone numbers, along with other phone numbers required by the plant's Emergency Action Plan, are to be posted in the first aid area of the office and elsewhere as appropriate.

III. Fire Extinguishers

A. Suitable fire extinguishers will be positioned in the plant as necessary, but at a minimum:

1. Within 75 feet of fixed employee workstations.

2. Within 50 feet of potential fuel, oil, or grease fires, including fueling areas, gasoline/diesel/oil storage areas, and equipment maintenance areas.

3. On mobile equipment.

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B. Fire extinguishers will be inspected and tagged annually, typically by a contract servicer.

C. Fire extinguishers will be checked monthly by a designated employee, who will ensure that:

1. Extinguishers are in their proper locations.

2. Access to extinguishers is unblocked.

3. Seals are unbroken and extinguisher is not discharged.

Monthly inspections will be documented by initialing each extinguisher's tag, by use of a checkoff sheet, or similarly.

D. All employees will be trained annually in proper use of fire extinguishers. Employees will be instructed to put out incipient fires only, never structural or other major fires.

E. Employees must report any use of a fire extinguisher to a supervisor immediately.

IV. Equipment Inspections

A. Cranes will be inspected daily for the following, as applicable:

1. Control mechanisms – for misadjustment and wear.
2. Safety devices – for proper function.
3. Air or fluid leaks.
4. Hook deformation or cracks.
5. Defects in wire rope or magnet chains/connections.

B. Cranes will be inspected monthly by a qualified person. The inspector will complete the form attached as Appendix A (for hydraulic cranes) or Appendix B (for cable cranes), or an equivalent form.

C. All other mobile equipment (forklifts, front-end loaders, skid-steer loaders, bulldozers, etc.) will be inspected at the beginning of each shift. Any items substantially affecting safe operation will be fixed before the unit is placed in service.

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V. Records

Following is a list of safety-related recordkeeping requirements for plants:

DOCUMENT	RETENTION	POLICY
Lockout/Tagout:		
Authorized/Affected/Qualified Employee Lists	Current Only	1.6
Annual Training Certifications	Current Only	1.6
List of Equipment Requiring Lockout	Current Only	1.6
Specific Lockout Procedures	Current Only	1.6
Periodic Lockout Inspections	2 Years	1.6
Hazard Communication:		
Material Safety Data Sheets	Permanent	1.10
Hazardous Material Inventory	Current Only	1.10
"Notice to Contractors" Form	Permanent	1.10
Safety Meeting Minutes	5 Years	1.3
Hepatitis B Vaccination Records	Permanent	1.10
Hepatitis B Declination Forms	Permanent	1.9
First Aid Certification Cards (Copy)	Current Only	1.3
Emergency Action Plan	Current Only	1.8
Hearing Test Results	Permanent	1.12
Noise Monitoring Employee Notifications	Permanent	1.12
Notifications to Employees for STS	Permanent	1.12
Respirator Fit Test Reports	Permanent	1.7
OSHA Form 200	5 Years	1.13
Accident/Incident Reports	Permanent	1.13
Hazard Assessment Certifications	Current Only	1.11
Equipment Inspection Reports - Daily	2 Years	1.3
Equipment Inspection Reports - Monthly	2 Years	1.3
New Employee Orientation	Permanent	-
Air Test Results	Permanent	*
Air Test Employee Notifications	Permanent	*
Arsenic/Cadmium/Lead Medical Surveillance Records	Permanent	*

*Plants where these are required are issued Exposure Control Plans which detail compliance requirements.

River Metals Recycling, LLC

Monthly Hydraulic Crane Inspection Report

Crane: _____

Inspected By: _____ Date: / /

Description	Safe	Unsafe	N/A
1 Boom/Crane Structure			
Free of Deformed, Cracked or Rusted Members in Crane Structure or Boom			
2 Moving Parts Free of Excessive Wear, Cracks or Distortion			
Pins			
Bearings			
Shafts			
Idlers			
Rollers			
Ring Gear and Bearing Assembly			
3 Cab			
Ladders, Handholds, Walking Surfaces, and Cab in Good Condition			
Exhaust Discharges Outside of Cab			
4 Controls			
Cables Free, Not Dragging			
Buttons Operate Freely			
Air Leaks			
5 Main Power Plant			
Proper Oil Level			
Proper Water Level			
Oil Pressure Gauge			
Throttle Cable			
Warning Lights			
6 Main Hydraulic System			
Filter Indicator			
Worn or Frayed Lines			
Stripped or Smashed Fittings			
Excessive Noise in Pump			
Excessive Oil Leaks			
Cooler Radiator			
Pump Drive Gear Box			
7 Miscellaneous			
Back-Up Alarm Functioning			
View Mirrors Intact			
Broken Glass in Cab			
Any Other Hazardous or Potentially Hazardous Defects or Repairs Necessary to Maintain Safety (Explain Below)			

Comments: _____

_____

_____

River Metals Recycling, LLC

Monthly Crawler and Locomotive Crane Inspection Report

Crane: _____

Inspected By: _____ Date: / /

Description	Safe	Unsafe	N/A
1 Control Mechanisms			
Load Hoist, Boom Hoist - Excess Wear or Contamination by Lubricants			
Swing Brake, Hoist Brake - Excess Wear or Contamination by Lubricants			
Closing Line - Excess Wear or Contamination by Lubricants			
Steer/Travel and Engine Controls - Excess Wear or Contamination by Lubricants			
2-Way Hand-Levers, Travel = Max 14" each Way			
1-Way Hand-Levers, Travel = Max 24"			
Foot-Levers, Travel = Max 10"			
2 Crane Hook (or Clevis): IF UNSAFE REPLACE - DO NOT REPAIR			
Are They Cracked, Worn or "Spread" more than 15%			
Are They Cracked, Worn or "Twisted" more than 10%			
3 Electric Apparatus:			
Magnet - Any Corrosion, Shorting, Dirt or Moisture Accumulation			
Magnet Cable - Any Corrosion, Shorting, Dirt or Moisture Accumulation			
Cable Reel - Any Corrosion, Shorting, Dirt or Moisture Accumulation			
Controls - Any Corrosion, Shorting, Dirt or Moisture Accumulation			
Generator & Engine Electrics - Any Corrosion, Shorting, Dirt or Moisture Accumulation			
4 Safety Devices			
Boom Stops, Boom Drum Stop and Boom Hoist Ratchet - Are They Functioning			
Glass - Is it Broken or Cracked			
Fire Extinguisher - Is It Properly Charged			
Whistle or Horn and Back-Up Alarm - Do They Work			
5 Wire Ropes			
Are They Reeved to Manufacturer's Recommendations			
Wire Diameter Reduced Because of Loss of Core Support or Wear			
6 Broken Wires in One Lay or 3 in One Strand Close Together			
Outside Wires Badly Worn			
Severe Kinking or Crushing of Rope			
Corroded or Broken Wires at End Connections			
6 Cable Clamps			
Proper Spacing and Number of Clips			
Are They Tight and Do They Have the U Bolts on the Dead-end of the Cable			
Are The U Bolts Tight			
7 Miscellaneous			
Any Other Hazardous or Potentially Hazardous Defects or Repairs Necessary to Maintain Safety (Explain Below)			

Comments: _____

_____

_____

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SECTION 1.4
POLICY ON EMPLOYMENT OF
ACCIDENT-PRONE YARD EMPLOYEES

Formal warnings will be issued to each yard employee who is involved in two on-the-job accidents resulting in employee injury or property damage within six months, or three within twelve months. A record of each warning must be included in the employee's personnel folder maintained at the yard.

Disciplinary action could result in termination. For the most part, termination should not be based solely on safety, but rather combined with other unsatisfactory work habits such as poor performance, excessive absenteeism, tardiness, etc.

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SECTION 1.5
SUBSTANCE ABUSE POLICY

River Metals Recycling is committed to providing a safe and productive work environment. It is a recognized fact that alcohol abuse and the use of illegal drugs directly contribute to increased accidents, health problems, absenteeism, and decreased productivity. As such, the Company will drug test each applicant being considered for employment, and will not hire any candidate who tests positive. In addition, appropriate measures will be taken to ensure that substance abuse by active employees does not adversely affect the safe and successful conduct of our business.

Employees who have or suspect they may have an alcohol or drug problem are encouraged to seek assistance from their physician, and to follow through with any prescribed treatment. To this end, certain medical and psychological services are covered by the medical plan, and employees are eligible to take non-paid time off while seeking medical assistance for substance abuse problems. An employee who voluntarily steps forward to seek help will not jeopardize their continued employment; whereas, performance, attendance, or behavioral problems will jeopardize continued employment, whether or not related to alcohol or drugs.

DRUG AND ALCOHOL TESTING

The Company reserves the right to conduct drug and alcohol screen tests under the following circumstances:

A. Any employee involved in an accident or incident which results in personal injury or property damage irrespective of such employee's responsibility for such accident or incident. When such an accident occurs, the employee must report it to his/her manager and submit to drug and alcohol testing immediately.

B. When management has reasonable cause to suspect that an employee may be at work under the influence of drugs or alcohol. Reasonable suspicion includes circumstances when an employee engages in reckless, careless, or negligent operation of machinery or equipment, physical characteristics such as a change in speech, excessively constricted or dilated pupils, odor of alcohol, etc.

C. As part of the Company's random drug and alcohol screening program.

D. Drivers of motor vehicles who must be tested in compliance with the Federal Motor Carrier Safety Regulations of the Department of Transportation (DOT).

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Employees who refuse to cooperate or submit to drug and alcohol testing as outlined above will be terminated. Further, if the testing indicates the employee is under the influence of alcohol at a level of 0.04% or greater alcohol concentration, or has used illegal drugs, the employee will be terminated.

Employees who are tested as a result of an accident or reasonable cause shall be temporarily assigned to a nonsafety-sensitive position where risk can be minimized and controlled until results are available. If such a position is not available, the employee shall not be permitted to work until test results are provided.

USE OF ILLEGAL DRUGS OR ALCOHOL ON COMPANY PREMISES

The possession, use, transfer, or sale of alcohol or drugs on Company property is prohibited. Further, the use of common commercial or household products as inhalants while at work is prohibited. Violation of these prohibitions may result in disciplinary action up to and including termination.

GENERAL

It is the responsibility of employees to report the use of any prescription or over-the-counter medication to his or her Supervisor prior to reporting to work under the influence of that medication, if the medication may cause drowsiness or otherwise affect motor function or change behavior.

This policy will be administered impartially. All test results shall be handled in confidence with authorized personnel only. Questions regarding this policy should be directed to your Supervisor or General Manager.

RIVER METALS RECYCLING, LLC

LOCKOUT POLICY

MARCH 1, 1999

LOCKOUT POLICY
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APPENDIX

A	Machines & Equipment Requiring Lockout
B	Authorized Employees
C.	Affected Employees
D	Qualified Employees
E	Periodic Lockout Inspection
F	Specific Lockout/Tagout Procedures for Each Piece of Equipment
G	Lockout/Tagout Training
H	"Qualified" Employee Checksheet

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SECTION 1.6
LOCKOUT/TAGOUT PROCEDURES

I. PURPOSE

This policy satisfies the requirements set forth in 29 CFR §1910.147 for the lockout/tagout of machinery and equipment in the plant. It is intended to protect employees from injuries resulting from the unexpected release of a hazardous energy source during maintenance operations.

II. MACHINES & EQUIPMENT

Appendix A contains a list of all machines and equipment in the plant requiring lockout/tagout. An assessment was made of each operation and a specific procedure was then established for each specific machine and equipment used in that operation. When similar machines or equipment were identified to be locked or tagged out the same way, they were grouped as one procedure.

The potential energy sources addressed in the procedures are:

1. Electrical
2. Gravity
3. Compressed Air
4. Hydraulic Fluid
5. Steam

III. TRAINING

Training will be conducted for all employees who work with any of the equipment listed in Appendix A. At those plants with Spanish-speaking employees, training will be conducted in Spanish and English. All written policies pertaining to lockout will also be printed in Spanish and English. Employees are classified into the following categories:

A. Authorized Employees

All employees who will be exposed to potential injury due to release of energy during maintenance operations are identified as authorized employees. These are the only employees certified to lock or tag out equipment or machinery.

Training for authorized employees will include all aspects of the lockout/tagout program and all specific policies and procedures on each individual machine and equipment identified in this program. Appendix B lists all authorized employees.

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B. **Affected Employees**

Affected persons are those employees who operate machinery or equipment requiring lockout or tagout, but who will not perform maintenance. Training these individuals will include the purpose and use of the lockout/tagout procedures. Appendix C lists all affected employees.

C. **Other Employees**

"Other" employees are those that do not fall into the authorized or affected category. It will include all other employees of the plant. These employees will be instructed in what the program is and to not touch any machine or equipment that has been locked or tagged out.

IV. TRAINING CERTIFICATION

Each employee trained will be certified as having received the training. A signed copy of this certification will be kept in the employee's file. A sample employee certification is included as Appendix G.

Retraining will be done on an annual basis, when an audit reveals that employees are not following the program appropriately, or when a change in the procedure occurs.

V. TAGOUTS

Lockouts are preferred to tagouts. When the use of tags is the only means of energy isolation, the employees will be instructed in its limited ability to provide the same protection that a lockout provides. The same restrictions apply for tags and locks.

VI. ELECTRICAL HAZARDS TRAINING

The training in this section will pertain to employees who face a risk of electrical shock. These employees are classified as qualified or unqualified under the §1910.331 standard, for those persons expected to perform work on electrical circuits and equipment.

A. **Qualified Employees**

Qualified employees are those who have training in avoiding the electrical hazards of working on or near exposed energized parts. Whether an employee is considered to be qualified will depend upon various circumstances in the workplace. An individual may be considered "qualified" with regard to certain equipment, but "unqualified" as to other equipment. An employee who is

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undergoing on-the-job training, has demonstrated an ability to perform duties safely and who is under the direct supervision of a qualified person, is considered to be a qualified person for the performance of those duties.

Appendix D lists all "qualified" employees. Appendix H lists training and skills required of "qualified" employees.

B. **Unqualified Employees**

1. These employees will be trained in and familiar with safety-related work practices listed in Appendix H that pertain to their respective job assignments.

2. Employees who are covered by the electrical lockout/tagout standard, but who are not qualified, shall also be trained in and familiar with any electrically-related safety practice not specifically addressed in Appendix H, but which are necessary for their safety.

VII. PERIODIC INSPECTIONS

In order to ensure the effectiveness of the lockout/tagout program, random audits and planned visual observations will be conducted in order to determine the extent of employee compliance. Specifically, three areas will be reviewed:

1. Whether the steps in the energy control procedure are being followed.

2. Whether the employee(s) involved know their responsibilities under the procedure.

3. Whether the procedure is adequate to provide the necessary protection and what changes, if any, are needed.

The inspection will be conducted when the program is initially implemented, and at least annually thereafter. The inspection will be conducted by a supervisor, manager, or superintendent only, who is not implementing the energy control procedure being inspected.

If deviations are identified or if employees do not clearly understand the procedure, retraining will be conducted to the extent that the procedures are properly followed. Certification of the training will be required.

If problems with the procedures are encountered, the process will be reevaluated and more appropriate procedures will be implemented.

The inspections will be done both on a one-on-one basis and through meeting with the entire crew.

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With tagouts, the inspection will be extended to include the affected person, because with tags, the role of the affected employee is important in avoiding accidental or inadvertent activation of the equipment or machinery being serviced.

The form included as Appendix E will be used to document lockout/tagout periodic inspections.

VIII. APPLICATION OF CONTROL MEASURES

A. Preparation for Shutdown

Before authorized or affected employees turn off a machine or equipment, the authorized employee will have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the means to control the energy.

B. Machine or Equipment Shutdown

The machine or equipment will be turned off or shut down using the specific procedures for that machine. An orderly shutdown will be utilized to avoid any additional or increased hazards to employees as a result of equipment de-energization.

C. Machine or Equipment Isolation

All energy control devices that are needed to control the energy to the machine or equipment will be physically located and operated in such a manner as to isolate the machine or equipment from the energy source.

D. Lockout or Tagout Device Application

Lockout or tagout devices will be affixed to energy isolating devices by authorized employees. Lockout devices will be affixed in a manner that will hold the energy isolating device in a "safe" or "off" position.

Where tagout devices are used, they will be affixed in such a manner that will clearly state that the operation or the movement of energy isolating devices from the "safe" or "off" position is prohibited.

Tags will be attached with self-locking, non-releasable devices such as nylon cable ties. Wire, twine or other reusable and easily unfastened attachments will not be used.

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The tagout devices will be attached to the same point a lock would be attached. If the tag cannot be affixed at that point, the tag will be located as close as possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.

E. **Stored Energy**

Following the application of the lockout/tagout devices to the energy isolating devices, all potential or residual energy will be relieved, disconnected, restrained, and otherwise rendered safe.

Where the reaccumulation of stored energy to a hazardous energy level is possible, verification of isolation will be continued until the maintenance of servicing is complete.

F. **Verification of Isolation**

Prior to starting work on machines or equipment that have been locked or tagged out, the authorized employee will verify that isolation or de-energization of the machine or equipment has been accomplished.

IX. RELEASE FROM LOCKOUT/TAGOUT

Each lockout or tagout device will be removed from each energy isolating device by the employee who applied the device. Before lockout or tagout devices are removed and the energy restored to the machine or equipment, the following actions will be taken:

1. The work area will be thoroughly inspected to ensure that nonessential items have been removed and that machine or equipment components are operational.

2. The work area will be checked to ensure that all employees have been safely positioned or removed. Before the lockout or tagout devices are removed, the affected employees will be notified that the lockout or tagout devices are being removed.

X. SPECIAL LOCKOUT REMOVAL

In situations where a lockout device must be removed by someone other than the person who installed it, the following steps must be taken:

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1. The supervisor in charge of the operation must personally verify that no employee is exposed to danger from the re-energizing or activation of the equipment. Guards, barriers, and other warning devices must be utilized as appropriate.

2. Only after the supervisor has verified that no employee exposure exists, may the lockout device(s) be removed by cutting or similar methods. All occurrences of this nature will be logged in the safety files along with the reason why it was necessary. The employee whose lock was cut will not be allowed to begin work until he has been notified. NOTE: The removal of lockout device(s) under these conditions is expected to occur very rarely.

XI. TESTING OR POSITIONING OF MACHINES & EQUIPMENT DURING LOCKOUT

In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment, or component thereof, the following sequence of actions shall be followed:

1. Clear the machine or equipment of tools and materials in accordance with the release from lockout or tagout procedures.

2. Energize and proceed with testing or positioning.

3. De-energize all systems and reapply energy control measures in accordance with normal lockout procedures to continue the servicing and/or maintenance.

XII. SPECIAL INSTRUCTIONS FOR ELECTRICAL LOCKOUT

A. De-Energizing Equipment

1. A tag used without a lock will be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock, including the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.

2. Qualified personnel will use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and will verify that the circuit elements and equipment parts are de-energized. The tests will also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of the circuit have been de-

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energized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment will be checked for proper operation immediately after the test.

3. The circuits and equipment to be worked on will be disconnected from all selector switches. Interlocks will not be used as the sole means for de-energizing circuits or equipment. Interlocks for electrical equipment will not be used as a substitute for lockout and tagging procedures.

4. Stored electrical energy which might endanger personnel will be released. Capacitors will be discharged and high capacitance elements will be short-circuited and grounded, if the stored energy might endanger personnel.

   NOTE: If the capacitors or associated equipment are handled in meeting this requirement, they will be treated as energized.

5. Stored non-electric devices that could re-energize electric circuit parts will be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

B. <u>Application of Locks and Tags</u>

1. A lock and a tag will be placed on each disconnecting means used to de-energize circuits and equipment on which work is performed. The lock will be attached so as to prevent persons from operating the disconnecting means, unless they resort to undue force or use of tools.

2. Each lock or tag must identify its owner. Locks may be engraved with employee initials, time card numbers, or other identifying indicators. If this is not possible, a tag with the employee's name may be affixed to the lock.

3. Each lock will have only one key, which will be kept by the employee using the lock. If new locks purchased are supplied with two keys, the second must be destroyed.

4. Each tag will contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

C. <u>Verification</u>

1. Only qualified persons will operate the equipment operating controls, verify de-energization, and ensure equipment cannot be restarted.

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2. Only qualified persons will conduct tests and visual inspections, as necessary, that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuits and equipment can be safely energized.

3. Employees exposed to the hazards associated with re-energizing the circuit or equipment will be warned to stay clear of circuits and equipment.

XIII. GROUP LOCKOUT/TAGOUT

There are occasions when more than one employee will be exposed to possible injury due to the unexpected release of a hazardous energy source. Two examples would be changing hammers in a shredder or knife blades in a shear. The leadman or supervisor will assume responsibility for the entire crew, determine the exposure for each employee, and ensure continuity of protection. Each employee must be provided with an equal amount of protection. Hasp devices that accommodate multiple locks will be used in these instances. Each employee will affix a personal lockout or tagout device to a group lockout device, group lockbox, or comparable mechanism, when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

XIV. OUTSIDE PERSONNEL (CONTRACTORS, ETC.)

All outside personnel and contractors will be informed by the plant manager of the company's lockout/tagout procedures and will be required to follow them. No work will be commenced in the plant by outside personnel or contractors before the plant manager has certified that they are aware of these procedures.

XV. SHIFT OR PERSONNEL CHANGES

In order to maintain continuity of lockout or tagout protection, the plant supervisor will assume responsibility. He will assure that:

1. Employees affected by the transfer of lockout or tagout devices between the off-going and oncoming employees are apprised of the transfer and coordinate the change.

2. All aspects of the lockout and tagout program are followed to minimize exposure to hazards from the unexpected energization, start-up of the machine or equipment, or release of stored energy.

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XVI. GLOSSARY

Affected Employee

An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee

A person who locks or implements a tagout system procedure on machines or equipment to perform the servicing or maintenance on that machine or equipment. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance or service on a machine or equipment which must be locked or a tagout system implemented.

Energy Isolating Device

A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a slide gate; a slip blind; a line valve; a block; and any similar device used to block or isolate energy. The term does not include a push button, selector switch, and other control circuit type devices.

Energy Source

Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Lockout

The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device

A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.

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Servicing and/or Maintenance

Workplace activities such as construction, installing, setting up, adjusting, inspecting, modifying, maintaining, and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes where the employee may be exposed to the unexpected energization or start-up of the equipment or release of hazardous energy.

Tagout

The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device

A prominent warning device, such as a tag and a means of attachment which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

APPENDIX A

MACHINES & EQUIPMENT REQUIRING LOCKOUT

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

APPENDIX B

AUTHORIZED EMPLOYEES

	NAME	EQUIPMENT & MACHINES
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

APPENDIX C

AFFECTED EMPLOYEES

	NAME	EQUIPMENT & MACHINES
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

APPENDIX D

QUALIFIED EMPLOYEES

	NAME	EQUIPMENT & MACHINES
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

APPENDIX E

PERIODIC LOCKOUT INSPECTION

NAME OF INSPECTOR: _____

DATE: _____ TIME: _____

LOCKOUT PROCEDURE INSPECTED: _____

EMPLOYEES INSPECTED: _____

_____

_____

_____

		YES	NO
1.	Were the steps in the energy control procedure being followed?	☐	☐
2.	Did the employee(s) involved know their responsibilities under the procedure?	☐	☐
3.	Is the procedure adequate to provide the necessary protection?	☐	☐
4.	Are any changes needed?	☐	☐
5.	If tagouts were used, did the employee know its limitations?	☐	☐

COMMENTS: _____

_____

_____

_____

_____

_____

APPENDIX F

SPECIFIC MACHINE OR EQUIPMENT PROCEDURE

NAME OF MACHINE OR EQUIPMENT: _____

PURPOSE OF THE LOCKOUT: _____

_____

AUTHORIZATION: _____

_____

ENERGY SOURCES:

- ☐ GRAVITY
- ☐ ELECTRICAL
- ☐ HYDRAULIC PRESSURE
- ☐ COMPRESSED AIR
- ☐ STEAM
- ☐ OTHER _____

ENERGY ISOLATION PROCEDURE: _____

_____

_____

_____

_____

ENERGY RESTORATION PROCEDURE: _____

_____

_____

_____

_____

APPENDIX G

LOCKOUT/TAGOUT TRAINING

All Authorized, Affected, Qualified and "Other" Employees must complete and sign the following at hire and after annual retraining or when procedures change:

I, _____, have read and understand the Company's Lockout/Tagout Policy.

☐ I visited and personally operated all electrical lockout devices located on the following equipment for which I am an Authorized Employee:

☐ I visited and have performed the tagout procedure on the following equipment for which I am an Authorized Employee:

☐ I understand that, as an Authorized Employee, I am responsible for locking out or tagging out all of the above equipment before attempting any repair, adjustment or maintenance. Failure to do so will result in disciplinary action, up to and including termination.

☐ I possess the required training and knowledge and am electrically qualified to perform maintenance on the following equipment:

☐ As an Affected or "Other" Employee, I understand that I am not to touch any piece of equipment that is locked out or tagged out.

EMPLOYEE	DATE
SUPERVISOR	DATE

APPENDIX H

"QUALIFIED" EMPLOYEE CHECKSHEET

"Qualified" employees must have received training in the following:

___ The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment.

___ The skills and techniques necessary to determine the nominal voltage of exposed live parts.

___ The clearance distances specified in 29 CFR 1910.333(c) and the corresponding voltages to which the "qualified" person will be exposed.

"Qualified" employees also must have received training in, and be familiar with, these safety-related work practices which pertain to their particular work assignments:

___ Precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools required when working near energized equipment. Examples are how to open and close high-voltage breakers, the use of fuse pullers, and the use of face and eye protection and nonconductive head protection. [Note: Only "Qualified" employees may work on equipment which has not been de-energized; and live parts to which an employee will be exposed must be de-energized whenever practical.]

___ The Lockout/Tagout Policy in force as described in Section 1.6 of the Company's Environmental, Health & Safety Manual, and specific lockout procedures pertaining to any equipment for which the employee is "Qualified."

___ Safe procedures for de-energizing circuits and equipment for which the employee is Qualified, including the release of any energy stored in capacitor elements which might harm the employee, and verification using test equipment that the circuit or equipment is de-energized.

___ Safe procedures regarding illumination and visibility of energized parts to which the employee is exposed. [Note: Employees may not enter spaces containing exposed energized parts without adequate lighting. Employees may not reach blindly into areas which may contain energized parts.]

___ Handling of conductive materials and equipment, ladders, and apparel (rings, jewelry, etc.) which may contact energized conductors or circuit parts.

RESPIRATOR PROTECTION PROGRAM

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C	Irritant Fume Protocol
D	Respiratory Protection Procedure
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F	Respirator Information for Physician or Licensed Health Care Professional (PLHCP)

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SECTION 1.7
RESPIRATOR PROTECTION PROGRAM

I. PURPOSE

The purpose of the respirator program is to protect employees from hazardous chemicals, dust, mist, and fumes to which they may be exposed, and to communicate the specific procedures established to protect them. It satisfies requirements in 29 CFR Part 1910.134 for a written respiratory protection program.

II. APPLICABILITY

Requirements of this program apply when employees are required to use respirators on the job. For employees who voluntarily use filtering facepiece (dust mask) respirators, only the simplified training requirement at the end of Section VII applies.

III. ADMINISTRATION

The Respiratory Protection Program Administrator is the Company's Safety & Environmental Control Engineer. Administration at specific sites on a day-to-day basis is the responsibility of a site coordinator as referenced in the attached worksite specific procedures (see Appendix D).

The program will be updated as needed when changes in the workplace affect respirator use. The Program Administrator will review the program periodically to ensure that it is implemented properly and that employees are using their respirators as required.

IV. SELECTION OF RESPIRATORS

Units for service will be approved by the Program Administrator based on the nature of the respiratory hazard, conditions in the specific work area, and other factors listed in Appendix D. To allow employees the best possible fit and comfort, the Program Administrator will approve at least two respirator units for each application.

V. RESPIRATORY PROTECTION PROCEDURES

Appendix D contains site-specific respiratory protection procedures. These include information on the respiratory hazard present, any engineering or administrative controls in use, exposure levels, approved respirators for use, and procedures for proper use and maintenance of respirators.

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VI. EMPLOYEE MEDICAL EVALUATION

Employees who use respirators must be evaluated medically to ensure that such use is safe. This evaluation can be done either by physical examination or by questionnaire review. Employees covered by lead, arsenic and/or cadmium exposure control programs usually will be evaluated by physical examination, while others will use the questionnaire method.

A. Medical Evaluation by Physical Examination

Employees who use respirators and are covered by a lead, arsenic, and/or cadmium program already have received a respirator medical evaluation as part of required physical examinations. If an employee's last such examination took place since April 8, 1997, the respirator evaluation is valid for the purposes of this program. If not, the employee must be reevaluated either during a new physical exam or by the questionnaire method described below.

B. Medical Evaluation by Questionnaire

A form titled "Respirator Medical Evaluation Questionnaire" is attached to this section as Appendix E. The form is filled out by an employee and then sent to any physician or licensed health care professional (PLHCP) for review.

1. Administration of Medical Questionnaire

The questionnaire will be administered confidentially and on paid time. Assistance must be arranged for employees whose language or reading skills interfere with an understanding of the questionnaire's content. [Note: Spanish versions of this policy and the questionnaire are available on request from Safety & Environmental Services.]

To maintain confidentiality, supervisors and other Company personnel may not look at the employee's answers. Instead, the employee will be given an envelope and asked to seal the completed questionnaire inside for delivery to the PLHCP.

The following must be provided to the PLHCP along with the completed questionnaire.

a) A copy of this program (one time only).

b) A copy of OSHA's respiratory protection standard, contained in 29 CFR 1910.134 (one time only).

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c) An "Information for Physicians or Licensed Health Care Professional" form with appropriate sections completed. A copy of this form is attached to this program as Appendix F.

OR

A Lead, Arsenic, and/or Cadmium Medical Surveillance Physician's Report (as applicable) with appropriate sections completed.

2. Medical Determination

The PLHCP will review each employee's medical questionnaire and determine if any limitations on respirator use apply. The PLHCP may also, because of information given on the questionnaire, require a medical examination. If this is the case, the PLHCP will so indicate on the "Respirator Information for PLHCP" form and the employee will be sent to the PLHCP for examination.

C. Additional Medical Evaluations

Employees will be provided with additional medical evaluations if:

1. An employee reports medical symptoms relating to ability to wear a respirator.

2. A PLHCP, supervisor, or the Program Administrator determines that reevaluation is needed.

3. Problems during fit testing or in reviewing this program indicate that reevaluation is needed.

4. Workplace changes substantially affect respirator use.

VII. TRAINING

Employees who are required to use respirators will receive training before their on-the-job respirator use begins, and annually thereafter. Additional retraining is required if respirators change or if employees do not use respirators properly.

Training will include the following:

1. Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.

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2. Capabilities and limitations of the respirator.

3. How to respond when the respirator malfunctions.

4. How to inspect, use, and check the seals of the respirator.

5. How to clean, maintain, and store the respirator.

6. How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.

7. The general requirements of the respirator program.

Employees who are not required to use filtering facepiece respirators (dust masks), but do so voluntarily, also must receive initial and annual training. This training will address the contents of 29 CFR 1910.134 Appendix D. The training will be documented in safety meeting minutes.

A. **Negative Pressure Respirators**

1. Inspection of Respirators

Employees required to wear negative pressure respirators will inspect their respirators before each use to ensure that:

a. Headbands are properly attached.

b. Faceplate is not deformed.

c. Inhalation valves are checked for cracks, tears, distortions, or residue and dirt buildup.

d. Filters are cleaned and properly installed.

e. Exhalation valves are checked for cracks, tears, distortions, or residue and dirt buildup.

Any respirators failing inspection must be removed from service immediately and repaired or discarded.

2. Usage of Respirators

Employees required to use negative pressure respirators will:

a. Place facepiece over nose.

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b. Adjust headbands over crown of head so mask fits snug. (Take care that the mask is not too tight.)

c. Test exhalation valve by placing hand over valve. Should feel slight pressure. **DO NOT** press hard, because it will not result in a true test.

d. Test inhalation valve by placing hands over valve. This should stop air flow.

e. Employee will be permitted to change filter elements or receive a new disposable respirator whenever an increase in breathing resistance occurs.

f. Employees will be permitted to leave work areas to wash their face and respirator facepiece whenever necessary to prevent skin irritation associated with respirator use.

3. Cleaning and Disinfecting of Respirators

Employees required to use nondisposable negative pressure respirators will do the following after they are through using the respirator:

a. Use warm water not to exceed 110 degrees with antibacterial soap.

b. Take mask apart so all areas can be thoroughly cleaned.

c. Inspect all parts during cleaning for any cracks, tears, or distortions.

d. Thoroughly rinse all parts with warm water.

e. Allow all parts to air dry. **DO NOT** use hot air to dry because this will cause mask distortion.

f. Properly assemble the respirator.

g. Replace filters.

4. Storage

Employees required to use negative pressure respirators will be responsible for properly storing them as follows:

a. Place in plastic storage bags in users' lockers for storage during nonworking hours.

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b. Make sure faceplate is not distorted. **DO NOT** compress or lay sideways.

c. Store away from heat, sunlight, or excessive moisture.

5. Respirator Limitations

Employees required to use respirators with tight-fitting facepieces will be instructed as to their limitation which includes the following:

a. No beards or sideburns.
b. No tobacco chewing.

B. RACAL "Breathe-Easy" Powered Air-Purifying Respirators

The operation and care of RACAL "Breathe-Easy" respirators is detailed in Chapters 2 and 3 of RACAL's "Breathe-Easy" instruction manual.

C. RACAL "Powerflow" Powered Air-Purifying Respirators

The operation and care of RACAL "Powerflow" respirators is detailed in Chapters 2 and 3 of RACAL's "Powerflow" instruction manual.

VIII. FIT TESTING

Employees who are required to wear tight-fitting positive or negative pressure respirators will be qualitatively fit tested as per the Saccharin Solution Protocol or the Irritant Fume Protocol attached as Appendix B and Appendix C. General requirements that apply to both protocols are attached as Appendix A. Fit testing will be conducted annually, as well as for new employees who will be required to wear a respirator. All fit testing will be documented.

No fit testing is required for employees wearing powered air-purifying respirators.

IX. APPROPRIATE SURVEILLANCE

Supervisors will be responsible for surveying their work areas to determine the conditions and degree of employee exposure relevant to the respirator usage.

X. INSPECTIONS

Supervisors will conduct daily inspections to evaluate and determine the continued effectiveness of the program.

APPENDIX A

FIT TEST GENERAL REQUIREMENTS

The employer shall conduct fit testing using the following procedures:

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension, and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.

3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.

5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item 6. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

   (a) Position of the mask on the nose.
   (b) Room for eye protection.
   (c) Room to talk.
   (d) Position of mask on face and cheeks.

7. The following criteria shall be used to help determine the adequacy of the respirator fit:

   (a) Chin properly placed.
   (b) Adequate strap tension, not overly tightened.
   (c) Fit across nose bridge.
   (d) Respirator of proper size to span distance from nose to chin.
   (e) Tendency of respirator to slip.
   (f) Self-observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a negative and positive pressure seal check as described in VI.A.2. of this program, or a seal check recommended by the respirator manufacturer which provide equivalent protection. Before conducting the negative and positive pressure checks, the subject shall be told to seal the mask on the face by moving the head from side to side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.

9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.

11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.

12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

APPENDIX B

SACCHARIN SOLUTION AEROSOL PROTOCOL

A. TASTE THRESHOLD SCREENING

1. Threshold screening, as well as fit testing employees, shall use an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly of part #FT 14 and FT 15 combined is adequate.

2. The test enclosure shall have a three-quarter-inch hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

3. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

4. For the threshold screening test, the test subject shall don the test enclosure and breathe with open mouth with tongue extended.

5. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

6. The threshold check solution consists of 0.83 grams of sodium saccharin, USP in water. It can be prepared by putting 1 cc of the fit test solution (see C6 below) in 100 cc of water.

7. To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

8. Ten squeezes of the nebulizer bulb are repeated rapidly, and then the test subject is asked whether the saccharin can be tasted.

9. If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted.

10. If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted.

11. The test conductor will take note of the number of squeezes required to elicit a taste response.

12. If the saccharin is not tasted after 30 squeezes (Step 10), the saccharin fit test may not be performed on the test subject.

13. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

14. Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

15. The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon, or at least every four hours.

B. FIT TEST

1. The fit test uses the same enclosure described in A1 and A2 above.

2. Each test subject shall don the properly selected respirator for at least 10 minutes before starting the fit test.

3. The test subject shall don the enclosure while wearing the respirator. This respirator shall be properly adjusted and equipped with a particulate filter cartridge.

4. The test subject may not eat, drink (except plain water) or chew gum for 15 minutes before the test.

5. A second DeVilbiss Model 40 Inhalation Medication Nebulizer, or equivalent, is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

6. The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 cc of warm water.

7. As before, the test subject shall breathe with mouth open and tongue extended.

8. The nebulizer is inserted into the hole in the front of the enclosure and the fit test solution is sprayed into the enclosure using the same technique as for the taste threshold screening and the same number of squeezes required to elicit a taste response in the screening. (See A8-A10 above.)

9. After generation of the aerosol, the test subject shall be instructed to perform the following exercises for one minute each.

   i. Breathe normally.

   ii. Breathe deeply. Be certain breaths are deep and regular.

iii. Turn head from side to side. Be certain movement is complete. Alert the test subject not to bump the respirator on the shoulders. Have the test subject inhale when his head is at either side.

iv. Nod head up and down. Be certain motions are complete. Alert the test subject not to bump the respirator on the chest. Have the test subject inhale when his head is in the full up position (looking toward the ceiling).

v. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

RAINBOW PASSAGE

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

vi. Grimace by smiling or frowning (15 seconds).

vii. Jog in place.

viii. Breathe normally [as in exercise (i)].

10. At the beginning of each exercise, the aerosol concentration shall be replenished using one-half the number of squeezes as initially described in B8.

11. The test subject shall so indicate to the test conductor if at any time during the fit test the taste of saccharin is detected.

12. If the saccharin is detected, the fit is deemed unsatisfactory and a different respirator shall be tried.

13. Successful completion of the test protocol shall allow the use of the tested respirator in contaminated atmospheres up to 10 times the PEL. In other words, this protocol may be used to assign protection factors no higher than ten.

14. Qualitative fit testing shall be repeated at least annually.

APPENDIX C

IRRITANT FUME PROTOCOL

A. FIT TEST

1. The test subject shall be allowed to smell a weak concentration of the irritant smoke to familiarize the subject with the characteristic odor.

2. The test subject shall don the properly selected respirator for at least 10 minutes before starting the fit test.

3. The test conductor shall review this protocol with the test subject before testing.

4. The test subject shall perform the conventional positive pressure and negative pressure fit checks. Failure of either check shall be cause to select an alternate respirator.

5. Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part #5645, or equivalent. Attach a short length of tubing to one end of the smoke tube. Attach the other end of the smoke tube to a low pressure air pump set to deliver 200 milliliters per minute, or to the squeeze bulb.

6. Advise the test subject that the smoke can be irritating to the eyes and instruct him to keep his eyes closed while the test is performed.

7. The test conductor shall direct the stream of irritant smoke from the tube towards the faceseal area of the test subject. He shall begin with the tube at least 12 inches from the facepiece and gradually move to within one inch, moving around the whole perimeter of the mask.

8. After generation of the aerosol, the test subject shall be instructed to perform the following exercises for one minute each.

   i. Breathe normally.

   ii. Breathe deeply. Be certain breaths are deep and regular.

   iii. Turn head from side to side. Be certain movement is complete. Alert the test subject not to bump the respirator on the shoulders. Have the test subject inhale when his head is at either side.

   iv. Nod head up and down. Be certain motions are complete. Alert the test subject not to bump the respirator on the chest. Have the test subject inhale when his head is in the full up position (looking toward the ceiling).

v. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

RAINBOW PASSAGE

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

vi. Walk in place.

9. If the irritant smoke produces an involuntary reaction (cough) by the test subject, the test conductor shall stop the test. In this case, the tested respirator is rejected and another respirator shall be selected.

10. Each test subject passing the smoke test without evidence of a response shall be given a sensitivity check of the smoke from the same tube to determine whether he reacts to the smoke. Failure to evoke a response shall void the fit test.

11. Steps A4, A7, A8 of this protocol shall be performed in a location with exhaust ventilation sufficient to prevent general contamination of the testing area by the irritant smoke.

12. If the irritant smoke is detected, the fit is deemed unsatisfactory and a different respirator shall be tried.

13. Successful completion of the test protocol shall allow the use of the tested respirator in contaminated atmospheres up to 10 times the PEL. In other words, this protocol may be used to assign protection factors no higher than ten.

APPENDIX D

RESPIRATORY PROTECTION PROCEDURE

PLANT: _____ WORKSITE/ACTIVITY: _____

SITE COORDINATOR: _____

ACTIVITY DESCRIPTION:

RESPIRATORY HAZARD:

ENGINEERING/ADMINISTRATIVE CONTROLS:

EXPOSURE LEVEL:

SELECTION CRITERIA FOR RESPIRATOR:

APPROVED RESPIRATORS:

PROPER USE OF RESPIRATORS:

RESPIRATOR MAINTENANCE:

REFERENCES:

APPENDIX E

RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

To the employee: Can you read (circle one): Yes/No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Fill in the information requested below (please print):

1. Today's date: _____
2. Your name: _____
3. Your age (to nearest year): _____
4. Sex (circle one): Male/Female
5. Your height: _____ft._____in.
6. Your weight: _____lbs.
7. Your job title: _____
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____
9. The best time to phone you at this number: _____
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):
    a. _____N, R, or P disposable respirator (filter-mask, non-cartridge type only).
    b. _____Other type (for example, half-or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes/No
    If "yes," what type(s): _____
13. A complete mailing address where a copy of the health care professional's opinion may be sent:
    _____
    _____

Answer the following by circling "yes" or "no":

1. Do you *currently* smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you *ever had* any of the following conditions?
   a. Seizures (fits): Yes/No
   b. Diabetes (sugar disease): Yes/No
   c. Allergic reactions that interfere with your breathing: Yes/No
   d. Claustrophobia (fear of closed-in places): Yes/No
   e. Trouble smelling odors: Yes/No

3. Have you *ever had* any of the following pulmonary or lung problems?
   a. Asbestosis: Yes/No
   b. Asthma: Yes/No
   c. Chronic bronchitis: Yes/No

d. Emphysema: Yes/No
e. Pneumonia: Yes/No
f. Tuberculosis: Yes/No
g. Silicosis: Yes/No
h. Pneumothorax (collapsed lung): Yes/No
i. Lung cancer: Yes/No
j. Broken ribs: Yes/No
k. Any chest injuries or surgeries: Yes/No
l. Any other lung problem that you've been told about: Yes/No

4. Do you *currently* have any of the following symptoms of pulmonary or lung illness?
   a. Shortness of breath: Yes/No
   b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
   c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
   d. Have to stop for breath when walking at your own pace on level ground: Yes/No
   e. Shortness of breath when washing or dressing yourself: Yes/No
   f. Shortness of breath that interferes with your job: Yes/No
   g. Coughing that produces phlegm (thick sputum): Yes/No
   h. Coughing that wakes you early in the morning: Yes/No
   i. Coughing that occurs mostly when you are lying down: Yes/No
   j. Coughing up blood in the last month: Yes/No
   k. Wheezing: Yes/No
   l. Wheezing that interferes with your job: Yes/No
   m. Chest pain when you breathe deeply: Yes/No
   n. Any other symptoms that you think may be related to lung problems: Yes/No

5. Have you *ever had* any of the following cardiovascular or heart problems?
   a. Heart attack: Yes/No
   b. Stroke: Yes/No
   c. Angina: Yes/No
   d. Heart failure: Yes/No
   e. Swelling in your legs or feet (not caused by walking): Yes/No
   f. Heart arrhythmia (heart beating irregularly): Yes/No
   g. High blood pressure: Yes/No
   h. Any other heart problem that you've been told about: Yes/No

6. Have you *ever had* any of the following cardiovascular or heart symptoms?
   a. Frequent pain or tightness in your chest: Yes/No
   b. Pain or tightness in your chest during physical activity: Yes/No
   c. Pain or tightness in your chest that interferes with your job: Yes/No
   d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
   e. Heartburn or indigestion that is not related to eating: Yes/No
   f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you *currently* take medication for any of the following problems?
   a. Breathing or lung problems: Yes/No
   b. Heart trouble: Yes/No
   c. Blood pressure: Yes/No
   d. Seizures (fits): Yes/No

8. If you've used a respirator, have you *ever had* any of the following problems? (If you've never used a respirator, check the following space and go to question 9.)
   a. Eye irritation: Yes/No
   b. Skin allergies or rashes: Yes/No
   c. Anxiety: Yes/No
   d. General weakness or fatigue: Yes/No
   e. Any other problem that interferes with your use of a respirator: Yes/No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10-15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you *ever lost* vision in either eye (temporarily or permanently): Yes/No

11. Do you *currently* have any of the following vision problems?
    a. Wear contact lenses: Yes/No
    b. Wear glasses: Yes/No
    c. Color blind: Yes/No
    d. Any other eye or vision problem: Yes/No

12. Have you *ever had* an injury to your ears, including a broken ear drum: Yes/No

13. Do you *currently* have any of the following hearing problems?
    a. Difficulty hearing: Yes/No
    b. Wear a hearing aid: Yes/No
    c. Any other hearing or ear problem: Yes/No

14. Have you *ever had* a back injury: Yes/No

15. Do you *currently* have any of the following musculoskeletal problems?
    a. Weakness in any of your arms, hands, legs, or feet: Yes/No
    b. Back pain: Yes/No
    c. Difficulty fully moving your arms and legs: Yes/No
    d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
    e. Difficulty fully moving your head up or down: Yes/No
    f. Difficulty fully moving your head side to side: Yes/No
    g. Difficulty bending at your knees: Yes/No
    h. Difficulty squatting to the ground: Yes/No
    i. Difficulty climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
    j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

APPENDIX F

Respirator Information for Physician or Licensed Health Care Professional (PLHCP)

TO: Attn: _____

FROM: Attn: _____
River Metals Recycling, LLC

Date: _____

This form accompanies a respiratory protection medical questionnaire for the following employee:

Name: _____
Mailing Address: _____

A copy of our respiratory protection program: ☐ Is attached ☐ Was sent previously

A copy of OSHA's respiratory protection standard: ☐ Is attached ☐ Was sent previously

Please evaluate this employee's fitness to wear a respirator given these specific conditions:

A. Respirator Type: _____ Respirator Weight: _____
Alternate: : _____

B. Duration and Frequency of Respirator Use: _____

C. Expected Physical Work Effort: _____

D. Additional Clothing and Equipment to be Worn: _____

E. Temperature and Humidity Extremes that May be Encountered: _____

PLHCP please complete the following:

List any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator: _____

_____

_____

_____

Is a follow-up medical evaluation required? ☐ Yes ☐ No

Please verify that the employee has been mailed a copy of these recommendations at the home address shown above. ☐ Yes

COMPLETED BY: Name _____

Title _____

Organization _____

Address _____

_____

Date _____

Return original to River Metals Recycling, LLC at address on page 1 of this form.

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SECTION 1.8
EMERGENCY ACTION PLAN GUIDELINES

I. PURPOSE

This section contains guidance for preparation of a Site Emergency Action Plan (EAP) as outlined in 29 CFR 1910.38. Every plant is required to have such a plan, which dictates response to such emergencies as a fire, chemical spill, severe storm, or employee injury.

II. WRITTEN PLAN AND REQUIRED ACTIVITIES

The EAP is documented in a written plan comprised of the following:

1. Chain of Command

This section specifies a Plant Emergency Coordinator (PEC) usually the Plant or Operations Manager. The PEC assumes responsibility for implementing the EAP during an emergency. Backup coordinators also are named here, to act in place of the PEC, if necessary. For a small plant with a dozen or less employees, usually one backup is sufficient. Large plants with 50 or more employees should designate and train three or more backup coordinators.

2. Communications

In this section, means of communication are discussed. The following functions should be established:

A. Employees Alerting the PEC or Backup - To accomplish this, two-way radio and telephone system use typically are specified. In small operations, verbal communication might be specified.

B. The Plant Alerting Outside Agencies - Provisions generally include two-way radio and telephone systems. At least two means of communication should be specified in case a power outage or downed lines disrupt one. Emergency notification frequencies, channels or phone numbers should be listed here, or locations of lists or postings with this information specified.

C. Outside Agencies Alerting the Plant - In some cases a port or industrial complex authority, client steel mill, neighboring business, Coast Guard, or other agency may be responsible for alerting our plant to a dangerous situation. This may be by Civil Defense siren, telephone, marine band,

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or other means. The plan should specify which outside agencies may be responsible to contact the plant, and how this is to be done.

D. Evacuation Notification to Employees - If ten or less employees are involved and all can be reached quickly, notification may be verbal. OSHA specifies an audible alarm for larger work forces, but will accept two-way radio or telephone notification. The plan must be clear on how employees will be notified if an alarm system is in place, and should specify how individuals without radios or access to phones will be notified.

3. **Accounting For Personnel**

If an area or the entire plant is evacuated, affected employees must be accounted for. The plan must specify where employees are to meet. This meeting place must have a means of communication, so that emergency response personnel can be notified if any employees are missing.

4. **Emergency Procedures**

The plant must formulate response procedures to specific emergencies that may occur. A hazard audit of the plant must first be performed and a list of potential hazards compiled. Typical emergencies for our plants include:

A. Extreme weather (hurricane, thunderstorm, tornado, flood).
B. Injury to employee or customer requiring evacuation.
C. Fire in building.
D. Fire in mobile equipment.
E. Explosion in shredder or shear.
F. Leaking propane or other flammable gas.
G. Gasoline or diesel fuel spill.
H. Chemical release from neighboring facility or railcar derailment.

There are many other potential emergencies. Each emergency that may occur should be listed in the plan, along with specific steps to be taken in response. Any emergency equipment or utility shutdowns or medical duties to be performed must be included. List first aid/CPR trained employees in this section.

Various emergencies may require evacuation by different means or along different routes. To be clear, specify evacuation requirements in the emergency procedures. It is especially effective to map escape routes and include this map with the plan.

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5. Training

The EAP must be reviewed with employees as follows:

A. When the plan is first developed, or changed.
B. When new employees are hired.
C. At least annually in a safety meeting.

Provisions for documenting training should be included in the plan. They include safety meeting minutes for initial or annual plan reviews and the new employee orientation form for new hires.

We are required to train a sufficient number of persons to assist in evacuations. Typically these are supervisors or lead employees. Typical duties of these persons include helping to direct others to the proper escape route and meeting place, making sure employees in remote or enclosed areas are notified of the evacuation, directing employees to perform emergency shutdowns as necessary, taking a first aid kit or employee lists or a radio to the meeting place, accounting for employees, and so on. In a small plant with few employees, the Plant Manager can cover these duties. In a large plant, several others may need training to ensure a safe and orderly evacuation.

An evacuation drill must be held annually. Document this in safety meeting minutes. This may coincide with annual EAP training for all employees. If such a drill cannot be held during working hours, it may be scheduled for off-hours.

III. POSTING OF INFORMATION

A list of emergency frequencies, channels, and phone numbers must be posted where they will be needed. Additionally, evacuation route maps or descriptions must be posted where they will be easily and frequently visible to employees.

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SECTION 1.9
BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN

I. PURPOSE

This plan meets the requirements outlined in 29 CFR 1910.1030 for protecting employees from bloodborne diseases. This is accomplished by eliminating or minimizing employee occupational exposure to blood and other bodily fluids.

II. APPLICATION

A. Exposure Determination

Employees who receive first aid training and are first responders in their workplace are considered to have occupational exposure to Bloodborne Pathogens, regardless of their job classification. Tasks in which occupational exposure may occur include the administration of first aid and associated cleanup activities. Appendix B contains a list of current first responders.

B. Training

All employees with occupational exposure will receive training to include the following:

1. A description of the Bloodborne Pathogens Standard as it applies to our employees. [NOTE: A copy of the text of the standard must be made accessible to employees during training.]

2. A general explanation of the epidemiology and symptoms of bloodborne diseases and means of transmission.

3. An explanation of this exposure control plan and how employees may obtain a copy if desired.

4. An explanation of how exposures might occur in our workplace, and how to prevent exposure using personal protective equipment and proper work practices.

5. Location, types, use, and disposal of personal protective equipment and an explanation of why it was selected.

6. Efficacy, safety, administration, and benefits of the Hepatitis B vaccine, and an explanation that this vaccine is available free of charge.

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7. Proper actions and notifications required during an emergency involving blood or bodily fluids.

8. Proper follow-up and reporting of an exposure incident, including post-exposure evaluation and follow-up by the Company.

9. Signs, labels, and color coding for biohazard materials.

10. An opportunity for questions and answers with the trainer.

Other employees will be trained, but this may be to a lesser degree which will include, at a minimum, an overview of this policy and a caution against exposure to blood and bodily fluids while on the job.

III. IMPLEMENTATION SCHEDULE AND METHODOLOGY

A. Compliance Methods

Universal precautions will be observed at this facility in order to prevent contact with blood or other potentially infectious materials. This means that all blood or other potentially infectious materials will be considered infectious regardless of the perceived status of the source individual.

Plant Managers/Operations Managers shall ensure that after the removal of personal protective gloves, employees shall wash hands and any other potentially contaminated skin area as soon as feasible with soap and water.

Supervisors shall ensure that if employees incur exposure to their skin or mucous membranes, then those areas shall be washed or flushed with water as soon as feasible following contact.

B. Contaminated Equipment

Supervisors are responsible for ensuring that equipment which has become contaminated with blood or other potentially infectious materials shall be examined and shall be decontaminated as necessary unless the decontamination of the equipment is not feasible.

C. Personal Protective Equipment (PPE)

The Plant Manager is responsible for ensuring that the following provisions are met:

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1. That the employee administering emergency medicine uses appropriate PPE when attending to individual(s) involved in an accident where the threat of exposure to blood, or other potentially infectious materials is present.

2. Gloves shall be worn where it is reasonably anticipated that employees will have hand contact with blood, other potentially infectious materials, non-intact skin, and mucous membranes.

3. The following equipment will be made readily available, in the appropriate sizes, for those individuals at each yard trained to administer emergency medicine: disposable gloves, disposable protective airway masks, and disposable surgical masks. Those individuals administering emergency medicine will wear their safety glasses at all times.

4. That appropriate PPE in the appropriate sizes is readily accessible at the work site for those trained and responsible for administering emergency medicine or conducting cleanup.

5. All personal protective equipment will be disposed of by the employer. All repairs and replacements will be made by the employer.

6. All garments which are penetrated by blood shall be removed immediately or as soon as feasible. All PPE will be removed prior to leaving the work area.

7. When PPE is removed, it shall be placed in an appropriately designated area or container for storage, washing, decontamination or disposal.

8. Disposable gloves used at this facility are not to be washed or decontaminated for re-use and are to be replaced as soon as practical when they become contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised.

D. Laundry Procedures

Laundry contaminated with blood or other potentially infectious materials will be handled as little as possible. Such laundry will be placed in appropriately marked plastic bags at the location where it was used. Such laundry will not be sorted or rinsed in the area of use.

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E. **Hepatitis B Vaccination**

River Metals Recycling, LLC shall make available the Hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and postexposure follow-up to employees who have had an exposure incident.

The Plant Manager shall ensure that all medical evaluations and procedures including the Hepatitis B vaccine and vaccination series and postexposure follow-up including prophylaxis are:

1. Made available at no cost to the employee;

2. Made available to the employee at a reasonable time and place;

3. Performed by or under the supervision of a licensed physician or by or under the supervision of another licensed health care professional; and

4. Provided according to the recommendations of the U.S. Public Health Service.

All laboratory tests shall be conducted by an accredited laboratory at no cost to the employee.

Any employee who declines to accept Hepatitis B vaccination will sign the declination, which is attached to this plan as Appendix A. If the employee initially declines the vaccination, but at a later time decides to accept it, such vaccination will be made available at that time.

A list of the current Hepatitis B vaccination status of all first responders is included in Appendix B.

F. **Postexposure Incident Procedure**

An exposure incident is defined as an incident in which blood or other potentially infectious materials contact the eye, mouth, other mucous membrane, non-intact skin, or parenteral tissue of an employee as a result of his or her duties. Non-intact skin is skin that has cuts, abrasions, or open sores which allow a route of entry for bloodborne pathogens.

An employee suffering an exposure, incident on the job must report this immediately to a supervisor. Any exposed employee who is not an identified first responder will be offered a Hepatitis B vaccination to be administered within 24 hours of the exposure.

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Notify Corporate Safety & Environmental staff immediately if an exposure incident occurs. This will help to ensure that all procedural requirements of the Bloodborne Pathogens Standard are met.

An RMR incident report must be filed for any exposure incident. An Exposure Incident Report form is included as Appendix C of the plan and must be filed with the Incident Report.

If consent is given, the source individual's blood will be tested as soon as possible to determine HIV and HBV infectivity. These results will be provided to the exposed employee, along with information about applicable laws and regulations concerning source identity. A Source Individual Medical Release/Refusal Form is included as Appendix D.

The exposed employee will be offered a medical evaluation and blood test for HIV and HBV. The Exposure Incident Report form includes a checklist of items that must be given to the doctor who performs the evaluation, and an employee release for information given to the doctor. The employee will receive a copy of the evaluation results within 15 days of the evaluation.

APPENDIX A

RIVER METALS RECYCLING, LLC
HEPATITIS B VACCINE DECLINATION

I understand that due to my occupational exposure to blood or other potentially infectious materials, I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

_____ EMPLOYEE SIGNATURE

_____ DATE SIGNED

_____ EMPLOYEE NAME (Print or Type)

_____ EMPLOYEE LOCATION

APPENDIX B

EXPOSURE DETERMINATION/
HEPATITIS B VACCINATION STATUS

Listed below are current first responders. These employees are classified as having occupational exposure to bloodborne pathogens.

	NAME/SSN	DATE OF FIRST AID/ CPR TRAINING	HEPATITIS B VACCINE		VACCINE COMPLETED (DATE)	POSITIVE ANTIBODY TEST? (Y/N)
			Accept	Decline		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

ATTACH ADDITIONAL SHEETS AS NECESSARY.

APPENDIX C
EXPOSURE INCIDENT REPORT

EXPOSED INDIVIDUAL:

NAME _____
ADDRESS _____
SS NUMBER _____

ROUTE(S) OF EXPOSURE: ☐ EYE ☐ MOUTH ☐ MUCOUS MEMBRANE
(Check Any That Apply) ☐ NONINTACT SKIN ☐ PUNCTURE

TO WHAT WAS THE EMPLOYEE EXPOSED? ☐ BLOOD ☐ VOMIT ☐ FECES ☐ URINE ☐ OTHER (Describe Below)

DESCRIBE THE EXPOSURE INCIDENT ON THE ATTACHED DJJ INCIDENT REPORT. INCLUDE DESCRIPTION OF:

- WHAT WORK WAS BEING DONE
- WHAT CAUSED THE INCIDENT
- WHAT PERSONAL PROTECTIVE EQUIPMENT WAS WORN
- WHAT ACTION WAS TAKEN FOLLOWING THE INCIDENT

SOURCE INDIVIDUAL:

NAME _____
ADDRESS _____

DOES YOUR STATE HAVE A CONFIDENTIALITY REQUIREMENT? ☐ YES ☐ NO ☐ UNKNOWN
IS THE SOURCE INDIVIDUAL INFECTED WITH HBV OR HIV? ☐ YES ☐ NO ☐ UNKNOWN
HAS THE SOURCE INDIVIDUAL CONSENTED TO BLOOD TESTING? ☐ YES ☐ NO

MEDICAL EXAMINATION CHECKLIST:

PROVIDE THE FOLLOWING TO THE DOCTOR PERFORMING FOLLOW-UP MEDICAL EVALUATION:

- COPY OF BLOODBORNE PATHOGENS STANDARD (29 CFR 1910.1030)
- COPY OF THIS REPORT
- RESULTS OF SOURCE INDIVIDUAL'S BLOOD TESTS
- COPY OF THE EXPOSED EMPLOYEE'S MEDICAL RECORDS RELEVANT TO THE EXPOSURE

THIS FORM COMPLETED BY _____ DATE _____

EXPOSED EMPLOYEE MEDICAL RELEASE:

I AFFIRM THAT THE INFORMATION IN THIS REPORT IS CORRECT, AND AUTHORIZE MY EMPLOYER TO RELEASE ALL RELEVANT MEDICAL RECORDS TO THE HEALTH CARE PROVIDER WHO WILL PERFORM THE MEDICAL EVALUATION AND FOLLOW-UP FOR THIS EXPOSURE INCIDENT. I UNDERSTAND THAT ALL INFORMATION COLLECTED DURING THIS EVALUATION AND THE CONTENTS OF THIS REPORT WILL REMAIN CONFIDENTIAL.

EMPLOYEE SIGNATURE _____ DATE _____

APPENDIX D

SOURCE INDIVIDUAL MEDICAL RELEASE/REFUSAL FORM

SOURCE INDIVIDUAL NAME _____
ADDRESS _____

You have been involved in an incident that has exposed these River Metals Recycling, LLC employees to your blood or bodily fluids:

_____
_____
_____
_____

PERMISSION FOR SOURCE INDIVIDUAL'S MEDICAL RELEASE

I hereby grant permission to have my blood drawn and tested to determine if I am a carrier of a bloodborne disease. I also grant permission to have the test results released to the individuals listed above and to the health care providers performing the follow-up evaluations.

SOURCE INDIVIDUAL'S SIGNATURE _____ DATE _____

REFUSAL FOR SOURCE INDIVIDUAL'S MEDICAL RELEASE

I have had the exposure evaluation process explained to me and I hereby refuse to consent to blood testing to determine my infectious status with regard to bloodborne pathogens including, but not limited to, hepatitis B virus (HBV) or human immunodeficiency virus (HIV). I understand that by refusing to do so, I am limiting the information available to those individuals who were exposed to my blood or bodily fluids and who are trying to determine their potential for contracting these diseases.

SOURCE INDIVIDUAL'S SIGNATURE _____ DATE _____

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SECTION 1.10
HAZARD COMMUNICATION PROGRAM

I. INTRODUCTION

This program satisfies the requirement of 29 CFR 1910.1200(e) for a written Hazard Communication Program. It describes how criteria for hazardous chemical labeling, Material Safety Data Sheets, and employee information and training will be met. It contains a list of this facility's hazardous chemicals as well as procedures addressing nonroutine tasks, chemicals in unlabeled pipes, and on-site contractors.

II. ADMINISTRATION

The Hazard Communication Program is controlled by the Plant Manager. Any employee may review the program by appointment in the Plant Manager's office.

III. LABELS AND OTHER FORMS OF WARNING

All containers of hazardous materials on site shall be labeled in accordance with Paragraph (f) of the Hazard Communication Standard. The following information is required.

A. Identity of the hazardous chemicals(s).
B. Appropriate hazard warnings.
C. Name and address of the manufacturer or distributor.

Incoming containers shall be checked on delivery and refused if not properly labeled. RMR personnel shall not remove or deface labels on incoming containers. Employees must report missing labels to their supervisor, who shall have the chemical set aside until the label is replaced.

An employee who transfers a hazardous material into an unlabeled portable container must properly label that container. Labeling is not required, however, if the material transferred is intended only for the immediate use of the employee performing the transfer. The Yard Clerk is responsible for maintaining a stock of appropriate labeling material.

For situations where labeling is impractical such as material in pipelines, materials generated during workplace operations (such as dust or welding fumes) and bulk storage of materials, the Area Supervisor will determine an appropriate means to convey information to employees. This may involve posting signs next to storage piles or bins, color coding pipes, and placing signs or placards in work areas where fumes or dusts are generated.

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The Plant Manager or Supervisor shall, within three months of becoming newly aware of any significant information regarding the hazards of a chemical, ensure that labels of any stock of that chemical on site are revised accordingly.

IV. MATERIAL SAFETY DATA SHEETS

Material Safety Data (MSD) Sheets will be maintained on file for all hazardous chemicals on site EXCEPT for consumer products whose use does not greatly exceed those of a normal consumer and are used as intended by the manufacturer. As an example, dishwashing liquid used to wash coffee cups would not require an MSDS on file.

The following are intended to ensure that Material Safety Data (MSD) Sheets are on hand for hazardous chemicals on site. Provisions do not apply to consumer products in regular use as described above.

A. The Yard Clerk shall review all purchase orders for chemicals of a potentially hazardous nature and request MSD Sheets when appropriate.

B. The Yard Clerk shall verify upon delivery of potentially hazardous chemicals that an MSD Sheet is on file or is included with the shipment. If an MSD Sheet is not on hand, the chemical shall be set aside until an MSD Sheet is obtained.

C. RMR personnel who make direct purchases at hardware stores, supply houses, or like retail "cash and carry" establishments shall obtain MSD Sheets from the retailer for any potentially hazardous chemicals to be used at work.

D. The Plant Manager or Supervisor shall perform an annual audit to ensure that MSD Sheets are on hand for all hazardous chemicals on site.

The Yard Clerk is responsible for maintaining the MSD Sheet file so that it is accessible to employees during each workshift.

V. HAZARDOUS MATERIALS INVENTORY

The Plant Manager shall maintain a list of the hazardous chemicals on site using the Materials Inventory form attached to this section as Appendix A. Consumer products in regular use are exempted. The list may be compiled for the workplace as a whole or for separate work areas. This inventory shall be updated at least annually.

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VI. EMPLOYEE INFORMATION AND TRAINING

Compliance with the information and training requirements outlined in Paragraph (h) of the Hazard Communication Standard is the responsibility of the Plant Manager. Employees shall receive effective information and training on hazardous chemicals in their work area at the time of their initial assignment and as new health hazards are introduced. Retraining will be done annually.

Employees shall be informed of:

A. The requirements of OSHA's Hazard Communication Standard.
B. The presence of any hazardous chemicals in their work area.
C. The location and availability of this written program, the hazardous chemicals list, and the MSD sheets.

Employee training shall include at least:

A. How to detect the presence or release of a hazardous chemical in the workplace (such as with monitoring devices, by visual appearance or odor, etc.).

B. Physical and health hazards of chemicals in the work area.

C. Measures employees can take to protect themselves from these hazards (such as work practices, emergency procedures, personal protective equipment, etc.).

D. Details of this written program, including an explanation of the labeling system and the MSD Sheet, and how to obtain and use the appropriate hazard information.

VII. TRAINING CERTIFICATION

For new employees, training certification is through sign-off of the New Employee Orientation Checklist. For annual retraining or training required by the introduction of a new hazardous chemical, safety meeting minutes with attendance lists will certify that the training was provided.

VIII. NONROUTINE TASKS

When employees are to be assigned nonroutine tasks which expose them to material hazards for which they have not previously been trained, the Plant or General Manager shall schedule a safety meeting to provide the necessary training. This meeting will be documented with minutes and an attendance list.

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IX. CHEMICALS IN UNLABELED PIPES

Whenever possible, pipes containing potentially hazardous chemicals (such as nitrogen, oxygen, fuel oil, etc.) shall be clearly labeled, color coded, or otherwise made recognizable to employees working in the area. When this kind of pipe identification is not feasible, employees will receive familiarity training in the location and contents of any such pipes in their work area. This training shall be done along with an employee's initial orientation and with annual retraining, and whenever piping changes dictate.

X. INDEPENDENT CONTRACTORS

The "Notice to Contractors," which is attached to this section as Appendix B, outlines the provisions for compliance with Paragraph (e)(2) of the Hazard Communication Standard. A copy of this notice shall be given to the supervisor of any independent contractor crew which potentially could be exposed to the hazardous materials on the RMR site. The contractor must sign the certification section of the notice indicating that any relevant hazards information was received, and return it to the Yard Clerk before commencing work on site. Certifications will be maintained on file by the Yard Clerk. The appropriate RMR supervisory personnel shall review any pending work on site by independent contractors to gauge potential hazard exposure and provide information accordingly.

XI. RULES FOR DISTRICT OFFICES

A. The office will obtain an MSDS from each shipper for each grade of material supplied to us. Our written requests, along with the MSDS's obtained, will be maintained on file at the office.

B. The office will supply an MSDS with the first load of each grade of material sold to each customer. For subsequent shipments, no MSDS need be sent except at the customer's request. Our transmittal cover letters, along with copies of the MSDS's sent, will be maintained on file at the office.

C. The office will attach a supply of hazard warning labels to the shipping documents for the use of the customer. This need be done for initial shipments only. Copies of hazard warning labels sent to each customer will be maintained on file at the office.

APPENDIX A

MATERIALS INVENTORY

COMMON NAME OF SUBSTANCE	OTHER NAMES (CHEMICAL NAME, TRADE NAME, ETC.)	STORAGE AREA(S)	AVERAGE AMOUNTS STORED	WORK AREA(S) WHERE USED OR GENERATED

APPENDIX B

NOTICE OF CONTRACTORS

Certain operations conducted on River Metals Recycling, LLC premises involve exposure or potential exposure to materials considered "hazardous" under various laws and regulations. To protect our employees against possible health hazards from such exposures, the Company has developed an extensive employee information program designed to teach employees about potential workplace hazards, and methods for protecting themselves against these potential hazards.

The major components of this program are:

- Hazard labels or other warning methods, in particular, work areas.
- Material Safety Data Sheets (MSDS) for potentially hazardous substances used or present in the workplace.

The Company also seeks to protect the health and safety of any visitors or other non-employed individuals entering the Company's premises. To help achieve this objective, prior to commencing work on Company property, each Contractor is advised of any potentially hazardous materials to which said Contractor's employees may be exposed in the course of their work on the premises. This information may include any or all of the following, as appropriate and relevant to the work being performed:

A. A list of the potentially hazardous substances which may be present in areas where work is to be performed.

B. A description of the labels or other methods used to warn of the potential hazards in a particular work area.

C. Copies of Material Safety Data Sheets (MSDS) pertaining to substances in the work area, describing potential hazards and appropriate protective measures.

Each contractor provided this information must inform its employees of relevant hazard information, and ensure that necessary or recommended protective measures are observed.

Likewise, the Company requires each Contractor performing work on the premises to inform Company personnel of any potentially hazardous materials or exposures which will be present in the workplace during the Contractor's operations. This information will be used where appropriate to train Company employees, and prescribe appropriate protective measures.

IT IS A CONDITION OF THIS CONTRACT THAT WORK WILL BE PERFORMED IN ACCORDANCE WITH COMPANY PROCEDURES AND REQUIREMENTS OF THE FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT AND RELEVANT STATE OR LOCAL LAWS.

CERTIFICATION

I hereby certify that I have reviewed this document, that I have received from the Company information relevant to the potential hazards in the work area where our operations will be performed, and that employees who will perform this work have received appropriate training. _____ certifies that work will be performed in accordance with OSHA requirements and state and local law.

Further, I hereby certify that no hazardous substances will be used or generated during the performance of this Contract except the following:

I agree to provide the Company with an appropriate Material Safety Data Sheet for each of the substances listed above, prior to beginning work.

SIGNATURE _____

NAME _____

TITLE _____

DATE _____

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SECTION 1.11
PERSONAL PROTECTIVE EQUIPMENT POLICY

I. INTRODUCTION

This policy specifies compliance with 29 CFR 1910.132, 133, 135, 136, and 138, which contain OSHA's standards for Personal Protection Equipment (PPE). A separate policy addressing respiratory protection, which is the subject of 29 CFR 1910.134, is contained in Section 1.7 of this manual.

II. STANDARD PPE

Listed below is the standard PPE required in all RMR facilities. Standard PPE requirements are set and periodically reviewed by Corporate Safety & Environmental staff.

A. Footwear

Steel-toed safety shoes must be worn by employees at all times while in the plant. Safety footwear must meet ANSI Z41.1-1991 requirements, and must be maintained in good condition by the employee.

B. Eye and Face Protection

Safety glasses with side shields must be worn by employees at all times while in the plant. Detachable side shields are permitted. Goggles, full-face shields, or other suitable eye and face protection will be provided for employees as needed for welding, grinding, handling of hazardous chemicals, or other operations posing hazards to the face and eyes.

C. Hard Hats

Hard hats must be worn by employees at all times while in the plant. Hard hats must meet ANSI Z89.1-1986 requirements.

D. Hand Protection

Appropriate gloves must be worn by employees to protect against cuts, abrasions, and chemical or thermal burns as needed for specific tasks posing these types of hazards to the hands.

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III. HAZARD ASSESSMENT AND EQUIPMENT SELECTION

The Plant Manager or area supervisors shall perform a hazard assessment, by workplace and operation, to evaluate hazards present. If protection given by an employee's standard PPE (hard hat, safety glasses, safety shoes) is not adequate, the Plant Manager or area supervisor shall:

1. Select and provide appropriate additional PPE.
2. Communicate selection decisions to each affected employee.
3. Ensure that the PPE fits each employee properly.

Employees are responsible for bringing damaged or defective PPE to the attention of a supervisor so that it may be repaired or replaced.

Appendix A of this section must be completed to verify that hazard assessments have been performed. New hazard assessments shall be performed when operations change substantially, requiring a re-evaluation of the appropriateness of PPE in use.

IV. EMPLOYEE TRAINING

Training shall be provided to each employee on the PPE they must use. The training will include:

1. When PPE is necessary.
2. What PPE is necessary.
3. How to don, doff, adjust, and wear the PPE.
4. Limitations of the PPE.
5. Proper care, maintenance, useful life, and disposal of the PPE.

Retraining is required when changes in PPE or in the workplace render previous training obsolete, or when an employee fails to demonstrate knowledge or use of PPE.

Safety meeting minutes and the new employee orientation checklist shall be used to document employees' PPE training and retraining.

APPENDIX A

RIVER METALS RECYCLING, LLC
HAZARD ASSESSMENT CERTIFICATION
_____ YARD

In accordance with 29 CFR 1910.132(d), a hazard assessment has been performed for the operation listed below. Based on this assessment, Personal Protective Equipment (PPE) has been provided to affected employees. Decisions concerning PPE selection have been communicated to affected employees, and their use of the PPE is enforced. PPE has been selected to properly fit each affected employee.

Date _____ By (Evaluator) _____

Workplace _____ Activity _____

Description of Hazard	Protective Equipment Required (Check All That Apply)								
	Hard Hat	Steel-Toed Safety Shoes	Safety Glasses	Goggles	Welding Goggles/ Face Shield	Gloves	Back Brace	Ear Plugs	Other (Describe Below)

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SECTION 1.12
HEARING CONSERVATION PROGRAM

I. INTRODUCTION

This policy specifies compliance with 29 CFR 1910.95, which contains OSHA's occupational noise exposure standard. All plant employees with occupational noise exposures at or above 85 decibels as an 8-hour time-weighted average are covered by the provisions of the policy.

II. NOISE EXPOSURE MONITORING

Employees must be monitored to determine their level of noise exposure on the job. If more than one employee performs similar tasks with roughly equivalent noise exposure, only representative employees need be tested.

We must retest when operation changes or new equipment may have changed employee noise exposures. Otherwise, original monitoring results can be used indefinitely.

Dosimeters are available on request from Safety & Environmental Services and are calibrated by staff. A form is attached to this policy for recording the results of dosimeter surveys. Results must be kept on file at the plant for as long as they apply.

Results of the noise survey must be shared with employees with exposure at or above 85 decibels on a time-weighted average. Notification may be individual or in a safety meeting.

III. AUDIOMETRIC TESTING

All employees in the Hearing Conservation Program will be offered audiometric tests at no cost. Testing must be done within six months of hire or first exposure to high noise levels, and thereafter annually.

We must notify employees to avoid high noise levels for at least 14 hours before testing.

Audiometric test records must be maintained on file permanently, together with noise exposure data.

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IV. STANDARD THRESHOLD SHIFT

After each test, an employee's audiogram is compared against baseline data. A Standard Threshold Shift (STS) has occurred if hearing threshold in either or both ears has risen an average of 10 dB at 2000, 3000 and 4000 Hertz compared to baseline.

If an STS is detected, we must notify the employee affected in writing within 21 days and retest within 30 days. If the STS is not confirmed by the retest, the retest results replace those of the first test and no further action is required. If the STS is confirmed by the retest, and unless a physician determines the STS is not work related, we will:

1. Provide the employee with hearing protectors, and require that they be used (or retrain if the employee has been using hearing protectors).

2. Refer the employee for further testing or medical attention, if appropriate.

Regardless of the results of the retest, we will share them with the employee.

V. OSHA RECORDABILITY OF AN STS

If an STS is 25 dB or greater, it must be recorded on the OSHA 200 Form as an occupational illness. We need to classify it on the Form 200 as "disorders associated with repeated trauma." This must be recorded within six days of receipt of the affected employee's audiogram.

If follow-up testing shows a shift of less than 25 dB, the Form 200 entry can be lined out.

VI. HEARING PROTECTION

We will provide a choice of at least two kinds of hearing protectors to employees in the Hearing Conservation Program. Offering two different styles of ear plugs satisfies this requirement.

Use of hearing protection will be mandatory in areas with high noise exposure, as defined by the Plant Manager and our dosimetric testing.

VII. EMPLOYEE TRAINING

All employees will receive annual training on provisions of the Company's Hearing Conservation Program. Training also will include:

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1. The effects of noise on hearing.

2. The purpose of hearing protectors, the advantages/disadvantages and attenuation of various types, and instructions on selection, fitting, use, and care.

3. The purpose of audiometric testing, and an explanation of the test procedures.

Document training in the safety meeting minutes and, for new employees, on the New Employee Orientation Checklist. Audiometric testing companies may provide annual training, as long as all of the above items are addressed.

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River Metals Recycling, LLC
Audio Dosimeter Noise Survey

Location_____

Supervised by_____

Note: Instructions for use are included with dosimeter. Column headings correspond to information displayed by dosimeter in the order it appears. See dosimeter instructions for additional details. Record information in nonshaded columns only.

Unit_____ Calibr. Date_____ By_____ Cal Value_____

		Data Read From Dosimeter										
Employee Name/ Date	Job Description	Dose (%) (STL)	Avg dB (STL)	Dose (%) (ACL)	Avg dB (ACL)	Sound Level	Sound Lvl Max	Lmax Time	Fast Lmax	8 Hr Dose	Time >115dB	Time Elapsed

Note: The "Data Read From Dosimeter" listed on this form is in order of appearance after Standby mode.

For use with Ametek MK-2 or MK-3 dosimeter.

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SECTION 1.13
ACCIDENT/INCIDENT REPORTING AND RECORDKEEPING

1. PURPOSE

This policy supplements the "Procedures for Employees Injured on the Job" contained in our Administrative Guidelines For Operations.

2. ACCIDENT/INCIDENT DEFINITIONS

An "accident" is an employee injury, property damage event, or environmental release that results in an invoice to be paid. Some examples are:

A. An employee's back strain resulting in medical treatment.
B. Damage to a customer's truck by our forklift.
C. A fuel spill requiring cleanup by an emergency response contractor.

An "incident" is an employee injury, property damage event, or environmental release, or a "near miss," that does not result in an invoice to be paid. Some examples are:

A. A minor cut or bruise treated with first aid materials on site and requiring no further treatment.

B. Denting of the hood on our service truck by falling materials which we push back into shape ourselves, generating no invoice.

C. A steel plate dropping from a platform to the ground below, narrowly missing an employee working nearby.

D. Minor oil spillage that we clean up ourselves, at no cost.

3. ACCIDENT/INCIDENT INVESTIGATION

All accidents and incidents will be investigated by the Core Team (if one is in place) or the facility manager. A standard investigation form must be used. The form has been distributed to all Company sites as a Microsoft Word Template. When completed, personnel accident reports are distributed via e-mail as outlined in "Procedures for Employees Injured on the Job." All other accident and incident reports, except for flat tire reports, must be e-mailed to Scott McAlpine in Safety & Environmental Services. A hard copy of the report must be signed by the facility manager and filed on site.

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4. PERSONNEL ACCIDENT LOG

Accidents that result in an employee injury will be entered on the Personnel Accident Log. A copy of this log has been distributed electronically to all sites.

Please note that the Personnel Accident Log will include entries for all OSHA recordable accidents, as well as others which generated an invoice but do not meet OSHA reporting requirements. Remember to e-mail this log to Corporate Safety & Environmental Services at the close of each quarter.

Also attached are column-by-column instructions for entering information in the Personnel Accident Log.

5. ACCIDENT/INCIDENT NUMBERING

Each accident and incident will be numbered. The form of the numbers is YRXXX, where:

- YR – the last two digits of the year (99 for 1999)
- XXX – the number from the appropriate accident or incident log (001 for the first entry, etc.)

This number should appear on the investigation form, and, in the case of OSHA-recordable accidents, on OSHA's Form 200.

6. TEMPORARY EMPLOYEES

Accidents and incidents involving temporary agency employees will be logged and investigated as we do for those involving RMR employees.

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DESCRIPTION OF PERSONNEL ACCIDENT LOG

CASE # - Sequential number used to assign the case number to each accident as it occurs in the yard. This number is preceded by the last two digits of the current year when referenced in the First Report of Injury and on the RMR Investigation Report form.

ACCIDENT DATE - The date on which the accident occurred. If the accident was reported late, the original accident occurrence date should be used in this field.

DATE REPORTED - The date on which the accident was reported.

LOST TIME – A yes or no answer whether the accident resulted in lost time. Following are general rules for determining whether an accident involved lost time:

- Do not count lost time for the day of the injury or the day an employee returns to work.
- Count time for weekends or holidays only if the employee was scheduled to work these days, either as regular shift work or as scheduled overtime.
- Do not count time spent by the employee for follow-up medical treatment such as physical therapy.

EMPLOYEE NAME - The injured employee's name as it appears on payroll records and the RMR Investigation Report form.

ACCIDENT DESCRIPTION - A brief description of the accident.

DRUG TEST - A yes or no answer whether a drug test was administered as part of our post-accident drug testing policy. If no is indicated, please indicate the management person (CJB or MST) who waived this requirement.

BODY PART - This is the body part affected by the accident and should correspond to one of the following categories: eyes, head/neck, chest, back, pelvis, arms, legs, hands, feet, and shoulders.

INJURY TYPE - Falls into one of the following categories: contusion, burn, cut, crush, strain, fracture, other.

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SECTION 1.14
FORKLIFT OPERATOR CERTIFICATION

I. PURPOSE

This section contains requirements for the training and certification of the operators of forklifts at Company facilities.

The certification process is intended to ensure that operators are aware of potential hazards they may encounter, and that they know and follow safe operating practices. This is important in limiting the possibility of accidents leading to the injury of the operator or others in the plant.

II. CERTIFICATION REQUIREMENTS

Any employee who operates a powered industrial truck (forklift) must be trained and certified before operating equipment on the job. Training will be in three general areas:

1. Equipment Related: Features, performance characteristics, limitations and general safety rules for the specific equipment to be operated.

2. Workplace Related: Conditions and hazards present in the area(s) where the equipment will be operated.

3. Policy: Contents and purpose of this policy.

The Operator Certification form attached to this policy for forklifts (Sheet A) lists specific training topics to be covered.

III. METHOD OF TRAINING

Training will consist of both classroom (lecture and/or videotape) and practical (demonstration and trainee exercise/practice) instruction. Before being certified, trainees may operate equipment only with direct supervision of the instructor and in an area away from other employees where the trainee may operate the equipment safely.

IV. AVOIDANCE OF REPETITIVE TRAINING

Repetitive training may be waived for operators who have been trained previously in any of the equipment or workplace topics listed on the certification sheets. The

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operator still must demonstrate competency in operation of the equipment and be certified even if part or all of the training has been waived.

V. RETRAINING

Safe practices for operating forklifts will be the subject of an annual safety meeting. Operator certifications are in effect indefinitely, but operator performance must be evaluated at least every three years by the Plant Manager or other designated person. Retraining will be conducted as the result of unsafe operation, an accident or near miss, or based on poor performance during reevaluation.

RIVER METALS RECYCLING, LLC
SECTION 1.14 - SHEET A
FORKLIFT OPERATOR CERTIFICATION

OPERATOR: _____

REEVALUATION

BY _____ DATE _____
BY _____ DATE _____
BY _____ DATE _____
BY _____ DATE _____

FORKLIFT(S) TO OPERATE: _____ _____ _____ _____

TRAINING TOPIC	DATE TRAINED	INSTRUCTOR INITIAL	CHECK (√) IF WAIVED
EQUIPMENT RELATED			
Operating Instructions, Precautions & Limitations			
Difference Between Forklifts & Automobiles			
Location & Function of Controls & Instrumentation			
Engine Operation & Maintenance			
Steering & Maneuvering			
Visibility, With Restrictions Due to Loading			
Fork & Attachment Operation & Use Limitations			
Vehicle Load Capacity, Load Center & Stability			
Vehicle Inspection/Maintenance/Refueling/Recharging			
General Safety Rules & Operating Limitations			
WORKPLACE RELATED			
Surface Conditions in Operating Area			
Probable Loads & Their Stability			
Load Manipulation, Stacking & Unstacking			
Pedestrian & Vehicular Traffic Issues			
Narrow Aisles & Other Areas of Restricted Operation			
Operation on Ramps, Railroad Tracks & Other Surfaces that Affect Stability			
Operation in Enclosed Areas Which Could Allow the Buildup of Engine Fumes or Carbon Monoxide			
Other Workplace Hazards			
POLICY			
Purpose & Contents of the Policy			

The employee has received the training indicated above and has demonstrated proficiency to me.

_____ INSTRUCTOR SIGNATURE

_____ DATE

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SECTION 2.1
ENVIRONMENTAL PROGRAM

It is the full intent of River Metals Recycling, LLC to provide all employees with the proper techniques and facilities, within the guidelines of state and federal law, to protect the environment through a strong and comprehensive environmental protection program. Long-term environmental liabilities resulting from the Company's presence in a community can only be prevented or minimized by the full observance and cooperation of all employees.

We recognize the responsibilities for the protection of the environment are shared:

- The employer is responsible for the leadership of this program, for its effectiveness and improvement, and for providing the safeguards required to ensure environmental protection.

- Managers and supervisors are responsible for developing the proper attitudes toward the environment in themselves and in their subordinates, and for ensuring that all operations are performed in an environmentally conscious manner by all personnel involved.

- The employees are responsible for adherence to the program including complying with all rules and regulations, and performing their duties in an environmentally conscious manner at all times.

Our Environmental Protection Program includes the following:

- Establishing environmentally sound practices and procedures.

- Conducting a program of environmental inspections to identify and remove conditions and practices which threaten the environment.

- Training all employees in environmentally sound practices.

- Developing and enforcing environmental rules and standards and requiring that all employees adhere to these rules and standards as a condition of employment.

- Investigating, promptly and thoroughly, every environmental incident to determine its cause and correct the deficiency so there is no recurrence.

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SECTION 2.2
RESPONSIBILITIES FOR ENVIRONMENTAL PROGRAM

Corporate Safety & Environmental Staff Is Responsible For:

All environmental policies, procedures, and review of the Company's plant performance on the details of the Company's Environmental Program, including:

A. Making periodic environmental inspections at all facilities.

B. Ensuring regulations are monitored and implemented.

C. Making applicable EPA requirements available to the plants in a written, but generalized, form.

D. Maintaining a log of all permits held by the Company for its facilities. Monitoring to be sure that all general and specific permit conditions are met.

E. Establishing and monitoring standards for discharges to the air, water, and land at Company facilities to ensure compliance with local, state, and federal regulations, as well as to minimize the liability of the Company.

F. Making periodic test of appropriate waste streams for proper classification and disposal.

G. Completing necessary permit applications to ensure operation of facility in compliance with local, state, and federal regulations.

H. Reviewing and approving corrective actions taken resulting from notices of deficiencies and violations received from local, state, or federal agencies.

I. Personally investigating serious environmental incidences.

Divisional Management Is Responsible for:

A. Monitoring environmental compliance on all visits to the facilities.

B. Recommending changes to the environmental rules or the environmental policy.

C. Ensuring necessary recordkeeping procedures are adequate at each plant.

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Plant/Operations Manager Is Responsible For:

A. Enforcing all environmental rules and regulations.

B. Monitoring and personally being involved in the Continuous Improvement Process.

C. Adopting a facility-wide inspection program and participating in monthly environmental inspections.

D. Holding the necessary meetings in order to properly convey to all employees the importance of the environmental program, and training all employees in the environmental rules and regulations adopted under the program.

E. Being personally involved in the investigation of all environmental incidents and reporting same to Divisional and Corporate staff.

F. Requiring a thorough inspection by maintenance and production personnel before equipment is placed into operation to ensure operation will not harm environment.

All Employees Are Responsible For:

A. Participating actively as members of Continuous Improvement Functional Teams:

1. Identifying environmental deficiencies in the workplace, reporting them, and working with the team to develop solutions and fix the deficiencies.

2. Leading team meetings on a rotating basis.

B. Participating actively as members of Continuous Improvement Core Teams (on a rotating basis):

1. Investigating workplace accidents and incidents and identifying and solving environmental deficiencies that contributed.

2. Leading core team activities on a rotating basis.

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SECTION 2.3
ENVIRONMENTAL PROGRAM - STANDARDS

I. Meetings should be held on an as-needed basis in order to provide the training of all employees concerning our environmental policy and program. Visual and/or practical demonstrations and discussions will be conducted. Minutes of these meetings will be maintained at the facility. These meetings should be scheduled to include all personnel. Other meetings may be held on an individual department basis as needed. Attendance at these meetings is mandatory.

Continuous Improvement Functional Team meetings will be held at least once per month, as described in Section 1.3 of this manual. Environmental issues and deficiencies will be addressed in these meetings as needed.

II. In order to properly respond to an environmental incident as it occurs, an effort is directed to training one person per shift in the details of the environmental program, special environmental programs, and permit conditions as they relate to the facility. A list of emergency phone numbers including corporate, division, and facility staff, as well as EPA hot line numbers should be posted in the office area.

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SECTION 2.4
GENERAL ENVIRONMENTAL RULES

A. All Company facilities must have a valid and up-to-date Spill Prevention, Control & Countermeasure Plan (SPCC) as determined by state regulation and the Corporate Safety & Environmental staff.

B. All spills will be cleaned up promptly in accordance with the SPCC Plan.

C. Radioactive scrap will not be accepted in the yard.

D. Significant quantities of shredder fluff will not be stored in the yard for prolonged periods of time without taking proper precautions to prevent releases.

E. No process water will be discharged from wet systems or scrubber pits.

F. Leaking hydraulic equipment will be repaired promptly.

G. Pollution control equipment will be properly maintained to reduce emissions.

H. Input specifications for purchasing material to shred will be strictly followed.

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SECTION 2.5
RULES FOR WASTE DISPOSAL

A. All wastes and by-products generated by Company facilities shall be tested in a manner to determine their proper status as a solid waste. The by-products, or waste material, shall be tested in accordance with EPA-approved procedures at a laboratory approved by the Corporate Safety & Environmental staff.

B. All Company wastes and by-products shall be tested for the presence of PCBs. No Company facility shall generate a waste with a PCB content in excess of 50 PPM.

C. No Company waste will be sent for disposal to a facility that has not been approved by the Director of Safety & Environmental Services.

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SECTION 2.6
RULES FOR USED OIL MANAGEMENT

It is the full intent of River Metals Recycling, LLC to control the potential hazards involved in used oil activities following the management standards as set forth by the EPA codified at Part 279 of Title 40 of the Code of Federal Regulations (CFR).

Used oil is defined as any oil that has been refined from crude oil, or any synthetic oil, that has been used, and as a result of such use, is contaminated by physical or chemical impurities. This includes those oils used as lubricants, coolants, emulsions, or for similar uses; not included are petroleum based solvents and used oil residues resulting from storage, processing, or refining of used oils which must be tested for hazardous waste characteristics and handled accordingly.

USED OIL GENERATOR REQUIREMENTS

A generator is defined as any person, by site, whose act or process produces used oil or whose act first causes used oil to become subject to regulation.

I. MANAGEMENT STANDARDS FOR GENERATORS

The following four basic requirements apply to all generators regardless of the quantity generated and regardless of whether the used oil is sent for recycling or disposal:

1. STORAGE - All storage tanks and containers must be kept in good condition and free from leaks upon visual inspection.

2. LABELING - All storage tanks and containers must have a "used oil" label affixed to them.

3. SPILL RESPONSE - Any spill or leak of used oil to the environment must be cleaned up immediately. Releases of used oil must be stopped, contained, and cleaned up and the materials used for cleanup must be properly managed. Tanks and containers that release used oil must be repaired or replaced before being returned to service.

4. TRANSPORTATION - Only use a transporter with an EPA identification (ID) number when used oil is shipped off site.

II. PCB-CONTAMINATED USED OILS

Those oils which are suspected to contain PCBs are to be kept separate from other used oils. Oils contaminated with PCBs are regulated under the Toxic Substances Control Act (TSCA) and have different requirements. Contact the Corporate Safety & Environmental group for assistance with any oils suspected to contain PCBs.

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III. USED OIL TRANSPORTED FOR BURNING FROM USED OIL GENERATOR

The following requirements must be satisfied when used oil is directed to a facility for burning:

1. Only ship to a burner having an EPA ID number.

2. Maintain records of all shipments for three years; records should include the burner's EPA ID and the quantity shipped. Records can take the form of a log, manifest, bill of lading, or other shipping document.

3. Obtain a one-time notice from the burner that the EPA has been notified of the burning for the first shipment of used oil shipped to the burner.

GENERAL OPERATING PRACTICES

All motor blocks, turnings, borings, and similar oily filmed scrap metal should be stored on an impervious surface. Provisions should be made to capture the residual oil that accumulates on this surface and deposit it in the used oil tank.

Used oil is not to be mixed with characteristic or listed hazardous wastes.

Used oil is not to be mixed with solid wastes.

Oil from oil/water separators is considered used oil and subject to the guidelines for used oil management.

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SECTION 2.7
CFC-CONTAINING MATERIAL POLICY

I. PURPOSE

The purpose of this policy is to comply with the Clean Air Act in its effort to reduce emissions of Class I and Class II refrigerants. Class I and Class II refrigerants are those which contain chlorofluorocarbons (CFCs). CFCs are chemicals in refrigerants and solvents which have been linked by the Environmental Protection Agency (EPA) to the depletion of the Earth's ozone layer. Release of Class I or Class II refrigerants is strictly prohibited.

CFCs are found in, but not limited to, the following appliances: household refrigerators, dehumidifiers, vending machines, ice makers, water coolers, residential and commercial air conditioners, heat pumps, transport refrigeration, and motor vehicle air conditioners (MVACs). Insulation and foam materials manufactured with the use of CFCs are not currently regulated.

II. SCOPE

This policy does not apply to automobiles nor appliances that have been crushed or flattened.

III. COMPLIANCE ALTERNATIVES

Facilities may either 1) use supplier verification that CFCs have been removed, or 2) remove the CFCs on site. The procedures for each of these methods is described below. However, for facilities that use verification as its compliance method, inspecting of appliances for CFCs should not occur.

A. SUPPLIER VERIFICATION THAT CFCS HAVE BEEN REMOVED

EPA requirements allow a facility to rely in good faith on a supplier's verification that CFCs have been properly removed from an appliance. This can be done either on a load-by-load basis, or a longer term agreement as described below. The following guidelines are to be followed for documenting the status of CFC charges in appliances:

1. Contract Verification - Appliances purchased on contract must have declaration in the contract verifying the existence or removal of all CFCs which have not leaked previously. Verification of the contract declaration must occur when the material is at the weighmaster's station. Sample verification language is in Appendix A.

2. Weight Ticket Verification - Suppliers delivering uncrushed appliances and semicrushed or uncrushed auto bodies for processing must declare whether CFCs which have not leaked previously have been removed according to EPA regulations. The gross weight tickets will be imprinted/stamped and signed by

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the supplier on back with language contained in Appendix A. This signed gross weight ticket must be retained for three (3) years. Final weight ticket should be retained in accordance with the current Yard Retention Schedule.

3. Bulk Hauler Verification - Regular suppliers of uncrushed appliances and semicrushed or uncrushed automobiles may submit the release form in Appendix B verifying that CFCs which have not leaked previously from MVACs were removed according to EPA regulations prior to crushing. This release should be re-verified annually. Otherwise these suppliers must sign the Appendix A certification for each load delivered.

B. FACILITIES REMOVING CFCS

Do not shred any appliances known to have their refrigerant charge intact. Materials purchased from suppliers which have not had CFCs removed previously must have the CFCs removed prior to processing according to the following regulatory requirements:

1. Any facility choosing to remove CFCs from appliances or MVACs must purchase recovery/recycling equipment that meets both of the following efficiency standards:

   A. Equipment used to evacuate refrigerant from MVACs must be capable of reducing the system pressure to 102 mm of mercury vacuum under the conditions set forth in 40 CFR Part 82, Appendix A.

   B. Equipment used to evacuate refrigerant from small appliances must be capable of evacuating the system to four inches of vacuum or removing 90% of the refrigerant when the appliance compressor is operating or removing 80% of the refrigerant when the appliance compressor is inoperable.

2. Any facility choosing to recover CFCs must complete the registration form and submit it to the appropriate address listed in Appendix C.

3. Any refrigerant removed from an appliance must be sent to a reclamation facility for purification prior to reintroduction into the servicing sector.

   In order for refrigerants to maintain any market value, the different types must be segregated. Most household appliances and MVACs are charged with R12 refrigerant. Most industrial air conditioners are charged with R22. Recovery/recycling equipment should be equipped with storage tanks for at least two types of refrigerant.

APPENDIX A

CFC REMOVAL VERIFICATION

BY SHIPMENT/ITEM

In consideration of purchase of this material, seller certifies that to the best of his knowledge, all refrigerant (including, but not limited to, chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), as defined in Paragraph 608 of the Clean Air Act and 40 CFR Part 82) - - [Check One]

☐ that had not leaked previously has been recovered from the appliance or shipment of appliances delivered under this sale. The refrigerant has been removed by:

Name _____
Address _____
Date of Removal _____

☐ has leaked previously from the appliance or shipment of appliances delivered under this sale.

☐ has never contained refrigerants.

_____ SIGNATURE

_____ DATE

BY CONTRACT

In consideration or purchase of this material, seller certifies that to the best of his knowledge, the appliances to be delivered under this contract of sale do not contain any refrigerants including, but not limited to, chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), as defined in Paragraph 608 of the Clean Air Act and 40 CFR Part 82. Seller further agrees to indemnify and hold River Metals Recycling, LLC harmless from any claim, penalty, fine, fee, cost, attorney's fees, or other liability resulting in whole or in part from seller's breach of this certification.

APPENDIX B

BULK AUTOMOBILE/APPLIANCE HAULER
VERIFICATION OF CFC REMOVAL

The Environmental Protection Agency (EPA) has enacted restrictions on the release of chlorofluorocarbons (CFCs) to the atmosphere. CFCs are chemicals that have been linked to the depletion of the Earth's ozone layer.

By signing this release form, _____ (Company Name) is verifying that all CFCs have been removed according to EPA guidelines from all uncrushed or semicrushed motor vehicle air conditioning units and appliances accepted for processing, thereby relieving River Metals Recycling, LLC from the removal requirements. Also, _____ (Company Name) has in its possession the proper documentation with the name and address of the person who removed the CFCs and the date on which removal occurred.

_____ _____

Signature of Authorized Representative Date

_____

Name & Title (Please Print)

APPENDIX C

REGISTRATION FORM FOR INDIVIDUALS RECOVERING CFCS

1. FACILITY INFORMATION

Company Name

Street

City | State | Zip Code

Phone Number | County

2. Facility is a scrap recycler which routinely handles small appliances, refrigeration equipment, and air conditioning equipment.

3. REFRIGERANT RECOVERY EQUIPMENT

	Name of Recovery Device	Model #	Year	Serial #	Self-Contained Yes	Self-Contained No
1.						
2.						
3.						
4.						
5.						
6.						

4. I hereby certify that the facility in Part 1 has acquired the refrigerant recovery or recycling device(s) listed in Part 3, that the facility is complying with Section 608 of the Clean Air Act, and that the information given is true and correct.

SIGNATURE OF RESPONSIBLE OFFICER | DATE | NAME & TITLE (Please Print)

MAILING ADDRESSES FOR REGISTRATIONS

CT, ME, MA, NH, RI, VT

EPA REGION I
Mail Code APC
JFK Federal Building
One Congress Street
Boston, MA 02203

NY, NJ, PR, VI

EPA REGION II
Jacob K. Javits Federal Bldg.
26 Federal Plaza, Room 5000
New York, NY 10278

MD, DE, DC, PA, VA, WV

EPA REGION III
Mail Code 3AT21
841 Chestnut Building
Philadelphia, PA 19107

FL, KY, TN, AL, GA, NC, SC

EPA REGION IV
Mail Code APT-AE
345 Courtland Steet, NE
Atlanta, GA 30365

IL, IN, MI, MN, OH, WI

EPA REGION V
Mail Code AT 18J
77 W. Jackson Blvd.
Chicago, IL 60604-3507

LA, NM, OK, TX, AR

EPA REGION VI
Mail Code 6T-EC
First Interstate Tower
@ Fountain Place
1445 Ross Ave., Suite 1200
Dallas, TX 75202-2733

IA, KS, MO, NE

EPA REGION VII
Mail Code ARTX/ARBR
726 Minnesota Ave.
Kansas City, KS 66101

UT, CO, MT, ND, SD, WY

EPA REGION VIII
Mail Code 8AT-AP
999 18th Street, Suite 500
Denver, CO 80202

NV HI, CA, GU, AZ

EPA REGION IX
Mail Code A-3
75 Hawthore St.
San Francisco, CA 94106

AK, ID, OR, WA

EPA REGION X
Mail Code AT-062
1200 Sixth Ave.
Seattle, WA 98101

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SECTION 2.8
RIVER METALS RECYCLING, LLC
RADIOACTIVE MATERIAL POLICY

It is the policy of River Metals Recycling, LLC to protect our employees, facilities, customers, and the public from exposure to radioactive material. To this end, the Company has established the following procedure for handling radioactive material and has installed equipment to detect radioactive material. The Company will handle and dispose of discovered radioactive material in a manner which complies with local, state, and federal laws, and which will not expose the public to unsafe levels of radioactivity.

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RIVER METALS RECYCLING, LLC
RADIATION MONITORING PROCEDURES

I. RADIATION DETECTION EQUIPMENT OPERATING & RECORDKEEPING PROCEDURES

1. Monitor both inbound and outbound materials, including waste and by-products. This includes shredder residue.

2. Check stationary detectors daily with a check source. Follow the procedures outlined in "Daily Function Check Procedures" below.

3. Check handheld detectors monthly with a radioactive check source.

4. Calibrate stationary detectors in place semiannually and send handheld units for factory calibration annually.

5. Maintain a log of ALL function checking, calibrating, and alarm activity using the attached form, "Radioactive Alarm Log."

6. Have at least one individual per shift who is competent in the operation of the stationary and handheld monitoring equipment.

7. Maintain all stationary detector printouts on hand for three (3) months.

8. Maintain all Radiation Detection Incident Reports for three (3) years.

II. DAILY FUNCTION CHECK PROCEDURES

1. With the stationary detector unit operating, carry the check source slowly through the detector panels, passing midway between them.

2. Return to the control unit and verify that both detectors have alarmed.

3. If proper system function has been verified, reset the detector system and record test result in the "Radioactive Alarm Log."

4. If either or both detectors fail to alarm, notify Safety & Environmental Services immediately for guidance. Use handheld detector to scan inbound and outbound materials until stationary detector function has been restored. Record test result in the "Radioactive Alarm Log."

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III. POST-ALARM PROCEDURES

A. ALARM VERIFICATION AND VEHICLE SURVEY

When a vehicle has caused the stationary monitoring equipment to alarm, do the following and complete the Radiation Incident Form:

1. Remove the vehicle from the monitoring area and reset the alarm. Remonitor the vehicle (generally by backing through).

2. Repeat step 1 to monitor the vehicle a third time (generally by driving forward once again).

3. Move the vehicle to an isolated area.

4. Scan the driver and tractor/cab section of the truck using a handheld unit. Be sure to determine the ambient background levels for comparison. If the driver is the source, perhaps due to radioactive medical treatment, end the vehicle survey. Enter the incident on the Radioactive Alarm Log and complete the Radiation Detection Incident Report. No further action is needed.

5. Slowly scan the exterior surfaces of the vehicle with the handheld unit. Hold the detecting surface of the portable unit within 2 inches of the surface. Mark all surfaces where elevated levels of radioactivity are detected and note on a diagram of the vehicle the areas where radioactivity is detected and the levels found. Be sure to include surface contamination, welds, and dirt on the exterior of the vehicle. If at any time while approaching the load detected levels exceed **2.0 x 10°° mRem/hr (or 2000 uRem/hr)**, estimate the distance from load, discontinue the survey, and notify the Corporate Safety & Environmental staff or Division Management immediately.

6. After the exterior survey is complete and <u>WITHOUT</u> dumping the load, survey individual scrap starting with materials closest to the exterior of the vehicle. Note all detected levels on the vehicle diagram.

7. If the stationary detector alarmed on the first pass only and the handheld survey detects no elevated radiation levels, consider this a false alarm and accept the load. Otherwise consider this a confirmed radioactive load and see disposition instructions below.

8. Identify materials, containers, or equipment with detected levels of radioactivity. Notify Corporate Safety & Environmental staff or Division Management.

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B. DISPOSITION OF CONFIRMED RADIOACTIVE LOADS

In order to determine the disposition of the load, apply the following criteria: A **low-emitting load** is a load which the handheld meter registers less than 2 mRem per hour (equivalent to 2,000 uRem/hr = 2.00 + 3 uRem/hr) in the cab of the truck, and less than .25 mRem per hour at 10' (equivalent to 2.5×10^{-01} mRem/hr or 2.50 + 02 uRem/hr on the handheld meter).

1. Low-Emitting Loads for Which RMR Does Not have Title (FOB Shipping Point):

STEP 1 Follow all yard procedures to reject the load.

STEP 2 Notify the driver that you will seek shipping approval for his load, and that he/she must wait until approval is received. Complete the "Notice to Transporter" and have the driver sign it. Give the driver a copy.

STEP 3 Fill in information on the Shipment Approval form with help from the driver. [Note: If the shipper will not cooperate, gather as much information as possible from available sources. Fill out the "Notification of Radioactive Material" and fax it to the agency in lieu of the Shipment Approval form.] You should be able to fill out the "Description and Location" and "Destination and Transportation" sections. The "shipper" is the party who owns the freight.

STEP 4 Phone the agency to advise that the approval form is on its way via fax.

STEP 5 Fax the approval form to the agency.

STEP 6 The agency will fax the approval form back to you. If not received in 30 minutes, call to check status.

STEP 7 When received, give the approval form and a copy of the DOT-E 10656 packet to the driver.

STEP 8 Make a phone available to the driver, so that he may consult with his supervisor.

STEP 9 Complete Radiation Incident Report and fax or e-mail to the Corporate Safety & Environmental staff.

2. Low-Emitting Loads for Which RMR Has Title (FOB Shipping Point):

STEP 1 Provide an isolated area to unload the contaminated material.

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STEP 2 Resurvey the load using the handheld radiation detector while the load is spread on the ground, recording all deviations above background.

STEP 3 Complete RMR Radiation Incident Report form and fax to Corporate Safety & Environmental staff. Await instructions for disposal of material.

STEP 4 Notify State Radiation Control Agency.

STEP 5 Notify shipper through District Office, Division Management, or Corporate Safety & Environmental staff.

3. **All High-Emitting Loads:**

STEP 1 Provide an isolated area for temporary storage for the load.

STEP 2 Complete RMR Radiation Incident Report form and fax it to the Corporate Safety & Environmental staff immediately.

STEP 3 Notify shipper that the load has been rejected and is isolated pending notification to the State Regulatory Agency.

STEP 4 Complete D.O.T. Shipment Approval Form and fax it to the State Regulatory Agency. Contact them regarding their level of concern and disposition.

STEP 5 Make a phone available to the driver, so that he may consult with his supervisor.

STEP 6 Await instructions from the Corporate Safety & Environmental staff regarding the disposition of the load.

RIVER METALS RECYCLING, LLC
RADIATION DETECTION INCIDENT REPORT

DATE OF INCIDENT: _____ TIME _____

YARD LOCATION: _____

TYPE OF TRUCK: _____

TYPE OF PURCHASE: _____

TRUCK OWNERSHIP: _____

SHIPPER NAME: _____ TRANSPORTER NAME: _____

TRUCK ID AND/OR LICENSE: _____

GRADE OF SCRAP: _____

GROSS VEHICLE WEIGHT: _____ LBS

DESCRIBE RESULTS OF HANDHELD DETECTOR SURVEY:

HANDHELD READINGS (uRem/hr): _____ @ 10' _____ @ 2" _____ In Truck Cab

REGULATOR(S) CONTACTED: _____

DISPOSITION OF LOAD:

WAS ANY OFFICIAL NOTIFICATION TO REGULATOR(S) PROVIDED?

Attach SM-1 Printout

[NOTE: A Word template of this form is available from Corporate Safety & Environmental Services and should be used.]

NOTIFICATION OF RADIOACTIVE MATERIAL

DATE:

Radiation Control Branch
Cabinet for Human Resources
275 East Main Street
Frankfort, KY 40621-0001
FAX: (502) 564-6533

Dear Madam or Sir:

Please be advised that our radiation detection equipment at the location described below detected radioactive material. We are rejecting the load and returning it to the shipper for his disposition. The transporter of this load declined to apply for an exemption at this time.

I. FACILITY DETECTING CONTAMINATED MATERIAL (Name & Address)

_____

_____

_____

DATE DETECTED: **TIME DETECTED:**

CONTACT NAME/TITLE _____

PHONE #: _____ **FAX #** _____

PROBABLE CONTAMINANT: Norm Other

II. RADIATION/MEASUREMENT/LEVELS

INITIAL DETECTION: (Check one):

____Henderson: National Nuclear Corp., Model SD-975 Plastic Scintillation Detector

____Newport: National Nuclear Corp., Model SD-975 Plastic Scintillation Detector

____Louisville/Klempner: Bicron Model ASM 1000 Plastic Scintillation Detector

____Louisville/Klempner: Bicron Model ASM 3000 Plastic Scintillation Detector

____Louisville/River City: Bicron Model ASM 1000 Plastic Scintillation Detector

AREA OF DETECTION: _____

TYPE OF MATERIAL: _____

III. OWNER OF CONTAMINATED SCRAP MATERIAL

OWNER:
PHONE #: **FAX #:**
ADDRESS:

SHIPPER:
PHONE #: **FAX #:**
ADDRESS:

DISTANCE & ROUTING TO REWORK LOCATION:

SHIPPED VIA: _____

Feel free to contact us if you require further information.

Sincerely,

RIVER METALS RECYCLING, LLC

Plant Manager

RADIOACTIVE MATERIAL WARNING

NOTICE TO TRANSPORTER:

THE LOAD OF SCRAP METAL WHICH YOU HAVE JUST DELIVERED TO RIVER METALS RECYCLING, LLC ("RIVER METALS") CONTAINS SOME MATERIAL WHICH HAS CAUSED OUR RADIATION DETECTION SYSTEM'S ALARM TO GO OFF. THE ALARM DOES NOT INDICATE THE TYPE OF RADIOACTIVITY, BUT WARNS OF THE PRESENCE OF A RADIOACTIVE SOURCE.

BECAUSE OF THE PRESENCE OF THE RADIOACTIVE SOURCE, RIVER METALS HAS NO CHOICE BUT TO REJECT THIS LOAD. IT IS IMPORTANT YOU UNDERSTAND IT IS AGAINST D.O.T. REGULATIONS (173.401 - 173.478) TO TRANSPORT RADIOACTIVE MATERIALS WITHOUT PRIOR APPROVAL AND THAT THE RADIOACTIVE MATERIALS MAY BE HARMFUL TO YOUR HEALTH.

BELOW IS A LIST OF NAMES AND PHONE NUMBERS WHICH YOU CAN CALL TO HELP RESOLVE THIS PROBLEM:

FEDERAL

Chief, Hazardous Materials Division
Office of Motor Carrier Field Operations
Federal Highway Administration
Department of Transportation
Washington, D.C. 20590-0001
DAY: (202) 366-4415 **NIGHT:** (202) 267-2100

STATE

Radiation Control Branch
Cabinet for Human Resources
275 East Main Street
Frankfort, KY 40621-0001
DAY: (502) 564-3700 **NIGHT:** (502) 564-7815
FAX: (502) 564-6533

RIVER METALS ADVISES YOU TO CALL AND ADVISE THE D.O.T. OF YOUR SITUATION. IN THE MEANTIME, WE HAVE DESIGNATED A LOCATION WITHIN OUR FACILITY WHERE YOU CAN PARK YOUR VEHICLE PENDING THE RESOLUTION OF YOUR SITUATION. THE SCALEMASTER/PLANT MANAGER WILL DIRECT YOU TO THAT AREA.

DRIVER SIGNATURE OF UNDERSTANDING

THROUGH MY SIGNATURE BELOW, I INDICATE THAT I HAVE READ AND UNDERSTAND THE ABOVE INFORMATION GIVEN TO ME BY RIVER METALS RECYCLING, LLC. I UNDERSTAND THAT IT MAY BE AGAINST D.O.T. REGULATIONS TO MOVE MY VEHICLE WITHOUT FIRST OBTAINING A PERMIT AND/OR AN EXEMPTION FROM THE D.O.T. FURTHER, I AGREE TO HOLD RIVER METALS RECYCLING, LLC HARMLESS BECAUSE OF ANY ACTION I MAY TAKE REGARDING THIS MATTER.

_____ _____
PRINT YOUR NAME HERE **SIGNATURE OF DRIVER**

DIRECTORY OF RADIATION CONTROL REGULATORS

COLORADO

PHONE: (303) 692-3030 (Business Hours)
(303) 756-4455 (24 Hours)
FAX: (303) 692-3692
ADDRESS: Radiation Control Division
Department of Health
8100 Lowry Blvd.
Denver, CO 80220-6928

FLORIDA

PHONE: (407) 297-2095
FAX: (407) 297-2085
ADDRESS: Office of Radiation Control
Department of Health & Rehabilitative Services
P.O. Box 680069
Orlando, FL 32868-0069

KENTUCKY

PHONE: (502) 564-3700 (Business Hours)
(502) 564-7815 (24 Hours)
FAX: (502) 564-6533
ADDRESS: Radiation Control Branch
Cabinet for Human Resources
275 East Main Street
Frankfort, KY 40621-0001

MARYLAND

PHONE: (410) 631-3300 (Business Hours)
(410) 243-8700 (24 Hours)
FAX: (410) 631-3198
ADDRESS: Radiological Health Program
Office of Toxics, Enviro, Science & Health (TESH)
Maryland Department of the Environment
2500 Broening Highway
Baltimore, MD 21224

DIRECTORY OF RADIATION CONTROL REGULATORS
(Continued)

TENNESSEE

PHONE:	(615) 532-0364 (Business Hours)
	(615) 741-0001 (24 Hours)
FAX:	(615) 532-7938
ADDRESS:	Division of Radiological Health
	L & C Annex
	401 Church Street
	Nashville, TN 37243-1532

UTAH

PHONE:	(801) 536-4250 (Business Hours)
	(801) 536-4123 (24 Hours)
FAX:	(801) 533-4097
ADDRESS:	Bureau of Radiation Control
	State Department of Health
	168 North 1950 W
	P. O. Box 144850
	Salt Lake City, UT 84114-4850

VIRGINIA

PHONE:	(804) 786-5932 (Business Hours)
	(800) 468-0138 (24 Hours)
FAX:	(804) 786-6979
ADDRESS:	631 Virginia Department of Health
	Bureau of Radiological Health
	P.O. Box 2448, Room 204
	Richmond, VA 23218

INSTRUCTIONS FOR COMPLETING D.O.T. SHIPMENT APPROVAL FORM

1. Complete the sections titled "Description and Location" and "Destination and Transportation." Leave the "Approval Number" and "State Radiation Control Officials" sections blank. These will be completed by state agency personnel.

2. I.D. numbers will be license plate numbers for trucks and the car numbers (e.g., RLMX 2203) for rail.

3. The shipper is the party who owns the scrap.

4. The carrier is the party who transported the scrap to our yard. This may or may not be the shipper.

5. The destination is the place to which the load will go next. Typically, this is the shipper's location for shipper-owned loads that we reject.

6. Radiation levels must be stated in millirems per hour (mr/h). To convert from microrems per hour, divide by 1,000. For example, 50 microrems equals .05 millirems.

Annex A

DOT–E 10656 Revision 4 Shipment Approval
for scrap metal or related recycling material

Approval Number ____–____–____–____ (Refer to E 10656 item 5 b)

Description and Location

Truck/Rail & car type: _____ Id. Nr.: _____

Present location of vehicle (place, city, state, zip code):

_____

Shipper's name: _____ Date advised: _____

Address: _____

Contact person: _____ Ph. _____ Fax. _____

Description of cargo: _____

Max. Rad. level: _____ mr/h located on vehicle at _____

Meter Mfg. and model Nr. _____ Bkg. _____ mr/h Date: _____

Inspected by: _____ Ph. _____ Fax. _____

Destination and Transportation

Carrier's name: _____ Date advised: _____

Address: _____

Contact person: _____ Ph. _____ Fax. _____

Anticipitated route and distance: _____

Destination firm: _____ Date advised: _____

Address: _____

Contact person: _____ Ph. _____ Fax. _____

State Radiation Control Officials

Destination state Rad. control program: _____ Date advised: _____

Address: _____

Contact person: _____ Ph. _____ Fax. _____

Special conditions of approval (If any): _____

_____

Rad. control Pgm. issuing this Shipment Approval: _____

Address: _____

Contact person: _____ Ph. _____ Fax. _____

Authorizing official: _____ Date: _____
(Signature)

Annex A

DOT-E 10656 Revision 4 Shipment Approval
for scrap metal or related recycling material

EXAMPLE

Approval Number ____-____-____-____ (Refer to E 10656 Item 8 b)

Description and Location

Truck lic: A026226 (AL)
Id. Nr.: Trailer lic: BYC301 (TX)

Truck/Rail & car type: Tractor/trailer

Present location of vehicle (place, city, state, zip code):
301 Scrap Yard Road, Anytown, USA 33341

Shipper's name: Acme Recycling Date advised: 9/9/99

Address: 201 Acme Road, Anytown, USA 33342

Contact person: Al Acme Ph. (306) 555-2211 Fax. (306) 555-3703

Description of cargo: Mixed pipe & cut tanks

Max. Rad. level: 0.130 mrh located on vehicle at center of trailer - middle of load

Meter Mfg. and model Nr. Eberline ESP-1 Bkg. .005 mrh Date: ____

Inspected by: Sandy Supervisor Ph. (306) 555-1111 Fax. (306) 555-1112

Destination and Transportation

Carrier's name: Total Trucking, Inc. Date advised: 9/9/99

Address: 101 Total Trail, Anytown, USA 33345

Contact person: Tom Total Ph. (306) 555-0162 Fax. (306) 555-0173

Anticipated route and distance: Scrap Yard Road west to Rt. 1 to Acme Road - 15 miles

Destination firm: Acme Recycling Date advised: 9/9/99

Address: 201 Acme Road, Anytown, USA 33341

Contact person: Al Acme Ph. (306) 555-2211 Fax. (306) 555-3703

State Radiation Control Officials

Destination state Rad. control program: ____ Date advised: ____

Address: ____

Contact person: ____ Ph. ____ Fax. ____

Special conditions of approval (if any): ____

Rad. control Pgm. issuing this Shipment Approval: ____

Address: ____

Contact person: ____ Ph. ____ Fax. ____

Authorizing official: ____ Date: ____
(Signature)

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The David J. Joseph Company
Radioactive Alarm Log

Location_____

Date Of Alarm	Transporter Notice #	Alarm Severity (circle one)	Type Of Alarm (circle one)	Support Documents Attached?	Transporter Action	DJJ Action	Description Of Incident
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			
/ /		SSF Alert Urgent	Vehicle Failure Test Calibration	Yes No			

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JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

August 7, 1998

Scott McAlpine, Safety & Environmental Engineer
The David J. Joseph Company
P.O. Box 1078
Cincinnati, OH 45201-1078

Re: Change in Name
Permit Number KYR001122
River Metals Recycling LLC
Campbell County

Dear Mr. McAlpine:

This letter is to confirm that the Division of Water has changed the name of the above referenced Storm Water General Permit.

If you have any questions, please contact Ronnie Thompson at (502) 564-2225, extension 423.

Sincerely,

Terry Hall for JZ

Judy Zeigler, Supervisor
Inventory & Data Management Section
KPDES Branch, Division of Water

JZ:NG
c: Florence Regional Office
DOW Files

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file

The David J. Joseph Company

July 30, 1998

Section Supervisor,
Commonwealth of Kentucky
Natural Resources & Environmental Protection Cabinet
Inventory & Data Management Section
Division of Water, KPDES Branch
14 Reilly Road
Frankfort, KY 40601

SUBJECT: Transfer of KPDES Stormwater Permits

Dear Madam or Sir:

As a result of the formation of River Metals Recycling, LLC, the following operations for which you have issued KPDES stormwater permits are changing names and ownership:

Facility's Former Name	Address	Stormwater Permit #	Date of Change
The David J. Joseph Company	6200 Riverport Road Henderson, KY 42420	KYR 001120	8/01/98
The David J. Joseph Company	1220 Licking Pike Newport, KY 41071-1567	KYR 001122	8/01/98
Klempner Brothers, Inc.	1371 Lexington Road Louisville, KY	KYR 001231	7/31/98
River City Baling, Inc./ River City Shredding, Inc.	2045/2255 River Road Louisville, KY	KYR 001228	8/03/98

The above facilities now will be operated under the name "River Metals Recycling, LLC." Please send updated permit cover sheets and any future correspondence regarding these permits to:

The David J. Joseph Company
Attn: Scott McAlpine
P.O. Box 1078
Cincinnati, OH 45201-1078

Feel free to call me at (513) 345-4317 with any questions related to this matter.

Sincerely,
THE DAVID J. JOSEPH COMPANY

Scott C. McAlpine
Safety & Environmental Engineer

SCM/mlb
cc: Christopher J. Bedell
Alan J. Crouch

Executive and General Offices: 300 Pike Street, Cincinnati, Ohio 45202-4214, 513/621-6770
Mail Address: P.O. Box 1078, Cincinnati, Ohio 45201-1078
District Offices: Birmingham, Charlotte, Chicago, Cincinnati, Houston, Omaha, Philadelphia, Pittsburgh, Salt Lake City, St. Louis, Tampa

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COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DIVISION OF WATER
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

September 5, 1997

Location Address:

1220 LICKING PIKE
NEWPORT

Re: THE DAVID J JOSEPH CO
KPDES General Permit No.: KYR001122
Permit Type:
Other Facilities
County: CAMPBELL

Dear Permittee:

The discharges associated with the Notice of Intent letter you submitted have been previously approved for coverage under a "General Permit for Storm Water Point Sources in the Commonwealth of Kentucky." This coverage will remain effective for the dates indicated on the cover page. During this period of coverage all discharges shall comply with the conditions of the applicable general permit. A copy of the applicable permit has been enclosed.

Any questions concerning the general permit and its requirements should be directed to Ronnie Thompson at (502) 564-2225, extension 423.

Sincerely,

Jack A. Wilson, Director
Divison of Water

Enclosures

cc: Division of Water Files
Regional Office: FLORENCE

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COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DIVISION OF WATER
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

September 5, 1997

Location Address:

6200 RIVERPORT RD
HENDERSON

Re: THE DAVID J JOSEPH CO
KPDES General Permit No.: KYR001120
Permit Type:
Other Facilities
County: HENDERSON

Dear Permittee:

The discharges associated with the Notice of Intent letter you submitted have been previously approved for coverage under a "General Permit for Storm Water Point Sources in the Commonwealth of Kentucky." This coverage will remain effective for the dates indicated on the cover page. During this period of coverage all discharges shall comply with the conditions of the applicable general permit. A copy of the applicable permit has been enclosed.

Any questions concerning the general permit and its requirements should be directed to Ronnie Thompson at (502) 564-2225, extension 423.

Sincerely,

Jack A. Wilson, Director
Divison of Water

Enclosures

cc: Division of Water Files
Regional Office: MADISONVILLE

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COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DIVISION OF WATER
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

C.C. BH 9-5-97

RECEIVED SEP 9 1997

September 5, 1997

Location Address:

1371 LEXINGTON RD
LOUISVILLE

Re: KLEMPNER BROS INC
KPDES General Permit No.: KYR001231
Permit Type:
Other Facilities
County: JEFFERSON

Dear Permittee:

The discharges associated with the Notice of Intent letter you submitted have been previously approved for coverage under a "General Permit for Storm Water Point Sources in the Commonwealth of Kentucky." This coverage will remain effective for the dates indicated on the cover page. During this period of coverage all discharges shall comply with the conditions of the applicable general permit. A copy of the applicable permit has been enclosed.

Any questions concerning the general permit and its requirements should be directed to Ronnie Thompson at (502) 564-2225, extension 423.

Sincerely,

Jack A. Wilson, Director
Divison of Water

Enclosures

cc: Division of Water Files
Regional Office: LOUISVILLE

KPDES

STORM WATER GENERAL PERMIT

PERMIT NO.: KYR000000

GENERAL PERMIT FOR
STORM WATER POINT SOURCES
OTHER FACILITIES
AUTHORIZATION TO DISCHARGE UNDER THE
KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Kentucky Revised Statutes Chapter 224 and pursuant to 401 KAR 5:055, Section 5, the following discharges are authorized:

New or existing storm water point sources within the Commonwealth of Kentucky that are required to have a permit pursuant to 401 KAR 5:055, Section 1 and KRS 224.16-050.

Specifically excluded from authorization under this permit are discharges that:

(1) Are subject to current, or expired and continued in effect, KPDES individual permits; or
(2) Are subject to any promulgated storm water effluent guideline or standard; or
(3) Correspond to pending applications filed for individual permit; or
(4) Are otherwise specifically designated by the Director as a significant contributor of pollution more appropriately regulated by an individual permit.

The receiving waters for the discharge(s) authorized by this permit are located within the political boundaries of the Commonwealth of Kentucky. Such authorization is in accordance with effluent limitations and other conditions set forth in PARTS I through IV hereof.

This permit consists of this cover sheet, Part I 2 page(s), Part II 1 page(s), Part III 4 page(s) and Part IV 13 page(s).

This permit shall become effective on OCT - 1 1997

This permit and the authorization to discharge shall expire at midnight SEP 30 2002

AUG 27 1997
Date Signed

Jack A. Wilson, Director
Division of Water

Robert W. Logan
Commissioner

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
Division of Water, Frankfort Office Park, 14 Reilly Road, Frankfort, Kentucky 40601

Printed on recycled Paper

RMR 0227

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, storm water discharges associated with industrial activity which are covered by this permit but are not subject to any other category of discharge are subject to the following effluent limitations and monitoring requirements.

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS Other Units (mg/l)		MONITORING REQUIREMENTS	
	Yearly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow (MGD)	Report	Report	2/Year 2/	Estimate
Chemical Oxygen Demand	Report	Report	2/Year 2/	Grab
Oil and Grease	Report	Report	2/Year 2/	Grab
Total Suspended Solids	Report	Report	2/Year 2/	Grab
Other Pollutants 1/	Report	Report	2/Year 2/	Grab

The pH of the effluent shall be monitored twice per year by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): nearest accessible point prior to actual discharge to or mixing with the receiving water.

Grab samples shall be taken during the first thirty minutes of the discharge. If the collection of a grab sample during the first thirty minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall note a description of why a grab sample during the first thirty minutes was impracticable.

The discharge shall not produce a visible sheen.

1/ The permittee shall monitor for any pollutant limited in an effluent limitations guideline (Federal Categorical Standards, 40 CFR, Subchapter N) to which the facility is subject.

2/ Monitoring frequency may be increased at any time at the discretion of the Division of Water (401 KAR 5:070, Section 6(3)).

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B. Schedule of Compliance

The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

Attain compliance with effluent limitations upon notification of coverage under this general permit.

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STANDARD CONDITIONS FOR KPDES PERMIT

The permittee is also advised that all KPDES permit conditions in KPDES Regulation 401 KAR 5:065, Section 1 will apply to all discharges authorized by this permit.

This permit has been issued under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal and local agencies.

It is the responsibility of the permittee to demonstrate compliance with permit parameter limitations by utilization of sufficiently sensitive analytical methods.

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PART III

OTHER REQUIREMENTS

A. Retention of Records

1. Routine submittal of monitoring results (annual or otherwise) is not required. The permittee shall retain records of all monitoring information, copies of all reports required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least six years from the date of the measurement, report, or application. This period may be explicitly modified by alternative provisions of this permit or extended by request of the Director at any time. The permittee shall use a standard form provided by the Division for the recording of data required by this permit. This form may be copied by the permittee as needed and the permittee must submit such monitoring results to the Director upon request.

2. The permittee shall retain the pollution prevention plan developed in accordance with Part IV (Storm Water Best Management Practices Plan) of this permit until at least one year after coverage under this permit terminates. This period may be explicitly modified by alternative provisions of this permit or extended by request of the Director at any time.

B. Reopener Clause

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under 401 KAR 5:050 thru 5:080 and KRS 224.70-120, if the effluent standard or limitation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

2. Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of KRS Chapter 224 when applicable.

C. Detection Limits

The permittee shall be deemed to be in compliance with any permit limitation which is below the detection limit of the pollutant if the permittee records that the discharge level of the pollutant in question is below the detection limit as required by 40 CFR Part 136.

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D. Sampling Waiver

When a discharger is unable to collect samples due to adverse climatic conditions, the discharger must submit in lieu of sampling data a description of why samples could not be collected, including available documentation of the event. Adverse climatic conditions which may prohibit the collection of samples includes weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.). Discharges are precluded from exercising this waiver more than once during a two year period.

E. Representative Discharge

When a facility has two or more outfalls that, based on a consideration of features and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may test the effluent of one of such outfalls and report that the quantitative data also applies to the substantially identical outfalls. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area e.g. low (under 40%), medium (40% to 65%) or high (above 65%) shall be made available.

F. Prohibition on Non-Storm Water Discharges

1. Except as provided in paragraph III.F.2., all discharges covered by this permit shall be composed entirely of storm water.

2. a. Except as provided in paragraph III.F.2.b, discharges of material other than storm water must be in compliance with a KPDES permit (other than this permit) issued for the discharge.

   b. The following non-storm water discharges may be authorized by this permit provided the non-storm water component of the discharge is in compliance with paragraph IV.6.b.(7): discharges from fire fighting activities; fire hydrant flushings; potable water sources including waterline flushings; irrigation drainage; lawn watering; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated ground water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

G. Releases in Excess of Reportable Quantities

1. The discharge of hazardous substances or oil in the storm water discharge(s) from a facility shall be minimized in accordance with the applicable storm water best management practices plan for the facility. This permit does not relieve the permittee of the reporting requirements of 40 CFR Part 117 and 40 CFR Part 302. Except as provided in Part III.G.2 of this permit, where a release containing a hazardous substance in an amount equal to or in excess of a reporting quantity established under either 40 CFR 117 or 40 CFR 302, occurs during a 24 hour period:

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a. The discharger is required to notify the National Response Center (NRC) (800-424-8802; in Washington, DC metropolitan area 202-426-2675) in accordance with the requirements of 40 CFR 110, 40 CFR 117 and 40 CFR 302 as soon as he or she has knowledge of the discharge;

b. The permittee shall submit within 14 calendar days of knowledge of the release a written description of: the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, and steps to be taken in accordance with Part III.G.3 of this permit to the appropriate office at the address provided below:

Section Supervisor
Emergency Response Team Section
Field Operations Branch
Kentucky Division of Water
14 Reilly Road, Frankfort Office Park
Frankfort, Kentucky 40601

c. The storm water best management practices plan required under Part IV of this permit must be modified within 14 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

2. Multiple Anticipated Discharges - Facilities which have more than one anticipated discharge per year containing a hazardous substance in an amount equal to or in excess of a reporting quantity established under either 40 CFR 117 or 40 CFR 302, which occurs during a 24 hour period, where the discharge is caused by events occurring within the scope of the relevant operating system shall:

a. submit notifications in accordance with Part III.G.1 of this permit for the first such release that occurs during a calendar year (or for the first year of this permit, after submittal of a NOI); and

b. shall provide in the storm water best management practices plan required under Part IV a written description of the dates on which such releases occurred, the type and estimate of the amount of material released, and the circumstances leading to the release. In addition, the plan must be reviewed to identify measures to minimize such releases and the plan must be modified where appropriate.

3. Spills - This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.

H. Failure to Certify

Any facility that is unable to provide the certification required under paragraph IV.6.b.(7) (testing for illicit connections), must notify the Director within 180 days of the effective date of this permit. Such notification shall describe: the procedure of any test conducted for the presence of non-storm water discharges; the results of such test or other relevant observations; potential sources of non-storm water discharges to the storm sewer; and why adequate tests for such storm sewers were not feasible.

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I. **Exceedance of Permit Limitations**

In the event that the permittee is in exceedance of permit limitations given in Part I of this permit, the permittee shall notify the Division of Water in writing stating what parameters are in non-compliance and actual discharge levels for those parameters. Notification should be sent to the Inventory and Data Management Section of the KPDES Branch at the following address:

Section Supervisor
Inventory and Data Management Section
KPDES Branch
Kentucky Division of Water
14 Reilly Road, Frankfort Office Park
Frankfort, Kentucky 40601

J. **Storm Event Definition**

Samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inch and at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Monitoring requirements do not apply to storm water events greater in magnitude than the ten (10) year, 24-hour storm event.

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STORM WATER BEST MANAGEMENT PRACTICES PLAN

A storm water best management practices plan shall be developed for each facility covered by this permit. Storm water best management practices plans shall be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with industrial activity from the facility. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the storm water best management practices plan required under this part as a condition of this permit.

1. The plan shall be signed in accordance with Part II of this permit, and be retained on site in accordance with Part III.A. of this permit. It shall be completed within 180 days of the date of coverage (and updated as appropriate). Compliance with the provisions of the plan shall be a requirement of this permit. Plans shall provide for compliance with the terms of the plan within 365 days of the date of coverage. The owner or operator of a facility with storm water discharges covered by this permit shall make plans available upon request to the Director, or authorized representative, or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with a KPDES permit, to the municipal operator of the system. For construction related activities the plan shall:

   a. Be completed prior to the submittal of a NOI to be covered under this permit and updated as appropriate;

   b. Provide for compliance with the terms and schedule of the plan beginning with the initiation of construction activities.

2. If the plan is reviewed by the Director, or authorized representative, the Director, or authorized representative, may notify the permittee at any time that the plan does not meet one or more of the minimum requirements of this Part. After such notification from the Director, or authorized representative, the permittee shall make changes to the plan in accordance with the time frames established below, and shall submit to the Director a written certification that the requested changes have been made.

   a. Except as provided below in paragraph b, the permittee shall have 30 days after such notification to make the changes necessary.

   b. The owner or operator of a storm water discharge associated with industrial activity composed in part or in whole of runoff from construction activities shall have 7 days after such notification to make changes relating to sediment and erosion controls to prevent loss of sediment from the site, unless additional time is provided by the Director.

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3. The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the waters of the Commonwealth of Kentucky or if the storm water best management practices plan proves to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity within 30 days of the change or the time when the plan is determined to be ineffective. Amendments to the plan may be reviewed by EPA in the same manner as Part IV.2. above.

4. Signature and Plan Review.

   a. The plan shall be signed in accordance with Part II, and be retained on-site at the facility which generates the storm water discharge in accordance with Part III.A.1 of this permit.

   b. The permittee shall make plans available upon request to the Director; a State or local agency approving sediment and erosion plans, grading plans, or storm water management plans; or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with a NPDES permit, to the municipal operator of the system.

   c. The Director, or authorized representative, may notify the permittee at any time that the plan does not meet one or more of the minimum requirements of this Part. Within 30 days of such notification from the Director, (or as otherwise provided by the Director), or authorized representative, the permittee shall make the required changes to the plan and shall submit to the Director a written certification that the requested changes have been made.

   d. All storm water best management practices plans required under this permit are considered reports that shall be available to the public under Section 308(b) of the CWA. The permittee shall make plans available to members of the public upon request by the public. However, the permittee may claim any portion of a storm water best management practices plan as confidential in accordance with 40 CFR Part 2.

5. Keeping Plans Current. The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the waters of the Commonwealth of Kentucky and which has not otherwise been addressed in the plan or if the storm water best management practices plan proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified under Part IV.6.a of this permit, or is otherwise achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity. Amendments to the plan may be reviewed by the Kentucky Division of Water in the same manner as Part IV.2 above.

6. Except for storm water discharges associated with industrial activity from construction activities, which are subject to the requirements of paragraph IV.7., the plan shall include, at a minimum, the following items:

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a. Description of Potential Pollutant Sources. Each plan shall provide a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges or which may result in the discharge of pollutants during dry weather from separate storm sewers draining the facility. Each plan shall identify all activities and significant materials which may potentially be significant pollutant sources. Each plan shall include, at minimum:

(1). Drainage.

a. A site map indicating an outline of the drainage area of each storm water outfall, each existing structural control measure to reduce pollutants in storm water runoff, surface water bodies, locations where significant materials are exposed to precipitation, locations where major spills or leaks identified under Part IV.6.a.(3) of this permit have occurred, and the locations of the following activities where such activities are exposed to precipitation: fueling stations, vehicle and equipment maintenance and/or cleaning areas, loading/unloading areas, locations used for the treatment, storage or disposal of wastes, liquid storage tanks, processing areas and storage areas.

b. For each area of the facility that generates storm water discharges associated with industrial activity with a reasonable potential for containing significant amounts of pollutants, a prediction of the direction of flow, and an estimate of the types of pollutants which are likely to be present in storm water discharges associated with industrial activity. Flows with a significant potential for causing erosion shall be identified.

(2). Inventory of Exposed Materials.

An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated stored or disposed in a manner to allow exposure to storm water between the time of three years prior to the date of the issuance of this permit and the present; method and location of on-site storage or disposal; materials management practices employed to minimize contact of materials with storm water runoff between the time of three years prior to the date of the issuance of this permit and the present; the location and a description of existing structural and non-structural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives.

(3). Spills and Leaks.

A list of significant spills and significant leaks of toxic or hazardous pollutants that occurred at the facility after the date of three years prior to October 1, 1997.

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(4). Sampling Data.

A summary of existing discharge sampling data describing pollutants in storm water discharges from the facility.

(5). Risk Identified and Summary of Potential Pollutant Sources.

A narrative description of the potential pollutant sources at the following areas: loading and unloading operations; outdoor storage activities; outdoor manufacturing or processing activities; significant dust or particulate generating processes; and on-site waste disposal practices. The description shall specifically list any significant potential source of pollutants at the site and for each potential source, any pollutant or pollutant parameter (e.g. biochemical oxygen demand, etc.) of concerns shall be identified.

b. Measures and Controls.

Each facility covered by this permit shall develop a description of storm water management controls appropriate for the facility, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

(1). Good Housekeeping - Good housekeeping requires the maintenance of a clean, orderly facility.

(2). Preventive Maintenance - A preventive maintenance program shall involve inspection and maintenance of storm water management devices (e.g. cleaning oil/water separators, catch basins) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems.

(3). Spill Prevention and Response Procedures - Areas where potential spills can occur, and their accompanying drainage points shall be identified clearly in the storm water best management practices plan. Where appropriate, specifying material handling procedures, storage requirements, and use of equipment such as diversion valves in the plan should be considered. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a clean up should be available to personnel.

(4). Inspections - In addition to or a part of the comprehensive site evaluation required under Part IV.6.c of this permit, qualified facility personnel shall be identified to inspect designated equipment and areas of the facility at appropriate intervals specified in the plan. A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections shall be maintained.

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(5). Employee Training - Employee training programs shall inform personnel at all levels of responsibility of the components and goals of the storm water best management practices plan. Training should address topics such as spill response, good housekeeping and material management practices. A best management practices plan shall identify periodic dates for such training.

(6). Record Keeping and Internal Reporting Procedures - A description of incidents such as spills, or other discharges, along with other information describing the quality and quantity of storm water discharges shall be included in the plan required under this part. Inspections and maintenance activities shall be incorporated into the plan.

(7). Non-Storm Water Discharges

a. The plan shall include a certification that the discharge has been tested or evaluated for the presence of non-storm water discharges. The certification shall include the identification of potential significant sources of non-storm water at the site, a description of the results of any test and/or evaluation for the presence of non-storm water discharges, the evaluation criteria or testing method used, the date of any testing and/or evaluation, and the on-site drainage points that were directly observed during the test. Such certification may not be feasible if the facility operating the storm water discharge associated with industrial activity does not have access to an outfall, manhole, or other point of access to the ultimate conduit which receives the discharge. In such cases, the source identification section of the storm water pollution plan shall indicate why the certification required by this part was not feasible, along with the identification of potential significant sources of non-storm water at the site. A discharger that is unable to provide the certification required by this paragraph must notify in accordance with Part III.H of this permit.

b. Except for flows from fire fighting activities, sources of non-storm water listed in Part III.F.2 of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

(8). Sediment and Erosion Control - The plan shall identify areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion, and identify measures to limit erosion.

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(9). Management of Runoff - The plan shall contain a narrative consideration of the appropriateness of traditional storm water management practices (practices other than those which control the source of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide that measures determined to be reasonable and appropriate shall be implemented and maintained. The potential of various sources at the facility to contribute pollutants to storm water discharges associated with industrial activity (see Parts IV.6.a.(2), (4) and (5) of this permit) shall be considered when determining reasonable and appropriate measures. Appropriate measures may include: including vegetative swales and practices, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, and wet detention/retention devices.

c. Comprehensive Site Compliance Evaluation.

Qualified personnel shall conduct site compliance evaluations at appropriate intervals specified in the plan, but, except as provided in paragraph IV.6.c.(4), in no case less than once a year. Such evaluations shall provide:

(1). Material handling areas and other potential sources of pollution identified in the plan in accordance with paragraph IV.6.a of this permit shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Structural storm water management measures, sediment and control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

(2). Based on the results of the inspection, the description of potential pollutant sources identified in the plan in accordance with paragraph IV.6.a of this permit and pollution prevention measures and controls identified in the plan in accordance with paragraph IV.6.b of this permit shall be revised as appropriate within two weeks of such inspection and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than twelve weeks after the inspection.

(3). A report summarizing the scope of the inspection, personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water best management practices plan, and actions taken in accordance with paragraph IV.D.6.c.(2) of the permit shall be made and retained as part of the storm water best management practices plan for at least three years. The report shall be signed in accordance with Part II of this permit.

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(4). Where annual site inspections are shown in the plan to be impractical for inactive mining sites due to the remote location and inaccessibility of the site, site inspections required under this part shall be conducted at appropriate intervals specified in the plan, but, in no case less than once in three years. At least one site inspection required under this part shall be conducted prior to October 1, 1999 or, for sites which become inactive after October 1, 1999, within two years after such site becomes inactive.

d. Additional Requirements for Storm Water Discharges Associated With Industrial Activity Through Municipal Separate Storm Sewer Systems Serving a Population of 100,000 or More.

(1). In addition to the applicable requirements of this permit, facilities covered by this permit must comply with applicable requirements in municipal storm water management programs developed under KPDES permits issued for the discharge of the municipal separate storm sewer system that receives the facility's discharge, provided the discharger has been notified of such conditions.

(2). Permittees which discharge storm water associated with industrial activity through a municipal separate storm sewer system serving a population of 100,000 or more shall make plans available to the municipal operator of the system upon request.

e. Consistency with Other Plans.

Storm water best management practices plans may reflect requirements for Spill Prevention Control and Countermeasure (SPCC) plans developed for the facility under section 311 of the CWA or Best Management Practices (BMP) Programs otherwise required by a KPDES permit for the facility as long as such requirement is incorporated or incorporated by reference into the storm water best management practices plan.

f. Additional Requirements for Salt Storage.

Piles of salt used for deicing or other commercial or industrial purposes which generate a storm water discharge to waters of the Commonwealth of Kentucky shall be enclosed or covered to prevent exposure to precipitation, except for exposure resulting from adding or removing materials from the pile. Piles do not need to be enclosed or covered where storm water from the pile is not discharged to waters of the Commonwealth of Kentucky.

7. Alternative Requirements for Construction Activities.

Operations that discharge storm water associated with industrial activity from construction activities are not subject to the requirements of Part IV.6. of this permit, but are instead subject to the following requirements. The storm water best management practices plan shall include, as a minimum, the following items:

a. Site Description.

Each plan shall provide a description of the following:

(1). A description of the nature of the construction activity;

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(2). A description of the intended sequence of major activities which disturb soils for major portions of the site (e.g. grubbing, excavation, grading);

(3). Estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities;

(4). An estimate of the runoff coefficient of the site after construction activities are completed and existing data describing the soil or the quality of any discharge from the site;

(5). A site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, the location of major structural and nonstructural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface water (including wetlands), and locations where storm water is discharged to a surface water; and

(6). The name of the receiving water(s) and the ultimate receiving water(s), and areal extent of wetland acreage at the site.

b. Controls.

Each plan shall include a description of appropriate controls and measures that will be implemented at the construction site. The plan will clearly describe for each major activity identified in Part IV.7.a.(2), identify appropriate control measures and the timing during the construction process that the measures will be implemented. (For example, perimeter controls for one portion of the site will be installed after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site. Perimeter controls will be actively maintained until final stabilization of those portions of the site upward of the perimeter control. Temporary perimeter controls will be removed after final stabilization). The description of controls shall address the following minimum components:

(1). Erosion and Sediment Controls.

(a). Stabilization Practices.

A description of interim and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized.

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Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Except as provided in paragraph IV.7.b.(1).(a).(1) and (2), stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased on all disturbed portions of the site where construction activity will not occur for a period of 21 or more calendar days.

(1). Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover, stabilization measures shall be initiated as soon as practicable thereafter.

(2). In arid (areas with an average annual rainfall of 0-10 inches) and semi-arid (areas with an average annual rainfall of 10-20 inches), regions where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable thereafter.

(b). Structural Practices.

A description of structural practices to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices shall include silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. Structural practices should be placed on upland soils to the degree attainable. The installation of these devices may be subject to Section 404 of the CWA.

(1). For common drainage locations that serve an area with more than 10 disturbed acres at one time, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. The 3,600 cubic feet of storage area per acre drained does not apply to flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around the sediment basin.

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For drainage locations which serve more than 10 disturbed acres at one time and where a temporary sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent controls is not attainable, sediment traps, silt fences, or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area.

(2). For drainage locations serving 10 or less acres, sediment traps, silt fences or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area or a sediment basin providing storage for 3,600 cubic feet of storage per acre drained.

(2). Storm Water Management. A description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. Structural measures should be placed on upland soils to the degree attainable. The installation of these devices may be subject to Section 404 of the CWA. This permit only addresses the installation of storm water management measures, and not the ultimate operation and maintenance of such structures after the construction activities have been completed and the site has undergone final stabilization. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site, and are not responsible for maintenance after storm water discharges associated with industrial activity have been eliminated from the site.

(a). Such practices may include: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). A goal of 80 percent removal of total suspended solids from those flows which exceed predevelopment levels should be used in designing and installing storm water management controls (where practicable). Where this goal is not met, the permittee shall provide justification for rejecting each practice based on site conditions.

(b). Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a watercourse so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions, such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

(3). Other Controls.

(a). Waste Disposal. No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a Section 404 permit.

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(b). Off-site vehicle tracking of sediments and the generation of dust shall be minimized.

(c). The plan shall ensure and demonstrate compliance with applicable State and/or local waste disposal, sanitary sewer or septic system regulations.

(4). Approved State or Local Plans.

Facilities which discharge storm water associated with industrial activity from construction activities must include in their storm water best management practices plan procedures and requirements specified in applicable sediment and erosion site plans or site permits or storm water management site plans or site permits approved by State or local officials. Requirements specified in sediment and erosion site plans or site permits or storm water management site plans or site permits approved by State or local officials that are applicable to protecting surface water resources are, upon submittal of a NOI to be authorized to discharge under this permit, incorporated by reference and are enforceable under this permit even if they are not specifically included in a storm water best management practices plan required under this permit. This provision does not apply to provisions of master plans, comprehensive plans, non-enforceable guidelines or technical guidance documents that are not identified in a specific plan or permit that is issued for the construction site.

(5). Maintenance.

A description of procedures to maintain in good and effective operating conditions vegetation, erosion and sediment control measures and other protective measures identified in the site plan.

(6). Inspections.

Qualified personnel (provided by the discharger) shall inspect disturbed areas of the construction site that have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within 24 hours of the end of a storm that is 0.5 inches or greater. Where sites have been temporary or finally stabilized, or during seasonal arid periods in arid (areas with an average annual rainfall of 0-10 inches) and semi-arid (areas with an average rainfall of 10-20 inches) such inspection shall be conducted at least once every month.

a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the plan shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

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b. Based on the results of the inspection, the description of potential pollutant sources identified in the plan in accordance with paragraph IV.7.a of this permit and pollution prevention measures identified in the plan in accordance with paragraph IV.7.b of this permit shall be revised as appropriate as soon as practicable after such inspection. Such modifications shall provide for timely implementation of any changes to the plan within seven calendar days following the inspection.

c. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water best management practices plan, and actions taken in accordance with paragraph IV.7.b.(6).b of the permit shall be made and retained as part of the storm water best management practices plan for at least three years after the date of inspection. The report shall be signed in accordance with Part II of this permit.

(7). Non-Storm Water Discharges.

Except for flows from fire fighting activities, sources of non-storm water listed in Part III.F.2 of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

(8). Additional Requirements for Storm Water Discharge From Industrial Activities Other Than Construction, Including Dedicated Asphalt Plants, and Dedicated Concrete Plants.

This permit may only authorize a storm water discharge associated with industrial activity from a construction site that is mixed with a storm water discharge from an industrial source other than construction, where:

a. the industrial source other than construction is located on the same site as the construction activity;

b. storm water discharges associated with industrial activity from the areas of the site where construction activities are occurring are in compliance with the terms of this permit; and

c. storm water discharges associated with industrial activity from the areas of the site where industrial activity other than construction are occurring (including storm water discharges from dedicated concrete plants) are in compliance with the terms, including applicable NOI or application requirements, of a different KPDES general permit or individual permit authorizing such discharges.

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(9). Contractors.

a. The storm water best management practices plan must clearly identify for each measure identified in the plan, the contractor(s) and/or subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the plan must sign a copy of the certification statement in Part IV.7.b.(9).b. of this permit in accordance with Part II of this permit. All certifications must be included in the storm water best management practices plan.

b. Certification Statement.

All contractors and subcontractors identified in a storm water best management practices plan in accordance with Part IV.7.b.(9).a. of this permit shall sign a copy of the following certification statement before conducting any professional service at the site identified in the storm water best management practices plan:

"I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification." The certification must include the name and title of the person providing the signature in accordance with Part II of this permit; the name, address, and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

8. All storm water best management practices plans required under this permit are considered reports that shall be available to the public under KRS 61.870 - 61.884. The owner or operator of a facility with storm water discharges covered by this permit shall make plans available to members of the public upon written request by the public. However, the permittee may claim any portion of a storm water best management practices plan as confidential in accordance with KRS 224.035.

9. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

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JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

FACT SHEET

GENERAL KPDES PERMIT FOR STORM WATER POINT SOURCES FROM OTHER FACILITIES

Permit No.: KYR000000
Date: July 10, 1997

1. COVERAGE UNDER THIS PERMIT

A. Permit Area. The permit covers all areas of the Commonwealth of Kentucky.

B. Eligibility.

1. Except for storm water discharges identified under paragraph 1.B.3. of this Fact Sheet, this permit may cover all new and existing point source discharges of storm water associated with industrial activity to waters of the Commonwealth of Kentucky.

2. This permit may authorize storm water discharges associated with industrial activity that are mixed with storm water discharges associated with industrial activity from construction activities provided that the storm water discharge from the construction activity is in compliance with the terms, including applicable Notice of Intent (NOI) or application requirements, of a different KPDES general permit or individual permit authorizing such discharges.

3. Limitations on Coverage. The following storm water discharges associated with industrial activity are not authorized by this permit:

a. storm water discharges associated with industrial activity that are mixed with sources of non-storm water other than non-storm water discharges that are:

(i) in compliance with a different KPDES permit; or

(ii) non-storm water discharges that are identified by and in compliance with Part III.F.2 of this permit.

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b. storm water discharges associated with industrial activity which are subject to an existing effluent limitation guideline addressing storm water (or a combination of storm water and process water);[1]

c. storm water discharges associated with industrial activity that are subject to an existing NPDES individual or general permit or which are issued a permit in accordance with Part II of this permit. Such discharges may be authorized under this permit after an existing permit expires provided the existing permit did not establish numeric limitations for such discharges; and

d. storm water discharges associated with industrial activity that the Director has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard.

e. storm water discharges associated with industrial activity that would adversely affect a listed endangered or threatened species or its critical habitat; and

f. storm water discharges associated with industrial activity from inactive mining, inactive landfills, or inactive oil and gas operations occurring on Federal lands where an operator cannot be identified.

4. Storm water discharges associated with industrial activity which are authorized by this permit may be combined with other sources of storm water which are not classified as associated with industrial activity pursuant to 40 CFR 122.26(b)(14), so long as the resulting discharge is in compliance with this permit.

C. <u>Authorization</u>.

1. Dischargers of storm water associated with industrial activity must submit a Notice of Intent (NOI) in accordance with the requirements of Part 2 of this fact sheet, to be authorized to discharge under this general permit.

2. Unless notified by the Director to the contrary, owners or operators who submit such notification are authorized to discharge storm water associated with industrial activity under the terms and conditions of this permit 48 hours after the date that the NOI is postmarked.

3. The Director may deny coverage under this permit and require submittal of an application for an individual NPDES permit based on a review of the NOI or other information.

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[1] For the purpose of this permit, the following effluent guideline limitations address storm water: cement manufacturing (40 CFR 411); animal feedlots (40 CFR 412); fertilizer manufacturing (40 CFR 418); petroleum refining (40 CFR 419); phosphate manufacturing (40 CFR 422); steam electric (40 CFR 423); coal mining (40 CFR 434); mineral mining and processing (40 CFR 436); ore mining and dressing (40 CFR 440); and asphalt emulsion (40 CFR 443 Subpart A). This permit may authorize storm water discharges associated with industrial activity which are not subject to an effluent limitation guideline even where a different storm water discharge at the facility is subject to an effluent limitation guideline.

KPDES

STORM WATER GENERAL PERMIT

PERMIT NO.: KYR00

GENERAL KPDES PERMIT FOR STORM WATER POINT SOURCE DISCHARGES

OTHER FACILITIES

In compliance with the provisions of the Kentucky Revised Statutes Chapter 224 and pursuant to 401 KAR 5:055, Section 5, the following discharges are authorized:

All new and existing storm water discharges associated with industrial activity that are required to have a permit pursuant to 401 KAR 5:055, Section 1 and KRS 224.16-050.

Specifically excluded from authorization under this permit are operations that:

1. Are subject to an existing individual KPDES permit or application,
2. Are subject to a promulgated storm water effluent guideline or standard,
3. The Director has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard or to the impairment of a 303(d) listed water, or
4. Are into a surface water that has been classified as an Exceptional or Outstanding or National Resource Water.

The receiving water for any discharge authorized by this permit is located within the political boundaries of the Commonwealth of Kentucky. Such authorization is in accordance with the effluent limitations and other conditions set forth in PARTS I, II, III, and IV hereof. This permit consists of this cover sheet, PART I 2 pages, PART II 1 page, PART III 1 page, and PART IV 4 pages.

This permit shall become effective on October 1, 2002.

This permit and the authorization to discharge shall expire at midnight, September 30, 2007.

9/13/02
Date Signed

Jeffrey W. Pratt, Director
Division of Water

Robert W. Logan
Commissioner

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
Division of Water, Frankfort Office Park, 14 Reilly Road
Frankfort, Kentucky 40601
Printed on Recycled Paper

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge storm water runoff associated with industrial activity from each outfall identified.

Such discharges shall be monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)		Other Units (Specify)			
	Yearly Avg.	Daily Max.	Yearly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow, m^3/day (mgd)	Report	Report	N/A	N/A	2/Year	Estimate
Chemical Oxygen Demand (mg/l)	N/A	N/A	Report	Report	2/Year	Grab
Oil & Grease (mg/l)	N/A	N/A	Report	Report	2/Year	Grab
Total Suspended Solids (mg/l)	N/A	N/A	Report	Report	2/Year	Grab
Other Pollutants* (mg/l)	N/A	N/A	Report	Report	2/Year	Grab

The pH of the effluent shall be monitored twice per Year (2/Year) by grab sample.

There shall be no discharge of floating solids or visible foam or sheen in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point after final treatment, but prior to actual discharge or mixing with receiving waters.

Grab samples shall be taken during the first 30 minutes of discharge, if possible. If conditions are not safe for sampling due to local flooding, high winds, electrical storms, etc., the permittee shall collect a sample once dangerous conditions have passed and must provide documentation as to why timely samples could not be collected.

Samples shall be collected from a discharge resulting from a storm event that is greater than 0.1 inch and is at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Monitoring requirements do not apply to storm events greater in magnitude than the 10-year, 24-hour storm event.

Monitoring frequency may be increased at any time at the discretion of the Division of Water (401 KAR 5:070, Section 5).

Report means specific effluent limitations do not exist.

* The permittee shall monitor for any pollutant limited in an effluent guideline (Federal Categorical Standards, 40 CFR, Subchapter N) to which the facility is subject, including guidelines for storm water and/or process wastewater.

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B. Schedule of Compliance

The permittee shall achieve compliance with all requirements upon notification of coverage under this general permit.

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STANDARD CONDITIONS FOR KPDES PERMIT

The permittee is also advised that all KPDES permit conditions in KPDES Regulation 401 KAR 5:065, Section 1 will apply to all discharges authorized by this permit.

This permit has been issued under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal, and local agencies.

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PART III

OTHER REQUIREMENTS

A. Retention of Records:

The permittee shall keep all monitoring results six (6) years from the date the sample was taken. Routine submittal of monitoring results is not required. The permittee shall record monitoring results for each outfall on the attached form, which may be copied as needed. The permittee shall make the monitoring results available upon request to the Director.

The permittee shall keep the BMP plan developed in accordance with PART IV, of this permit, one (1) year after coverage under this permit ends.

These periods may be extended by request of the Director of Water at any time.

B. Reopener Clause:

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under 401 KAR 5:050 through 5:080 and KRS 224 if the effluent standard or limitation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or

2. Controls any pollutant not limited in this permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of KRS Chapter 224 when applicable.

C. Other Discharges:

All discharges covered by this permit shall be composed entirely of storm water except for discharges from fire fighting activities, fire hydrant flushing, potable water sources, waterline flushing, irrigation or lawn watering, detergent free building or pavement washing where spills or leaks of toxic materials have not occurred or have been completely removed, air conditioning condensation, natural springs, and uncontaminated ground water sources.

This permit can only authorize storm water discharges from industrial activity that are mixed with storm water discharges from construction activity if the construction activity discharge is in compliance with a different KPDES permit.

D. Releases in Excess of Reportable Quantities:

The presence of hazardous substances or oil in the storm water discharge shall be minimized in accordance with the BMP plan. Coverage under this permit does not relieve the permittee of the reporting requirements of 40 CFR Part 117 and 40 CFR Part 302.

E. Representative Discharge:

When two (2) or more outfalls discharge substantially identical effluents, the permittee may sample only one (1) outfall and may report those monitoring results for the substantially identical outfalls. For each outfall not monitored, an estimate of the size of the drainage area and a determination if the runoff coefficient is high (over 65%), medium (40% to 65%), or low (under 40%) shall be made and recorded.

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PART IV

BEST MANAGEMENT PRACTICES

A storm water Best Management Practices (BMP) plan shall be developed in accordance with good engineering practices for each facility covered by this permit. The BMP plan shall identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the facility. The BMP plan shall describe and ensure the implementation of practices that are to be used to reduce the pollutants in storm water discharges and to assure compliance with the terms and conditions of this permit. Facilities must implement the BMP plan required by this PART as a condition of this permit.

The BMP plan shall:

1. Be completed 180 days after the date of coverage under this permit.

2. Be implemented 365 days after the date of coverage under this permit.

Signature and Plan Review:

The BMP plan shall be signed in accordance with PART II and shall be kept onsite.

The permittee shall make the BMP plan available upon request to the Director, or in the case of a storm water discharge to a MS4 with a KPDES permit, to the operator of the system.

After a review, the permittee may be notified that the BMP plan does not meet the minimum requirements of this PART. In that case, the permittee shall modify the BMP plan within 30 days of notification and shall submit a written certification that the requested changes have been made.

BMP plans required by this permit are considered reports that shall be made available to the public, upon written request by the public, in accordance with Section 308(b) of the Clean Water Act (CWA). However, the permittee may claim any portion of the BMP plan as confidential, in accordance with 40 CFR Part 2.

Plan Modification:

The permittee shall modify the BMP plan when there is a change in design, construction, operation or maintenance of the facility which has a significant effect on the potential for the discharge of pollutants to waters of the Commonwealth and shall implement the changes within 30 days.

Modification for Ineffectiveness:

The permittee shall amend the BMP plan if it proves to be ineffective in controlling the discharge of pollutants to waters of the Commonwealth and shall implement the changes within 30 days.

Other Plans:

Spill Prevention Control and Countermeasure (SPCC) plans developed for a facility under section 311 of the CWA, or other plans required by a KPDES permit, may be incorporated or incorporated by reference into the BMP plan required by this PART.

Minimum Requirements:

The BMP plan shall include, as a minimum, Items A through P.

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A. Potential Pollutant Sources:

The BMP plan shall include a clear description of all the potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges, or which may discharge pollutants during dry weather to storm sewers draining the facility. Potential pollutants from loading and unloading areas, outdoor storage facilities, outdoor manufacturing or processing operations, dust generating activities, and outdoor waste disposal sites shall be included. For each pollutant present, a prediction of the direction of flow and of the likely parameters present, such as Biochemical Oxygen Demand, shall be made.

The BMP plan shall include an inventory of all materials that are, or have been, handled, treated, stored, or disposed of in a manner to allow exposure to storm water and a summary of any existing discharge sampling data indicating the level of pollutants in storm water discharges from the facility.

The BMP plan shall include a description of the method and location of on-site storage or disposal, management practices used to minimize contact of materials with storm water, and any storm water treatment provided.

B. Site Map:

The BMP plan shall include a site map showing each storm water outfall and its drainage area, any structural control measures and all surface water bodies. The site map should show fueling stations, vehicle and equipment maintenance and cleaning areas, loading and unloading areas, storage or disposal areas, liquid storage tanks, processing areas, and locations where materials are exposed to precipitation.

C. Spills and Leaks:

The BMP plan shall include a list of significant spills or leaks of toxic or hazardous materials that have occurred at the facility. The location of any major spill or leak shall be indicated on the site map.

D. Storm Water Control Measures:

The BMP plan shall include a clear description of what storm water runoff control measures are used. The following control measures shall be used as a minimum.

1. Good Housekeeping - A clean, orderly facility shall be maintained.

2. Preventive Maintenance - Storm water management devices shall be properly maintained, such as cleaning catch basins and oil/water separators. Equipment and systems shall be inspected and tested as necessary to uncover conditions that could cause breakdowns or failures resulting in the discharge of pollutants to surface waters.

3. Spill Prevention and Response Procedures - Areas where potential spills could occur, and their drainage points, shall be identified. Clean up procedures and the necessary equipment shall be made available to the appropriate personnel. Where appropriate, the use of devices such as diversion valves should be considered.

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4. Inspections - Qualified personnel shall inspect designated areas of the facility and equipment at appropriate intervals specified in the BMP plan. Follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections and follow up actions shall be maintained.

5. Employee Training Programs - Employee training programs shall be held to inform personnel, at all levels of responsibility, of the components and the goals of the BMP plan. Periodic training should address topics such as spill response, good housekeeping, and material management practices. Dates of employee training should be designated.

6. Non-Storm Water Certification - A certification that all discharges have been tested or evaluated for the presence of non-storm water flows shall be included. The certification shall include a list of any potential significant sources of non-storm water flows, the test or evaluation results, the evaluation criteria or testing method used, the date of the test or evaluation, and the outfalls that were observed during the test or evaluation.

   If certification is not feasible, the BMP plan shall include a list of any potential significant sources of non-storm water flows and shall indicate why the certification was not feasible. A permittee that is unable to provide the certification must notify the Division within 180 days of coverage under this permit. The notification shall include a clear description of any test conducted for the presence of non-storm water flows, explain the test results or other relevant observations and list potential sources of non-storm water flows.

7. Sediment and Erosion Control - Areas that have a high potential for soil erosion due to topography, local activities, or other factors shall be identified. Measures that will limit erosion shall be implemented.

8. Management of Runoff - A narrative consideration of the suitability of traditional storm water management practices (practices other than those that control the source of pollutants) to divert, infiltrate, use, or otherwise manage storm water runoff in a manner that reduces storm water discharges from the facility shall be included. Those measures determined to be reasonable and appropriate, based upon the potential of various sources at the facility to contribute pollutants to the storm water discharges, shall be implemented and maintained. Appropriate measures may include collecting and using storm water in a process or for irrigation or using vegetative swales, infiltration devices, retention/detention devices, and snow management procedures.

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E. Comprehensive Compliance Evaluation:

Qualified personnel shall conduct a facility compliance evaluation at least once a year. (At least once every three (3) years for remote inactive mining sites.)

Material handling areas and other potential sources of pollution identified in the BMP plan shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Structural storm water pollution prevention measures and sediment and control measures identified in the BMP plan shall be observed to ensure that they are operating correctly. A visual inspection of the equipment needed to implement the BMP plan, such as spill response equipment, shall be made.

Based on the results of the inspection, the list of potential pollutant sources shall be revised if necessary. Changes to the BMP plan shall be made within two (2) weeks of the inspection and changes shall be implemented within 12 weeks.

A report summarizing the scope of the inspection, personnel making the inspection, the date of inspection, major observations relating to the implementation of the BMP plan, and actions taken shall be made and retained as part of the BMP plan for at least three (3) years after the date of inspection, or until one (1) year after coverage under this permit ends. The report shall be signed in accordance with PART II.

F. Non-Storm Water Discharges:

The BMP plan shall identify and ensure the implementation of appropriate pollution prevention measures for any non-storm water component of a discharge as listed in PART III C. except for flows from fire fighting activities.

Additional Requirements for Salt Storage

Salt piles that generate a storm water discharge to waters of the Commonwealth shall be enclosed or covered while not in use to prevent exposure to precipitation.

DISCHARGE MONITORING REPORT (DMR)

NAME _____

ADDRESS _____

_____

FACILITY _____

LOCATION _____

_____

PERMIT NUMBER _____ DISCHARGE NUMBER _____

MONITORING PERIOD:

FROM _____ TO _____

PARAMETER		QUALITY OR LOADING		UNITS	QUALITY OR CONCENTRATION			UNITS	NO EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM		MINIMUM	AVERAGE	MAXIMUM				
	Sample Measurement										
	Permit Requirement										
	Sample Requirement										
	Permit Requirement										
	Sample Measurement										
	Permit Requirement										
	Sample Measurement										
	Permit Requirement										
	Sample Measurement										
	Permit Requirement										
	Sample Measurement										
	Permit Requirement										

NAME/TITLE
PRINCIPLE EXECUTIVE OFFICER

TYPED OR PRINTED

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. See 401 KAR5: 065 and KRS 224.994. (Penalties under these statutes may include fines up to $15,000 per day of violation or by imprisonment for not more than one year, or by both)

SIGNATURE
PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

PHONE

DATE

COMMENT:

RMR 0259

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JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

FACT SHEET

GENERAL KPDES PERMIT FOR STORM WATER POINT SOURCE DISCHARGES

OTHER FACILITIES

KPDES No.: KYR00
Date: July 22, 2002

1. COVERAGE UNDER THIS GENERAL PERMIT

Area of Coverage:

This permit covers all areas of the Commonwealth of Kentucky.

Discharges Eligible for Coverage:

This permit covers all new and existing storm water discharges associated with industrial activity from facilities not subject to another permitted category of discharge.

Limitations on Coverage:

This permit does not authorize discharges that:

1. Are subject to an existing individual KPDES permit or application,
2. Are subject to a promulgated storm water effluent guideline or standard,
3. The Director has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard or to the impairment of a 303(d) listed water, or
4. Are into a surface water that has been classified as an Exceptional or Outstanding or National Resource Water.

2. REQUIREMENTS FOR GENERAL PERMIT COVERAGE

Notice of Intent:

A signed copy of a Notice of Intent (NOI) form must be submitted to the following address 48 hours before industrial activity begins:

Kentucky Division of Water
KPDES Branch
Inventory and Data Management Section
14 Reilly Road
Frankfort, Kentucky 40601

vb

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Unless notified by the Director to the contrary, owners or operators who submit the above notification are authorized to discharge storm water associated with industrial activity under the terms and conditions of this permit. Discharge may begin 48 hours after the NOI is postmarked, even if the permittee has not yet received a copy of the general permit from the Division of Water.

Coverage under this general permit may be denied and submittal of an application for an individual KPDES permit may be required based on a review of the NOI and/or other information.

Notice of Termination:

When all storm water discharges associated with industrial activity are eliminated the owner or operator must submit a signed copy of a Notice of Termination (NOT) form in order to end coverage under this general permit and nullify its requirements. NOTs are to be sent to the above address.

Change of Ownership:

When the owner or operator of a facility covered by this permit changes, the new owner or operator must submit a notice 48 hours before the change in order to transfer coverage under this general permit. Change of ownership notices are to be sent to the above address.

3. ADDITIONAL INFORMATION

Municipal Notification:

Facilities which discharge storm water associated with industrial activity to a municipal separate storm sewer system (MS4) shall submit a signed copy of the NOI to the operator of the MS4 48 hours before industrial activity begins.

Other Storm Water Discharges:

Storm water discharges authorized by this permit may be combined with other sources of storm water that are not associated with industrial activity, if the resulting discharge is in compliance with this permit.

4. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Discharge Description	Effluent Characteristics	Limitations: Yearly Average	Limitations: Daily Maximum	Applicable Water Quality Criteria
Storm Water Associated with Industrial Activity	Flow	Report	Report	401 KAR 5:065, Section 2(8)
	Chemical Oxygen Demand	Report	Report	401 KAR 5:065, Section 2(8)
	Oil & Grease	Report	Report	401 KAR 5:065, Section 2(8)
	Total Suspended Solids	Report	Report	401 KAR 5:065, Section 2(8)
	Other Pollutants*	Report	Report	401 KAR 5:065, Section 2(8)
	pH	Report	Report	401 KAR 5:065, Section 2(8)

* The permittee shall monitor for any pollutant limited in an effluent guideline (Federal Categorical Standards, 40 CFR, Subchapter N) to which the facility is subject, including guidelines for storm water and/or process wastewater.

The following categories are addressed by 40 CFR, Subchapter N: dairy products processing (Part 405), grain mills (Part 406), canned & preserved fruits & vegetables processing (Part 407), sugar processing (Part 409), textile mills (Part 410), cement manufacturing (Part 411), animal feedlots (Part 412), electroplating (Part 413), organic chemical, plastics & synthetic fibers (Part 414), inorganic chemicals manufacturing (Part 415), soap & detergent manufacturing (Part 417), fertilizer manufacturing (Part 418), petroleum refining (Part 419), iron & steel manufacturing (Part 420), nonferrous metals manufacturing (Part 421), phosphate manufacturing (CFR 40 422), steam electric (Part 423), ferroalloy manufacturing (Part 424), leather tanning (Part 425), glass manufacturing (Part 426), asbestos manufacturing (Part 427), rubber manufacturing (Part 428), timber products processing (Part 429), pulp, paper & paperboard manufacturing (Part 430), paper & board mills (Part 431), meat products (Part 423), metal finishing (Part 433), coal mining (Part 434), oil & gas extraction (Part 435), mineral mining & processing (CFR 40 436), pharmaceutical manufacturing (Part 439), ore mining & dressing (Part 440), asphalt emulsion (Part 443), paint formulating (Part 446), ink formulating (Part 447), gum & wood chemicals manufacturing (Part 454), pesticide manufacturing (Part 455), explosives manufacturing (Part 457), carbon black manufacturing (Part 458), photographic (Part 459), hospitals (Part 460), battery manufacturing (Part 461), plastics molding & forming (Part 463), metal molding & casting (Part 464), coil coating (Part 465), porcelain enameling (Part 466), aluminum forming (Part 467), copper forming (Part 468), electric components (Part 469), and nonferrous metals forming & metal powders (Part 471).

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Monitoring Requirements:

An estimate of flow shall be made twice per year. A grab sample shall be taken twice per year for Chemical Oxygen Demand, Oil & Grease, Total Suspended Solids, Other Pollutants, and pH.

5. JUSTIFICATION OF PERMIT CONDITIONS

The following regulations are pursuant to KRS 224.10-100, 224.70-100, and 224.70-110.

Flow, Chemical Oxygen Demand, Oil & Grease, Total Suspended Solids, Other Pollutants, and pH - The monitoring requirements for these parameters are consistent with 401 KAR 5:065, Section 2(8).

Best Management Practices (BMP):

This requirement is consistent with 401 KAR 5:065, Section 2(10).

Antidegradation:

The conditions of 401 KAR 5:029, Section 1(1) will be satisfied by coverage under this permit. A review under Section 1(2), (3), and (4) will not be applicable.

6. COMPLIANCE SCHEDULE

The permittee shall achieve compliance with all requirements upon notification of coverage under this general permit.

7. PERMIT DURATION

This permit is valid for five (5) years. Upon issuance of a new general permit, the permittee will have coverage automatically renewed. A new NOI or other notification is not necessary.

8. PERMIT INFORMATION

The application, draft permit, fact sheet, public notice, comments received, and additional information is available from the Division of Water at 14 Reilly Road, Frankfort Office Park, Frankfort, Kentucky 40601.

9. REFERENCES AND CITED DOCUMENTS

All material and documents referenced or cited in this fact sheet are part of the permit information as described above and are readily available at the Division of Water Central Office. Information regarding these materials may be obtained from the person listed below.

10. CONTACT

Additional information concerning this permit may be obtained from Ronnie Thompson at the address noted in Item 8 or at (502) 564-2225, extension 423.

11. PUBLIC NOTICE INFORMATION

Please refer to the attached Final Permit Decision Cover Letter or Public Notice for details regarding the procedures for a final permit decision, deadline for comments, and other information required by 401 KAR 5:075, Sections 12 and 4(2)(e).

AIR POLLUTION CONTROL DISTRICT OF JEFFERSON COUNTY

850 Barret Ave., Louisville, Kentucky 40204

OPERATING PERMIT

Permit No. 292-03-O

Co/Plant ID 1465

Effective Date Aug 31, 2003 Expiration Date Aug 31, 2006 Permit Fee $202.00

Permission is hereby given by the Air Pollution Control District of Jefferson County to OPERATE PROCESS equipment located at:

River Metals Recycling, LLC, 2114 Metal Lane, Louisville, KY

in accordance with plans and specifications on file with the District and under the conditions stipulated on the reverse hereof. Permit covers:

Williams aluminum shredder

Max Permitted Cap 5,500 pounds per hour Permitted Oper Schedule 24x7x52 hr/yr

Fuels Used: Primary NA Secondary NA

Allowable Emissions	TSP	SO2	VOC	CO	NOx	TAPS
Lbs/Hr	6.71					*
Tons/Yr						

Special Restrictions on Emissions (see page 2)

No

Applicable Regulation(s) *5.12 and 7.08

The requirements of Regulation 1.04 shall be followed for any source testing.

Control Reference *Permit 293-03

Neither EMISSIONS OFFSET nor PSD applicable in the granting of this permit.

Emissions Bank Code Ref.

Bubble Reference

Applicant for Permit Harry Holden, P.E.

Title Corporate Engineer

Application Received Aug 06, 2002

Mike Brown 8-25-03
Reviewing Engineer (088).

Jesse M. Goldsmith
Air Pollution Control Officer

Additional conditions applicable to this permit are attached hereto and made part hereof on pages 2 - 3.

(SOF: 11649-Aug 25, 2003)

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ADDITIONAL CONDITIONS

1. Standards

a. PM

The owner or operator shall not allow PM emissions to exceed 6.72 lb/hr for the shredder. (Regulation 7.08, section 3.1.2) (See Comment 2)

b. Opacity

The owner or operator shall not allow visible emissions to equal or exceed twenty percent (20%) opacity for the shredder. (Regulation 7.08, section 3.1.1)

c. TAP

The owner or operator shall limit the TAP emissions to less than the Adjusted Significance Level (ASL) calculated with a stack height of eleven feet (11') and one hundred sixty-eight (168) hours per week for the Aluminum Shredder. (Regulation 5.12, section 2) (See Comment 2)

2. Monitoring (Regulation 2.03, section 5.1)

a. PM

i. For the monitoring of the baghouse see Permit 293-03-O.

ii. For the monitoring of the Aluminum Shredder, see recordkeeping.

b. Opacity

For the monitoring of the baghouse see Permit 293-03-O.

c. TAP

See Comment 2.

3. Record keeping (Regulation 2.03, section 5.1)
These records shall be maintained for a minimum of 5 years and be made readily available to the District upon request.

a. PM

i. There are no compliance recordkeeping requirements for the Shredder. See Comment 2.

ii. See Permit 293-03 for the recordkeeping for the baghouse.

b. Opacity

For the recordkeeping of the baghouse see Permit 293-03-O.

c. TAP

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See Comment 2.

4. Reporting (Regulation 2.03, section 5.1)

a. PM

There are no compliance reporting requirements for this pollutant.

b. Opacity

There are no compliance reporting requirements for this standard.

c. TAP

There are no compliance reporting requirements for this pollutant.

COMMENTS/EXPLANATIONS

1. Permit fees are based on plantwide emissions of 29.4 tons per year of PM.

2. The ASL is calculated using: M for Aluminum oxide is 0.002551 lb/hr, K = 12 based on a height of release of 11 feet, Time is 168 hours per week, yields: ASL = .002551 * 12 * 168/168 = 0.030612 lb/hr. Using AP-42 emission factors for Metallic Minerals Processing, January '95, 11.24-4, air emissions for dry grinding without air conveying is: 2.4 lb/ton processed (PM). Adjusting this emission factor to account for shredding processed aluminum instead of grinding metallic ores, we multiply by 0.05 thus, 2.4 * 0.05 = 0.12 lb/ton processed. The existing equipment can process 2.75 tons/hr, which is 2.75 ton/hr * 0.12 lb/ton processed = 0.33 lbs of emissions/hr, before baghouse. Baghouse efficiency is +96%, thus 0.33 * (1 - 0.96) = 0.0132 lb/hr. Therefore, the District has determined that the TAP emission Standards cannot be exceeded similarly the same for the PM emission limit of 6.71 lb/hr. Therefore, the District has determined that monitoring and recordkeeping are not required for TAPs and PM compliance, other than on the control device listed on permit #293-03.

3. This permit was originally issued as construction permit 286-02-C.

AIR POLLUTION CONTROL DISTRICT OF JEFFERSON COUNTY

850 Barret Ave. - Louisville, Kentucky 40204

OPERATING PERMIT

Permit No: 1283-03-OP Co/Plant ID 1465

Effective Date Aug 31, 2003 Expiration Date Aug 31, 2008 Permit Fee $202.00

Permission is hereby given by the Air Pollution Control District of Jefferson County to OPERATE CONTROL equipment located at:

River Metals Recycling, LLC, 2114 Metal Lane, Louisville, KY

in accordance with plans and specifications on file with the District and under the conditions stipulated on the reverse hereof. Permit covers:

One (1) pulse-jet baghouse, make ETA 2000.

Max Permitted Cap 15,000 cfm Permitted Oper Schedule 24x7x52 hr/yr

Fuels Used: Primary NA Secondary NA

Allowable Emissions	TSP	SO2	VOC	CO	NOx	TAPS
Lbs/Hr	*					*
Tons/Yr						

Special Restrictions on Emissions (see page 2): Yes

Applicable Regulation(s): *5.12 and 7.08

The requirements of Regulation 1.04 shall be followed for any source testing.

Process Reference Permit 292-03

Neither EMISSIONS OFFSET nor PSD applicable in the granting of this permit.

Emissions Bank Code Ref.

Bubble Reference

Applicant for Permit: Barry Holdent P.E.

Title Corporate Engineer

Application Received Aug 08, 2002

Mike Brown 8-25-03
Reviewing Engineer (OSE)

Jesse M. Goldsmith
Air Pollution Control Officer

Additional conditions applicable to this permit are attached hereto and made part hereof on pages 2 - 3. (SOF: 11649 Aug 25, 2003)

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ADDITIONAL CONDITIONS

1. **Standards**

a. **PM**

See Permit 292-03-0.

b. **Opacity**

See Permit 292-03-0.

c. **TAP**

See Permit 292-03-0.

2. **Monitoring** (Regulation 2.03, section 5.1)

a. **PM**

The owner or operator shall, monthly, perform a visual inspection of the structural and mechanical integrity of the dust collector for signs of damage, air leakage, corrosion, etc. and repair as needed.

b. **Opacity**

The owner or operator shall conduct a monthly one-minute visible emissions survey, during normal operation and daylight hours, of the dust collector. No more than four emission points shall be observed simultaneously.

At emission points where visible emissions are observed, the owner or operator shall initiate corrective action within eight hours of the initial observation. If the visible emissions persist, the owner or operator shall perform or cause to be performed a Method 9, in accordance with 40 CFR Part 60, Appendix A, within 24 hours of the initial observation. If the opacity standard is exceeded, the owner or operator shall report the exceedance to the District, according to Regulation 1.07, and take all practical steps to eliminate the exceedance.

c. **TAP**

See Permit 292-03-0.

3. **Record keeping** (Regulation 2.03, section 5.1)
These records shall be maintained for a minimum of 5 years and be made readily available to the District upon request.

a. **PM**

The owner or operator shall keep records, monthly, of the visual inspection of the structural and mechanical integrity of the dust collector. Records shall include the date, condition of the dust collector and the name or initials of the person making the record.

b. **Opacity**

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The owner or operator shall maintain records of all Method 9 tests and visible emission surveys.

c. TAP

See Permit 292-03-O.

4. Reporting (Regulation 2.03, section 5.1)

a. PM

See Permit 292-03-O.

b. Opacity

See Permit 292-03-O.

c. TAP

See Permit 292-03-O.

COMMENTS/EXPLANATIONS

1. Permit fees are based on plantwide emissions of 29.4 tons per year of PM.

2. This permit was originally issued as construction permit 287-02-C.

Louisville Metro
Air Pollution Control District

850 Barret Avenue • Louisville, KY 40204-1745

Rcd 1-2-08

STATEMENT OF FEES No. 13312

RIVER METAL RECYCLING LLC
BARRY HOLDEN
PO BOX 8521
LOUISVILLE KY 40206-0521

Company River Metals Recycling, LLC, 2114 Metal Lane, Louisville, KY 40206

Applicant Barry Holden, P.E. Title Corporate Engineer

The CONSTRUCTION of fuel burning, process, or air pollution control equipment for the above facility has been approved by the Air Pollution Control Officer.

Payment is required within thirty(30) days of the date of this statement. Enclose the PINK copy with your payment; the WHITE copy is for your records.

Please note that failure to remit payment in a timely manner may cause issuance of a notice of violation and suspension of the enclosed permit(s).

405-05-C

Permit letter legend: C - Construction, O - Operating, B - Banking

Total permits ISSUED this statement: 1

Total fees due: $1165

Evan Addison

Deputy Air Pollution Control Officer (149)

Date: Dec 19, 2007

(Transaction Number: 13345, Co/Plant ID: 1465)

Mailed 1-7-08
Ck# 0009324

RMR 0270

Louisville Metro Air Pollution Control District
850 Barret Avenue
Louisville, Kentucky 40204-1745

Permit No. 405-05-C

Plant ID 1465

Effective Date 11-30-2007 Expiration Date 11-30-2008 Permit Fee $ 1165.00

River Metals Recycling, LLC
2114 Metal Lane
Louisville, KY 40206

is authorized to construct the described process or process equipment by the Louisville Metro Air Pollution Control District. Authorization is based on information provided with the application submitted by the company and in accordance with applicable regulations and the conditions specified herein.

Process or process equipment description:

One (1) steel shredder with conveyor system for the recycling of automobiles and miscellaneous scrap steel.

Applicable Regulation(s): 7.08

Process and/or control reference(s): NA

Responsible Official (RO)	Barry Holden	Application Received 05-19-2004
RO Title	Director of Quality, Safety & Environmental Affairs	
Permit Writer	Chris Gerstle	Air Pollution Control Officer
Date of Final Draft	11-16-2007	
Application No.	9687	

This permit covers only the provisions of Kentucky Revised Statutes Chapter 77 Air Pollution Control, the regulations of the Louisville Metro Air Pollution Control District (District) and, where appropriate, certain federal regulations. The issuance of this permit does not exempt any owner or operator to whom it has been issued from prosecution on account of the emission or issuance of any air contaminant caused or permitted by such owner or operator in violation of any of the provisions of KRS 77 or District regulations. Any permit shall be considered invalid if timely payment of applicable fees is not made after receipt of the statement of fees (SOF). The permit contains general permit conditions and specific permit conditions. General conditions are applicable unless a more stringent requirement is specified elsewhere in the permit.

General Conditions

G1. The owner or operator of the affected facility covered by this permit shall notify the District of any process change, equipment change, material change, or change in method or hours of operation. This requirement is applicable to those changes that may have the potential for increasing the emission of air contaminants to a level in excess of the applicable limits or standards specified in this permit or District regulations.

G2. The owner or operator shall obtain new or revised permits from the District when: (See District Regulation 2.16 for Title V sources. See District Regulation 2.17 for FEDOOP sources. See District Regulation 2.03 for other sources.)

a. The company relocates to a different physical address.
b. The ownership of the company is changed.
c. The name of the company as shown on the permit is changed.
d. Permits are nearing expiration or have expired.

G3. The owner or operator shall submit timely application for changes according to G2. For minor sources only, the District does not require application for permit renewal. The District automatically commences the process of permit renewal for minor sources upon expiration. Timely renewal is not always achievable; therefore, the company is hereby authorized to continue operation in compliance with the latest District permit(s) until the District issues the renewed permit(s).

G4. The owner or operator shall not be authorized to transfer ownership or responsibility of the permit. The District may transfer permits after appropriate notification has been received and review has been made.

G5. The owner or operator shall pay the required permit fees within 30 days after issuance of the SOF by the District, unless other arrangements have been proposed and accepted by the District.

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G6. This permit allows operation 8,760 hours per year unless specifically limited elsewhere in this permit.

G7. The owner or operator shall submit emission inventory reports as required by Regulation 1.06.

G8. The owner or operator shall timely report abnormal conditions or operational changes which may cause excess emissions as required by Regulation 1.07.

Specific Conditions

S1. Standards

a. **PM**

The owner or operator shall not allow PM emissions to exceed 40.64 lb/hr. (Regulation 7.08, section 3.1.2)

b. **Opacity**

The owner or operator shall not allow visible emissions to equal or exceed 20% opacity. (Regulation 7.08, section 3.1.1)

S2. Monitoring (Regulation 2.03, section 5.1)

a. **PM**

See Specific Condition 3.a.

b. **Opacity**

The owner or operator shall conduct a monthly one-minute visible emissions survey, during normal operation and daylight hours, of the emission points. No more than four emission points shall be observed simultaneously. The opacity surveys can be performed on the building exhaust points if the process is inside an enclosure.

At emission points where visible emissions are observed, the owner or operator shall initiate corrective action within eight hours of the initial observation. If the visible emissions persist, the owner or operator shall perform or cause to be performed a Method 9, in accordance with 40 CFR Part 60, Appendix A, within 24 hours of the initial observation.

S3. **Record Keeping** (Regulation 2.03, section 5.1)

The owner or operator shall maintain the required records for a minimum of 5 years and make the records readily available to the District upon request.

a. **PM**

See Comment 1.

b. **Opacity**

The owner or operator shall maintain records, monthly, of the results of all visible emissions surveys and tests. Records of the results of any visible emissions survey shall include the date of the survey, the name of the person conducting the survey, whether or not visible emissions were observed, and what if any corrective action was performed. If an emission point is not being operated during a given month, then no visible emission survey needs to be performed and a negative declaration shall be entered in the record.

S4. **Reporting** (Regulation 2.03, section 5.1)

a. **PM**

There are no compliance reporting requirements for this pollutant.

b. **Opacity**

There are no compliance reporting requirements for this pollutant.

Comment

1. The District has performed a one time compliance demonstration on 9/9/05 and determined the PM emission limit cannot be exceeded.

2. The construction permit fees are based on emissions of less than fifty (50) and greater than ten (10) tons per year of PM.

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EPA/310-R-95-010

EPA Office of Compliance Sector Notebook Project

Profile of the Nonferrous Metals Industry

September 1995

Office of Compliance
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
401 M St., SW (MC 2221-A)
Washington, DC 20460

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II. INTRODUCTION TO THE NONFERROUS METALS INDUSTRY

This section provides background information on the Nonferrous Metals Industry and the organization of this sector's notebook.

II.A. Introduction and Background of the Notebook

The Standard Industrial Classification (SIC) code 33 is composed of establishments that engage in: the primary and secondary smelting and refining of ferrous and nonferrous metal from ore or scrap; rolling, drawing, and alloying; and the manufacturing and casting of basic metal products such as nails, spikes, wire, and cable. Primary smelting and refining produces metals directly from ores, while secondary refining and smelting produces metals from scrap and process waste. Scrap is bits and pieces of metal parts, bars, turnings, sheets, and wire that are off-specification or worn-out but are capable of being recycled.

Two metal recovery technologies are generally used to produce refined metals. Pyrometallurgical technologies are processes that use heat to separate desired metals from other less or undesirable materials. These processes capitalize on the differences between constituent oxidation potential, melting point, vapor pressure, density, and/or miscibility when melted. Examples of pyrometallurgical processes include drying, calcining, roasting, sintering, retorting, and smelting. Hydrometallurgical technologies differ from pyrometallurgical processes in that the desired metals are separated from undesirables using techniques that capitalize on differences between constituent solubilities and/or electrochemical properties while in aqueous solutions. Examples of hydrometallurgical processes include leaching, chemical precipitation, electrolytic recovery, membrane separation, ion exchange, and solvent extraction.

During pyrometallic processing, an ore, after being concentrated by beneficiation (crushing, washing, and drying) is sintered, or combined by heat, with other materials such as baghouse dust and flux. The concentrate is then smelted, or melted, in a blast furnace in order to fuse the desired metals into an impure molten bullion. This bullion then undergoes a third pyrometallic process to refine the metal to the desired level of purity. Each time the ore or bullion is heated, waste materials are created. Air emissions such as dust may be captured in a baghouse and are either disposed of or returned to the process depending upon the residual metal content. Sulfur is also captured, and when concentrations are above four percent it can be turned into sulfuric acid, a component of fertilizers. Depending upon the origin of the ore and its residual metals

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3) Repair and reuse is better than recycling.

Like the recycled tissue paper mill, secondary metal recycling is at best the lesser of two evils. While mining is an evil which will occur to fill whatever gap in demand recycling leaves, it does not make recycling pretty.

Shocking descriptions and photos of the recycling process have recently been posted at www.ban.org. It is difficult to discern how much Basel Action Network's photos of Guiyu, China[17] recycling disturb us because of the low working standards and primitive metal extraction technology, and how much we are bothered by images of poverty in any practice, be it bakeries, hospitals, or schoolyards. But BAN is correct that recycling is dirty. Even in the West, the industry has a dark underbelly. One of the largest electronic copper smelters in the US was forcibly closed last year, and the principles sent to prison, following an FBI and EPA action near East St. Louis, Illinois.[18]

Unlike aluminum cans and office paper, however, durables like electronic appliances (and car parts, used shoes, and pots and pans) have a third alternative. If they are built with sufficient quality and foresight, and are supported by manufacturer product support, they can be reused. The used car economy in the US is seven times the size of the new car economy, and if teenagers had no used cars to learn on, we would have a "driving skills gap" as well as a "digital divide".[19] Of course, average age of cars in poorer countries is even higher, and repair shops are even busier.

Assuming they are put to productive and good use, as an alternative to a newly manufactured product, more environmental and economic benefits are gained from repair and reuse of the first 3 monitors in our example than from recycling the other 7 monitors[20]. While recycling the 7 for individual materials saves mining, the recycling practice itself is nasty even in the US[21].

Monitors separated by make, model and condition for repair export to Eastern Europe

Repair is an activity which requires active support through our proposed business standards.

---

[17] http://www.ban.org *Exporting Harm: The High-Tech Trashing of Asia*

[18] Chemetco smelter http://www.newstribune.com/stories/010900/sta_0109000099.asp.

[19] Once again, we are not exploring the social costs and benefits of access.

[20] http://www.epa.gov/region1/compliance/solid/jtrfinal00.pdf a report on jobs created by electronics recycling infrastructure in Massachusetts

[21] (see link on Chemetco's Illinois smelter – the FBI and EPA shut down the company last year) http://www.newstribune.com/stories/010900/sta_0109000099.asp.

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content, various metals such as gold and silver may also be produced as by-products.

Production operations under this SIC code are subject to a number of regulations, including those imposed by the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), and the Clean Air Act (CAA). A number of RCRA-listed hazardous wastes are produced during primary refining operations which require the heating of ores to remove impurities. Specific pretreatment standards under the CWA apply to the processes associated with copper and aluminum. Lastly, large amounts of sulfur are released during copper, lead, and zinc smelting operations which are regulated under the CAA.

The Department of Commerce classification codes divide this industry by production process. The two-digit SIC code is broken down as follows:

SIC 331	-	Steel Works, Blast Furnaces, and Rolling and Finishing Mills (covered in a separate profile)
SIC 332	-	Iron and Steel Foundries (covered in a separate profile)
SIC 333	-	Primary Smelting and Refining of Nonferrous Metals
SIC 334	-	Secondary Smelting and Refining of Nonferrous Metals
SIC 335	-	Rolling, Drawing, and Extruding of Nonferrous Metals (not covered in this profile)
SIC 336	-	Nonferrous Foundries (castings) (not covered in this profile)
SIC 339	-	Miscellaneous Primary Metal Products (not covered in this profile).

II.B. Organization of the Nonferrous Metals Notebook

SIC 33 is a diverse industrial area which is comprised of many different manufacturing processes. It is because of this diversity of processes and related pollutant issues that this notebook focuses only on SIC 333 and 334: Primary and Secondary Nonferrous Metals Processing. The metals aluminum, copper, lead, and zinc were chosen for inclusion in this profile because they are the four most widely used nonferrous metals in the United States. Where possible, information for the four metals is discussed separately. However, due to the SIC groupings, in many instances data for all four metals and other processes are intermingled. Every effort will be made to highlight where separate information is

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III. PRIMARY AND SECONDARY ALUMINUM PROCESSING INDUSTRY

III.A. Characterization of Industry - Aluminum

This section provides background information on the size, geographic distribution, employment, production, sales, and economic condition of the Primary and Secondary Aluminum Industry. The type of facilities described within the document are also described in terms of their Standard Industrial Classification (SIC) codes.

III.A.1. Industry Size and Geographic Distribution - Aluminum

The following discussion is based upon the following materials: "Aluminum Know the Facts, July 1994," the Aluminum Association; "Industry & Trade Summary - Aluminum," the U.S. Trade Commission; and "U.S. Industrial Outlook 1994 - Metals," U.S. Department of Commerce.

Variation in facility counts occur across data sources due to many factors, including reporting and definitional differences. This document does not attempt to reconcile these differences, but rather reports the data as they are maintained by each source.

In 1993, the majority of primary aluminum producers (SIC 3334) in the U.S. were located either in the Northwest (39.1 percent of U.S. capacity) or the Ohio River Valley (31.1 percent of U.S. capacity), while most secondary aluminum smelters were located in Southern California and the Great Lakes Region. The reason for the difference in plant locations is due to the energy intensive nature of the primary aluminum smelting process and the cost of fuels. Primary smelters are located in the Northwest and Ohio River Valley to take advantage of the abundant supplies of hydroelectric and coal-based energy, while secondary smelters locate themselves near major industrial and consumer centers to take advantage of the large amounts of scrap generated. Secondary smelting uses 95 percent less energy to produce the same product than primary reduction. On the average, a third of primary production costs are attributable to the cost of energy.

The domestic primary aluminum smelting industry consists of 23 smelting facilities operated by 13 firms which employ approximately 20,000. Of the thirteen firms, four integrated producers, Alcoa, Alumax, Reynolds, and Kaiser, accounted for 63 percent of 1993's capacity. The secondary smelting industry operates an estimated 68 plants employing

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3,600. These figures have remained stable since 1988 and reflect an industry that emerged strong and competitive following the contractions and restructuring of the early 1980's that were caused by worldwide price swings and supply/demand disequilibrium.

About 40 percent of the domestic supply of aluminum is recovered by secondary refiners (SIC 334) from both purchased new and old aluminum scrap. New scrap is material generated during the fabrication of aluminum products. Old scrap includes products such as aluminum pistons and other aluminum engine or body parts from junked cars, used aluminum beverage cans, doors and siding, and used aluminum foil. In 1993, 2.3 million metric tons (Mmt) of metal, valued at an estimated $3.5 billion, were recovered from both new and old aluminum scrap. Of this total, approximaterly 55 percent was recovered from old scrap. Recycling rates for aluminum beverage containers reached 63 percent (60 billion cans) in 1993, keeping more than two billion pounds of material out of landfills.

III.A.2. Product Characterization - Aluminum

The primary and secondary aluminum industry produces ingots of pure (greater than 99 percent) aluminum that serve as feedstock for other materials and processes. Within the U.S., the leading end-users of aluminum come from three industries; containers and packaging, transportation, and building and construction. In 1993, demand from the three industries accounted for an estimated 60 percent of the eight Mmt of aluminum ingot and semifabricated products produced, with containers and packaging alone accounting for more than 25 percent of total shipments. Examples of materials produced with aluminum are: sheet metal; aluminum plate and foil; rod, bar, and wire; beverage cans, automobiles, aircraft components, and window/door frames.

III.A.3. Economic Trends - Aluminum

The amount of aluminum a plant could produce if working at engineered (full) capacity held steady in 1993. This was due to two factors: reduced hydroelectric supplies in the Northwest and falling aluminum prices. Hydroelectric supplies were reduced in the Northwest due to drought. Prices for primary aluminum fell to record-lows in 1993 despite a slight global increase in demand, due in large part to a flood of exports from the former Soviet republics.

U.S. aluminum shipments increased 12 percent in 1994, based on increased demands in the beverage can stock and transportation sectors.

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dioxide from the reduction cells; and fluorides, vaporized organics and sulfur dioxide from the anode baking furnaces. A variety of control devices such as wet scrubbers are used to abate emissions from reduction cells and anode baking furnaces.

Wastewaters generated from primary aluminum processing are produced during clarification and precipitation though much of this water is fed back into the process to be reused.

Solid-phase wastes are generated at two stages in the primary aluminum process; red mud produced during bauxite refining, and spent potliners from the reduction process. Red mud normally contains significant amounts of iron, aluminum, silicon, calcium, and sodium. The types and concentrations of minerals present in the mud depends on the composition of the ore and the operating conditions in the digesters. Red mud is managed on site in surface impoundments, and has not been found to exhibit any of the characteristics of hazardous waste (1990 Report to Congress on Special Wastes from Mineral Processing). The process does however, generate hazardous waste. The carbon potliners used to hold the alumina/cryolite solution during electrolytic aluminum reduction process eventually crack and need to be removed and replaced. When the liners are removed they are "spent," and are considered to be RCRA listed hazardous waste K088.

Secondary Aluminum Processing

Secondary aluminum processing also results in air emissions, wastewaters, and solid wastes. Atmospheric emissions from reverberatory (chlorine) smelting/refining represent a significant fraction of the total particulate and gaseous effluents generated in the secondary aluminum industry. Typical furnace effluent gases contain combustion products, chlorine, hydrogen chloride and metal chlorides of zinc, magnesium, and aluminum, aluminum oxide and various metals and metal compounds, depending on the quality of scrap charges. Emissions from reverberatory (fluorine) smelting/refining are similar to those from reverberatory (chlorine) smelting/refining. The use of AlF_3 rather than chlorine in the demagging step reduces demagging emissions. Fluorides are emitted as gaseous fluorides or as dusts. Baghouse scrubbers are usually used for fluoride emission control.

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Solid-phase wastes are also generated during secondary scrap aluminum smelting. The slag generated during smelting contains chlorides resulting from the use of fluxes and magnesium. Waste waters are also generated during secondary aluminum processing when water is added to the smelting slags to aid in the separation of metallics. The waste waters are also likely to be contaminated with salt from the various fluxes used.

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IV. PRIMARY AND SECONDARY COPPER PROCESSING INDUSTRY

IV.A. Characterization of the Industry - Copper

This section provides background information on the size, geographic distribution, employment, production, sales, and economic condition of the Primary and Secondary Copper Industry. The type of facilities described within the document are also described in terms of their Standard Industrial Classification (SIC) codes.

IV.A.1. Industry Size and Geographic Distribution - Copper

The following discussion is based in part upon the following documents: "U.S. Industrial Outlook 1994 - Metals," U.S. Department of Commerce, and information provided by the U.S. Department of the Interior, Bureau of Mines.

Variation in facility counts occur across data sources due to many factors, including reporting and definitional differences. This document does not attempt to reconcile these differences, but rather reports the data as they are maintained by each source.

Copper ore is mined in both the Northern and Southern Hemispheres but is primarily processed and consumed by countries in the Northern Hemisphere. The U.S., is both a major producer (second only to Chile) and consumer of copper.

The domestic primary unwrought, or unworked, integrated copper industry consists of mines, concentrators, smelters, refineries, and electrowinning plants (SIC 3331 encompasses facilities engaging in primary smelting and refining, but not mining). The number of operating mines producing copper has decreased from 68 mines in 1989 to 65 mines in 1992. Of the 65 mines actively producing copper in the U.S., 33 list copper as the primary product. The remaining 32 mines produce copper either as a byproduct or co-product of gold, lead, zinc, or silver (U.S. DOI, Bureau of Mines). Nineteen of the 33 active mines that primarily produce copper are located in Arizona, which accounts for 65 percent of domestically mined copper ore. The remaining mines are located throughout New Mexico and Utah, which together account for 28 percent of domestic production, and Michigan, Montana, and Missouri account for the remainder (U.S. DOI, Bureau of Mines). Five integrated producers, Phelps Dodge Corp., Magma Copper Co., ASARCO Incorporated, Kennecott Corp., and Cyprus-AMAX Minerals Co., produce over 90 percent of domestic primary copper.

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In 1988, there were 17 copper mines in the U.S. using leaching methods, with total production of approximately 227,000 metric tons of electrowon copper (U.S. EPA; U.S. DOI, Bureau of Mines). According to the U.S. Bureau of Mines, in 1991 441,000 metric tons of copper (an increase of 94 percent in three years) were recovered by leaching/electrowinning methods (U.S. DOI, Bureau of Mines). While solution operations are conducted throughout the Southwestern U.S., almost 75 percent of the facilities (14) are located in Arizona. There are two facilities in New Mexico, one in Utah, and one in Nevada.

In 1991, the consumption of refined copper in the U.S. decreased by four percent from 1990 levels. In 1992, refined copper was consumed at approximately 20 wire-rod mills, 41 brass mills, and 750 foundries, chemical plants, and other manufacturers. According to the Bureau of Mines, in 1992 U.S. consumption of copper was about 2.2 million tons. Consumption in 1993 and 1994 rose sharply to almost 2.7 million tons.

Fifty-six percent of recycled, or secondary copper, is derived from new scrap, while 44 percent comes from old scrap. Domestically, the secondary copper smelting industry is led by four producers: Franklin, Southwire Co., Chemetco., and Cerro Copper Co. Like the secondary aluminum industry, these producers buy the scrap they recycle on the open market, in addition to using scrap generated in their own downstream productions. The secondary copper industry is concentrated in Georgia, South Carolina, Illinois, and Missouri.

IV.A.2. Product Characterization - Copper

Because of its superior electrical conductivity, the leading domestic consumer of refined copper is wire mills, accounting for 75 percent of refined copper consumption. Brass mills producing copper and copper alloy semi-fabricated shapes are the other dominant domestic consumers at 23 percent. The dominant end-users of copper and copper alloy are the construction and electronic products industries, accounting for 65 percent of copper end-usage. Transportation equipment such as radiators also account for a fair amount of copper end-usage at 11.6 percent. Copper and copper alloys powders are used for brake linings and bands, bushings, instruments, and filters in the automotive and aerospace industries, for electrical and electronic applications, for anti-fouling paints and coatings, and for various chemical and medical purposes. Copper chemicals, principally copper sulfate and the cupric and cuprous oxides, are widely used as algaecides, fungicides, wood preservatives, copper

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An activity that is carried out concurrently with the primary copper production is sulfur fixation. As mentioned above, in the pyrometallurgical process most of the sulfur in the ore is transformed into sulfur dioxide (though a portion is discarded in the slag). The copper smelting and converting processes typically generate over half a ton of sulfur dioxide per ton of copper concentrate. In order to meet CAA emission standards, sulfur dioxide releases must be controlled. This is accomplished by elaborate gas collection and filtration systems after which the sulfur dioxide contained in the off-gases is made into sulfuric acid. In general, if the sulfur dioxide concentration exceeds four percent it will be converted into sulfuric acid, an ingredient in fertilizer. Fugitive gases containing less than four percent sulfuric acid are either released to the atmosphere or scrubbed to remove the sulfur dioxide. The sulfur recovery process requires the emissions to flow through a filtering material in the air emissions scrubber to capture the sulfur. A blowdown slurry is formed from the mixture of the filtering material and sulfur emissions. This slurry contains not only sulfur, but cadmium and lead, metals that are present in copper ore. The acid plant blowdown slurry/sludge that results from thickening of blowdown slurry at primary copper facilities is regulated by RCRA as hazardous waste K064.

Secondary Copper Processing

The primary processes involved in secondary copper recovery are scrap metal pretreatment and smelting. Pretreatment includes cleaning and concentration to prepare the material for the smelting furnace. Pretreatment of the feed material can be accomplished using several different procedures, either separately or in combination. Feed scrap is concentrated by manual and mechanical methods such as sorting, stripping, shredding, and magnetic separation. Feed scrap is sometimes briquetted in a hydraulic press. Pyrometallurgical pretreatment may include sweating, burning of insulation (especially from scrap wire), and drying (burning off oil and volatiles) in rotary kilns. Hydrometallurgical methods include flotation and leaching with chemical recovery.

After pretreatment the scrap is ready for smelting. Though the type and quality of the feed material determines the processes the smelter will use, the general fire-refining process is essentially the same as for the primary copper smelting industry.

IV.B.2. Raw Material Inputs and Pollution Outputs

The material inputs and pollution outputs resulting from primary and secondary copper processing are presented by media in Exhibit 6.

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Large amounts of water are used in the copper concentration process though disposal of liquid wastes is rarely a problem because the vast majority of the water is recycled back into the process. Once the wastewater exits the flotation process it is sent to a sediment control pond where it is held long enough for most of the sediment to settle.

The seepage and leaking of sulfuric acid solutions used in leaching can also produce liquid wastes, however this potential is off-set by the copper producer's interest to collect as much of the copper-bearing leachate as possible. Older operations generally do not have protective liners under the piles, and experience some loss of leachate. New leaching operations use impermeable membranes to confine leach solutions and channel them to collection ponds.

Electrolytic refining does produce wastewaters that must be treated and discharged, reused, or disposed in some manner. Many facilities use a wastewater treatment operation to treat these wastes.

Primary copper processing primarily generates two solid-phase wastes: slag and blowdown slurry/sludge. Slag is generated during the smelting, converting, fire refining, and electrolytic refining stages. Slag from smelting furnaces is higher in copper content than the original ores taken from the mines. These slags therefore, may be sent to a concentrator and the concentrate returned to the smelter. This slag processing operation results in slag tailings. Slag resulting from converting and fire refining also is normally returned to the process to capture any remaining mineral values. Blowdown slurry/sludge that results from the sulfur recovery process is regulated by RCRA as hazardous waste K064.

Secondary Copper Processing

Secondary copper processing produces the same types of wastes as primary pyrometallurgical copper processing. One type of secondary processing pollutant that differs from primary processing is the air emissions. Air pollutants are generated during the drying of chips and borings to remove excess oils and cuttings fluids and causes discharges of large amounts of dense smoke containing soot and unburned hydrocarbons. These emissions can be controlled by baghouses and/or direct-flame afterburners.

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V. PRIMARY AND SECONDARY LEAD PROCESSING INDUSTRY

V.A. Characterization of the Industry - Lead

This section provides background information on the size, geographic distribution, employment, production, sales, and economic condition of the Primary and Secondary Lead Industry. The type of facilities described within the document are also described in terms of their Standard Industrial Classification (SIC) codes.

V.A.1. Industry Size and Geographic Distribution - Lead

The following discussion is based upon "U.S. Industrial Outlook 1994 - Metals," U.S. Department of Commerce, and information provided by the U.S. Department of the Interior, Bureau of Mines.

Variation in facility counts occur across data sources due to many factors, including reporting and definitional differences. This document does not attempt to reconcile these differences, but rather reports the data as they are maintained by each source.

The U.S. is the world's third largest primary lead producer with 1/7 of all production reserves. Over 80 percent of the lead ore mined domestically comes from Missouri. The mines with the largest ore capacity are owned by Asarco Inc., The Doe Run Co., and Cominco American Inc., the first two of which are also integrated producers of refined lead materials. The majority of lead ores mined in the U.S. are smelted in conventional blast furnaces and are refined using pyrometallurgical methods.

In 1993, the lead industry employed 600 workers at primary smelters and refineries, and 1,700 at secondary smelters and refineries. Primary and secondary smelter and refinery employment was not expected to change in 1994 (U.S. DOI, Bureau of Mines, 1995).

The U.S. is the world's largest recycler of lead scrap and is able to meet about 72 percent of its total refined lead production needs from scrap recycling. At the end of 1991, the secondary lead industry consisted of 16 companies that operated 23 battery breakers-smelters with capacities of between 10,000 and 120,000 metric tons a year (mt/y); five smaller operations with capacities between 6,000 and 10,000 mt/y; and 15 smaller plants that produced mainly specialty alloys for solders, brass and bronze ingots, and miscellaneous uses. Sanders Lead Co., East Penn Mfg. Co.,

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surface impoundments to settle. The impoundments are used to collect solids from miscellaneous slurries, such as acid plant blowdown, slag granulation water, and plant washings. Acid plant blowdown is generated during the production of lead the same way it is produced at a copper plant; during the recovery of sulfur dioxide emissions. Slag granulation water is produced when hot slag from the process is sprayed with water to be cooled and granulated before transport to a slag pile. Plant washing is a housekeeping process and the washdown normally contains a substantial amount of lead and other process materials. When these materials accumulate in a surface impoundment or are dredged from the surface impoundment they are regulated as hazardous waste K065.

Secondary Lead Processing

The secondary production of lead begins with the recovery of old scrap from worn-out, damaged, or obsolete products and new scrap that is made of product wastes and smelter-refinery drosses, residues, and slags. The chief source of old scrap in the U.S. is lead-acid batteries, though cable coverings, pipe, sheet, and terne bearing metals also serve as a source of scrap. Solder, a tin-based alloy, may also be recovered from the processing of circuit boards for use as lead charge.

While some secondary lead is recovered directly for specialty products like babbitt metal, solder, re-melt, and copper-base alloys, about 97 percent of secondary lead is recovered at secondary lead smelters and refineries as either soft (unalloyed) or antimonial lead, most of which is recycled directly back into the manufacture of new batteries. Unlike copper and zinc, where scrap processing varies tremendously by scrap type and ultimate use, the dominance of lead battery scrap allows for a more standard secondary recovery process. Prior to smelting, batteries must be broken by one of several techniques, and classified into their constituent products. The modern battery breaking process classifies the lead into metallics, oxides and sulfate fragments, and organics into separate casing and plate separator fractions. Cleaned polypropylene case fragments are recycled back into battery cases or other products. The dilute sulfuric acid is either neutralized for disposal, or recycled into the local acid market. One of three main smelting processes is then used to reduce the lead fractions to produce lead bullion.

The majority of domestic battery scrap is processed in blast furnaces or rotary reverberatory furnaces. Used to produce a semisoft lead, a reverberatory furnace is more suitable for processing fine particles and may be operated in conjunction with a blast furnace. The reverberatory

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furnace is a rectangular shell lined with refractory brick, and is fired directly with oil or gas to a temperature of 2300 degrees F. The material is heated by direct contact with combustion gases. The average furnace can process about 50 tons per day. About 47 percent of the charge is recovered as lead product and is periodically tapped into mold or holding pots. Forty-six percent of the charge is removed as slag and later processed in blast furnaces. The remaining seven percent of the furnace charge escapes as dust or fume. Short (batch) or long (continuous) rotary furnaces may be used. Slags from reverberatory furnaces are processed through the blast furnace for recovery of alloying elements.

Blast furnaces produce hard lead from charges containing siliceous slag from previous runs (about 4.5 percent of the charge), scrap iron (about 4.5 percent), limestone (about 3 percent), and coke (about 5.5 percent). The remaining 82.5 percent of the charge is comprised of oxides, pot furnace refining drosses, and reverberatory slag. The proportions of rerun slags, limestone, and coke, respectively vary to as high as eight percent, ten percent, and eight percent of the charge. Processing capacity of the blast furnace ranges from 20 to 80 tons per day. Similar to iron cupolas, the blast furnace is a vertical steel cylinder lined with refractory brick. Combustion air at 0.5 to 0.75 pounds per square inch is introduced through tuyeres (pipes) at the bottom of the furnace. Some of the coke combusts to melt the charge, while the remainder reduces lead oxides to elemental lead.

As the lead charge melts, limestone and iron float to the top of the molten bath and form a flux that retards oxidation of the product lead. The molten lead flows from the furnace into a holding pot at a nearly continuous rate. The product lead constitutes roughly 70 percent of the charge. From the holding pot, the lead is usually cast into large ingots, called pigs or sows. About 18 percent of the charge is recovered as slag, with about 60 percent of this being matte. Roughly five percent of the charge is retained for reuse, and the remaining seven percent of the charge escapes as dust or fume.

Refining/casting is the use of kettle type furnaces for re-melting, alloying, refining, and oxidizing processes. Materials charged for re-melting are usually lead alloy ingots that require no further processing before casting. Alloying furnaces simply melt and mix ingots of lead and alloy materials. Antimony, tin, arsenic, copper, and nickel are the most common alloying materials. Refining furnaces, as in primary lead production, are used either to remove copper and antimony to produce soft lead, or to remove arsenic, copper, and nickel for hard lead production.

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granulation water is often transported to surface impoundments for settling. Plant washdown water results from plant housekeeping and normally contains a substantial amount of lead and other process materials. Acid plant blowdown results from the conversion of SO_2 to sulfuric acid. All of these materials are included in the definition of hazardous waste K065.

Secondary Lead Processing

Secondary lead processing results in the generation of air emissions and solid-phase wastes. As with primary lead processing, reverberatory and blast furnaces used in smelting account for the vast majority of the total lead emissions. Other emissions from secondary smelting include oxides of sulfur and nitrogen, antimony, arsenic, copper, and tin. Smelting emissions are generally controlled with a settling and cooling chamber, followed by a baghouse. Other air emissions are generated during battery breaking. Emissions from battery breaking are mainly sulfuric acid and dusts containing dirt, battery case material, and lead compounds. Emissions from crushing are also mainly dusts.

The solid-phase wastes generated by secondary processing are emission control dust and slag. Slag is generated from smelting, and the emission control dust, when captured and disposed of, is considered to be hazardous waste K069.

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VI. PRIMARY AND SECONDARY ZINC PROCESSING

VI.A. Characterization of the Industry - Zinc

This section provides background information on the size, geographic distribution, employment, production, sales, and economic condition of the Primary and Secondary Zinc Industry. The type of facilities described within the document are also described in terms of their Standard Industrial Classification (SIC) codes.

VI.A.1. Industry Size and Geographic Distribution - Zinc

The following discussion is based upon "U.S. Industrial Outlook 1994 - Metals," U.S. Department of Commerce, and information provided by the U.S. Department of the Interior, Bureau of Mines.

Variation in facility counts occur across data sources due to many factors, including reporting and definitional differences. This document does not attempt to reconcile these differences, but rather reports the data as they are maintained by each source.

Zinc is the fourth most widely used metal after iron, aluminum, and copper (lead is fifth). In abundant supply world-wide, zinc is mined and produced mainly in Canada, the former Soviet Union, Australia, Peru, Mexico, and the United States. Historically, in the U.S. recoverable zinc has been mined in 19 States: Alaska, Arizona, Colorado, Idaho, Illinois, Kansas, Missouri, Montana, Nevada, New Jersey, New Mexico, New York, Oklahoma, Pennsylvania, Tennessee, Utah, Virginia, Washington, and Wisconsin. In 1993, nearly 50 percent of all domestic zinc was produced in Alaska. Except for Missouri (eight percent) other exact state production figures were withheld to protect company proprietary data. Other top producing states in order of output were Tennessee, New York, and Missouri.

In 1993, the zinc industry employed 22,250 workers at mines and mills and 1,400 at primary smelters. For 1994, mine and mill employment was expected to stay at 2,200 and employment at zinc smelters was expected to decrease to 1,100 (U.S. DOI, Bureau of Mines, 1995). Employment decreases for primary smelters was attributed to the indefinite closures of a smelter in Oklahoma in later 1993. The four primary zinc smelters in the U.S., are located in Illinois, Oklahoma, Tennessee and Pennsylvania. There are currently 10 secondary zinc recovery plants in the U.S. (U.S. EPA, AP42, 1993).

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Electrolytic zinc smelters contain as many as several hundred cells. A portion of the electrical energy is converted into heat, which increases the temperature of the electrolyte. Electrolytic cells operate at temperature ranges from 86 to 95 degrees F at atmospheric temperature. During electrowinning a portion of the electrolyte passes through cooling towers to decrease its temperature and to evaporate the water it collects during the process.

Sulfur dioxide is generated in large quantities during the primary zinc refining process and sulfur fixation is carried out concurrently with the primary production process in order to meet CAA emission standards. Concentrations of sulfur dioxide in the off-gas vary with the type of roaster operation. Typical concentrations for multiple hearth, suspension, and fluidized bed roasters are 4.5 to 6.5 percent, 10 to 13 percent, and 7 to 12 percent respectively. This sulfur dioxide is then converted into sulfuric acid.

The sulfur recovery process requires that the emissions from the zinc calcining, or roasting process, where over 90 percent of potential sulfur dioxide is generated during primary zinc refining, flow through a filtering material in the air emissions scrubber to capture the sulfur. A blowdown slurry is formed from the mixture of the filtering material and sulfur emissions. This slurry contains not only sulfur, but cadmium and lead, materials that are always present in zinc ore. The acid plant blowdown slurry/sludge that results from thickening of blowdown slurry at primary zinc facilities is regulated by RCRA as hazardous waste K066.

During the electrolytic refining of zinc, solid materials in the electrolytic solution that are not captured previously during purification may precipitate out in the electrolytic cell. When the cells undergo their periodic shutdown to recover zinc, this precipitated waste (known as anode slimes/sludges) is collected during cell cleaning. Once collected it is sent to a waste water treatment plant and the resulting sludges are also regulated by RCRA as hazardous waste K066.

Secondary Zinc Processing

The secondary zinc industry processes scrap metals for the recovery of zinc in the form of zinc slabs, zinc oxide, or zinc dust. Zinc recovery involves three general operations; pretreatment, melting, and refining (see Exhibit 9). Secondary recovery begins with the separation of zinc-containing metals from other materials, usually by magnetics, sink-float, or hand sorting. In situations where nonferrous metals have been mixed

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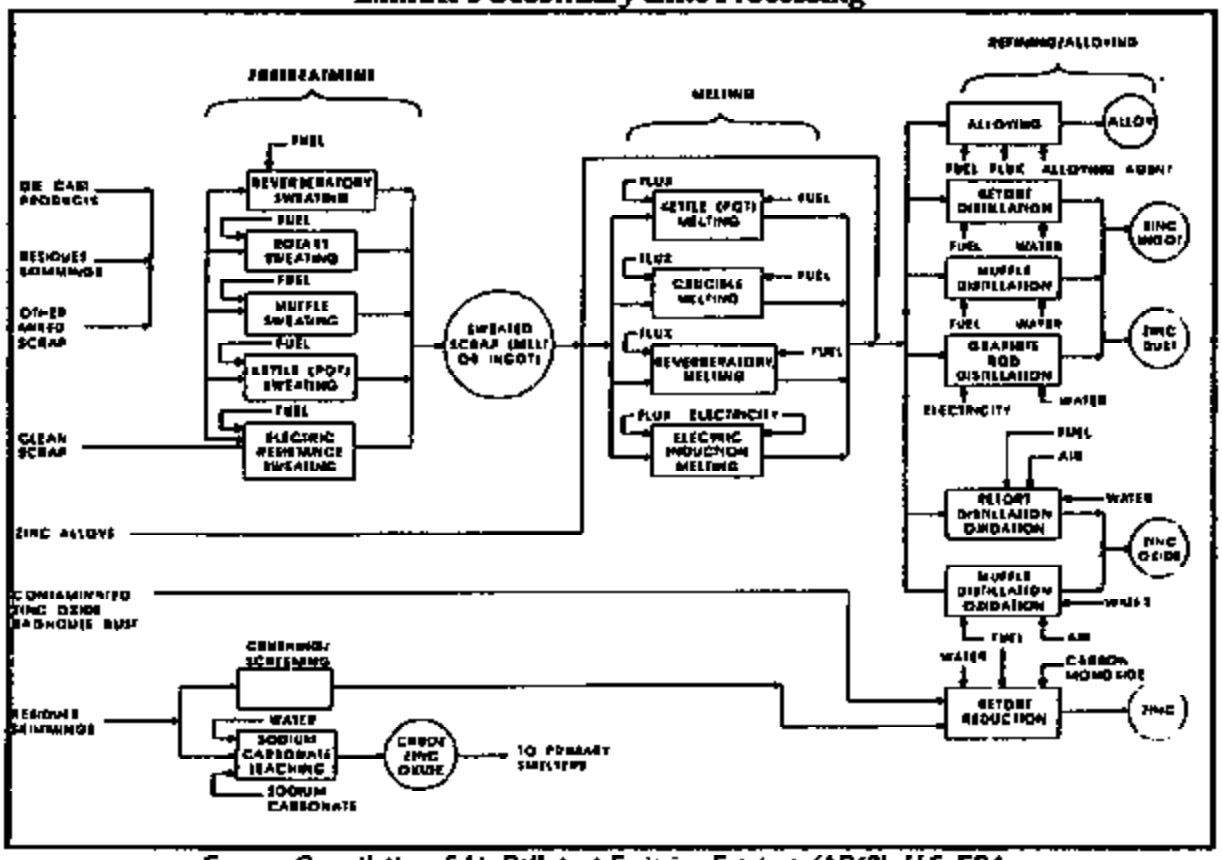
In shredder scrap, zinc can be separated from higher-melting metals such as copper and aluminum, by selective melting in a sweating furnace. A sweating furnace (rotary, reverberatory, or muffle furnace) slowly heats the scrap containing zinc and other metals to approximately 787 degrees F. This temperature is sufficient to melt zinc but is still below the melting point of the remaining metals.

Exhibit 9 Secondary Zinc Processing



Source: Compilation of Air Pollutant Emission Factors, (AP42), U.S. EPA.

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Molten zinc collects at the bottom of the sweat furnace and is subsequently recovered. The remaining scrap is cooled and removed to be sold to other secondary processors. In the case of zinc-galvanized steel, the zinc will be recovered largely in furnace dust after the scrap is charged into a steel making furnace and melted. Almost all of the zinc in electric arc furnace (EAF) dust is first recovered in an upgraded, impure zinc oxide product and is then shipped to primary pyrometallurgical zinc smelter for refinement to metal.

Clean new scrap, mainly brass and rolled zinc clippings and reject diecastings, generally require only re-melting before reuse. During melting, the zinc-containing material is heated in kettle, crucible, reverberatory, and electric induction furnaces. Flux is used to trap impurities from the molten zinc. Facilitated by agitation, flux and impurities float to the surface of the melt as dross, and is skimmed from the surface. The remaining molten zinc may be poured into molds or transferred to the refining operation in a molten state. Drosses, fragmentized diecastings, and mixed high-grade scrap are typically re-melted, followed by zinc distillation with recovery as metal, dust, or oxide. Sometimes, high-purity drosses are simply melted and reacted with various fluxes to release the metallic content; often the recovered metal can be used directly as a galvanizing brightener or master alloy. Zinc alloys are produced from pretreated scrap during sweating and melting processes. The alloys may contain small amounts of copper, aluminum, magnesium, iron, lead, cadmium, and tin. Alloys containing 0.65 to 1.25 percent copper are significantly stronger than unalloyed zinc.

Medium and low-grade skims, oxidic dust, ash, and residues generally undergo an intermediate reduction-distillation pyrometallurgical step to upgrade the zinc product before further treatment; or, they are leached with acid, alkaline, or ammoniacal solutions to extract zinc. For leaching, the zinc containing material is crushed and washed with water, separating contaminants from zinc-containing material. The contaminated aqueous stream is treated with sodium carbonate to convert zinc chloride into sodium chloride and insoluble zinc hydroxide. The sodium chloride is separated from the insoluble residues by filtration and settling. The precipitate zinc hydroxide is dried and calcined (dehydrated into a powder at high temperature) to convert it into crude zinc oxide. The zinc oxide product is usually refined to zinc at primary zinc smelters. The washed zinc-containing metal portion becomes the raw material for the melting process.

Distillation retorts and furnaces are used either to reclaim zinc from alloys or to refine crude zinc. Bottle retort furnaces consist of a pear-shaped

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ceramic retort (a long-necked vessel used for distillation). Bottle retorts are filled with zinc alloys and heated until most of the zinc is vaporized, sometimes as long as 24 hours. Distillation involves vaporization of zinc at temperatures from 1800 to 2280 degrees F, and condensation as zinc dust or liquid zinc. Zinc dust is produced by vaporization and rapid cooling, and liquid zinc results when the vaporous product is condensed slowly at moderate temperatures.

A muffle furnace is a continuously charged retort furnace which can operate for several days at a time. Molten zinc is charged through a feed well that also acts as an airlock. Muffle furnaces generally have a much greater vaporization capacity than bottle retort furnaces.

Air pollution control can be an area of concern when pyrometallurgical processes are employed in the secondary recovery of zinc. When the recovery process used is simply an iron pot re-melt operation to produce zinc metal, fumes will not normally be generated. If slab zinc is needed and a rotary furnace is used, any air emissions are captured directly from the venting system (a rotating furnace sweats, or melts, the zinc separating it from drosses with different melting points, which allows it to be poured off separately). Air emissions become more of a concern when more complicated processes are used to produce zinc powder. Retort and muffle furnaces used to produce zinc powder heat the zinc and other charges to such a high temperature that the zinc vaporizes and is captured in the pollution control equipment. It is this zinc oxide dust that is the process' marketable product. Hoods are employed around the furnace openings used to add additional charge. The fumes collected from the hoods are not normally of high quality and will be used for products like fertilizer and animal feed.

For the most part, the zinc materials recovered from secondary materials such as slab zinc, alloys, dusts, and compounds are comparable in quality to primary products. Zinc in brass is the principal form of secondary recovery, although secondary slab zinc has risen substantially over the last few years because it has been the principal zinc product of EAF dust recycling. Impure zinc oxide products and zinc-bearing slags are sometimes used as trace element additives in fertilizers and animal feeds. Currently about 10 percent of the domestic requirement for zinc is satisfied by old scrap.

Due to environmental concerns, both domestic and world-wide secondary recovery of zinc (versus disposal) is expected to increase. However, the prospect for gains higher than 35 to 40 percent of zinc consumption is relatively poor because of the dissipative nature of zinc vapor.

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and composition of particulate varies with operating parameters, the particulate is likely to contain zinc and lead.

Wastewaters may be generated during the leaching, purification, and electrowinning stages of primary zinc processing when electrolyte and acid solutions become too contaminated to be reused again. This wastewater needs to be treated before discharge.

Solid wastes, some of which are hazardous, are generated at various stages in primary zinc processing. Slurry generated during the operation of sulfuric acid plants is regulated as hazardous waste K066 as is the sludge removed from the bottom of electrolytic cells. The solid copper cake generated during purification is generally sent off-site to recover the copper.

Secondary Zinc Processing

Secondary zinc processing generates air emissions and solid-phase wastes. Air emissions result from sweating and melting and consist of particulate, zinc fumes, other volatile metals, flux fumes, and smoke generated by the incomplete combustion of grease, rubber, and plastics in zinc scrap. Zinc fumes are negligible at low furnace temperatures. Substantial emissions may arise from incomplete combustion of carbonaceous material in the zinc scrap. These contaminants are usually controlled by afterburners, and particulate emissions are most commonly recovered by fabric filters. Emissions from refining operations are mainly metallic fumes. Distillation/oxidations operations emit their entire zinc oxide product in the exhaust dust. Zinc oxide is usually recovered in fabric filters with collection efficiencies of 9 to 99 percent.

The secondary zinc recovery process generates slags that contain metals such as copper, aluminum, iron, and lead. Though slag generated during primary pyrometallurgical processes is exempt from regulation as a hazardous waste under RCRA, slag resulting from secondary processing is not automatically exempt. Therefore if secondary processing slag exhibits a characteristic (e.g., toxicity for lead), it would need to be managed as a hazardous waste.

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Copper is usually found in nature in association with sulfur. Pure copper metal is generally produced from a multistage process, beginning with the mining and concentrating of low-grade ores containing copper sulfide minerals, and followed by smelting and electrolytic refining to produce a pure copper cathode. An increasing share of copper is produced from acid leaching of oxidized ores. Copper is one of the oldest metals ever used and has been one of the important materials in the development of civilization. Because of its properties, singularly or in combination, of high ductility, malleability, and thermal and electrical conductivity, and its resistance to corrosion, copper has become a major industrial metal, ranking third after iron and aluminum in terms of quantities consumed. Electrical uses of copper, including power transmission and generation, building wiring, telecommunication, and electrical and electronic products, account for about three quarters of total copper use. Building construction is the single largest market, followed by electronics and electronic products, transportation, industrial machinery, and consumer and general products. Copper byproducts from manufacturing and obsolete copper products are readily recycled and contribute significantly to copper supply.

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- International Mineral Exploration Activities From 1995 Through 2004
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- Metal Prices in the United States through 1998
  - Copper (PDF)
- Physical Aspects of Waste Storage from a Hypothetical Open Pit Porphyry Copper Operation
  OF-03-143
- Statistical Compendium
  - Copper
- World Copper Smelters (map and table)

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COPPER

(Data in thousand metric tons of copper content, unless otherwise noted)

Domestic Production and Use: Domestic mine production in 1998 declined to 1.85 million metric tons and was valued at about $3.3 billion. The five principal mining States, in descending order, Arizona, Utah, New Mexico, Nevada, and Montana, accounted for 99% of domestic production; copper was also recovered at mines in three other States. While copper was recovered at about 35 mines operating in the United States, 15 mines accounted for about 97% of production. Seven primary and 3 secondary smelters, 7 electrolytic and 6 fire refineries, and 15 solvent extraction-electrowinning facilities were operating at yearend. Refined copper and direct melt scrap were consumed at about 35 brass mills; 13 rod mills; and 600 foundries, chemical plants, and miscellaneous consumers. Copper and copper alloy products were consumed[1] in building construction, 42%; electric and electronic products, 25%; industrial machinery and equipment, 11%; transportation equipment, 13%; and consumer and general products, 9%.

Salient Statistics—United States:	1994	1995	1996	1997	1998[e]
Production: Mine	1,850	1,850	1,920	1,940	1,850
Refinery: Primary[2]	1,840	1,930	2,010	2,060	2,140
Secondary[3]	392	352	345	383	290
Copper from all old scrap	500	442	428	496	410
Imports for consumption:					
Ores and concentrates	82	127	72	44	110
Refined	470	429	543	647	720
Unmanufactured	763	825	961	978	1,130
Exports: Ores and concentrates	261	239	195	128	40
Refined	157	217	169	93	100
Unmanufactured	752	894	683	618	450
Consumption: Reported refined	2,680	2,530	2,610	2,790	2,920
Apparent unmanufactured[4]	2,690	2,540	2,830	2,950	3,030
Price, average, cents per pound:					
Domestic producer, cathode	111.0	138.3	109.0	106.9	80
London Metal Exchange, high-grade	104.6	133.1	104.0	103.2	76
Stocks, yearend, refined[5]	119	163	146	314	450
Employment, mine and mill, thousands	13.1	13.8	13.3	13.2	13.0
Net import reliance[6] as a percent of apparent consumption	13	7	14	13	16

Recycling: Old scrap, converted to refined metal and alloys, provided 410,000 tons of copper, equivalent to 14% of apparent consumption. Purchased new scrap, derived from copper fabricating operations, yielded 950,000 tons of contained copper; 80% of the copper contained in new scrap was consumed at brass mills. Of the total copper recovered from scrap, copper smelters and refiners recovered 23%; ingot makers, 10%; brass mills, 63%; and miscellaneous manufacturers, foundries, and chemical plants, 4%. Copper in all old and new, refined or remelted scrap contributed 34% of the U.S. copper supply.

Import Sources (1994-97): Unmanufactured: Canada, 47%; Chile, 23%; Mexico, 13%; and other, 17%. Refined copper accounted for 60% of imports of unwrought copper.

Tariff: Item	Number	Normal Trade Relations (NTR) 12/31/98	Canada and Mexico 12/31/98	Non-NTR[7] 12/31/98
Unrefined copper; anodes	7402.00.0000	0.2% ad val.[8]	Free	6% ad val.[8]
Refined and alloys; unwrought	7403.00.0000	1% ad val.	Free	6% ad val.
Copper powder	7406.10.0000	1.1% ad val.	Free	49% ad val.
Copper wire (bare)	7408.11.6000	3.2% ad val.	Free	28% ad val.

Depletion Allowance: 15% (Domestic), 14% (Foreign).

Government Stockpile: The stockpile of about 20,000 tons of refined copper was liquidated in 1993. The stockpile of about 8,100 tons of brass was liquidated in 1994. For details on inventories of beryllium-copper master alloys (4% beryllium) see the section on beryllium.

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COPPER

Events, Trends, and Issues: World mine production of copper continued its 4-year-long upward trend, rising about 4% in 1998. Most of the increase in production came from South America and Indonesia, where an estimated 700,000 tons of new capacity came on-stream. In the United States, mine production declined by an estimated 90,000 tons. In response to sustained lower copper prices, a number of companies cut back production and deferred development of previously announced projects. One mine in Arizona completely curtailed its copper sulfide concentrate operations, and several others reduced production. One mine in New Mexico revised its mine plan to reduce electrowon production over a 3-year period. At yearend, further cutbacks were announced for 1999. The growth in world refined production lagged behind that of mine production owing to reduced secondary refined production. In the United States, an increase in primary refined production from the renovated Utah smelter/refinery complex was partially offset by reduced secondary refined production, cutbacks in electrowon production, and anode feed shortages.

The global production of refined copper during 1998 exceeded consumption, and reported world-wide inventories of copper rose during the second half of the year. With sustained high inventories, copper prices remained low throughout 1998. By July, prices, in constant dollar terms, had fallen to their lowest level since the Great Depression. A large shift in global inventories to U.S. London Metal Exchange (LME) warehouses in California had industry concerned that incentives offered by the warehouse operators, coupled with other market factors, had led to a distorted market. In September, the LME announced plans to limit further stock accumulations in California.

Domestic refined copper demand grew by about 5% in 1998 owing to demand for wire mill products and substitution of refined copper for scrap at brass mills. In June, a new wire-rod mill was commissioned in Texas. Worldwide, consumption grew by only about 2% in 1998 owing to the economic crises in Asia. In 1999, continued low global demand growth and a projected increase in mine production of more than 700,000 tons is expected to generate a surplus of refined copper.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[8]	Reserve base[9]
	1997	1998[e]		
United States	1,940	1,850	45,000	90,000
Australia	545	600	7,000	23,000
Canada	657	710	10,000	23,000
Chile	3,390	3,660	88,000	160,000
China	414	440	18,000	37,000
Indonesia	529	750	19,000	25,000
Kazakhstan	316	340	14,000	20,000
Mexico	391	400	15,000	27,000
Peru	491	450	19,000	40,000
Poland	414	420	20,000	36,000
Russia	505	450	20,000	30,000
Zambia	353	280	12,000	34,000
Other countries	1,450	1,550	50,000	105,000
World total (rounded)	11,400	11,900	340,000	650,000

World Resources: Land-based resources are estimated at 1.6 billion tons of copper, and resources in deep-sea nodules are estimated at 0.7 billion tons.

Substitutes: Aluminum substitutes for copper in various products, such as electrical power cables, electrical equipment, automobile radiators, and cooling/refrigeration tubing. Titanium and steel are used in heat exchangers, and steel is used for artillery shell casings. Optical fiber substitutes for copper in some telecommunications applications. Plastics also substitute for copper in water pipe, plumbing fixtures, and many structural applications.

[e]Estimated.
[1]Some electrical components are included in each end use. Estimated after Copper Development Association, 1997.
[2]From both domestic and imported ores and concentrates.
[3]From both primary and secondary refineries.
[4]Defined as primary refined production + copper from old scrap converted to refined metal and alloys + refined imports - refined exports ± changes in refined stocks.
[5]Held by industry, COMEX, and London Metal Exchange warehouses in the United States.
[6]Defined as imports - exports + adjustments for Government and industry stock changes for refined copper.
[7]See Appendix B.
[8]Value of copper content.
[9]See Appendix D for definitions.

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(Data in thousand metric tons of copper content, unless otherwise noted)

Domestic Production and Use: Domestic mine production in 1999 declined to 1.66 million metric tons and was valued at about $2.8 billion. The five principal mining States, in descending order, Arizona, Utah, New Mexico, Nevada, and Montana, accounted for 99% of domestic production; copper was also recovered at mines in three other States. While copper was recovered at about 35 mines operating in the United States, 15 mines accounted for about 98% of production. Four primary and 2 secondary smelters, 6 electrolytic and 4 fire refineries, and 16 solvent extraction-electrowinning facilities were operating at yearend. Refined copper and direct melt scrap were consumed at about 35 brass mills; 17 rod mills; and 600 foundries, chemical plants, and miscellaneous consumers. Copper and copper alloy products were consumed[1] in building construction, 42%; electric and electronic products, 26%; transportation equipment, 12%; industrial machinery and equipment, 11%; and consumer and general products, 9%.

Salient Statistics—United States:	1995	1996	1997	1998	1999[e]
Production: Mine	1,850	1,920	1,940	1,860	1,860
Refinery: Primary[2]	1,930	2,010	2,070	2,140	1,870
Secondary[3]	352	345	363	336	240
Copper from all old scrap	442	428	496	466	400
Imports for consumption:					
Ores and concentrates	127	72	44	217	150
Refined	429	543	632	683	880
Unmanufactured	825	961	999	1,190	1,230
Exports: Ores and concentrates	239	195	127	37	40
Refined	217	169	93	86	25
Unmanufactured	894	748	628	412	360
Consumption: Reported refined	2,530	2,610	2,790	2,880	2,950
Apparent unmanufactured[4]	2,540	2,830	2,950	3,010	3,090
Price, average, cents per pound:					
Domestic producer, cathode	138.3	109.0	107.0	78.6	75.7
London Metal Exchange, high-grade	133.1	104.0	103.2	75.0	71.2
Stocks, yearend, refined[5]	163	146	314	532	550
Employment, mine and mill, thousands	13.8	13.3	13.2	13.0	12.0
Net import reliance[6] as a percent of apparent consumption	7	14	13	14	27

Recycling: Old scrap, converted to refined metal and alloys, provided 400,000 tons of copper, equivalent to 13% of apparent consumption. Purchased new scrap, derived from fabricating operations, yielded 950,000 tons of contained copper; about 80% of the copper contained in new scrap was consumed at brass mills. Of the total copper recovered from scrap, brass mills recovered 67%; copper smelters and refiners, 19%; ingot makers, 10%; brass mills, 67%; and miscellaneous manufacturers, foundries, and chemical plants, 4%. Copper in all old and new, refined or remelted scrap contributed 33% of the U.S. copper supply.

Import Sources (1995-98): Unmanufactured: Canada, 43%; Chile, 21%; Mexico, 15%; and other, 21%. Refined copper accounted for 58% of imports of unwrought copper.

Tariff: Item	Number	Normal Trade Relations 12/31/99	Canada and Mexico 12/31/99
Unrefined copper; anodes	7402.00.0000	Free	Free.
Refined and alloys; unwrought	7403.00.0000	1.0% ad val.	Free.
Copper powder	7406.10.0000	Free	Free.
Copper wire (rod)	7408.11.6000	3.0% ad val.	Free.

Depletion Allowance: 15% (Domestic and foreign).

Government Stockpile: The stockpile of about 20,000 tons of refined copper was liquidated in 1993. The stockpile of about 8,100 tons of brass was liquidated in 1994. For details on inventories of beryllium-copper master alloys (4% beryllium), see the section on beryllium.

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Events, Trends, and Issues: World mine capacity rose for the fifth consecutive year, rising by about 600,000 tons, 4.5% in 1999 and almost 30% since 1994. Australia, Chile, and Peru accounted for most of the increase. Production rose about 3% in 1999 and 32% since 1994.

U.S. mine capacity, however, declined in 1999 owing to indefinite closure of sulfide operations in Arizona and New Mexico in addition to other announced reductions and production fell by over 200,000 tons to 1.66 million tons. In addition to announced closures in 1999, the full effect of cutbacks during 1998 were felt in 1999. In June Broken Hill Propriety Ltd. (BHP) announced that it would cease operations at its North American properties by September, including its San Manuel Mine in Arizona and Robinson Mine in Nevada. The San Manuel smelter remained closed following its April renovation shutdown, and closure of the refinery and rod mill followed later in the year.[7] In June, Phelps Dodge Corp., which had already cut back production at its Chino Mine and closed its Cobre Mine, announced the shutdown of its Hidalgo, NM, smelter and the smaller of its two concentrators at Morenci, AZ.[8] By yearend, only four primary smelters remained open. In July 1999, an announced merger-of-equals transaction between Cyprus Amax Minerals Company and ASARCO Incorporated, initiated competition between North American copper producers for control of the U.S. copper industry. Following numerous offers and counter offers, including an attempt by Phelps Dodge to acquire the assets of both Asarco and Cyprus Amax, a realigned industry emerged by mid-October: Phelps Dodge acquired Cyprus Amax and Mexico's Grupo Mexico S.A. de C.V. acquired the assets of Asarco. (For details see Copper Mineral Industry Surveys for July and August 1999.)

The above closures and ownership changes were part of cost-cutting measures encouraged by the low prevailing copper prices and the perception that the underlying oversupply would continue at least through 2000. Worldwide exchange warehouse inventories of copper rose to 975,000 tons in August, up from 177,000 tons at yearend 1996.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[10]	Reserve base[10]
	1998	1999[e]		
United States	1,860	1,660	45,000	90,000
Australia	604	730	7,000	23,000
Canada	707	630	10,000	23,000
Chile	3,691	4,360	88,000	160,000
China	476	450	18,000	37,000
Indonesia	761	765	19,000	25,000
Kazakhstan	337	350	14,000	20,000
Mexico	385	375	15,000	27,000
Peru	522	540	19,000	40,000
Poland	415	450	20,000	36,000
Russia	515	520	20,000	30,000
Zambia	320	280	12,000	34,000
Other countries	1,590	1,530	50,000	105,000
World total (may be rounded)	12,200	12,600	340,000	650,000

World Resources: Land-based resources are estimated at 1.6 billion tons of copper, and resources in deep-sea nodules are estimated at 0.7 billion tons.

Substitutes: Aluminum substitutes for copper in various products, such as electrical power cables, electrical equipment, automobile radiators, and cooling/refrigeration tubing. Titanium and steel are used in heat exchangers, and steel is used for artillery shell casings. Optical fiber substitutes for copper in some telecommunications applications. Plastics also substitute for copper in water pipe, plumbing fixtures, and many structural applications.

[e]Estimated.
[1]Some electrical components are included in each end use. Distribution by Copper Development Association, 1999.
[2]From both domestic and imported ores and concentrates.
[3]From both primary and secondary refineries.
[4]Defined as primary refined production + copper from old scrap converted to refined metal and alloys + refined imports - refined exports ± changes in refined stocks. In 1998 and 1999 general imports of 725,000 tons and 880,000 tons, respectively were used to calculate apparent consumption.
[5]Held by industry, COMEX, and London Metal Exchange warehouses in the United States.
[6]Defined as imports - exports + adjustments for Government and industry stock changes for refined copper.
[7]Value of copper content.
[8]Broken Hill Propriety Ltd., 1999, BHP 1999 profit result: Melbourne, Australia, BHP press release, June 25, 2 p.
[9]Phelps Dodge Corp., 1999, Phelps Dodge Curtails Copper Production and restructures wire and cable business: Phoenix, AZ, Phelps Dodge financial news, June 30, 2 p.
[10]See Appendix C for definitions.

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(Data in thousand metric tons of copper content, unless otherwise noted)

Domestic Production and Use: Domestic mine production in 2000 declined to 1.45 million metric tons and was valued at about $2.8 billion. The principal mining States, in descending order, Arizona, Utah, New Mexico, and Montana, accounted for 99% of domestic production; copper was also recovered at mines in three other States. Although copper was recovered at about 30 mines operating in the United States, 15 mines accounted for about 99% of production. At yearend, 4 primary smelters and 1 secondary smelter, 4 electrolytic and 4 fire refineries, and 15 solvent extraction-electrowinning facilities were operating. Refined copper and direct melt scrap were consumed at about 35 brass mills; 15 rod mills; and 600 foundries, chemical plants, and miscellaneous consumers. Copper and copper alloy products consumed[1] in building construction totaled 41%; electric and electronic products, 27%; transportation equipment, 12%; industrial machinery and equipment, 10%; and consumer and general products, 10%.

Salient Statistics—United States:	1996	1997	1998	1999	2000[e]
Production: Mine	1,920	1,940	1,660	1,600	1,450
Refinery: Primary[2]	2,010	2,070	2,140	1,890	1,610
Secondary[3]	345	396	349	230	210
Copper from all old scrap	428	458	466	381	360
Imports for consumption:					
Ores and concentrates	72	44	217	143	1
Refined	543	632	[r]725	[r]915	[r]970
Unmanufactured	961	999	1,190	1,280	1,320
Exports: Ores and concentrates	195	127	37	64	220
Refined	169	93	86	25	110
Unmanufactured	748	628	412	395	740
Consumption: Reported refined	2,610	2,790	2,690	2,990	3,000
Apparent unmanufactured[5]	2,830	2,950	3,020	3,130	3,120
Price, average, cents per pound:					
Domestic producer, cathode	109.0	107.0	78.6	75.9	89
London Metal Exchange, high-grade	104.0	103.2	75.0	71.3	83
Stocks, yearend, refined[6]	146	314	532	564	280
Employment, mine and mill, thousands	13.3	13.2	13.0	11.6	10
Net import reliance[7] as a percent of apparent consumption	14	13	14	27	37

Recycling: Old scrap, converted to refined metal and alloys, provided 360,000 tons of copper, equivalent to 12% of apparent consumption. Purchased new scrap, derived from fabricating operations, yielded 970,000 tons of contained copper; about 90% of the copper contained in new scrap was consumed at brass or wire-rod mills. Of the total copper recovered from scrap, brass mills recovered 67%; copper smelters and refiners,18%; ingot makers, 11%; and miscellaneous manufacturers, foundries, and chemical plants, 4%. Copper in all old and new, refined or remelted scrap contributed 33% of the U.S. copper supply.

Import Sources (1996-99): Unmanufactured: Canada, 38%; Chile, 24%; Mexico, 14%; and other, 24%. Refined copper accounted for 61% of imports of unwrought copper.

Tariff: Item	Number	Normal Trade Relations[8] 12/31/00
Unrefined copper; anodes	7402.00.0000	Free
Refined and alloys; unwrought	7403.00.0000	1.0% ad val.
Copper powder	7406.10.0000	Free
Copper wire (rod)	7408.11.6000	3.0% ad val.

Depletion Allowance: 15% (Domestic), 14% (Foreign).

Government Stockpile: The stockpile of about 20,000 tons of refined copper was liquidated in 1993. The stockpile of about 8,100 tons of brass was liquidated in 1994. For details on inventories of beryllium-copper master alloys (4% beryllium), see the section on beryllium.

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Events, Trends, and Issues: World mine capacity continued its upward trend, rising about 300,000 tons, or 2%, in 2000. World mine production kept pace with the increased capacity, rising by about 300,000 tons. Though world refined copper production was projected to rise by about 400,000 tons owing to increases in primary and secondary production, the increase was not sufficient to keep pace with the projected growth in world refined consumption. According to the International Copper Study Group,[9] world consumption of refined copper for the first half of 2000 rose by almost 600,000 tons, and reported global inventories of refined copper, which had risen by 800,000 tons during the previous 3 years, declined significantly. Prices trended upward with declining stocks; the U.S. producer price averaged almost $0.96 per pound in September.

Reorganization of the U.S. copper industry was completed by yearend 1999; Phelps Dodge Corp. acquired the assets of Cyprus Amax Minerals Corp., and Grupo Mexico, S.A. de C.V. acquired the assets of ASARCO Incorporated. The Broken Hill Proprietary Ltd. mine, smelter, and refinery operations closed in 1999 and remained shuttered. (For details, see USGS Mineral Industry Surveys, Copper in June 1999 and Copper in August 1999.) Previously announced cutbacks contributed to a decline in mine, smelter, and refinery production in 2000. In May, Southwire Company closed its secondary smelter and associated refinery in Georgia (For details see USGS Mineral Industry Surveys, Copper in February 2000.) Power disruptions and high energy costs resulted in production losses by at least one producer and led to the temporary closure of one mine in Montana during the third quarter. One new leaching operation in Nevada began commercial production during the second quarter. Consumption of refined copper was essentially unchanged in 2000. Growing industrial demand for wire-rod was met by increased imports. The shortfall in domestic refined production was met by imports and a drawdown in metal exchange inventories. U.S. mine production is expected to decline further in 2001 as one major mine converts to an all leach operation. The U.S. import dependance for refined copper and wire-rod is expected to increase with growing industrial demand.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[10]	Reserve base[11]
	1999	2000[e]		
United States	1,600	1,450	45,000	90,000
Australia	735	760	9,000	23,000
Canada	614	650	10,000	23,000
Chile	4,382	4,500	88,000	160,000
China	500	510	18,000	37,000
Indonesia	740	850	19,000	25,000
Kazakhstan	374	380	14,000	20,000
Mexico	362	390	15,000	27,000
Peru	536	530	19,000	40,000
Poland	460	480	20,000	36,000
Russia	530	620	20,000	30,000
Zambia	280	260	12,000	34,000
Other countries	1,500	1,600	50,000	110,000
World total (may be rounded)	12,600	12,900	340,000	650,000

World Resources: Land-based resources are estimated to be 1.6 billion tons of copper, and resources in deep-sea nodules are estimated to be 700 million tons.

Substitutes: Aluminum substitutes for copper in various products, such as electrical power cables, electrical equipment, automobile radiators, and cooling/refrigeration tubing. Titanium and steel are used in heat exchangers, and steel is used for artillery shell casings. Optical fiber substitutes for copper in some telecommunications applications. Plastics also substitute for copper in water pipe, plumbing fixtures, and many structural applications.

[e]Estimated.
[1]Some electrical components are included in each end use. Distribution by Copper Development Association, 2000.
[2]From domestic and imported ores and concentrates.
[3]From primary and secondary refineries.
[4]General imports of refined copper.
[5]Defined as primary refined production + copper from old scrap converted to refined metal and alloys + refined imports - refined exports ± changes in refined stocks. In 1998 and 1999, general imports of 725,000 tons and 915,000 tons, respectively, were used to calculate apparent consumption.
[6]Held by industry, COMEX, and London Metal Exchange warehouses in the United States.
[7]Defined as imports - exports + adjustments for Government and industry stock changes for refined copper.
[8]No tariff for Canada and Mexico for items shown.
[9]International Copper Study Group, 2000, Copper Bulletin: Lisbon, Portugal, International Copper Study Group September, 45 p.
[10]See Appendix C for definitions.

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(Data in thousand metric tons of copper content, unless otherwise noted)

Domestic Production and Use: Domestic mine production in 2001 declined to 1.34 million metric tons and was valued at about $2.2 billion. The principal mining States, in descending order, Arizona, Utah, and New Mexico, accounted for 99% of domestic production; copper was also recovered at mines in three other States. Although copper was recovered at about 25 mines operating in the United States, 15 mines accounted for about 99% of production. Four primary smelters and 1 secondary smelter, 4 electrolytic and 3 fire refineries, and 14 solvent extraction-electrowinning facilities operated during the year. Refined copper and direct melt scrap were consumed at about 35 brass mills; 13 rod mills; and 600 foundries, chemical plants, and miscellaneous consumers. Copper and copper alloy products consumed[1] in building construction totaled 39%; electric and electronic products, 28%; transportation equipment, 11%; industrial machinery and equipment, 11%; and consumer and general products, 11%.

Salient Statistics—United States:	1997	1998	1999	2000	2001[e]
Production:					
Mine	1,940	1,860	1,600	1,440	1,340
Refinery:					
Primary	2,070	2,140	1,890	1,590	1,600
Secondary	396	349	230	209	170
Copper from all old scrap	498	466	381	353	310
Imports for consumption:					
Ores and concentrates	44	217	143	([2])	20
Refined	632	683	837	1,060	1,200
Unmanufactured	999	1,190	1,280	1,350	1,550
Exports:					
Ores and concentrates	127	37	64	116	50
Refined	93	86	25	94	20
Unmanufactured	628	412	395	661	600
Consumption:					
Reported refined	2,790	2,890	2,980	3,030	2,710
Apparent unmanufactured[3]	2,940	3,030	3,130	3,100	2,770
Price, average, cents per pound:					
Domestic producer, cathode	107.0	78.6	75.9	88.2	76
London Metal Exchange, high-grade	103.2	75.0	71.3	82.2	72
Stocks, yearend, refined, held by U.S. producers, consumers, and metal exchanges	314	532	565	334	800
Employment, mine and mill, thousands	13.2	13.0	11.6	10.2	10
Net import reliance[4] as a percentage of apparent consumption	13	14	27	37	31

Recycling: Old scrap, converted to refined metal and alloys, provided 310,000 tons of copper, equivalent to 11% of apparent consumption. Purchased new scrap, derived from fabricating operations, yielded 910,000 tons of contained copper; about 90% of the copper contained in new scrap was consumed at brass or wire-rod mills. Of the total copper recovered from scrap (including aluminum- and nickel-base scrap), brass mills recovered 65%; copper smelters and refiners, 13%; ingot makers, 11%; and miscellaneous manufacturers, foundries, and chemical plants, 11%. Copper in all old and new, refined or remelted scrap contributed 33% of the U.S. copper supply.

Import Sources (1997-2000): Unmanufactured: Canada, 34%; Chile, 24%; Peru, 16%; Mexico, 14%; and other, 12%. Refined copper accounted for 67% of imports of unwrought copper.

Tariff: Item	Number	Normal Trade Relations[5] 12/31/01
Unrefined copper; anodes	7402.00.0000	Free.
Refined and alloys; unwrought	7403.00.0000	1.0% ad val.
Copper powder	7406.10.0000	Free.
Copper wire (rod)	7408.11.6000	3.0% ad val.

Depletion Allowance: 15% (Domestic), 14% (Foreign).

Government Stockpile: The stockpile of about 20,000 tons of refined copper was liquidated in 1993. The stockpile of about 6,100 tons of brass was liquidated in 1994. For details on inventories of beryllium-copper master alloys (4% beryllium), see the section on beryllium.

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Events, Trends, and Issues: World mine production of copper rose by about 300,000 tons (2%), despite a significant drop in U.S. production. World mine capacity rose by only about 100,000 tons (1%), representing a break from the rapid expansion in capacity over the preceding 5 years. Although, according to preliminary data compiled by the International Copper Study Group,[6] world refinery production increased by about 450,000 tons (5%) for the first 7 months of 2000, world copper use declined by 2.6% for the corresponding period. As a result, a calculated global production surplus of about 200,000 developed and reported stocks increased by more than 350,000 tons. This contrasts with an inventory draw-down for the first 7 months of 2000 of about 275,000 tons. Copper prices trended downward throughout the year with rising inventories, and by September the average monthly COMEX and U.S. producer price had fallen to $0.654 and $0.696 per pound, respectively.

U.S. production cutbacks continued into 2001. The Continental Mine in Montana, which had expected to reopen in late 2000, remained closed. Phelps Dodge Corp. completed conversion of its Morenci, AZ, mine to an all-leach operation by the end of the first quarter and curtailed concentrate production at Chino, NM. (For details, see USGS Mineral Industry Surveys, Copper in March 2001.) With falling copper prices, rising inventories, and a weak demand outlook, several companies announced additional reductions in the second half of the year. Kennecott Utah Copper Corp. closed its higher cost North concentrator at its Bingham Canyon Mine at midyear. (For details, see USGS Mineral Industry Surveys, Copper in April 2001.) In October, citing further deterioration in the near-term economic outlook following the September 11 terrorist attacks, Phelps Dodge announced that it would curtail an additional 220,000 tons per year of U.S. production by mid-January 2002. Phelps Dodge planned to close the Chino (NM) and Miami (AZ) leach operations and halve production at the Sierrita (AZ) and Bagdad (AZ) mines. It also planned to close its Chino smelter and Miami refinery.[7] U.S. refined consumption was projected to decline by 10% in 2001.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[8]	Reserve base[8]
	2000	2001[e]		
United States	1,440	1,340	45,000	90,000
Australia	829	900	9,000	23,000
Canada	634	620	10,000	23,000
Chile	4,600	4,650	88,000	160,000
China	590	620	18,000	37,000
Indonesia	1,012	1,060	19,000	25,000
Kazakhstan	430	470	14,000	20,000
Mexico	365	370	15,000	27,000
Peru	554	580	19,000	40,000
Poland	456	450	20,000	36,000
Russia	570	550	20,000	30,000
Zambia	240	320	12,000	34,000
Other countries	1,480	1,570	50,000	105,000
World total (may be rounded)	13,200	13,200	340,000	650,000

World Resources: Land-based resources are estimated to be 1.6 billion tons of copper, and resources in deep-sea nodules are estimated to be 700 million tons. In the United States, discovered copper resources are estimated to contain 350 million tons and undiscovered deposits to contain 290 million tons of copper.

Substitutes: Aluminum substitutes for copper in various products, such as electrical power cables, electrical equipment, automobile radiators, and cooling/refrigeration tubing. Titanium and steel are used in heat exchangers, and steel is used for artillery shell casings. Optical fiber substitutes for copper in some telecommunications applications. Plastics also substitute for copper in water pipe, plumbing fixtures, and many structural applications.

[e]Estimated.
[1]Some electrical components are included in each end use. Distribution by Copper Development Association, 2000.
[2]Less than ½ unit
[3]Defined as primary refined production + copper from old scrap converted to refined metal and alloys + refined imports - refined exports ± changes in refined stocks. In 1998, 1999, 2000, and 2001, general imports of 725,000 tons, 915,000 tons, 1,020,000 tons, and 1,350,000 tons, respectively, were used to calculate apparent consumption.
[4]Defined as imports - exports + adjustments for Government and industry stock changes for refined copper.
[5]No tariff for Canada and Mexico for items shown.
[6]International Copper Study Group, 2001, Copper Bulletin: Lisbon, Portugal, International Copper Study Group, v. 8, no. 10, 48 p.
[7]Phelps Dodge Corp., 2001, Phelps Dodge addresses current economic environment: Phoenix, Phelps Dodge news release, October 23, 3 p.
[8]See Appendix C for definitions.

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By Daniel L. Edelstein

Domestic survey data and tables were prepared by Janet D. Richards and Donna Damichelis, statistical assistants, and the world production tables were prepared by Regina R. Coleman, Linder Roberts, and Glenn J. Wallace, international data coordinators.

In 2000, mine production of recoverable copper in the United States continued its downward slide that began in 1998, falling by more than 150,000 metric tons (t) to the lowest level since 1988. In addition to mine closures and cutbacks carried forward from midyear 1999, high energy costs coupled with low copper prices led to unanticipated cutbacks and closures. Some rationalization of capacity occurred following consolidation of ownership at the end of 1999. Three companies, Phelps Dodge Corp., ASARCO Inc. (owned by Mexico's Grupo Mexico S.A. de C.V.), and Kennecott Utah Copper Corp. (owned by Rio Tinto plc of the United Kingdom), accounted for more than 95% of U.S. copper mine production.

While the United States maintained its position as the world's second largest mine producer of copper, accounting for about 11% of world production, its share of global production continued to decline from its 19% share in 1994. Chile, where mine production increased by 5% in 2000, and by 85% since 1995, was the largest mine producer and accounted for 35% of world production. World mine production grew by about 3.5% in 2000 and by 30% since 1995. The world reserves and reserve base for copper were estimated to be 340 million metric tons (Mt) and 650 Mt, respectively. The United States had about 13% each of reserves and reserve base. In the 1998 National Mineral Resource Assessment conducted by the U.S. Geological Survey (U.S. Geological Survey, 2000), the estimated copper contained in undiscovered resources in the United States ranged from greater than 170 Mt at a 90% probability to greater than 440 Mt at a 10% probability. The mean estimate of copper in undiscovered deposits was 290 Mt. According to the assessment, more than two-thirds of the copper was thought to be contained in undiscovered porphyry copper deposits. Other major deposit types were sediment-hosted and volcanogenic massive sulfide deposits. About 50% of the undiscovered resource was believed to be in Great Basin and Southern Basin and Range regions (portions of Arizona, California, Nevada, New Mexico, and Utah). The identified copper resource was estimated to be 260 Mt. Coupled with past production of about 91 Mt, the total discovered copper resource in the United States was estimated to be 350 Mt.

U.S. copper smelter and refinery production also continued to fall and were down by 23% and 16%, respectively, from 1999 production levels, and 42% and 33%, respectively, from production in 1998. Owing to the combined impact of mine cutbacks and low prices, three of seven primary smelters had closed in 1999. Primary refined production declined owing to a downstream shortage of anode for refining. With the three smelters remaining closed in 2000, the United States became a net exporter of copper in concentrates. Contraction of the secondary copper industry continued with the closure in May of one of the Nation's two remaining secondary smelters and its

Copper in the 20th Century

At the beginning of the 20th century, following patenting of the electric lightbulb and initial development of electric power distribution infrastructure late in the 19th century, the United States was experiencing a prolonged period of expansion in copper use for electrical generation, distribution, and industrial applications. U.S. mine production rose from 27,000 metric tons in 1880 to 275,000 tons in 1900 and 490,000 tons in 1910. Most of the copper produced came from high-grade vein deposits that predominantly yielded ore for direct shipping to smelters (80 smelters operated in 1907). By 1900, Montana and Arizona had emerged as the leading producing States, accounting for 45% and 20% of domestic production, respectively. The United States was by far the world's largest producer in 1900, accounting for 55% of world production and exporting about 160,000 tons of refined copper and consuming about 160,000 tons.

The United States retained its position as the largest producer and consumer of copper through most of the century. Domestic copper mine production peaked in 1997 at 1.94 million tons. Froth flotation and large-scale open pit mining methods introduced during the first decade of the century had revolutionized copper mining, and production was derived increasingly from low-grade porphyry copper deposits. Industrialization, rural electrification, and growing infrastructure all contributed to the growth in copper demand. Electrical applications accounted for an increasing share of domestic consumption (about 75% in 2000).

By the start of the 21st century, however, the United States had relinquished its role as the world's largest copper producer to Chile (35% of global production). U.S. mine production in 2000 fell to about 1.4 million tons and accounted for only about 11% of world production. Technology advances made in the 1980s resulted in one-third of U.S. mine output in 2000 coming from the leaching and solvent extraction-electrowinning of acid soluble ores. The combined impact of environmental regulation and industry restructuring left only four smelters operating. The United States remained the world's largest user of refined copper (about 3 million tons, 20% of world total) and was dependant on imports for about one-third of its refined copper supply. Copper recovered from old scrap (500,000 tons in 1997) also fell victim to industry consolidation and offshore processing and declined to only 350,000 tons in 2000.

captive electrolytic refinery. Electrowon production, which accounted for a record 36% of primary refined production and 38% of mine production, declined by about 5%. Though it retained its position as the second largest refiner and third largest smelter, the U.S. share of world smelter and refinery production fell to 9% and 12%, both down from 15% in 1998. In 1998, the United States had been the largest smelter and refiner of copper.

Twenty-seven mines operating in 7 States, down from 33 in 1999, reported recoverable quantities of copper in 2000. Fourteen mines located in Arizona, Utah, New Mexico, and Montana, in descending order, accounted for more than 99% of production. The remaining 13 mines were either small heach operations or byproduct producers of copper. Despite the decline in production, capacity utilization at domestic mines rose, as capacity was adjusted downward to reflect the long-term closure of mines that were not expected to reopen without significant capital investment.

During the year, 4 primary and 2 secondary smelters, 6 electrolytic and 3 fire refineries, and 14 solvent extraction-electrowinning (SX-EW) facilities operated in the United States. By yearend, however, one secondary smelter and associated electrolytic refinery had closed. Following closure of three primary smelters in 1999, which were not anticipated to reopen in the short term, smelter capacity for 2000 was revised downward from 1.75 million metric tons per year (Mt/yr) in 1999 to 1.18 Mt/yr. Consequently, smelter capacity utilization rose from 74% in 1999 to 85% in 2000. Capacity at refineries declined by about 200,000 metric tons per year (t/yr) to 2.4 Mt/yr and the utilization rate fell to 74%. The conversion of old scrap to alloys and refined copper, declined by 47,000 t (12%), contributed 334,000 t of copper to the market, and accounted for 11% of apparent industrial demand. Lower copper prices in 2000 and closure of a secondary copper smelter led to the continued downward trend in recovery.

Copper was consumed as refined copper and as direct melt scrap at about 35 brass mills, 13 wire-rod mills, and 600 foundries, chemical plants, and miscellaneous operations. According to data compiled by the Copper Development Association Inc. (CDA) (Copper Development Association, Inc., 2001, p. 18), mill and foundry product shipments to the U.S. market, including net imports of mill products, continued their upward trend, rising by170,000 t (4%) to 4.33 Mt, and were 43% higher than shipments in 1990.

The net import reliance for refined copper, as a percentage of apparent consumption, rose sharply to a record-high 37% (from 14% in 1998) following cutbacks in domestic production and growth in demand. Peru emerged as the largest source of refined copper, and, along with Canada and Chile, accounted for about 80% of refined imports. Canada remained the largest U.S. source for unwrought copper, accounting for 27% of total imports of unwrought copper. China (including Hong Kong), owing to a large growth in U.S. scrap exports, became the largest recipient for unwrought exports, accounting for 58% of refined exports and 38% (copper content) of total exports.

Legislation and Government Programs

On January 26, 2000, as authorized by the Coin Act of 1997, the U.S. Mint began releasing its new Golden dollar coin to replace the Susan B. Anthony dollar coin that had been introduced in 1979. In its report to Congress, the Mint outlined details of a promotional campaign aimed at helping the public build a strong awareness for the coins. According to the Mint, about 700 million Golden Dollars were placed in circulation during 2000, 7 times initial expectations. The new coins also generated an $800 million profit for the Mint (U.S. Mint, 2001). At a coin weight of 8.1 grams and overall composition of 88.5% copper, 6% zinc, 3.5% manganese, and 2% nickel, the 700 million coins contained about 5,000 t of copper.

In January, the U.S. Department of Labor, Division of Trade Adjustment and Assistance, rejected a petition by the United Steel Workers of America seeking transitional adjustment assistance for workers producing copper rod at the Pauline, KS, plant of Superior-Essex Inc. In rejecting the petition, the department found that criterion 3 (the subject firm increased imports of like products from Canada or Mexico) and criterion 4 (the firm shifted production to Canada or Mexico) of the act had not been met. The Division of Trade Adjustment and Assistance concluded that copper rod production at Pauline had been shifted to other domestic plants of the subject firm and that Superior-Essex had neither increased its imports from Mexico or Canada nor shifted production to those countries (U.S. Department of Labor, 2000).

In June, the U.S. Environmental Protection Agency (EPA) proposed a change to its proposed national emissions standards for hazardous air pollutants (NESHAP) for primary smelters (smelting furnaces, slag cleaning furnaces, and batch converters). In April 1998, under section 112 of the Clean Air Act, which directs EPA to establish NESHAPs to control emissions from major stationary sources, EPA had proposed an equipment-based standard. The new proposed rule for the control of process emissions would establish a numerical emissions standard for particulate matter of 23 milligrams of total particulate matter per dry standard cubic meter (0.010 grains per dry standard cubic foot). In EPA's judgment, the proposed standard reflects "a level of total particulate matter emissions that can be achieved consistently by a properly operated and maintained sulfuric acid plant used to control process offgas from primary smelting and converting operations." The proposed standard also specifies that a furnace will be in violation of the standard if leak detector alarms installed on baghouses indicate higher than allowable emissions more than 5% of the operating time over a 6-month period. Copper smelting was 1 of 170 categories selected for regulation under the Clean Air Act (U.S. Environmental Protection Agency, 2000b).

In November, in response to an industry petition, EPA issued a final rule exempting the need for a residue tolerance test, in accordance with the Federal Food, Drug, and Cosmetic Act (as amended by the Food Quality Protection Act of 1996), when copper sulfate pentahydrate is used as a fungicide on raw agricultural commodities after harvest. This regulation eliminates the need to establish a maximum permissible level for residues of copper sulfate pentahydrate. While use of copper compounds has been exempted from tolerance tests when applied to growing crops, they had not been exempted when applied to crops at the time of or after harvest. Copper compounds are already exempted from testing when used on harvested fish, meat, poultry, eggs, and irrigated crops. In granting its exception, EPA noted relevant scientific data indicating that it is unlikely that excessive amounts of copper

ion from this use would be ingested, that copper is ubiquitous in nature and naturally occurring in ingested water and plants, is an essential nutritional element in animals (including humans) and plants, not readily absorbed when ingested, and that most of absorbed copper is excreted (U.S. Environmental Protection Agency, 2000a).

Production

Mine production capacity was adjusted downward by about 250,000 t/yr to about 1.75 Mt/yr, reflecting the sustained closure of BHP Copper Co. mines and reduced capacity at several other mines that had shifted mining strategies or plans. Phelps Dodge closed its Metcalf concentrator at its Morenci Mine in Arizona during August in anticipation of switching to an all leach operation in 2001. In response to lower average prices, mine closures, and higher than anticipated utility rates, production declined by about 160,000, t and capacity utilization rose slightly to about 84%. With the exception of its small Arizona leach SX-EW operations at San Manuel, Pinto Valley, and Miami, BHP's mines remained shuttered.

Primary smelter production declined by 21% following the closure of three of the seven primary domestic smelters during 1999 and was down by 42% from that in 1998. Smelter capacity was revised downward to reflect the indefinite closure of these smelters. Secondary smelter production continued its downward trend, declining by 31%. In May, Southwire Co. closed its secondary smelter and associated electrolytic refinery, in Carrollton, GA. Southwire continued to operate its rod mill housed within its Copper Division Southwire (CDS). Sixteen months prior, as part of a restructuring plan aimed at lowering its costs, Southwire had unsuccessfully placed its Carrollton copper smelter/refinery operations on the market. Southwire cited economic factors, including the continued cost of compliance with environmental regulations in the metro-Atlanta area, for the closure of copper smelting operations. CDS was constructed in 1972, at a time when primary producers exerted greater control over copper prices. As part of the closure justification, Southwire cited the advent of worldwide commodity prices and their own "strong buying position" as leverage in meeting future raw material needs (Southwire Co., 2000). Closure of CDS secondary copper facilities, which have a capacity to produce 140,000 t/yr of refined copper, had a significant impact on the U.S. scrap copper market. Southwire processed a mixture of imported blister and copper scrap at its smelter to produce anode for electrolytic refining. Southwire was one of two remaining secondary smelters in the United States, two other smelters having closed in the preceding 3 years. Southwire closed its other secondary copper smelter in Claston, SC, at the end of 1994, also citing the high cost of environmental compliance as the reason for closure.

Primary and secondary refinery production declined by 16% and 9%, respectively. The aforementioned smelter closures led to downstream shortages of anode for refining. Electrowon production declined by only about 3% and accounted for a record 36% of primary refined production. The Warrenton fire refinery, which had closed in March 1999, was reopened under different management, mitigating some of the lost secondary refinery capacity.

Following acquisition of the assets of Cyprus Amax Minerals Co. at yearend 1999, Phelps Dodge Corp. reported record copper production of 1.32 Mt, including minority participants share of 235,000 t, from its worldwide operations. U.S. production amounted to 850,000 t. In the United States, production and costs were adversely affected by unusually heavy precipitation during the fourth quarter of the year and high energy costs, including electricity, diesel fuel, and natural gas. According to Phelps Dodge, its domestic electricity costs during the fourth quarter averaged $0.11 per kilowatthour, more than three times their 5-year average cost, and total energy costs rose by $0.08 per pound of copper production, a 65% increase over the comparative 1999 period. Total energy costs increased copper unit costs in 2000 by approximately $0.04 per pound compared with unit costs in 1999. Beginning in the spring of 2000, the impact of a power supply/demand imbalance in California, drought in the Pacific Northwest, and higher natural gas prices caused a shortage of electricity and higher spot market electricity costs. Approximately 27% of Phelps Dodge's electricity requirements in 2000 was purchased on the spot market (Phelps Dodge Corp., 2001a, p. 15-16; 2001b, p. 3).

At its Morenci Mine, production of copper in concentrate declined from 177,000 t to 120,000 t following placement of the Metcalf concentrator on standby in June. In September 1999, Phelps Dodge had announced its intent to reduce production costs by converting all Morenci production to mine-for-leach by early 2001 and permanently shut both the Metcalf and Morenci concentrators. The $220 million conversion proceeded throughout 2000 and was completed during the first quarter of 2001. New facilities included an expanded crushing and conveying system, mobile stackers to disperse the ore on leach piles, expanded solvent extraction facilities, and construction of a new electrowinning tankhouse. Electrowon production in 2000 of 258,000 t was unchanged from that of 1999 (Phelps Dodge Corp., 2001a, p. 3-9).

At its Miami, AZ, leach operations acquired with the purchase of Cyprus Amax, a new mine plan was instituted in June that suspended stripping in a higher cost section of the mine and allowed redistribution of equipment to other Phelps Dodge operations. Production in 2000 of 54,000 t of cathode was not impacted by the mine plan change, though production in 2001 and 2002 was expected to fall by 16,000 t and 39,000 t, respectively. At its newly acquired Bagdad Mine in Arizona, Phelps Dodge reported production of 101,000 t of copper in concentrate and 10,700 t of electrowon copper. Electrowon production at its Tyrone, NM, mine was essentially unchanged at 72,000 t (Phelps Dodge Corp., 2001a, p. 3-9).

In March, Phelps Dodge ended speculation on the fate of its newly acquired Sierrita Mine in Arizona when it announced that it intended to invest $13 million to upgrade the mine ($2.9 million), the crushing and conveying system ($2.5 million), the solvent extraction circuit ($1.3 million), as well as other upgrades and land purchases ($3.0 million) (Platt's Metals Week, 2000c). Production in 2000 amounted to 87,000 t of copper in concentrate and 24,000 t of electrowon copper (Phelps Dodge Corp., 2001a, p. 8).

At its Hidalgo, NM, smelter, closed in September 1999, Phelps Dodge announced its intention to reconfigure the smelter to produce sulfuric acid for its leaching operations. While Phelps Dodge had a near-term surplus of concentrate, the company announced at midyear that it intended to stop exporting surplus concentrates and to stockpile them in anticipation of conversion of Morenci to all leach operation,

resulting in a future concentrate shortfall. Prior to closure of the Hidalgo smelter, Phelps Dodge had been a net importer of copper concentrates from its South American operations (Phelps Dodge Corp., 2000). In 2000, Phelps Dodge smelters produced 449,000 t of copper. As a result of the upstream curtailment in smelting, Phelps Dodge's refineries in El Paso, TX, and Miami, AZ, operated at only 72% of their combined capacity, producing 427,000 t of copper cathode (Phelps Dodge Corp., 2001a, p. 9).

In July, Asarco, a wholly owned subsidiary of Mexico's Grupo Mexico S.A. de C.V., announced plans to consolidate all corporate functions in Phoenix, AZ, by yearend. Following acquisition by Grupo in November 1999, Asarco had already transferred many of its corporate functions from New York City to Arizona (ASARCO Inc., 2000a). Grupo reported that operating and cost savings from the integration of Asarco and Southern Peru Copper Corp. following acquisition in 1999 amounted to more than $171 million. Asarco's share of mine production declined from 293,000 t in 1999 to 261,000 t in 2000 (Grupo Mexico S.A. de C.V., 2001b).

At Asarco's Ray Operations in Hayden, AZ, production of copper in concentrate and electrowon cathode declined to 99,300 t and 38,800 t, respectively, down from 144,000 t and 40,000 t, respectively, in 1999. The Ray mining unit consists of a 227,000-metric-ton-per-day (t/d) open pit mine with a 27,000-t/d concentrator (Ray) and a 23,500-t/d concentrator (Hayden), a 13,600-t/d silicate leaching system, a low-grade sulfide dump leaching system, and a SX-EW operation. The Hayden oxygen flash smelter, with an annual capacity of 650,000 t/yr of concentrates, produced 191,000 t of copper anode. Asarco's El Paso smelter remained on standby throughout the year, and production at its Silver Bell Mine and SX-EW operation in Arizona declined by about 2,000 t to 18,300 t (Grupo Mexico S.A. de C.V., 2001a, p. 10-13).

In November, Asarco initiated a new mine plan at its Mission Mine Unit in Arizona. Under the plan, ore production was reduced from 56,000 t/d to 37,000 t/d, while total material mined was increased by 25%, thus increasing the stripping ratio and extending the reserve life at the mine from 14 to 22 years. The new plan was expected to boost average ore grades, increase recovery rates, and reduce unit production costs. Annual production of copper in concentrate was expected to decline by 22,000 t (ASARCO Inc., 2000b).

Montana Resources Inc. (49% owned by Asarco) suspended milling operations at its Continental Mine in Montana on June 30, citing "a dramatic escalation in power prices" as the reason for the shutdown. Stripping operations continued after the mill closed, and the company had anticipated resuming operations by yearend when it had expected utility rates to abate after the peak summer demand (Platt's Metal's Week, 2000b). At yearend, however, the mine remained closed and was not anticipated to reopen in the near term.

Despite numerous setbacks and limited interest by investment companies, Summo Minerals Corp. continued predevelopment work on its Lisbon Valley Copper Project, San Juan County, UT. The company resumed a drilling program early in the year in the Centennial SE Extension deposit and updated reserve calculations for a revised "final feasibility study," approved in September, for submission to banks for solicitation of financing. The plan design is for an open pit, heap-leach, SX-EW project producing 18,000 t/yr of cathode during a minimum 8.5-year period at anticipated cash and full operating costs of below $0.50 and $0.75 per pound of copper, respectively. Reserves were estimated at 333 Mt of ore grading an average 0.54% copper with a stripping ratio of 2.25 (Summo Minerals Corp., 2000a; 2000b).

At Kennecott Utah Copper Corp.'s Bingham Canyon Mine, production of copper increased by 5.9% to 296,000 t, and gold output rose 44% to 529,000 ounces compared with production in 1999. A 4% increase in ore milled, combined with a 4% and 44% increase, respectively, in copper and gold grades, accounted for the production growth. Copper ore grades had fallen from 0.62% copper in 1998 to 0.55% in 1999 and recovered, beginning midyear, to an annual average of 0.57% in 2000, still below the expected life-of-the-mine average. Kennecott anticipated that large-scale underground mining would extend mine life by 15 years when open pit reserves are exhausted around 2015. Refinery output increased nominally to 269,000 t with the smelter reportedly operating in excess of rated capacity (Rio Tinto plc, 2001, p. 37).

Nord Resources Corp. was seeking financing to return the Johnson Camp copper mine to full production. Nord acquired Johnson Camp in June 1999. In the first 6 months of 2000, the company incurred losses related to the planned redevelopment of the mine but operated on a close to break-even basis after that (Nord Resources Corp., 2000b). The Johnson Camp Copper Mine, 105 kilometers east of Tucson, AZ, is currently being operated on a maintenance basis. Since 1975, the mine has produced more than 68,000 t of cathode copper from open pit mining, heap leaching, and SX-EW processing of oxide ores. Although significant reserves remain, mining operations ceased in 1997. Heap leaching continues and the mine is producing 1 to 2 million pounds of copper annually. A detailed feasibility study to restart the Johnson Camp Mine demonstrated that the mine could produce 8,900 t per year of copper cathode for 11 years at an average cash cost of $0.63 per pound. Startup costs would total $13.5 million, including $7.9 million of capital investment and $5.6 million of working capital and other costs. Current reserves are placed at 3.2 Mt grading 0.417% copper (Nord Resources Corp., 2000a).

Consumption

Reported consumption of refined copper by domestic manufacturers continued its upward trend, rising by 1.6%, to 3.03 Mt. In addition to refined copper, domestic manufacturers directly consumed (melted or processed into chemicals) 1.3 Mt of copper-base scrap containing about 1 Mt of recoverable copper. An additional 75,000 t of copper was recovered in the consumption of aluminum-, nickel-, and zinc-base scrap.

Consumption of refined copper at wire-rod mills increased nominally and accounted for about 74% of domestic consumption of refined copper. For the third consecutive year, consumption growth at wire-rod mills was moderated by increased imports of wire rod, principally from Canada and Mexico, from which imports rose by 45,000 t to 225,000 t in 2000. Total imports rose by 63,000 t. Capacity utilization at domestic mills remained high following closure of two wire-rod mills in 1999. According to industry reports, despite increased imports, the U.S. wire-rod market was tight and at midyear experienced supply shortages. Wire-rod inventories in June fell to their lowest levels in recent years. An extended maintenance

shut down at Grupo Minero Mexico S.A.'s Mexican wire-rod mill led to a 20% cutback in shipments in June, and production difficulties were also reported at Southwire Co., which had closed its secondary smelter and electrolytic refinery at the end of May (Platt's Metals Week, 2000d). In response to limited U.S. capacity and expectations of continued demand growth, Alcatel, a French-owned communications company with wire-rod mills in Canada, France, and Germany, announced plans to construct a 200,000-t/yr wire-rod mill in the southeastern United States. Commissioning was anticipated in 2 to 3 years (Platt's Metals Week, 2000a).

At brass mills, which were the second largest consumers of refined copper, consumption of refined copper rose by about 5%, while consumption of copper-base scrap rose by less than 2%, reflecting the continued impact of relatively low copper prices that reduced the cost of using refined copper and reduced the availability of scrap for processing. Brass mills still remained the largest consumers of scrap, accounting for about two-thirds of the total copper recoverable from scrap.

According to data compiled by the CDA (2001, p. 18), the supply of copper and copper-alloy products to the U.S. market by fabricators (wire mills, brass mills, foundries, and powder producers), including net imports, rose by about 4% to 4.3 Mt, up from the revised total of 4.16 Mt in 1999, and contained an estimated 3.9 Mt of copper. About 71% of these shipments was as unalloyed copper products. Wire mill products accounted for about 49% of total shipments to the domestic market; brass mill products, 47%; and foundry and powder products, 4%. In building construction, the largest end-use sector, shipments were essentially unchanged and accounted for about 39% of the market, down from 41% the previous year. Building construction included products used for building wire, plumbing and heating, air conditioning and commercial refrigeration, builders hardware, and architectural applications. Shipments for electric/electronic products and consumer/general products rose by 9% and 11%, respectively, and accounted for 28% and 11% of the market, respectively. Shipments for transportation equipment, 11%, and industrial machinery, 11%, rose slightly.

In May, Cerro Copper Products Co. announced that it had broken ground on a new "flagship" tube manufacturing and distribution center in Cedar City, UT. The tube mill was expected to be commissioned in 2001. The facility is part of a 3-year, $125 million expansion program. In addition to employing a unique, Cerro-developed process to produce both plumbing and air conditioning tube, the mill will be the only tube mill in the western United States (Cerro Copper Products, 2000). According to the Copper Development Association Inc. data (2001, p. 17), though down slightly in 2000, plumbing and commercial tube shipments to the U.S. market have risen 14% since 1995.

Prices and Stocks

Despite growing global inventories, copper prices in January continued the upward trend begun in mid-1999 and rose to their highest level in almost 2 years. The Commodity Exchange (COMEX) spot price averaged $0.85 per pound in January. With global inventories held on the commodity exchanges continuing to rise in February, prices began to weaken. Despite a sharp reversal in the upward trend in global inventories beginning in March, prices remained lower, the COMEX price averaging only $0.80 per pound in the March to June period. According to data compiled by the International Copper Study Group (2001a, p. 6), monthend inventories of refined copper on the global exchanges (LME, COMEX, and Shanghai Futures Exchange) peaked in February at 990,000 t before beginning a sustained slide that lasted through November when monthend inventories fell to 495,000 t. Prices began to respond to the decline in global stocks in May, and the average monthly COMEX price climbed to $0.91 per pound in September. Prices weakened and fluctuated during the fourth quarter of the year, the COMEX price averaging $0.86 per pound and finishing the year at $0.85 per pound. At yearend, inventories of copper held on the metals exchanges totaled 530,000 t, and total reported inventories, as reported by the International Copper Study Group (ICSG), decreased to 1.31 Mt, down from 1.62 Mt in 1999. At the prevailing rate of consumption, global inventories at yearend represented only about 31 days of supply, down from 41 days in 1999.

Trade

Net imports of refined copper rose sharply for the fifth consecutive year to 962,000 t, compared with 812,000 t in 1999. General imports of refined copper (1,025,000 t) were 30,000 t lower than imports for consumption as bonded material was removed from U.S.-located London Metal Exchange Ltd. (LME) warehouses. Beginning in March, LME inventories declined steadily and at yearend totaled 204,000 t, down from 412,000 t at yearend 1999. Exports of refined copper rose to 94,000 t, up from 25,000 t in 1999, and accounted for some of the drawdown in LME inventories.

Reduced domestic capacities led to shifts in the trade pattern for several copper products. Continuing the trend began during the second half of 1999 following the closure of three primary smelters, the United States reverted to being a net exporter of copper in concentrates during 2000. The United States exported 175,000 t of copper in concentrate while having only negligible imports. Prior to 1998, the United States had been a long-term net exporter of concentrates. Reduced secondary processing capacity led to a surge in scrap exports; combined scrap exports of 486,000 t for 2000 exceeded exports of 315,000 t in 1999. China, including Hong Kong, was the largest recipient, accounting for 223,000 t, 46%, of total scrap exports. Owing to reduced capacity at domestic wire-rod mills, growth in industrial demand for wire rod was met by increased imports. Wire-rod imports (as reported by the U.S. Census Bureau and adjusted by the U.S. Geological Survey) rose to 247,000 t, up from 197,000 t in 1999 and 108,000 t in 1998.

According to U.S. Census Bureau data compiled by the Copper and Brass Fabricators Council Inc. (2001, p. 1-9), the United States imported 394,000 t of copper and copper-alloy semifabricated products, excluding wire-rod mill products, and exported 158,000 t. Net imports rose to 236,000 t, up from 139,000 t in 1999 and 86,000 t in 1998. Canada and Mexico accounted for 75% of semifabricated copper exports and 30% of imports.

Each year during the anniversary month of the publication of an antidumping or countervailing duty order, finding, or suspension of investigation, interested parties may request that the Department of Commerce conduct a review of the prevailing ruling. Numerous copper products for which antidumping or

countervailing duties have been imposed were subject to review in 2000. In May, the International Trade Administration (ITA) ruled that revocation of antidumping duty orders against brass sheet and strip from the Republic of Korea, the Netherlands, and Sweden was not likely to lead to recurrence or continuation of material injury to the domestic industry and that it was revoking the duties effective January 1, 2000 (U.S. Department of Commerce, 2000b). Conversely, the ITA ruled to maintain antidumping and countervailing duty orders for brass sheet and strip from Brazil, Canada, France, Germany, Italy, and Japan (U.S. Department of Commerce, 2000a).

World Review

The global production oversupply for refined copper that developed at midyear 1997, and continued into 1999, began to shift during the first quarter of 2000. According to data compiled by the ICSG, reported world inventories of refined copper by the end of June had declined 220,000 t from those held at yearend 1999, and by yearend 2000 were down by 310,000 t to 1.3 Mt. At the prevailing rate of consumption, yearend world inventories represented a 31-day supply of refined copper, down from about 42 days at the end of 1999. Inventories held in LME warehouses declined by 433,000 t, overshadowing increases in reported consumer and Shanghai Futures Exchange inventories. The transition from production surplus in 1999 to production deficit in 2000 reflects a slowdown in refined production growth and an almost 8% growth in world refined copper consumption to 15.3 Mt. While consumption grew only about 2% in North America to 3.74 Mt, consumption by European Union countries grew by about 7% to 4.1 Mt, and Asian countries by about 11% to 6.1 Mt. Growth was particularly strong in China, where usage grew by about 25% to 1.88 Mt (International Copper Study Group, 2001a).

In 2000, despite the decline in U.S. capacity, estimated world mine capacity rose by 470,000 t/yr, or 3.4%, to 14.4 Mt/yr, extending the strong growth trend that began in 1995. Chile, Indonesia, and Kazakhstan accounted for most of the capacity expansion, their capacities having grown by 270,000 t/yr, 145,000 t/yr, and 90,000 t/yr, respectively. Capacity also increased significantly in Australia (33,000 t/yr) and China (30,000 t/yr). World smelter capacity, which had trended upward over the preceding 5 years, declined by about 150,000 t/yr. Indefinite closures of U.S. smelters were partially offset by expanded capacity in Australia (110,000 t/yr), where the Mount Isa smelter reached full capacity and the new Port Kembla smelter was commissioned during the year. In Korea, incremental expansions of the Onsan smelters boosted capacity by about 40,000 t/yr; in Bulgaria, expansion of the UM Pirdop smelter increased capacity by 45,000 t/yr; and in China, installation of an Isasmelt furnace at the Yunnan smelter boosted capacity by about 50,000 t (International Copper Study Group, 2001c, p.1-56). According to CRU International Ltd. (2001, p. 54-55), the supply of copper concentrates for smelting exceeded demand by about 230,000 t/yr of contained copper, and contract treatment (smelting) and refining charges assessed by smelters averaged about $0.18 per pound of recoverable copper, essentially unchanged from that in 1999.

World refinery capacity rose by about 140,000 t/yr, less than 1%, principally owing to expansion of electrowinning capacity in Chile. The decline in U.S. electrolytic refining capacity was offset by increased capacity in Australia, where the Port Kembla refinery was commissioned (60,000 t/yr expanding to 120,000 t/yr) and the Olympic Dam refinery was expanded by about 50,000 t/yr. In Indonesia, capacity increased by about 30,000 t/yr at the Gresik refinery, commissioned in 1999 (International Copper Study Group, 2000c, p. 57-98).

Outlook

U.S. mine production is expected to decline by about 100,000 t in 2001 as the full impact of 2000 mine plan changes is realized and new cost saving programs are implemented. Production is expected to decline by an additional 40,000 t in 2002. The Morenci Mine in Arizona already closed its remaining concentrator and converted to an all leach operation during the first quarter 2001, reducing its total output but increasing production of electrowon copper. At Miami, suspension of stripping in 2000 was expected to reduce output in 2001 and 2002 by 16,000 t and 38,000 t, respectively. The mine plan implemented by Asarco at its Mission Mine at yearend should further reduce production in 2001 by about 20,000 t. In June 2001, Kennecott announced that it would suspend operations from its higher cost North concentrator, reducing ore throughput by about 18% (Kennecott Utah Copper Corp., 2001). Following cutbacks in concentrate output, the three primary smelters closed in 1999 are expected to remain shuttered.

Primary refined production in 2001 is expected to decline only slightly owing to a decrease in net exports of concentrate and increased electrowon production. Secondary refined production is expected to fall following the May closure of Southwire Co.'s secondary smelter.

Domestic consumption of refined copper during the first 6 months of 2001 was down by about 10% from the same period in 2000. In addition to a more than 100,000 t decline in copper consumption at wire-rod mills, weakness in the wire-rod market was indicated by a 20,000-t decline in net imports of wire rod for the first 6 months of the year. Economic slowdown during the second half of 2001 was expected to keep demand at or below first half levels.

At the Annual General Session of the ICSG, held in June 2001, in Lisbon, Portugal, a consensus view of the world balance of copper supply and use for refined copper was developed by Government and industry delegates. According to the consensus, world production of refined copper from both primary and secondary sources in 2001 (adjusted to reflect primary feed shortages and disruptions to operations) is projected to increase by about 500,000 t (3.4%), while world refined copper use is expected to decline by about 100,000 t (less than 1%). This forecast follows a 10-year period of sustained demand growth. Consequently, the production deficit that developed in 2000 was expected to be reversed, and a small surplus of about 130,000 t of refined copper was anticipated. At the prevailing rate of use, this surplus represents only about a 3-day supply of copper. Projections by the ICSG for 2002 indicate that refined production, adjusted to reflect feed shortages and disruptions, will increase by only about 0.5% and will not keep pace with the projected 3.7% growth in demand. As a result, a production deficit is expected for 2002 (International Copper Study Group, 2001b).

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COPPER

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In 2002, mine production of recoverable copper in the United States, which continued the downward trend that began in 1998, fell by more than 100,000 metric tons (t) to its lowest level since 1987. Production cutbacks previously imposed in the United States in response to sustained low copper prices continued into 2002. In January, Phelps Dodge Corp. implemented most of the additional cutbacks announced in October 2001—curtailing 165,000 metric tons per year (t/yr) of production by halting mining at its Miami, AZ, leach operations and halving production at its Sierrita, AZ, and Bagdad, AZ, mines. Its Chino, NM, electrowon operation, however, continued to operate, though no new material was added to the leach pads. It also temporarily closed its Chino smelter and Miami electrolytic refinery (Phelps Dodge Corp., 2001).

The strong growth trend in world mine production that began in 1995 came to an abrupt halt in 2002 when producers, primarily in Chile and the United States, instituted cutbacks. The United States, which accounted for about 8% of world production, relinquished its position as the world's second largest mine producer by falling to third place just behind Indonesia. Chile, where mine production declined by about 3%, remained the largest mine producer and accounted for 34% of world production. The reduced output took place despite a growth of more than 400,000 t in world mine capacity.

U.S. Geological Survey (USGS) estimates indicate world copper reserves of 480 million metric tons (Mt) and a copper reserve base of 950 Mt. The United States had about 7% each of the world's reserves and reserve base. According to the national mineral resource assessment conducted by the U.S. Geological Survey (2000, p. 10), the mean estimate of copper in undiscovered deposits in the United States was 290 Mt. More than two-thirds of the undiscovered copper was thought to be contained in porphyry copper deposits. The identified U.S. copper resource, from which reserves and reserve base are derived, was estimated to be 260 Mt.

U.S. smelter and refinery production fell by 26% and 16%, respectively, despite a 59,000-t increase in net imports of copper in concentrates. Phelps Dodge closed its Chino smelter and Miami electrolytic refinery in response to the reduced availability of concentrates from its mine cutbacks. Only three primary smelters and no secondary smelters operated during the year. Production at ASARCO Incorporated's Amarillo, TX, refinery was reduced significantly following cutbacks at its Mission Mine in Arizona and the closure of Chemetco Inc.'s secondary smelter near Hartford, IL, in 2001, which supplied anode to Amarillo. Electrowon production, which declined by about 28,000 t, accounted for a record 40% of refined copper production. Secondary refined production, which fell by 59%, was affected by the upstream closure of the Chemetco's smelter and reduced production at the three remaining fire refineries. The United States fell to fifth place in world smelter and third place in refinery production.

The principal mining States were, in descending order of production, Arizona, Utah, and New Mexico, and accounted for 99% of domestic production; copper was also recovered at mines in Missouri and Idaho. Although copper was recovered at 22 mines that operated in the United States, just 12 mines accounted for more than 99% of production. The remaining 10 mines were either small leach operations or producers of byproduct copper.

During the year, 3 primary smelters, 4 electrolytic and 3 fire refineries, and 13 solvent-extraction electrowinning (SX-EW) facilities operated in the United States. Smelter capacity was revised downward to about 900,000 t to reflect the permanent closure of Chemetco, while refinery capacity remained unchanged at 2.3 Mt. Smelter and refinery capacity utilization rates fell to 76% and 66%, respectively, down from 91% and 78%, respectively, in 2001. While U.S. refinery capacity has declined by about 460,000 t since 1998, the closure of three primary smelters and three secondary smelters has led to a 1-Mt decline in smelter capacity. In the case of refineries, the net growth in electrowon capacity of about 90,000 t has partially offset refinery closures. Also, though operating at significantly reduced levels, engineered capacity has been retained at Asarco's and Phelps Dodge's electrolytic refineries, which are the two largest in the country.

The conversion of old scrap to alloys and refined copper, which declined for the fifth consecutive year, fell by 110,000 t (35%) to 207,000 t and contributed 8% of apparent industrial demand for copper. Lower copper prices in 2001 and secondary copper smelter closures led to the continued downward trend in recovery. Net exports of copper scrap of 411,000 t were down by about 7% from the record level of 2001.

Copper was consumed as refined copper and as direct melt scrap at about 30 brass mills, 13 wire-rod mills, and 500 chemical plants, foundries, and miscellaneous operations. According to data compiled by Copper Development Association Inc. (2003, p. 18), mill and foundry product shipments to the U.S. market, including net imports of mill products, declined by about 6% in 2002 to 3.24 Mt and were down by 21% from the record-high shipments reported in 2000. According to their revised data, mill shipments to domestic markets were at their lowest levels since 1993. Owing to erosion in U.S. refined production, the net import reliance for refined copper as a percentage of apparent consumption increased to about 37% and was at the same record-high level as in 2000.

Peru, Chile, Canada, and Mexico, in descending order, accounted for 89% of U.S. imports for consumption. Canada and Chile, which remained the country's largest sources for

unwrought copper, accounted for 30% and 27%, respectively, of total imports of unwrought copper.

Legislation and Government Programs

On June 12, the U.S. Environmental Protection Agency (EPA) promulgated national emission standards for hazardous air pollutants (NESHAP) at primary copper smelters. The final rules apply to primary copper smelters that use batch copper converters. They are based on the assumption that copper smelters have the potential to release significant quantities of metals listed as hazardous air pollutants under the Clean Air Act, which include antimony, arsenic, beryllium, cadmium, cobalt, lead, manganese, nickel, and selenium, and that exposure to these pollutants has been demonstrated to cause adverse health effects. The standards reflect the application of the maximum achievable control technology (MACT) as they apply to particulate emissions. The NESHAP for primary copper smelters was first proposed in April 1998 and has been modified to account for numerous public review comments and changes in the domestic industry that took place since 1998. Of the seven smelters originally subject to NESHAP, four have suspended operations, and one (Kennecott smelter in Utah) has adopted new flash-converting technology that has eliminated the major source of fugitive emissions that were discharged during the transfer and handling of molten metal in the batch converting process. In response to industry comments, the new flash-converting technology at Kennecott was included in the broader definition of primary copper smelting but was excluded from this rulemaking and MACT standard. The rulemaking, in fact, set flash converting as the new standard for any new converting operation. While applicable to smelters with batch converting, the rule also sets emissions limits for concentrate dryers, smelting furnaces, slag cleaning vessels, and fugitive dust sources (U.S. Environmental Protection Agency, 2002b).

In April, the EPA published the results of its review of existing drinking water standards for 69 substances, which included copper, for which national primary drinking water regulations (NPDWRs) were established prior to 1997 and requested public comment on their proposed rules. The EPA published the current NPDWR for copper in June 1991, establishing a maximum contaminant level goal for copper of 1.3 milligrams per liter (mg/L). As part of its review, the EPA commissioned the National Research Council (NRC) in 1999 to examine available nutritional and toxicological data for copper and to provide recommendations. The NRC concluded that copper in drinking water in concentrations of 3 mg/L or higher could produce adverse gastrointestinal effects and could be a problem for individuals who carry a recessive gene for Wilson's disease (a condition which causes excess copper to accumulate in the liver). The NRC recommended retention of the 1.3-mg/L limit pending collection of additional data on the risk to carriers of the Wilson's disease gene and other populations with a propensity to accumulate copper in their livers. Accordingly, The EPA initiated a further assessment of copper's health risk and retained the current 1.3-mg/L standard pending reevaluation of the health risks (U.S. Environmental Protection Agency, 2002c).

In February, the EPA announced that it had received a voluntary request from the producers of chromated copper arsenate (CCA) to cancel the authorization for the use of CCA pesticides in the treatment of certain lumber products. Implementation of this action would effectively eliminate the use of CCA to treat lumber for residential applications by December 31, 2003. A 2-year transition period would provide consumers with increasingly more non-CCA treated wood alternatives as the industry undergoes conversion and retooling to take advantage of alternative wood preservatives that do not contain arsenic. In announcing receipt of the producers' request, the EPA did not recommend that existing structures or surrounding soils be removed or replaced. The CCA registry with the EPA would be retained, however, for treatment of wood used in commercial applications, such as marine applications, round poles for building construction, sawn timbers to support residential construction, and highway timbers. Official cancellation of CCA use in residential products, as proposed in the industry's initial voluntary request, was announced on March 17, 2003 (U.S. Environmental Protection Agency, 2002d, 2003).

On November 22, the EPA announced that it had finalized a rule to improve its New Source Review Program and was proposing a rule to provide a regulatory definition of "routine maintenance, repair and replacement." These actions were intended to offer industry, which included copper producers, greater flexibility to improve and modernize plants in ways that would reduce energy use and air pollution. The final rule improvements, which were the culmination of a 10-year review process, will provide facilities with greater flexibility to modernize, incentives to install best available pollution control, and more accurate procedures for evaluating the effect of projects on future emissions and will expedite permitting of investments in pollution prevention (U.S. Environmental Protection Agency, 2002a).

Production

In response to the continuing global oversupply and resulting sustained low copper prices, previously announced mine cutbacks extended into 2002, and a new round of cuts was initiated at the onset of the year. Consequently, mine production dropped precipitously in January and remained at the lower level throughout the year. Annual production fell by almost 200,000 t (15%) to the lowest level since 1985. Capacity utilization at domestic mines fell to about 73% as production fell, and effective capacity remained at about 1.57 Mt.

Smelter production, which continued its downward trend, plummeted by about 26% and was only 52% of the production in 1999. Since then, five smelters have closed permanently—three primary smelters in 1999 and two secondary smelters in 2000 and 2001. The production drop in 2002 was attributable to the closure of Chemetco's secondary smelter in November 2001 and the temporary closure of Phelps Dodge's Chino smelter at the start of the year owing to a shortage of concentrate feed. The U.S. concentrate supply, production plus net imports, fell by about 120,000 t of contained copper.

Downstream, refined copper production fell by 290,000 t, or 16%, owing to a shortage of anode feed from domestic smelters, reduced production from scrap, and a drop in net imports of blister and anode for refining. Electrowon production accounted for a record 53% and 40% of mine and refinery output, respectively.

The proceeds would allow Asarco to pay off a $450 million loan that came due in the autumn to a consortium of lenders. By retiring the loan, Asarco hoped to free up significant cash each month that had been used for debt interest payments (ASARCO Incorporated, 2002a). On July 15, however, the DOJ filed a court injunction to block the deal. In its injunction, the DOJ cited that because of extensive environmental liabilities, Asarco's transfer of its subsidiary SPHC to Grupo Mexico would cause fraud or injustice to the United States and other creditors of Asarco and that Grupo Mexico had formed SPHC after acquiring Asarco for the purpose of defrauding the unsecured creditors of Asarco, including the United States, by attempting to insulate its stock from claims of such creditors. In its submission, the DOJ further claimed that Asarco's total environmental cleanup or payment obligations for sites in numerous Western States could amount to more than $700 million. Asarco disputed this, however, and claimed that it would be in a much better position following the sale to meet its financial and environmental obligations and that its liability was no more than $200 million (American Metal Market, 2002b; Platts Metals Week, 2002f). On August 13, Asarco and SPCC filed a stipulation agreement with the DOJ that legally bound Asarco from selling any of its SPCC shares until a U.S. court ruled on the DOJ motion. Asarco and the DOJ agreed in September to extend the moratorium on the sale of SPHC and agreed to ask the court for an expedited hearing, briefing, and discovery schedule (American Metal Market, 2002a). At the end of August, Asarco announced that it had submitted to the DOJ a comprehensive proposal for environmental remediation at its closed plants and other sites where the company had historically operated that addressed DOJ concerns (ASARCO Incorporated, 2002b). In January 2003, Asarco and the DOJ filed a final agreement with the U.S. District Court in Phoenix, AZ, clearing the way for Asarco to transfer the company's interest in SPCC to AMC (ASARCO Incorporated, 2003).

At Kennecott Utah Copper Corp., operations continued uninterrupted through yearend although Kennecott and the 1,200 members of United Steelworkers of America at the company were unable to reach a contract settlement following expiration of a 6-year labor agreement on September 30; the two sides had begun negotiating in mid-July. The company had reportedly offered wage increases and maintenance of existing benefits in exchange for "efficiencies and flexibilities" in labor practices (Platts Metals Week, 2002d). Negotiations broke down in October, and suits and countersuits were filed with the National Labor Relations Board (NLRB) by United Steelworkers and Kennecott. The NLRB subsequently dismissed both sets of charges, and at yearend, the two parties continued to negotiate (Pisciulli, 2002).

Production of copper in concentrates, however, plummeted by 53,000 t to 260,000 t owing to the processing of harder and lower grade ore from the south side of the Bingham Canyon pit. Mill-head grade fell to 0.69% in 2002 from 0.73% copper in 2001. Production of refined copper, however, rose by 59,000 t to 294,000 t as a result of improved smelter performance and the drawdown of concentrate inventories (Rio Tinto plc., 2003, p. 42).

BHP Billiton's copper operations in Arizona remained shuttered throughout 2002. Copper production from the company's residual Arizona leach operations at Miami, Pinto Valley, and San Manuel, AZ, totaled 13,200 t, down from 23,800 t in 2001 (BHP Billiton, 2003, p. 9). In January 2002, BHP Copper Inc. (a subsidiary of BHP Billiton) permanently closed its mining operations at San Manuel. Included in the closure were the remaining in situ copper leach operations, which resulted in the loss of about 9,000 t/yr of electrowon copper cathode. BHP Copper also stopped pumping water from the underground mine, which had been placed on care and maintenance in August 1999, ensuring permanent loss of mining capacity. BHP Copper continued its efforts to sell the idled smelting, refining, and wire-rod facilities associated with the mine (BHP Billiton Base Metals, 2001).

In September, BHP Billiton announced that it would close its Nicolet Minerals Company offices in Crandon, WI, and abandon its plans to develop the Crandon underground copper and zinc mine. The Crandon deposit contains an estimated 55 Mt of ore lying between about 60 and 670 meters below the surface. The company planned to continue to secure environmental permits in anticipation of selling the project. The Governor of Wisconsin announced that the State, which had considered purchasing the 5,000-acre property from Nicolet, would not do so owing to the high price. The land and mineral rights appraised at between $51.2 million and $94 million (Rebhahn, 2002§[1]). Billiton Plc (now BHP Billiton) had purchased the rights to Crandon from Rio Algom Ltd. of Toronto, Ontario, Canada, in 2000.

Summo Minerals Corp., which at midyear changed its name to Constellation Copper Corp., placed its Lisbon Valley Project on care and maintenance at the beginning of the year. The company had yet to begin development of the permitted project and cited the need for sustained copper prices to exceed $0.85 per pound to justify the investment. The company continued to evaluate alternative scenarios that would allow development of the project at lower copper prices. A feasibility study to evaluate its development as a copper powder producer was abandoned the previous year. Lisbon Valley is a fully permitted and engineered open pit, heap-leach, SX-EW project designed to produce 18,000 t/yr of cathode copper (Constellation Copper Corp., 2003, p. 19).

The Johnson Camp Copper Mine (owned by Nord Resources Corp.) located 65 miles east of Tucson, AZ, was retained on a care-and-maintenance status. Although significant reserves remained, mining operations ceased in 1997, and leaching of stockpiles stopped in 2001. Environmental remediation and upgrade of facilities at the site continued during the year. The existing facilities included a 4,000-gallon-per-minute solvent extraction plant, a tank farm, and a 24-t/d electrowinning tank house. According to Nord, which was operating under Chapter 11 reorganization, the mine could be returned to production quickly upon receipt of necessary project financing. At an anticipated rate of 8,570 t/yr of cathode copper, the mine was expected to generate a positive cash flow (Nord Resources Corp, 2003§).

Consumption

Reported consumption of refined copper by domestic manufacturers declined precipitously by about 10% (250,000

[1]References that include a section mark (§) are found in the Internet References Cited section.

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t) and was down by about 22% from the record-high demand of 2000. Consumption of copper-base scrap used directly (melted or processed to chemicals) by manufacturers declined by about 9% to 1.26 Mt and contained 988,000 t of recoverable copper. An additional 61,000 t of copper was recovered in the consumption of aluminum-, nickel-, and zinc-base scrap.

During 2002, three fire refineries processed scrap to recover unalloyed copper products in the United States. Scrap was also consumed in relatively small quantities at several of the primary smelters. Chemetco, which operated the last remaining U.S. secondary smelter, closed in October 2001 and remained shuttered throughout 2002. The closure of Chemetco and reduced production at one fire refinery that operated intermittently throughout the year accounted for the large drop in secondary copper consumption.

Direct melt scrap, principally alloy scrap, was consumed at about 30 brass mills, 20 alloy ingot makers, and 500 foundries, chemical plants, and miscellaneous consumers. Of the 1.05 Mt of copper recovered from scrap, brass mills recovered 70%; brass and bronze ingot makers, 11%; copper smelters and refiners, 7%; and foundries, chemical plants, and miscellaneous manufacturers, which included aluminum and steel alloy producers, 12%. Alloyed copper products accounted for about 93% of the total copper recovered from scrap.

According to data compiled by American Bureau of Metal Statistics, Inc. (2003a), wire-rod shipments by domestic producers to the U.S. market fell by 5% in 2002, which was down by 12% from the record-high shipments in 2000. The apparent consumption for wire rod (shipments plus net imports) fell by 3% to 1.95 Mt, which was down by 15% from shipments in 2000. Net imports rose by 16% in 2002 to 194,000 t and accounted for 10% of apparent wire-rod demand. According to American Bureau of Metal Statistics, Inc. (2003b) data, brass mill product shipments by domestic producers rose by 1.4% in 2002 to 745,000 t following an 18.6% decline in 2001. Tube accounted for 35% of shipments; copper and copper-alloy rods and bars, 34%; and plate sheet and strip, 31%.

According to preliminary data from Copper Development Association Inc. (2003, p. 18-20), the supply of copper and copper-alloy products to the U.S. market by fabricators (brass mills, wire mills, foundries, and powder producers), which included net imports, declined to 3.32 Mt in 2002, which was down by 6% from the revised total of 3.53 Mt in 2001, and by 21% from the record-high shipments of 4.22 Mt in 2000. About 73% of shipments in 2002 was as unalloyed copper products. Brass mill products accounted for about 49% of total shipments to the domestic market; wire mill products, 47%; and foundry and powder products, 4%. In building construction, which was the largest end use sector, shipments declined by 4% and accounted for about 46% of the market. Building construction included products used for building wire, plumbing and heating, air conditioning and commercial refrigeration, builders hardware, and architectural applications. Shipments for electric/electronic products (23% market share) and industrial machinery and equipment (10% market share) declined by 16% and 3%, respectively. Consumption for transportation equipment (10% market share) rose by 3%, and consumer and general products (11% market share) remained unchanged.

As evidence of the continued weak U.S. demand for copper products, several companies announced facility closures. Phelps Dodge closed two U.S. wire and cable plants and consolidated other functions, which eliminated a total of 345 jobs. The Laurinburg, NC, magnet wire plant closed at yearend, and its production was shifted to the company's El Paso, TX, and Fort Wayne, IN, plants. Phelps Dodge also closed its West Caldwell, NJ, High Performance Conductors plant. The plant produced low-temperature wires generally used in aerospace and electronics applications (Phelps Dodge Corp., 2002b). Phelps Dodge's North American magnet wire operations also faced increased competition. Superior TeleCom Inc. (through its Mexican affiliate Grupo Essex de Mexico) began production during the fourth quarter of 2000 at a new state-of-the art magnet wire operation in Torreón, Mexico. With the addition of Torreón, Superior TeleCom operated eight magnet wire manufacturing facilities in North America (Superior TeleCom Inc., 2001).

In December, Olin Corporation announced that it was considering the possible closure of its brass manufacturing facility in Indianapolis, IN, owing to the weak market demand for its products. The plant manufactured copper and copper alloy sheet and strip products and employed about 200 people (Olin Corporation, 2002). In January 2003, Olin announced that closure would be completed by the end of the first quarter of 2003 and that, owing to capacity additions at its East Alton, IL, facility, it had sufficient capacity to meet customer needs (Olin Corporation, 2003). The plant had been shuttered or operating at significantly reduced capacity for the first 5 months of 2002.

Cerro Metal Products Co. closed its Paramount, CA, brass mill in November. The plant produced brass, bar, rod, shapes, and wire and was a consumer of yellow brass scrap. The company reportedly will continue to supply Western State markets from its Bellefonte, PA, plant (Platts Metals Week, 2002b).

Prices and Stocks

Copper prices, which had trended downward during most of 2001, finished the year on an upward trend following an announcement in November by BHP Billiton Base Metals, which was the world's second largest producer of copper, that it would temporarily reduce copper production by 170,000 t/yr (BHP Billiton Base Metals, 2001). The cutback was in response to a growing overproduction of copper and the doubling of refined inventories held on the global commodity exchanges [COMEX (a division of the New York Mercantile Exchange), London Metals Exchange Ltd. (LME), and Shanghai Futures Exchange]. At yearend 2001, 76% of exchange inventories were located in LME and COMEX warehouses in the United States (International Copper Study Group, 2003a, p. 19).

After falling slightly from their yearend rally during January 2002, copper prices remained relatively stagnant during a 3-month period as world exchange inventories climbed to more than 1.5 Mt in April. After peaking in April, exchange inventories began a slide that continued to the end of the year. At the end of May, prices responded to lower stock levels and several industry announcements of production cutbacks. During the first week of June, COMEX spot prices jumped to $0.78 per pound, which was up from $0.73 per pound prior to the

announcements. BHP Billiton announced on May 28 that it would extend production constraints at its Escondida Mine in Chile and that it would temporarily close sulfide operations at its Tintaya Mine in Peru through the end of 2002 (BHP Billiton, 2002b).

On June 4, Grupo México announced that it was closing its Cananea Mine copper facilities owing to a labor union strike; the strike was ultimately settled before the mine could be fully closed (Platts Metals Week, 2002c). Though prices softened slightly by monthend, the June COMEX spot price averaged $0.76 per pound, which was up from $0.73 per pound in May.

Prices weakened again during the third quarter of the year because exchange inventories remained well above 1 Mt. Despite apparent continued weakness in the market, however, copper prices strengthened in November and December; the COMEX price averaged above $0.72 per pound, which was the highest level since a midyear price rise in June. The price rise was sustained by several industry announcements that affected the supply of copper. On October 30, SPCC announced that workers at its Toquepala Mine in Peru had gone on strike, which was the first such action at SPCC in more than 10 years (Platts Metals Week, 2002e). Also, Asarco's announcements during October and December about the fate of its Mission Mine and concerns over its stalled attempt to raise capital through the sale of its SPCC subsidiary signaled additional production cuts. On December 4, BHP Billiton announced that it would continue its program of "demand-based" production, which had been initiated in November 2001 at the Escondida Mine in Chile and the Tintaya Mine in Peru, and that it intended to keep its Pinto Valley Mine in Arizona and its Robinson Mine in Nevada on standby (BHP Billiton, 2002a).

At yearend 2002, despite the continued slide in inventories (global exchange inventories fell to 1.29 Mt) COMEX and U.S. producer prices finished on a downturn by falling to $0.70 per pound and $0.74 per pound, respectively. According to data compiled by the International Copper Study Group (2003a, p. 7), at the prevailing rate of consumption, total global yearend inventories (consumer, producer, governments, merchants, and exchanges) of 2.2 Mt represented about 53 days of supply, which was up from 52 days in 2001 and 32 days in 2000. At yearend 2002, 74% of exchange inventories and 46% of reported global inventories were held in the United States compared with 76% and 45%, respectively, at yearend 2001.

Trade

Net refined copper imports of 900,000 t were down by about 7% from the record-high level in 2001. General imports of refined copper of 1.06 Mt were 135,000 t higher than imports for consumption as material entered U.S. warehouses under bond. U.S. import reliance as a percentage of apparent demand rose to 37%. Canada remained the most significant source of unwrought copper products and from 1998 through 2002 accounted for 29% of unmanufactured imports, followed by Peru and Chile, with 25% each, and Mexico with 13%. Refined copper accounted for 72% of unwrought copper imports during this period.

Net imports of copper in concentrate, which had fallen to zero in 2000 owing to cutbacks in smelter capacity, rose to about 49,000 t in 2002. This was in part owing to reduced concentrate output from domestic mines and increased smelter production by one domestic producer that had been selling surplus concentrates into the U.S. market. Though down slightly from 2001 levels, reduced secondary processing capacity led to a sustained high level of scrap exports; combined scrap exports (alloyed and unalloyed) of 511,000 t in 2002 were down by 23,000 t compared with that of 2001.

According to U.S. Census Bureau data compiled by Copper and Brass Fabricators Council Inc. (2003, p. 1-9), the United States imported 270,000 t of copper and copper-alloy semifabricated products (excluding wire-rod mill products) and exported 137,000 t. Net imports fell to 133,000 t, which were down from 171,000 t in 2001 and 220,000 t in 2000. Canada and Mexico accounted for 81% of semifabricated copper exports and 29% of imports. Germany, which was the largest source of imports, accounted for 22% of the total.

U.S. imports of wire rod grew to 249,000 t in 2002 from 108,000 t in 1998. In 1998, Canada accounted for 64% of imports and Mexico for essentially all of the balance. By 2001, imports had risen to 222,000 t and were still dominated by Canada (51%) and Mexico (42%). In 2002, however, according to U.S. Census Bureau data (adjusted to account for misclassification of shipments from Russia), Russia and Brazil emerged as major sources and accounted for 15% and 11%, respectively, of wire-rod imports (table 17). While Canada maintained its market share at 52%, imports from Mexico fell to only 22% of the total.

Chile and the United States completed negotiations on a free trade agreement (FTA) in a final-round meeting in December. More than 90 Chilean negotiators and 140 U.S. negotiators (representing 19 U.S. agencies) met for 9 days to complete the agreement. Chile and the United States began bilateral negotiations on the FTA in December 2000 and held a series of 14 negotiating rounds with teams of specialists who met alternately in Santiago, Chile, and cities in the United States. Although the eventual elimination of the 1% tariff on refined copper imported into the United States was anticipated, details on specifics were not released. Technical details remained to be clarified before the President signs the FTA and Congress passes implementing legislation (Office of the United States Trade Representative, 2003).

World Review

The global production surplus of refined copper, which developed in midyear 1997 and faltered only in 2000, continued into early 2002. By yearend, however, a nearly balanced market had emerged. According to the International Copper Study Group (2003a, p. 19), reported global inventories of refined copper rose to 2.29 Mt in August, which is the period of traditional weak demand, before declining slightly to 2.16 Mt at yearend. This was an increase of about 87,000 t compared with yearend 2001. This contrasts sharply with 2001 when world inventories climbed by more than 750,000 t. World production of refined copper fell by 220,000 t while world refined usage grew by about 300,000 t (International Copper Study Group, 2003a, p. 7). The net effect was to bring production and use into closer balance. With the exception of Asia, the major copper consuming regions of the world reported lower refined copper

RMR 0323

COPPER

By Daniel L. Edelstein

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In 2002, mine production of recoverable copper in the United States, which continued the downward trend that began in 1998, fell by more than 100,000 metric tons (t) to its lowest level since 1987. Production cutbacks previously imposed in the United States in response to sustained low copper prices continued into 2002. In January, Phelps Dodge Corp. implemented most of the additional cutbacks announced in October 2001—curtailing 165,000 metric tons per year (t/yr) of production by halting mining at its Miami, AZ, leach operations and halving production at its Sierrita, AZ, and Bagdad, AZ, mines. Its Chino, NM, electrowon operation, however, continued to operate, though no new material was added to the leach pads. It also temporarily closed its Chino smelter and Miami electrolytic refinery (Phelps Dodge Corp., 2001).

The strong growth trend in world mine production that began in 1995 came to an abrupt halt in 2002 when producers, primarily in Chile and the United States, instituted cutbacks. The United States, which accounted for about 8% of world production, relinquished its position as the world's second largest mine producer by falling to third place just behind Indonesia. Chile, where mine production declined by about 3%, remained the largest mine producer and accounted for 34% of world production. The reduced output took place despite a growth of more than 400,000 t in world mine capacity.

U.S. Geological Survey (USGS) estimates indicate world copper reserves of 480 million metric tons (Mt) and a copper reserve base of 950 Mt. The United States had about 7% each of the world's reserves and reserve base. According to the national mineral resource assessment conducted by the U.S. Geological Survey (2000, p. 10), the mean estimate of copper in undiscovered deposits in the United States was 290 Mt. More than two-thirds of the undiscovered copper was thought to be contained in porphyry copper deposits. The identified U.S. copper resource, from which reserves and reserve base are derived, was estimated to be 260 Mt.

U.S. smelter and refinery production fell by 26% and 16%, respectively, despite a 59,000-t increase in net imports of copper in concentrates. Phelps Dodge closed its Chino smelter and Miami electrolytic refinery in response to the reduced availability of concentrates from its mine cutbacks. Only three primary smelters and no secondary smelters operated during the year. Production at ASARCO Incorporated's Amarillo, TX, refinery was reduced significantly following cutbacks at its Mission Mine in Arizona and the closure of Chemetco Inc.'s secondary smelter near Hartford, IL, in 2001, which supplied anode to Amarillo. Electrowon production, which declined by about 28,000 t, accounted for a record 40% of refined copper production. Secondary refined production, which fell by 59%, was affected by the upstream closure of the Chemetco's smelter and reduced production at the three remaining fire refineries. The United States fell to fifth place in world smelter and third place in refinery production.

The principal mining States were, in descending order of production, Arizona, Utah, and New Mexico, and accounted for 99% of domestic production; copper was also recovered at mines in Missouri and Idaho. Although copper was recovered at 22 mines that operated in the United States, just 12 mines accounted for more than 99% of production. The remaining 10 mines were either small leach operations or producers of byproduct copper.

During the year, 3 primary smelters, 4 electrolytic and 3 fire refineries, and 13 solvent-extraction electrowinning (SX-EW) facilities operated in the United States. Smelter capacity was revised downward to about 900,000 t to reflect the permanent closure of Chemetco, while refinery capacity remained unchanged at 2.3 Mt. Smelter and refinery capacity utilization rates fell to 76% and 66%, respectively, down from 91% and 78%, respectively, in 2001. While U.S. refinery capacity has declined by about 460,000 t since 1998, the closure of three primary smelters and three secondary smelters has led to a 1-Mt decline in smelter capacity. In the case of refineries, the net growth in electrowon capacity of about 90,000 t has partially offset refinery closures. Also, though operating at significantly reduced levels, engineered capacity has been retained at Asarco's and Phelps Dodge's electrolytic refineries, which are the two largest in the country.

The conversion of old scrap to alloys and refined copper, which declined for the fifth consecutive year, fell by 110,000 t (35%) to 207,000 t and contributed 8% of apparent industrial demand for copper. Lower copper prices in 2001 and secondary copper smelter closures led to the continued downward trend in recovery. Net exports of copper scrap of 411,000 t were down by about 7% from the record level of 2001.

Copper was consumed as refined copper and as direct melt scrap at about 30 brass mills, 13 wire-rod mills, and 500 chemical plants, foundries, and miscellaneous operations. According to data compiled by Copper Development Association Inc. (2003, p. 18), mill and foundry product shipments to the U.S. market, including net imports of mill products, declined by about 6% in 2002 to 3.24 Mt and were down by 21% from the record-high shipments reported in 2000. According to their revised data, mill shipments to domestic markets were at their lowest levels since 1993. Owing to erosion in U.S. refined production, the net import reliance for refined copper as a percentage of apparent consumption increased to about 37% and was at the same record-high level as in 2000.

Peru, Chile, Canada, and Mexico, in descending order, accounted for 89% of U.S. imports for consumption. Canada and Chile, which remained the country's largest sources for

unwrought copper, accounted for 30% and 27%, respectively, of total imports of unwrought copper.

Legislation and Government Programs

On June 12, the U.S. Environmental Protection Agency (EPA) promulgated national emission standards for hazardous air pollutants (NESHAP) at primary copper smelters. The final rules apply to primary copper smelters that use batch copper converters. They are based on the assumption that copper smelters have the potential to release significant quantities of metals listed as hazardous air pollutants under the Clean Air Act, which include antimony, arsenic, beryllium, cadmium, cobalt, lead, manganese, nickel, and selenium, and that exposure to these pollutants has been demonstrated to cause adverse health effects. The standards reflect the application of the maximum achievable control technology (MACT) as they apply to particulate emissions. The NESHAP for primary copper smelters was first proposed in April 1998 and has been modified to account for numerous public review comments and changes in the domestic industry that took place since 1998. Of the seven smelters originally subject to NESHAP, four have suspended operations, and one (Kennecott smelter in Utah) has adopted new flash-converting technology that has eliminated the major source of fugitive emissions that were discharged during the transfer and handling of molten metal in the batch converting process. In response to industry comments, the new flash-converting technology at Kennecott was included in the broader definition of primary copper smelting but was excluded from this rulemaking and MACT standard. The rulemaking, in fact, set flash converting as the new standard for any new converting operation. While applicable to smelters with batch converting, the rule also sets emissions limits for concentrate dryers, smelting furnaces, slag cleaning vessels, and fugitive dust sources (U.S. Environmental Protection Agency, 2002b).

In April, the EPA published the results of its review of existing drinking water standards for 69 substances, which included copper, for which national primary drinking water regulations (NPDWRs) were established prior to 1997 and requested public comment on their proposed rules. The EPA published the current NPDWR for copper in June 1991, establishing a maximum contaminant level goal for copper of 1.3 milligrams per liter (mg/L). As part of its review, the EPA commissioned the National Research Council (NRC) in 1999 to examine available nutritional and toxicological data for copper and to provide recommendations. The NRC concluded that copper in drinking water in concentrations of 3 mg/L or higher could produce adverse gastrointestinal effects and could be a problem for individuals who carry a recessive gene for Wilson's disease (a condition which causes excess copper to accumulate in the liver). The NRC recommended retention of the 1.3-mg/L limit pending collection of additional data on the risk to carriers of the Wilson's disease gene and other populations with a propensity to accumulate copper in their livers. Accordingly, The EPA initiated a further assessment of copper's health risk and retained the current 1.3-mg/L standard pending reevaluation of the health risks (U.S. Environmental Protection Agency, 2002c).

In February, the EPA announced that it had received a voluntary request from the producers of chromated copper arsenate (CCA) to cancel the authorization for the use of CCA pesticides in the treatment of certain lumber products. Implementation of this action would effectively eliminate the use of CCA to treat lumber for residential applications by December 31, 2003. A 2-year transition period would provide consumers with increasingly more non-CCA treated wood alternatives as the industry undergoes conversion and retooling to take advantage of alternative wood preservatives that do not contain arsenic. In announcing receipt of the producers' request, the EPA did not recommend that existing structures or surrounding soils be removed or replaced. The CCA registry with the EPA would be retained, however, for treatment of wood used in commercial applications, such as marine applications, round poles for building construction, sawn timbers to support residential construction, and highway timbers. Official cancellation of CCA use in residential products, as proposed in the industry's initial voluntary request, was announced on March 17, 2003 (U.S. Environmental Protection Agency, 2002d, 2003).

On November 22, the EPA announced that it had finalized a rule to improve its New Source Review Program and was proposing a rule to provide a regulatory definition of "routine maintenance, repair and replacement." These actions were intended to offer industry, which included copper producers, greater flexibility to improve and modernize plants in ways that would reduce energy use and air pollution. The final rule improvements, which were the culmination of a 10-year review process, will provide facilities with greater flexibility to modernize, incentives to install best available pollution control, and more accurate procedures for evaluating the effect of projects on future emissions and will expedite permitting of investments in pollution prevention (U.S. Environmental Protection Agency, 2002a).

Production

In response to the continuing global oversupply and resulting sustained low copper prices, previously announced mine cutbacks extended into 2002, and a new round of cuts was initiated at the onset of the year. Consequently, mine production dropped precipitously in January and remained at the lower level throughout the year. Annual production fell by almost 200,000 t (15%) to the lowest level since 1985. Capacity utilization at domestic mines fell to about 73% as production fell, and effective capacity remained at about 1.57 Mt.

Smelter production, which continued its downward trend, plummeted by about 26% and was only 52% of the production in 1999. Since then, five smelters have closed permanently—three primary smelters in 1999 and two secondary smelters in 2000 and 2001. The production drop in 2002 was attributable to the closure of Chemetco's secondary smelter in November 2001 and the temporary closure of Phelps Dodge's Chino smelter at the start of the year owing to a shortage of concentrate feed. The U.S. concentrate supply, production plus net imports, fell by about 120,000 t of contained copper.

Downstream, refined copper production fell by 290,000 t, or 16%, owing to a shortage of anode feed from domestic smelters, reduced production from scrap, and a drop in net imports of blister and anode for refining. Electrowon production accounted for a record 53% and 40% of mine and refinery output, respectively.

In 2002, Phelps Dodge reported copper production of 1.157 Mt, which included minority participants' share of 224,000 t, from its worldwide operations, compared with 1.28 Mt and 228,000 t, respectively, in 2001. U.S. production amounted to 642,000 t (525,000 t electrowon and 117,000 t in concentrate), which was down from 764,000 t (533,000 t electrowon and 231,000 t in concentrate) in 2001 (Phelps Dodge Corp., 2003, p. 11). The drop in domestic production was the result of a series of cutbacks announced in October 2001 to address the "current economic environment and the 500,000-t/yr imbalance in the copper market owing to reduced demand" (Phelps Dodge Corp., 2001, p. 1). Though the company fell short of its goal, the temporary curtailments were expected to reduce output by 220,000 t/yr and were viewed as quickly reversible "should copper prices improve or circumstances warrant" (Phelps Dodge Corp., 2001, p. 3).

Following completion of a $220 million mine-for-leach project and closure of its concentrators at its Morenci Mine in Arizona, Phelps Dodge produced a record 374,000 t of electrowon copper cathode, which exceeded projected capacity by several thousand metric tons. The crushing facility at the permanently closed Metcalf concentrator processed 77,000 metric tons per day (t/d) of ore for the expanded leach operation. Though the Morenci concentrator was being retained on a care-and-maintenance status and could "under certain favorable economic circumstances" be reactivated, the USGS has excluded it in its capacity estimations. In 2002, Morenci placed almost 220 Mt of leach ore with an average grade of 0.28% copper on its leach pile. At yearend, run-of-the-mine leach reserves totaled 2.3 billion metric tons with an average grade of 0.19% copper, and millable leach reserves totaled 533 Mt with an average grade of 0.57% copper (Phelps Dodge Corp., 2003, p. 4, 11).

At the Bagdad Mine in Arizona, production fell by 35% to 76,700 t as mill throughput was reduced to about 50% of capacity as part of Phelps Dodge's comprehensive reduction plan. Production, however, exceeded initial expectations by about 23,000 t owing to higher-than-anticipated ore grades (0.43% mill and 0.29% leach) from changes in the mine plan, improved recovery rates from mill improvements, and recoveries from leaching operations that rose by 50% to 14,200 t. Also, mill throughput was increased to more than the 50% target at times to generate sufficient smelter feed to meet byproduct sulfuric acid demand (Phelps Dodge Corp., 2003, p. 4, 11).

In February, Phelps Dodge announced that it would construct a $40 million copper concentrate leaching demonstration plant at its Bagdad Mine to recover commercial-grade copper cathode from chalcopyrite concentrates. The plant was expected to begin operations during the first half of 2003 and, at capacity, process 136 t/d of concentrate (15% of Bagdad's total production) to produce about 16,000 t/yr of electrowon copper. The new pressure leach process to be demonstrated was jointly developed by Phelps Dodge and Placer Dome, Inc. (Phelps Dodge Corp., 2002a).

As part of the Phelps Dodge curtailment program, mill throughput at the Sierrita Mine in Arizona was cut by 44%. Copper in concentrate, which fell by 37% to 54,400 t, was higher than originally anticipated owing to a 10% increase in mill-head grade to 0.32% copper. Production of electrowon copper fell to 14,700 t (38%) owing to curtailment of leach ore production (Phelps Dodge Corp., 2003, p. 4, 11).

At its Miami, AZ, operations, Phelps Dodge temporarily closed its electrolytic refinery and stopped mining in January but continued to operate its smelter and wire-rod mill. Electrowon production from continued leaching of residual stockpiles yielded 9,500 t of copper. Production from the Miami smelter, which was Phelps Dodge's only operating smelter in 2002, amounted to 221,000 t of anode (Phelps Dodge Corp., 2003, p. 5, 13).

In New Mexico, curtailments were extended at the Chino Mine. In March 2001, the concentrator was temporarily idled resulting in the loss of about 79,000 t/yr of production. In January 2002, leach ore production was suspended, which reduced electrowon production to 49,000 t from 54,000 t in 2001, and the smelter was placed on care-and-maintenance status. Despite an increase in ore processed and 20% higher ore grades (0.35%), production of electrowon copper at Phelps Dodge's Tyrone Mine fell by about 6,000 t to 63,400 t; this continued a 5-year decline in output (Phelps Dodge Corp., 2003, p. 5, 11).

As a result of mine cutbacks and concentrate shortages, the company produced only 290,000 t of electrorefined copper at its El Paso, TX, refinery, down from a total production of 456,000 t at El Paso and Miami in 2001 (Phelps Dodge Corp., 2003, p. 5).

At the end of November 2001, Asarco announced that effective January 1, 2002, it would curtail copper ore production by 23% at its Mission mining complex in Arizona owing to poor market conditions. This reflected the second curtailment at Mission in 4 months and represented a total cutback of 61% since November 2000 (ASARCO Incorporated, 2001). In December 2002, Asarco announced another cutback at Mission that would reduce production to about 15% of capacity, or about 22,000 t/yr. The cutback was to reduce downstream production at the Hayden smelter and the Amarillo refinery by 33% and 13%, respectively (ASARCO Incorporated, 2002c). In 2002, Mission milled almost 8 Mt of ore to produce 36,600 t of copper in concentrate, which had dropped by 63,000 t in 2001 from 115,000 t in 1999. The reduction at Mission was partially offset by an increase in concentrate production to 131,000 t in 2002 from 113,000 t in 2001 at its Ray Mine in Arizona. Production of Ray electrowon copper, however, fell to 41,900 t, which was down from 46,700 in 2001. In Montana, Montana Resources Continental Pit (49% owned by Asarco) remained on care-and-maintenance status (Grupo México, S.A. de C.V., 2003, p. 13). Asarco temporarily halted stripping operations at Ray in June but resumed again in September. Ray had been maintaining high-production levels by high grading its ore (Platts Metals Week, 2002a).

On July 11, Asarco informed the U.S. Department of Justice (DOJ) that it intended to transfer ownership of its 54% stake in Southern Peru Copper Corp. (SPCC) [owned through its subsidiary Southern Peru Holdings Corp. (SPHC)] to its parent company Americas Mining Corp. (AMC). AMC (a wholly owned subsidiary of Grupo México S.A. de C.V.) controlled Grupo México's copper mining interests in North America and South America. According to Asarco, the intent of the sale was to help it meet its future obligations and remain economically viable.

The proceeds would allow Asarco to pay off a $450 million loan that came due in the autumn to a consortium of lenders. By retiring the loan, Asarco hoped to free up significant cash each month that had been used for debt interest payments (ASARCO Incorporated, 2002a). On July 15, however, the DOJ filed a court injunction to block the deal. In its injunction, the DOJ cited that because of extensive environmental liabilities, Asarco's transfer of its subsidiary SPHC to Grupo Mexico would cause fraud or injustice to the United States and other creditors of Asarco and that Grupo Mexico had formed SPHC after acquiring Asarco for the purpose of defrauding the unsecured creditors of Asarco, including the United States, by attempting to insulate its stock from claims of such creditors. In its submission, the DOJ further claimed that Asarco's total environmental cleanup or payment obligations for sites in numerous Western States could amount to more than $700 million. Asarco disputed this, however, and claimed that it would be in a much better position following the sale to meet its financial and environmental obligations and that its liability was no more than $200 million (American Metal Market, 2002b; Platts Metals Week, 2002f). On August 13, Asarco and SPCC filed a stipulation agreement with the DOJ that legally bound Asarco from selling any of its SPCC shares until a U.S. court ruled on the DOJ motion. Asarco and the DOJ agreed in September to extend the moratorium on the sale of SPHC and agreed to ask the court for an expedited hearing, briefing, and discovery schedule (American Metal Market, 2002a). At the end of August, Asarco announced that it had submitted to the DOJ a comprehensive proposal for environmental remediation at its closed plants and other sites where the company had historically operated that addressed DOJ concerns (ASARCO Incorporated, 2002b). In January 2003, Asarco and the DOJ filed a final agreement with the U.S. District Court in Phoenix, AZ, clearing the way for Asarco to transfer the company's interest in SPCC to AMC (ASARCO Incorporated, 2003).

At Kennecott Utah Copper Corp., operations continued uninterrupted through yearend although Kennecott and the 1,200 members of United Steelworkers of America at the company were unable to reach a contract settlement following expiration of a 6-year labor agreement on September 30; the two sides had begun negotiating in mid-July. The company had reportedly offered wage increases and maintenance of existing benefits in exchange for "efficiencies and flexibilities" in labor practices (Platts Metals Week, 2002d). Negotiations broke down in October, and suits and countersuits were filed with the National Labor Relations Board (NLRB) by United Steelworkers and Kennecott. The NLRB subsequently dismissed both sets of charges, and at yearend, the two parties continued to negotiate (Pisculli, 2002).

Production of copper in concentrates, however, plummeted by 53,000 t to 260,000 t owing to the processing of harder and lower grade ore from the south side of the Bingham Canyon pit. Mill-head grade fell to 0.69% in 2002 from 0.73% copper in 2001. Production of refined copper, however, rose by 59,000 t to 294,000 t as a result of improved smelter performance and the drawdown of concentrate inventories (Rio Tinto plc., 2003, p. 42).

BHP Billiton's copper operations in Arizona remained shuttered throughout 2002. Copper production from the company's residual Arizona leach operations at Miami, Pinto Valley, and San Manuel, AZ, totaled 13,200 t, down from 23,800 t in 2001 (BHP Billiton, 2003, p. 9). In January 2002, BHP Copper Inc. (a subsidiary of BHP Billiton) permanently closed its mining operations at San Manuel. Included in the closure were the remaining in situ copper leach operations, which resulted in the loss of about 9,000 t/yr of electrowon copper cathode. BHP Copper also stopped pumping water from the underground mine, which had been placed on care and maintenance in August 1999, ensuring permanent loss of mining capacity. BHP Copper continued its efforts to sell the idled smelting, refining, and wire-rod facilities associated with the mine (BHP Billiton Base Metals, 2001).

In September, BHP Billiton announced that it would close its Nicolet Minerals Company offices in Crandon, WI, and abandon its plans to develop the Crandon underground copper and zinc mine. The Crandon deposit contains an estimated 55 Mt of ore lying between about 60 and 670 meters below the surface. The company planned to continue to secure environmental permits in anticipation of selling the project. The Governor of Wisconsin announced that the State, which had considered purchasing the 5,000-acre property from Nicolet, would not do so owing to the high price. The land and mineral rights appraised at between $51.2 million and $94 million (Rebhahn, 2002§[1]). Billiton Plc (now BHP Billiton) had purchased the rights to Crandon from Rio Algom Ltd. of Toronto, Ontario, Canada, in 2000.

Summo Minerals Corp., which at midyear changed its name to Constellation Copper Corp., placed its Lisbon Valley Project on care and maintenance at the beginning of the year. The company had yet to begin development of the permitted project and cited the need for sustained copper prices to exceed $0.85 per pound to justify the investment. The company continued to evaluate alternative scenarios that would allow development of the project at lower copper prices. A feasibility study to evaluate its development as a copper powder producer was abandoned the previous year. Lisbon Valley is a fully permitted and engineered open pit, heap-leach, SX-EW project designed to produce 18,000 t/yr of cathode copper (Constellation Copper Corp., 2003, p. 19).

The Johnson Camp Copper Mine (owned by Nord Resources Corp.) located 65 miles east of Tucson, AZ, was retained on a care-and-maintenance status. Although significant reserves remained, mining operations ceased in 1997, and leaching of stockpiles stopped in 2001. Environmental remediation and upgrade of facilities at the site continued during the year. The existing facilities included a 4,000-gallon-per-minute solvent extraction plant, a tank farm, and a 24-t/d electrowinning tank house. According to Nord, which was operating under Chapter 11 reorganization, the mine could be returned to production quickly upon receipt of necessary project financing. At an anticipated rate of 8,570 t/yr of cathode copper, the mine was expected to generate a positive cash flow (Nord Resources Corp, 2003§).

Consumption

Reported consumption of refined copper by domestic manufacturers declined precipitously by about 10% (250,000

[1]References that include a section mark (§) are found in the Internet References Cited section.

t) and was down by about 22% from the record-high demand of 2000. Consumption of copper-base scrap used directly (melted or processed to chemicals) by manufacturers declined by about 9% to 1.26 Mt and contained 988,000 t of recoverable copper. An additional 61,000 t of copper was recovered in the consumption of aluminum-, nickel-, and zinc-base scrap.

During 2002, three fire refineries processed scrap to recover unalloyed copper products in the United States. Scrap was also consumed in relatively small quantities at several of the primary smelters. Chemetco, which operated the last remaining U.S. secondary smelter, closed in October 2001 and remained shuttered throughout 2002. The closure of Chemetco and reduced production at one fire refinery that operated intermittently throughout the year accounted for the large drop in secondary copper consumption.

Direct melt scrap, principally alloy scrap, was consumed at about 30 brass mills, 20 alloy ingot makers, and 500 foundries, chemical plants, and miscellaneous consumers. Of the 1.05 Mt of copper recovered from scrap, brass mills recovered 70%; brass and bronze ingot makers, 11%; copper smelters and refiners, 7%; and foundries, chemical plants, and miscellaneous manufacturers, which included aluminum and steel alloy producers, 12%. Alloyed copper products accounted for about 93% of the total copper recovered from scrap.

According to data compiled by American Bureau of Metal Statistics, Inc. (2003a), wire-rod shipments by domestic producers to the U.S. market fell by 5% in 2002, which was down by 12% from the record-high shipments in 2000. The apparent consumption for wire rod (shipments plus net imports) fell by 3% to 1.95 Mt, which was down by 15% from shipments in 2000. Net imports rose by 16% in 2002 to 194,000 t and accounted for 10% of apparent wire-rod demand. According to American Bureau of Metal Statistics, Inc. (2003b) data, brass mill product shipments by domestic producers rose by 1.4% in 2002 to 745,000 t following an 18.6% decline in 2001. Tube accounted for 35% of shipments; copper and copper-alloy rods and bars, 34%; and plate sheet and strip, 31%.

According to preliminary data from Copper Development Association Inc. (2003, p. 18-20), the supply of copper and copper-alloy products to the U.S. market by fabricators (brass mills, wire mills, foundries, and powder producers), which included net imports, declined to 3.32 Mt in 2002, which was down by 6% from the revised total of 3.53 Mt in 2001, and by 21% from the record-high shipments of 4.22 Mt in 2000. About 73% of shipments in 2002 was as unalloyed copper products. Brass mill products accounted for about 49% of total shipments to the domestic market; wire mill products, 47%; and foundry and powder products, 4%. In building construction, which was the largest end use sector, shipments declined by 4% and accounted for about 46% of the market. Building construction included products used for building wire, plumbing and heating, air conditioning and commercial refrigeration, builders hardware, and architectural applications. Shipments for electric/electronic products (23% market share) and industrial machinery and equipment (10% market share) declined by 16% and 3%, respectively. Consumption for transportation equipment (10% market share) rose by 3%, and consumer and general products (11% market share) remained unchanged.

As evidence of the continued weak U.S. demand for copper products, several companies announced facility closures. Phelps Dodge closed two U.S. wire and cable plants and consolidated other functions, which eliminated a total of 345 jobs. The Laurinburg, NC, magnet wire plant closed at yearend, and its production was shifted to the company's El Paso, TX, and Fort Wayne, IN, plants. Phelps Dodge also closed its West Caldwell, NJ, High Performance Conductors plant. The plant produced low-temperature wires generally used in aerospace and electronics applications (Phelps Dodge Corp., 2002b). Phelps Dodge's North American magnet wire operations also faced increased competition. Superior TeleCom Inc. (through its Mexican affiliate Grupo Essex de Mexico) began production during the fourth quarter of 2000 at a new state-of-the art magnet wire operation in Torreón, Mexico. With the addition of Torreón, Superior TeleCom operated eight magnet wire manufacturing facilities in North America (Superior TeleCom Inc., 2001).

In December, Olin Corporation announced that it was considering the possible closure of its brass manufacturing facility in Indianapolis, IN, owing to the weak market demand for its products. The plant manufactured copper and copper alloy sheet and strip products and employed about 200 people (Olin Corporation, 2002). In January 2003, Olin announced that closure would be completed by the end of the first quarter of 2003 and that, owing to capacity additions at its East Alton, IL, facility, it had sufficient capacity to meet customer needs (Olin Corporation, 2003). The plant had been shuttered or operating at significantly reduced capacity for the first 5 months of 2002.

Cerro Metal Products Co. closed its Paramount, CA, brass mill in November. The plant produced brass, bar, rod, shapes, and wire and was a consumer of yellow brass scrap. The company reportedly will continue to supply Western State markets from its Bellefonte, PA, plant (Platts Metals Week, 2002b).

Prices and Stocks

Copper prices, which had trended downward during most of 2001, finished the year on an upward trend following an announcement in November by BHP Billiton Base Metals, which was the world's second largest producer of copper, that it would temporarily reduce copper production by 170,000 t/yr (BHP Billiton Base Metals, 2001). The cutback was in response to a growing overproduction of copper and the doubling of refined inventories held on the global commodity exchanges [COMEX (a division of the New York Mercantile Exchange), London Metals Exchange Ltd. (LME), and Shanghai Futures Exchange]. At yearend 2001, 76% of exchange inventories were located in LME and COMEX warehouses in the United States (International Copper Study Group, 2003a, p. 19).

After falling slightly from their yearend rally during January 2002, copper prices remained relatively stagnant during a 3-month period as world exchange inventories climbed to more than 1.5 Mt in April. After peaking in April, exchange inventories began a slide that continued to the end of the year. At the end of May, prices responded to lower stock levels and several industry announcements of production cutbacks. During the first week of June, COMEX spot prices jumped to $0.78 per pound, which was up from $0.73 per pound prior to the

announcements. BHP Billiton announced on May 28 that it would extend production constraints at its Escondida Mine in Chile and that it would temporarily close sulfide operations at its Tintaya Mine in Peru through the end of 2002 (BHP Billiton, 2002b).

On June 4, Grupo México announced that it was closing its Cananea Mine copper facilities owing to a labor union strike; the strike was ultimately settled before the mine could be fully closed (Platts Metals Week, 2002c). Though prices softened slightly by monthend, the June COMEX spot price averaged $0.76 per pound, which was up from $0.73 per pound in May.

Prices weakened again during the third quarter of the year because exchange inventories remained well above 1 Mt. Despite apparent continued weakness in the market, however, copper prices strengthened in November and December; the COMEX price averaged above $0.72 per pound, which was the highest level since a midyear price rise in June. The price rise was sustained by several industry announcements that affected the supply of copper. On October 30, SPCC announced that workers at its Toquepala Mine in Peru had gone on strike, which was the first such action at SPCC in more than 10 years (Platts Metals Week, 2002e). Also, Asarco's announcements during October and December about the fate of its Mission Mine and concerns over its stalled attempt to raise capital through the sale of its SPCC subsidiary signaled additional production cuts. On December 4, BHP Billiton announced that it would continue its program of "demand-based" production, which had been initiated in November 2001 at the Escondida Mine in Chile and the Tintaya Mine in Peru, and that it intended to keep its Pinto Valley Mine in Arizona and its Robinson Mine in Nevada on standby (BHP Billiton, 2002a).

At yearend 2002, despite the continued slide in inventories (global exchange inventories fell to 1.29 Mt) COMEX and U.S. producer prices finished on a downturn by falling to $0.70 per pound and $0.74 per pound, respectively. According to data compiled by the International Copper Study Group (2003a, p. 7), at the prevailing rate of consumption, total global yearend inventories (consumer, producer, governments, merchants, and exchanges) of 2.2 Mt represented about 53 days of supply, which was up from 52 days in 2001 and 32 days in 2000. At yearend 2002, 74% of exchange inventories and 46% of reported global inventories were held in the United States compared with 76% and 45%, respectively, at yearend 2001.

Trade

Net refined copper imports of 900,000 t were down by about 7% from the record-high level in 2001. General imports of refined copper of 1.06 Mt were 135,000 t higher than imports for consumption as material entered U.S. warehouses under bond. U.S. import reliance as a percentage of apparent demand rose to 37%. Canada remained the most significant source of unwrought copper products and from 1998 through 2002 accounted for 29% of unmanufactured imports, followed by Peru and Chile, with 25% each, and Mexico with 13%. Refined copper accounted for 72% of unwrought copper imports during this period.

Net imports of copper in concentrate, which had fallen to zero in 2000 owing to cutbacks in smelter capacity, rose to about 49,000 t in 2002. This was in part owing to reduced concentrate output from domestic mines and increased smelter production by one domestic producer that had been selling surplus concentrates into the U.S. market. Though down slightly from 2001 levels, reduced secondary processing capacity led to a sustained high level of scrap exports; combined scrap exports (alloyed and unalloyed) of 511,000 t in 2002 were down by 23,000 t compared with that of 2001.

According to U.S. Census Bureau data compiled by Copper and Brass Fabricators Council Inc. (2003, p. 1-9), the United States imported 270,000 t of copper and copper-alloy semifabricated products (excluding wire-rod mill products) and exported 137,000 t. Net imports fell to 133,000 t, which were down from 171,000 t in 2001 and 220,000 t in 2000. Canada and Mexico accounted for 81% of semifabricated copper exports and 29% of imports. Germany, which was the largest source of imports, accounted for 22% of the total.

U.S. imports of wire rod grew to 249,000 t in 2002 from 108,000 t in 1998. In 1998, Canada accounted for 64% of imports and Mexico for essentially all of the balance. By 2001, imports had risen to 222,000 t and were still dominated by Canada (51%) and Mexico (42%). In 2002, however, according to U.S. Census Bureau data (adjusted to account for misclassification of shipments from Russia), Russia and Brazil emerged as major sources and accounted for 15% and 11%, respectively, of wire-rod imports (table 17). While Canada maintained its market share at 52%, imports from Mexico fell to only 22% of the total.

Chile and the United States completed negotiations on a free trade agreement (FTA) in a final-round meeting in December. More than 90 Chilean negotiators and 140 U.S. negotiators (representing 19 U.S. agencies) met for 9 days to complete the agreement. Chile and the United States began bilateral negotiations on the FTA in December 2000 and held a series of 14 negotiating rounds with teams of specialists who met alternately in Santiago, Chile, and cities in the United States. Although the eventual elimination of the 1% tariff on refined copper imported into the United States was anticipated, details on specifics were not released. Technical details remained to be clarified before the President signs the FTA and Congress passes implementing legislation (Office of the United States Trade Representative, 2003).

World Review

The global production surplus of refined copper, which developed in midyear 1997 and faltered only in 2000, continued into early 2002. By yearend, however, a nearly balanced market had emerged. According to the International Copper Study Group (2003a, p. 19), reported global inventories of refined copper rose to 2.29 Mt in August, which is the period of traditional weak demand, before declining slightly to 2.16 Mt at yearend. This was an increase of about 87,000 t compared with yearend 2001. This contrasts sharply with 2001 when world inventories climbed by more than 750,000 t. World production of refined copper fell by 220,000 t while world refined usage grew by about 300,000 t (International Copper Study Group, 2003a, p. 7). The net effect was to bring production and use into closer balance. With the exception of Asia, the major copper consuming regions of the world reported lower refined copper

use for the second consecutive year. In Asia, where copper use grew by more than 760,000 t (12%), all copper-consuming countries increased their use of copper. Growth in apparent use was led by China with 400,000 t (16%); Taiwan, 115,000 t (21%); the Republic of Korea, 65,000 t (8%); and Indonesia, 45,000 t (41%).

Mine Production.—In 2002, estimated world mine capacity rose by about 650,000 t/yr (4.5%) to about 15.7 Mt/yr, which extended the strong growth trend that began in 1995. South America and Indonesia accounted for most of the increase in capacity. The increased capacities came from expansion of existing facilities or achievement of a full year's production from capacity expansions in 2001. Mine production failed to keep pace with capacity increases principally owing to the conscious action of BHP Billiton to reduce output at its mines in Chile and Peru. In November 2001, the company first announced its intention to reduce output at its Escondida and Tintaya mines, which would reduce production by 170,000 t. In May 2002, it extended the production cut, which effectively reduced production by a total of 250,000 t for the period from November 2001 through December 2002 (BHP Billiton, 2002b).

In Chile, despite the announced cutback in output, production at Escondida declined by only 20,000 t to a level of 755,000 t owing to completion of the $1 billion Phase 4 expansion in October. The expansion increased total concentrate capacity by 400,000 t/yr, and capacity at the oxide plant, by 8% to 150,000 t/yr. Total production capacity of 1.2 million metric tons per year (Mt/yr) was projected for a 5-year period. Mill throughput actually increased by 8% to 46.5 Mt, but copper in concentrate production fell by 3% to 623,000 t owing to a drop in average mill-head ore grades to 1.58% copper from 1.81% copper (Rio Tinto plc, 2003, p. 42).

Production by Corporación Nacional del Cobre de Chile (Codelco) declined by 4% (70,000 t) to 1.63 Mt. Production at the Radomiro Tomic Division rose by 17,000 t, which exceeded its post expansion capacity projections of 272,000 t/yr. Production at the Chuquicamata Mine, which along with Radomiro Tomic constituted Codelco's new Norte Division, fell by 45,000 t to 597,000 t. Production from the Andina, El Teniente, and Salvador Divisions fell by 34,000 t, 11,000 t, and 8,000 t, respectively (Corporación Nacional del Cobre de Chile, 2003, p. 36-43).

At El Abra Mine (Phelps Dodge, 51%, and Codelco, 49%), a $70 million project to leach uncrushed run-of-mine ore was completed in 2001, and production began in January 2002; full production was achieved in the second half of the year. Production in 2002 rose by about 8,000 t to 225,000 t (Phelps Dodge Corp., 2003, p. 7-11).

In Peru, only negligible quantities of copper in concentrate were produced at the Tintaya Mine. Production from Tintaya's new leach project, which began operating at midyear, rose to 8,900 t in the fourth quarter of 2001 and totaled 17,300 t for the year. In northern Peru, the Antamina copper-zinc project (BHP Billiton, Mitsubishi Corp., Noranda Inc., and Teck Cominco Ltd.) achieved commercial production (defined as 80% of design capacity) during the fourth quarter of 2001. In 2002, it produced almost 320,000 t of copper in concentrate, up from 78,000 t in 2001, exceeding its projected capacity of 306,000 t (BHP Billiton, 2003§).

Despite an investment of $352 million in 2001 by SPCC to expand production at its Cuajone and Toquepala mines, production rose only nominally in 2002. Cuajone produced 153,000 t of copper in concentrate, up from 150,000 t in 2001, and Toquepala's production (electrowon copper plus copper in concentrate) was essentially unchanged at 162,000 t. Cash costs, however, reportedly declined by 9.1 cents per pound (Grupo México, S.A. de C.V., 2003, p. 11-13).

In Indonesia, production from the Batu Hijau copper-gold mine, which was commissioned during the fourth quarter of 1999, was essentially unchanged at 298,000 t. Copper production costs reportedly declined by 16% to $0.31 per pound of copper as the result of operational improvements. Reserves at Batu Hijau rose by 16% to 3.93 Mt of contained copper (Newmont Mining Corp., 2003, p. 29). At the Grasberg Complex, production rose to 864,000 t of copper in concentrate compared with 749,000 t the previous year owing to a 14% improvement in mill-head grade to 1.14% copper. Production from the deep ore zone achieved design capacity of 25,000 t/d 1 year earlier than anticipated. Despite a 12% decline in gold grades, net cash costs amounted to only $0.08 per pound of copper (Freeport-McMoRan Copper & Gold Inc., 2003, p. 1-18).

In Zambia, production from First Quantum Minerals Ltd.'s (Canada) wholly owned Bwana Mkubwa facilities rose to almost 12,000 t of electrowon copper, which was up from 9,700 t the previous year. Commissioned in 1998 at a cost of about $30 million, the facilities had a reported cash operating cost of $0.27 per pound of copper. In 2002, the 10,000-t/yr electrowinning plant was modified and expanded to process high-grade ore from the Lonshi copper deposit in the neighboring Congo (Kinshasa). Production was anticipated to rise to 29,000 t in 2003. In the 13-month period ending December 31, Lonshi produced 951,000 t of high-grade ore grading 5.42% acid-soluble copper and 224,000 t of ore grading 0.88% acid-soluble copper. In mid-2002, First Quantum reduced its interest in Mopani Copper Mines to 16.9% from 49%. Combined production from Mopani's Mufulira and Nkana Divisions rose to 111,000 t, which was up from 83,000 t in 2001 and 46,000 t in 2000 (First Quantum Minerals, Ltd., 2003, p. 18-28).

In December, First Quantum completed a feasibility study for the phase I (years 1-16) development of the Kansanshi project. Phase I will focus on the open pit mining of shallow oxide, mixed ores, and sulfide ores. These reserves were estimated to be 142 Mt and contain an average of 1.43% copper. The planned ore-treatment facilities will be flexible, which will allow for variations in ore type. In the first 3 years of operation, production of up to 60,000 t/yr of electrowon cathode and 75,000 t/yr of copper in concentrate is anticipated. Capital costs were estimated to be $163 million and cash production costs to be $0.36 per pound of copper. The company anticipated completing financial arrangements and development agreements with the Government of Zambia in 2003 (First Quantum Minerals, Ltd., 2003, p. 28-29).

Non-Ferrous China (NFC) Africa Mining Plc (85% owned by the Chinese parastatal China Nonferrous Materials Industry Engineering and Construction Group) continued to develop and purchase mining equipment for its $200 million Chambishi Mine Project. NFC Africa Mining acquired its interest from

Zambia Consolidated Copper Mines Ltd. in June 1998 for $20 million. Rehabilitation work on the underground mine and surface facilities began in July 2000 and startup of mining is anticipated in 2003. At full capacity, NFC Africa Mining anticipated mining 2.15 Mt/yr of ore by a combination of cut and fill and sublevel stopping. The mill is anticipated to produce 45,000 t/yr of copper in concentrates containing an average of 40% copper. Chambishi ore reserves were reported to be 33 Mt with additional resources of more than 100 Mt (George Coakley, Country Specialist, U.S. Geological Survey, written commun., September 29, 2003).

Smelter Production.—Despite the continued decline in North American smelting capacity, world smelter capacity rose by about 120,000 t to a record high 14.8 Mt/yr. In Canada, Noranda, Inc. first announced the temporary closure of its Gaspé smelter in Quebec in November 2001 (effective the end of April) and then announced its permanent closure. The smelter, which had operated as a custom smelter, produced 109,000 t of anode in 2001 following the closure of associated mines in 1999 (Noranda, Inc., 2002a). A strike at Noranda's Horne smelter, which began in June 2002 and continued into 2003, further curtailed Canadian smelter output (Noranda, Inc., 2002b). With closure of the Gaspé smelter, smelting capacity in North America fell to 2.01 Mt/yr in 2002 from 3.11 Mt/yr in 1998.

Most of the global smelter expansion took place in China and India, where capacity in 2002 increased by more than 200,000 t and 60,000 t, respectively (International Copper Study Group, 2003b, p. 62-76). In China, expansions of the Guixi (Jiangxi Copper Corp.) and Tongdu (Tongling Nonferrous Metals Corp.) flash smelters and the Yunnan (Yunnan Copper Industry Group) Isasmelt furnace and the restart of the Shenyang (Shenyang Xinxing Copper Co.) blast furnace accounted for most of the capacity increase. In India, the Birla Group smelter was installing Ausmelt technology to expand its Outokumpu furnace to an eventual 250,000 t/yr from 120,000 t/yr in 2001. The Sterlite Industries Ltd. Isasmelt smelter, which started up in 1996, reached full capacity of about 150,000 t/yr.

Despite a decline in world concentrate production, world primary and secondary smelter production remained essentially unchanged in 2002. The supply of copper concentrates from new mine production was insufficient to meet smelter demand for the second consecutive year (CRU International Ltd., 2003, p. 58-61). Yearend 2002 inventories of copper concentrate fell by about 115,000 t compared with 2001 when they had declined by about 250,000 t from yearend 2000. In response to the continued concentrate shortage, annual contractual treatment and refining charges declined by about 2 cents per pound to 17.9 cents per pound of copper. Owing to the growing tightness in supply for copper concentrates, spot treatment and refining charges were reported to have fallen below 6 cents per pound, which was down from 15 cents per pound at yearend 2001. Growing Chinese demand and the limited growth in global production of copper concentrates during the preceding years appeared to be driving the downward spiral in the spot market. Chinese imports of copper in concentrate grew to 620,000 t in 2002 from 375,000 t in 1999.

Refinery Production.—World refinery capacity rose by about 550,000 t/yr (3%), principally owing to expansion of electrowinning capacity in Chile (100,000 t/yr), Peru (35,000 t/yr), and Zambia (25,000 t/yr); expanded electrolytic refining in China and India that paralleled the growth in smelter capacity; and small incremental increases at refineries in other countries. No new electrolytic refineries were commissioned in 2002, and for the most part, expansions followed expanded smelter capacities (International Copper Study Group, 2003b, p. 59-79). In Spain, Atlantic Copper, S.A. set new production records at its Huelva facility and reported the sale of more than 250,000 t of refined copper (Freeport-McMoRan Copper & Gold Inc., 2003, p. 11).

Outlook

U.S. mine production is expected to decline by about 20,000 t to 1.12 Mt in 2003. Production cutbacks from prior years are expected to be carried forward. Moreover, Asarco further reduced production at its Mission Mine at the beginning of 2003 to about 22,000 t/yr, which decreased its operating rate to just 15% of capacity. Asarco's cutback also affected downstream operations at the company's Hayden smelter and its Amarillo refinery (ASARCO Incorporated, 2002c). Asarco, however, was granted permission by the DOJ to sell its interest in SPCC. Refinery production is anticipated to decline by more than 150,000 t owing to an anode shortage caused by reduced concentrate production, imports, and a temporary smelter shutdown early in the year.

Based on USGS data for the first 6 months of 2003, the slump in domestic consumption of brass and wire mill products was expected to continue through 2003 owing to weakness in commercial construction, telecommunications, and numismatic markets.

According to preliminary data compiled by the International Copper Study Group (2003b, p. 9, 10), world mine production resumed its upward trend in 2003 despite production cutbacks at mines in the United States, Chile, and Peru announced early in the year that were intended to help reduce global oversupply. Chile was expected to account for most of the increase in global mine production and capacity, principally owing to the Phase 4 expansion of its Escondida Mine. According to International Copper Study Group (2003a, p. 7) preliminary data, however, global production of refined copper for the first 7 months of 2003 declined by more than 150,000 t compared with the same period in 2000. World use of refined copper, which was buoyed by a 16% rise in apparent use in China, increased by about 275,000 t during the same comparative periods. As a result, the production surplus of the preceding years was reversed, and reported global inventories declined by about 300,000 t. Copper prices rose accordingly; in September the COMEX spot price averaged $0.82 per pound, which was the highest level since February 2001.

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TABLE 1
SALIENT COPPER STATISTICS[1]

(Metric tons unless otherwise specified)

		1998	1999	2000	2001	2002
United States:						
Mine production:						
Ore concentrated	thousand metric tons	268,000	236,000	202,000	148,000	104,000
Average yield of copper[2]	percent	0.46	0.42	0.43 r	0.47 r	0.51
Recoverable copper:						
Arizona		1,190,000	1,050,000	929,000	879,000	767,000
Michigan, Montana, Utah		337,000	313,000	W	W	W
New Mexico		252,000	197,000	195,000	141,000	133,000
Other States		78,900	37,400	322,000 r	318,000	263,000
Total		1,860,000	1,600,000	1,450,000	1,340,000	1,140,000
Total value	millions	$3,220	$2,690	$2,810	$2,270	$1,910
Smelter production:						
From domestic and foreign ores		1,490,000	1,090,000	(3)	(3)	(3)
From scrap (new and old)		232,000	205,000	(3)	(3)	(3)
Total		1,720,000	1,290,000	1,000,000	919,000	683,000
Byproduct sulfuric acid, sulfur content	thousand metric tons	1,420	1,130	820	813	695
Refinery production:						
Primary materials:						
Electrolytic from domestic ores		1,290,000	1,110,000	865,000	808,000	725,000
Electrolytic from foreign materials		238,000	196,000	163,000	192,000	116,000
Electrowon		609,000	586,000	566,000	628,000	601,000
Total		2,140,000	1,890,000	1,590,000	1,630,000	1,440,000
Secondary materials (scrap):						
Electrolytic		202,000	156,000	(3)	(3)	(3)
Fire refined		147,000	73,700	(3)	(3)	(3)
Total		349,000	230,000	208,000	172,000	69,900
Grand total		2,490,000	2,120,000	1,800,000	1,800,000	1,510,000
Secondary copper produced:						
Recovered from new scrap		956,000	949,000	955,000	833,000	842,000
Recovered from old scrap		466,000	381,000	357,000	316,000	207,000
Total		1,420,000	1,330,000	1,310,000	1,150,000	1,050,000
Copper sulfate production		44,000	52,700	55,500	55,200	49,200
Exports:						
Refined		86,200	25,200	93,600	22,500	26,600
Unmanufactured[4]		412,000	395,000	650,000	556,000	506,000
Imports:						
Refined		683,000	817,000	1,060,000	991,000	927,000
Unmanufactured[4]		1,190,000	1,280,000	1,350,000	1,400,000	1,230,000
Copper stocks, December 31:						
Blister and in-process material		160,000	138,000	122,000	98,000	44,400
Refined copper:						
Refineries		44,200	9,830	14,800	28,600	11,700
Wire-rod mills		37,300	32,500	28,600	37,600 r	23,000
Brass mills		20,800	23,800	23,600	25,500	28,700
Other industry		3,870	3,870	4,680	4,860 r	3,600
New York Commodity Exchange (COMEX)		85,200	83,100	58,700	244,000	362,000
London Metal Exchange (LME), U.S. warehouses		341,000	412,800	204,000	617,000	601,000
Total		532,000	565,000	334,000	957,000 r	1,030,000
Consumption:						
Refined copper, reported		2,890,000	2,980,000	3,030,000	2,620,000	2,370,000
Apparent consumption, primary refined and old scrap[5]		3,030,000	3,130,000	3,130,000	2,500,000	2,610,000
Price:						
Producer, weighted average	cents per pound	78.64	75.91	88.16	76.85	75.80
COMEX, first position	do.	75.08	72.11	83.97	72.57	71.67
LME, Grade A cash	do.	75.01	71.33	82.24	71.57	70.72
World, production:						
Mine	thousand metric tons	12,100	12,800 r	13,200	13,700	13,600 e
Smelter	do.	11,300 r	11,700 r	11,000 r	11,500 e	11,500 e
Refinery	do.	14,100	14,600	15,000 r	15,700 r	15,500 e

See footnotes at end of table.

TABLE 1--Continued
SALIENT COPPER STATISTICS[1]

[e]Estimated. [r]Revised. W Withheld to avoid disclosing company proprietary data; included in "Other States."
[1]Data are rounded to no more than three significant digits, except prices; may not add to totals shown.
[2]Yield calculations are for concentrated ore only.
[3]Withheld to avoid disclosing company proprietary data; included in "Total."
[4]Includes copper content of alloy scrap.
[5]In 1998, 1999, 2000, 2001, and 2002, apparent consumption is calculated using general imports of 725,000 metric tons (t), 915,000 t, 1,020,000 t, 1,200,000 t, and 1,060,000 t, respectively.

TABLE 2
LEADING COPPER-PRODUCING MINES IN THE UNITED STATES IN 2002, IN ORDER OF OUTPUT[1]

Rank	Mine	County and State	Operator	Source of copper	Capacity (thousand metric tons)
1	Morenci	Greenlee, AZ	Phelps Dodge Corp.	Copper ore, leached	390
2	Bingham Canyon	Salt Lake, UT	Kennecott Utah Copper Corp.	Copper-molybdenum ore, concentrated	300
3	Ray Mines	Pinal, AZ	ASARCO Incorporated	Copper ore, concentrated and leached	180
4	Bagdad	Yavapai, AZ	Phelps Dodge Corp.	Copper-molybdenum ore, concentrated and leached	120
5	Sierrita	Pima, AZ	do.	do.	120
6	Tyrone	Grant, NM	do.	Copper ore, leached	95
7	Chino	do.	do.	do.	125
8	Mission Complex	Pima, AZ	ASARCO Incorporated	Copper ore, concentrated	70
9	Silver Bell	do.	do.	Copper ore, leached	22
10	Miami Mine	Gila, AZ	Phelps Dodge Corp.	do.	75
11	Pinto Valley	do.	BHP Copper Co.	do.	10
12	Miami	do.	do.	do.	12

[1]The mines in this list accounted for 99% of the U.S. mine production in 2002.

TABLE 3
MINE PRODUCTION OF COPPER-BEARING ORES AND RECOVERABLE COPPER CONTENT OF ORES PRODUCED IN THE UNITED STATES, BY SOURCE AND TREATMENT PROCESS[1]

(Metric tons)

Source and treatment process	2001 Gross weight	2001 Recoverable copper	2002 Gross weight	2002 Recoverable copper
Mined copper ore:				
Concentrated	148,000,000 [2]	707,000	104,000,000	535,000
Leached	NA	624,000	NA	601,000
Total	NA	1,330,000	NA	1,140,000
Copper precipitates shipped, leached from tailings, dumps, and in-place material	1,570	936	950	536
Other copper-bearing ores[3]	5,390,000 r	6,870	3,330,000	6,550
Grand total	XX	1,340,000	XX	1,140,000

[r]Revised. NA Not available. XX Not applicable.
[1]Data rounded to three significant digits; may not add to totals shown.
[2]In 2002, 12,500 kilograms of gold and 167 metric tons of silver were recovered from concentrated ore. The average value of gold and silver per metric ton of ore concentrated was $1.45.
[3]Includes gold ore, lead ore, silver ore, silver-copper ore, zinc ore, and ore shipped directly to smelter.

TABLE 4
CONSUMPTION OF COPPER AND BRASS MATERIALS IN THE UNITED STATES, BY ITEM[1]

(Metric tons)

Item	Brass mills	Wire-rod mills	Foundries, chemical plants, miscellaneous users	Smelters, refiners, ingot makers	Total
2001:					
Copper scrap	919,000 [2]	W	87,500 [r]	371,000	1,380,000
Refined copper[3]	623,000	1,940,000	51,400	4,590	2,620,000
Hardeners and master alloys	528	--	1,980 [r]	--	2,510 [r]
Brass ingots	--	--	112,000 [r]	--	112,000 [r]
Slab zinc	51,700	--	(4)	(4)	73,600 [r]
2002:					
Copper scrap	930,000 [2]	W	86,900	240,000	1,260,000
Refined copper[3]	593,000	1,710,000	63,000	4,570	2,370,000
Hardeners and master alloys	554	--	2,450	--	3,010
Brass ingots	--	--	100,000 [r]	--	100,000
Slab zinc	67,900	--	(4)	(4)	85,600

[r]Revised. W Withheld to avoid disclosing company proprietary data; included with "Brass mills." -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes item indicated by symbol W.
[3]Detailed information on consumption of refined copper can be found in table 5.
[4]Withheld to avoid disclosing company proprietary data; included in "Total."

TABLE 5
CONSUMPTION OF REFINED COPPER SHAPES IN THE UNITED STATES, BY CLASS OF CONSUMER[1]

(Metric tons)

Class of consumer	Cathodes	Ingots and ingot bars	Cakes and slabs	Wirebar, billets, other	Total
2001:					
Wire-rod mills	1,930,000	--	--	12,600	1,940,000
Brass mills	429,000	18,400	95,900	80,000	623,000
Chemical plants	--	--	--	1,190	1,190
Ingot makers	W	W	W	4,590 [2]	4,590
Foundries	2,840 [r]	5,570 [r]	--	13,200 [r]	21,600 [r]
Miscellaneous[3]	W	W	W	28,600 [r,3]	28,600 [r]
Total	2,360,000	24,000	95,900	140,000 [r]	2,620,000
2002:					
Wire-rod mills	1,700,000	--	--	8,710	1,710,000
Brass mills	439,000	17,700	72,600	63,700	593,000
Chemical plants	--	--	--	954	954
Ingot makers	W	W	W	4,570 [2]	4,570
Foundries	2,840	11,600	--	11,900	26,400
Miscellaneous[3]	W	W	W	35,700 [2]	35,700
Total	2,140,000	29,300	72,600	126,000	2,370,000

[r]Revised. W Withheld to avoid disclosing company proprietary data; included with "Wirebar, billets, other." -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes items indicated by symbol W.
[3]Includes consumers of copper powder and copper shot, iron and steel plants, and other manufacturers.

TABLE 6
COPPER RECOVERED FROM SCRAP PROCESSED IN THE UNITED STATES, BY KIND OF SCRAP AND FORM OF RECOVERY[1]

(Metric tons)

	2001	2002
Kind of scrap:		
New scrap:		
Copper-base	795,000	805,000
Aluminum-base	38,300 r	37,100
Nickel-base	18	18
Total	833,000	842,000
Old scrap:		
Copper-base	292,000	183,000
Aluminum-base	24,000	24,000
Nickel-base	173	178
Zinc-base	29	29
Total	316,000	207,000
Grand total	1,150,000	1,050,000
Form of recovery:		
As unalloyed copper	180,000	77,700
In brass and bronze	893,000 r	896,000
In alloy iron and steel	506 r	449
In aluminum alloys	64,000 r	62,700
In other alloys	117 r	117
In chemical compounds	11,200	12,200
Total	1,150,000	1,050,000

r Revised.
[1] Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 7
COPPER RECOVERED AS REFINED COPPER AND IN ALLOYS AND OTHER FORMS FROM COPPER-BASE SCRAP PROCESSED IN THE UNITED STATES, BY TYPE OF OPERATION[1]

(Metric tons)

Type of operation	From new scrap		From old scrap		Total	
	2001	2002	2001	2002	2001	2002
Ingot makers	28,200 r	28,100	94,400 r	90,600	123,000 r	119,000
Refineries[2]	35,800	36,500	137,000	33,400	172,000	69,900
Brass and wire-rod mills	707,000	716,000	19,800	18,700	727,000	735,000
Foundries and manufacturers	18,600	19,200	38,600 r	37,200	57,300 r	56,400
Chemical plants	5,120	5,070	2,960	2,960	8,080	8,040
Total	795,000	805,000	292,000	183,000	1,090,000	988,000

r Revised.
[1] Data are rounded to no more than three significant digits; may not add to totals shown.
[2] Electrolytically refined based on source of material at smelter level.

TABLE 8
PRODUCTION OF SECONDARY COPPER AND COPPER-ALLOY PRODUCTS IN THE UNITED STATES, BY ITEM PRODUCED FROM SCRAP[1]

(Metric tons)

Item produced from scrap	2001	2002
Unalloyed copper products:		
Refined copper	172,000	69,900
Copper powder	7,450	7,440
Copper castings	323	300
Total	180,000	77,700
Alloyed copper products:		
Brass and bronze ingots:		
Tin bronzes	14,300	15,300
Leaded red brass and semi-red brass	87,100 r	87,900
High leaded tin bronze	11,000	10,500
Yellow brass	5,980	6,610
Manganese bronze	9,510	10,000
Aluminum bronze	7,100	7,010
Nickel silver	2,450	2,040
Silicon bronze and brass	4,780	4,340
Copper-base hardeners and master alloys	11,300	6,630
Miscellaneous	3,640	4,490
Total	157,000 r	155,000
Brass mill and wire-rod mill products	905,000	916,000
Brass and bronze castings	45,000 r	44,000
Brass powder	102	123
Copper in chemical products	11,200	12,200
Grand total	1,300,000 r	1,210,000

r Revised.
[1] Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 9
COMPOSITION OF SECONDARY COPPER-ALLOY PRODUCTION IN THE UNITED STATES[1]

(Metric tons)

	Copper	Tin	Lead	Zinc	Nickel	Aluminum	Total
Brass and bronze ingot production:[2]							
2001	130,000 r	5,080 r	8,130 r	14,100 r	263 r	16	157,000 r
2002	127,000	5,550	8,570	13,600	253	17	155,000
Secondary metal content of brass mill products:							
2001	728,000 r	1,690	6,340	167,000	W	W	905,000
2002	736,000	1,450	6,400	171,000	W	W	916,000
Secondary metal content of brass and bronze castings:							
2001	40,600 r	1,440 r	909 r	1,860 r	91	94	45,000 r
2002	39,200	1,490	1,100	2,050	78	72	44,000

r Revised. W Withheld to avoid disclosing company proprietary data; included in "Total."
[1] Data are rounded to no more than three significant digits; may not add to totals shown.
[2] Includes approximately 97% from scrap and 3% from other than scrap in 2001 and approximately 96% from scrap and 4% from other than scrap in 2002.

TABLE 10

CONSUMPTION AND YEAREND STOCKS OF COPPER-BASE SCRAP[1]

(Metric tons, gross weight)

Scrap type and processor	2001 Consumption	2001 Stocks	2002 Consumption	2002 Stocks
No. 1 wire and heavy:				
Smelters, refiners, and ingot makers	82,700 r	1,010 r	74,500	1,030
Brass and wire-rod mills	395,000	(2)	379,000	(2)
Foundries and miscellaneous manufacturers	34,600 r	(2)	34,000	(2)
No. 2 mixed heavy and light:				
Smelters, refiners, and ingot makers	103,000	1,370	42,800	1,350
Brass and wire-rod mills	5,340	(2)	6,630	(2)
Foundries and miscellaneous manufacturers	3,060	(2)	3,490	(2)
Total unalloyed scrap:				
Smelters, refiners, and ingot makers	186,000	2,370 r	117,000	2,380
Brass and wire-rod mills	400,000	16,100	386,000	15,800
Foundries and miscellaneous manufacturers	37,700 r	2,700	37,400	2,470
Red brass:[3]				
Smelters, refiners, and ingot makers	47,400 r	2,350 r	37,000	2,250
Brass mills	8,990	(2)	13,500	(2)
Foundries and miscellaneous manufacturers	10,900	(2)	9,090	(2)
Leaded yellow brass:				
Smelters, refiners, and ingot makers	14,900 r	1,130	13,500	1,120
Brass mills	337,000	(2)	327,000	(2)
Foundries and miscellaneous manufacturers	1,340 r	(2)	1,200	(2)
Yellow and low brass, all plants	111,000	963 r	105,000	904
Cartridge cases and brass, all plants	36,400	(2)	70,900	(2)
Auto radiators:				
Smelters, refiners, and ingot makers	45,400	1,300	39,900	2,000
Foundries and miscellaneous manufacturers	2,840 r	(2)	4,770	(2)
Bronzes:				
Smelters, refiners, and ingot makers	11,700 r	1,200 r	10,100	1,130
Brass mills and miscellaneous manufacturers	20,200	(2)	24,400	(2)
Nickel-copper alloys, all plants	19,300	302 r	15,700	245
Low grade and residues:				
Smelters, refiners, and miscellaneous manufacturers	70,200 r	3,740 r	33,000	3,740
Other alloy scrap:[4]				
Smelters, refiners, and ingot makers	8,460 r	281 r	3,090	259
Brass mills and miscellaneous manufacturers	6,910	(2)	8,010	(2)
Total alloyed scrap:				
Smelters, refiners, and ingot makers	185,000	11,300 r	123,000	11,600
Brass mills	518,000	32,900	544,000	31,300
Foundries and miscellaneous manufacturers	49,800 r	2,570 r	49,400	2,950
Grand total:				
Smelters, refiners, and ingot makers	371,000	13,600 r	240,000	14,000
Brass and wire-rod mills	919,000	48,900	930,000	47,100
Foundries and miscellaneous manufacturers	87,500 r	5,270 r	86,900	5,420

r Revised.

[1] Data are rounded to no more than three significant digits; may not add to totals shown.

[2] Individual breakdown is not available; included in "Total unalloyed scrap," "Total alloyed scrap," and "Grand total."

[3] Includes cocks and faucets, commercial bronze, composition turnings, gilding metal, railroad car boxes, and silicon bronze.

[4] Includes aluminum bronze, beryllium copper, and refinery brass.

TABLE 11
CONSUMPTION OF PURCHASED COPPER-BASE SCRAP[1, 2]

(Metric tons, gross weight)

Type of operation	From new scrap 2001	From new scrap 2002	From old scrap 2001	From old scrap 2002	Total 2001	Total 2002
Ingot makers	44,400 r	41,900	131,000	128,000	175,000	170,000
Smelters and refineries	135,000	36,400	61,300	33,900	196,000	70,300
Brass and wire-rod mills	898,000	910,000	20,400	19,300	919,000	930,000
Foundries and miscellaneous manufacturers	41,900	42,300	45,500	44,600	87,500 r	86,900
Total	1,120,000	1,030,000	258,000	226,000	1,380,000	1,260,000

rRevised.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Consumption at brass and wire-rod mills assumed equal to receipts.

TABLE 12
FOUNDRIES AND MISCELLANEOUS MANUFACTURERS CONSUMPTION OF BRASS INGOT, REFINED COPPER AND COPPER SCRAP IN THE UNITED STATES[1]

(Metric tons)

Ingot type or material consumed	2001 r	2002
Tin bronzes	26,300	25,400
Leaded red brass and semired brass	65,900	58,800
Yellow, leaded, low brass[2]	7,740	5,040
Manganese bronze	4,830	6,080
Nickel silver[3]	2,730	1,160
Aluminum bronze	3,760	3,460
Hardeners and master alloys[4]	1,980	2,450
Lead free alloys[5]	331	316
Total brass ingot	114,000	103,000
Refined copper	51,400	63,000
Copper scrap	87,500	86,900

rRevised.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes brass and silicon bronze.
[3]Includes brass, copper nickel, and nickel bronze.
[4]Includes special alloys.
[5]Includes copper-bismuth and copper-bismuth-selenium alloys.

TABLE 13
AVERAGE PRICES FOR COPPER SCRAP AND ALLOY-INGOT, BY TYPE

(Cents per pound)

Year	Brass mills No. 1 scrap	Refiners No. 2 scrap	Dealers' buying (New York) No. 2 scrap	Dealers' buying (New York) Red brass turnings and borings
2001	69.57 r	58.90 r	48.71 r	40.77 r
2002	70.23	59.45	42.36	37.00

rRevised.

Source: American Metal Market.

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TABLE 14

U.S. EXPORTS OF UNMANUFACTURED COPPER (COPPER CONTENT), BY COUNTRY[1]

Country	Ore and concentrate		Matte, sub and precipitates		Refined		Unalloyed copper strap		Blister and anodes		Total	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2001	43,300	$62,700	23,900	$31,200	22,500	$39,400	262,000	$294,000	26,000	$46,600	379,000	$474,000
2002:												
Australia	21	39	5	7	1,650	3,090	--	--	77	154	1,750	3,290
Belgium	42	74	12	27	--	--	2,210	5,540	179	275	2,440	5,910
Canada	17,500	30,800	2,560	3,330	3,130	5,650	20,100	18,900	17,700	21,400	61,000	80,100
China	1,110	1,730	63	36	14,900	26,900	122,000	136,000	515	2,000	139,000	166,000
Egypt	--	--	--	--	2,200	3,580	--	--	--	--	2,200	3,580
Germany	28	51	85	140	79	167	14,200	16,800	241	522	14,600	17,600
Hong Kong	25	44	160	278	38	69	7,180	17,100	2,600	5,500	10,000	23,000
India	9	15	153	141	821	878	3,920	3,920	83	203	4,990	5,160
Japan	36	60	1,330	2,980	48	123	11,000	15,900	40	95	12,500	19,100
Korea, Republic of	197	376	40	64	524	2,150	14,900	21,100	707	1,710	16,300	25,400
Mexico	2,620	4,350	12,400	9,230	135	254	2,280	5,260	38	113	17,500	19,200
Netherlands	38	94	35	50	16	23	232	255	1,100	1,450	1,420	1,870
Peru	1,230	2,030	39	29	--	--	--	--	--	--	1,270	2,060
Philippines	--	--	3	4	3	5	--	--	5,880	10,000	5,880	10,000
Singapore	60	138	[2]	18	7	11	--	--	614	1,210	682	1,380
Spain	--	--	4	13	6	10	109	37	259	549	379	608
Taiwan	80	127	104	258	1,630	2,620	10,100	13,200	1,000	2,150	12,900	18,400
Thailand	7	13	--	--	--	--	1,010	756	317	720	1,340	1,490
United Kingdom	16	29	65	200	527	860	17	90	469	1,060	1,100	2,240
Other	47	93	75	324	158	1,660	3,470	3,610	1,080	2,280	5,330	7,970
Total	23,000	40,100	17,100	17,100	26,600	48,000	213,000	258,000	32,900	51,400	313,000	415,000

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Less than 1/2 unit.

Source: U.S. Census Bureau.

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TABLE 15
U.S. EXPORTS OF COPPER SEMIMANUFACTURES, BY COUNTRY[1]

Country	Pipes and tubing		Plates, sheets, foil, bars		Bars wire, including wire rod[2]		Wire and cable, stranded		Copper sulfate[3]	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value thousands
2001	22,400	$72,700	31,800	$111,000	76,400	$169,000	29,800	$136,000	970 r	$869 r
2002:										
Australia	5	32	6	98	3	49	28	632	--	--
Canada	9,770	28,100	12,200	40,400	16,300	37,700	5,030	12,700	1,250	1,070
Chile	4	9	49	136	2	95	32	250	4	8
China	335	948	546	1,330	148	461	277	2,080	86	72
Denmark	--	--	[4]	13	2	8	5	74	--	--
France	160	834	94	1,470	50	453	81	1,840	--	--
Germany	20	115	366	2,420	26	367	109	4,210	--	--
Hong Kong	3	10	63	332	28	444	117	1,510	63	58
Indonesia	--	--	--	--	[4]	3	2	46	--	--
Israel	39	143	47	1,810	4	41	95	623	4	3
Italy	501	1,350	45	427	5	37	45	742	--	--
Japan	5	22	352	1,820	130	832	391	2,730	--	--
Korea, Republic of	26	125	834	1,780	47	238	903	5,060	90	72
Malaysia	101	422	45	226	4	54	29	234	--	--
Mexico	10,900	36,200	24,300	48,600	74,000	144,000	30,800	78,200	36	40
Netherlands	123	465	113	529	36	298	367	28,300	14	11
New Zealand	[4]	9	70	523	8	70	7	126	--	--
Portugal	1,230	2,560	6	61	--	--	[4]	3	--	--
Saudi Arabia	261	876	45	173	4	38	271	823	--	--
Singapore	6	197	133	786	92	668	242	1,460	23	23
Sweden	--	--	51	534	6	109	33	398	--	--
Taiwan	10	98	999	2,880	41	195	84	668	--	--
United Kingdom	54	269	252	3,140	203	1,360	170	3,620	5	5
Other	715	3,670	444	2,600	1,220	3,070	2,670	14,600	84	82
Total	24,300	75,500	41,000	112,000	92,400	190,000	32,000	161,000	1,650	1,440

[1]Revised. -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Total exports of wire rod were 44,100 metric tons (t) valued at $98,800,000 in 2001 and 55,200 t valued at $105,000,000 in 2002.
[3]Previously published copper sulfate export quantity data for 2000 have been revised to 811 t from 10,274 t, and value data have been revised to $934 from $25,092.
[4]Less than 1/2 unit.

Source: U.S. Census Bureau.

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TABLE 16

U.S. IMPORTS FOR CONSUMPTION OF UNMANUFACTURED COPPER (COPPER CONTENT), BY COUNTRY[1]

Country	Ore and concentrate		Matte, ash and precipitates		Blister and anode		Refined		Unalloyed scrap		Total	
	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)
2001	46,500	$62,100	945	$1,850	271,000	$645,000	991,000	$1,620,000	30,300	$41,700	1,340,000	$2,370,000
2002:												
Brazil	--	--	--	--	--	--	45,000	69,600	--	--	45,000	69,600
Canada	8,350	8,200	75	107	83,700	247,000	235,000	378,000	13,900	22,200	341,000	655,000
Chile	51,800	83,600	--	--	37,400	56,900	245,000	384,000	611	916	335,000	525,000
Costa Rica	--	--	--	--	--	--	--	--	1,100	973	1,100	973
Dominican Republic	--	--	--	--	--	--	--	--	1,360	1,260	1,360	1,260
Guatemala	--	--	--	--	--	--	--	--	536	532	536	532
Honduras	--	--	--	--	--	--	--	--	399	518	399	518
Indonesia	2,910	5,720	--	--	--	--	--	--	--	--	2,910	5,720
Italy	--	--	--	--	--	--	--	--	116	679	116	679
Jamaica	--	--	--	--	--	--	--	--	362	413	362	413
Japan	--	--	2	10	(3)	17	8,640	18,200	97	844	8,730	19,100
Mexico	4	10	324	179	16,200	46,700	57,200	90,000	9,250	8,830	82,900	146,000
Namibia	--	--	--	--	6,340	11,300	--	--	--	--	6,340	11,300
Nicaragua	--	--	--	--	--	--	--	--	321	428	321	428
Peru	5,960	7,330	--	--	4,730	7,220	288,000	457,000	--	--	298,000	471,000
Russia	--	--	--	--	--	--	28,800	46,300	--	--	28,800	46,300
Taiwan	17	85	621	1,320	--	--	10	34	15	30	663	1,460
Turkey	2,910	2,260	--	--	--	--	--	--	--	--	2,910	2,260
United Kingdom	--	--	--	--	2	99	3,410	5,380	155	451	3,570	5,930
Other	2	28	17	50	70	34	16,600	31,200	1,020	934	17,700	32,300
Total	71,900	107,000	1,040	1,660	148,000	369,000	927,000	1,480,000	29,300	39,000	1,180,000	2,000,000

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Cost, insurance, and freight value at U.S. port.

[3]Less than 1/2 unit.

Source: U.S. Census Bureau.

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TABLE 17

U.S. IMPORTS FOR CONSUMPTION OF COPPER SEMIMANUFACTURES, BY COUNTRY[1]

Country	Pipes and tubing		Plates, sheets, foil, bars		Bare wire, including wire rod[2]		Wire and cable, stranded		Copper sulfate[4]	
	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)
2001	1,270	$6,940	101,000	$319,000	234,000	$442,000	8,660	$32,800	40,200 r	$10,200 r
2002:										
Belgium	--	--	3	5	53	380	(5)	3	1,050	798
Brazil	(5)	9	838	2,080	34,900	59,300	--	--	13	8
Canada	936	4,950	6,470	18,600	132,000	234,000	693	3,090	5,940	4,870
Chile	15	34	2,880	6,930	43	65	--	--	96	76
China	--	--	710	2,710	56	242	13	43	7,360	4,950
Finland	20	188	2,410	8,300	607	2,180	49	328	416	223
France	(5)	36	1,890	4,610	199	1,730	18	332	174	198
Germany	163	717	25,900	66,600	1,460	4,280	406	1,800	63	225
Hong Kong	--	--	54	440	--	--	(5)	13	--	--
India	1	9	337	375	2	21	18	185	--	--
Israel	--	--	--	--	5	68	2,150	9,690	20	18
Italy	--	--	3,900	9,260	51	186	1	24	18	12
Japan	(5)	5	5,000	21,500	565	1,610	10	165	43	218
Luxembourg	--	--	2,000	11,800	--	--	3	3	--	--
Malaysia	668	2,230	(5)	2	2	91	1	3	--	--
Mexico	--	--	1,550	4,330	53,800	84,700	(5)	3	26,100	19,600
Peru	--	--	3,250	7,130	420	941	346	743	2,170	1,420
Russia	--	--	13,100	22,400	22,000	42,200	--	--	--	--
Sweden	--	--	8,620	26,700	16	246	(5)	3	--	--
Taiwan	1	26	211	1,570	91	388	51	290	1,320	815
Turkey	--	--	15	34	5,070	14,100	463	1,410	--	--
United Kingdom	1	25	648	2,950	214	658	8	106	--	--
Other	6	66	2,190	6,240	794	2,660	50	311	1,710	1,240
Total	1,810	8,290	81,800	225,000	252,000	453,000	4,280	18,500	46,500	34,700

r Revised. -- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Total imports of wire rod were 247,000 metric tons (t) valued at $502,000,000 in 2001 and 221,000 t valued at $393,000,000 in 2002. Import data adjusted by the U.S. Geological Survey to correct misclassification of imports from Mexico.

[3]Cost, insurance, and freight value at U.S. port.

[4]Previously published copper sulfate import quantity data for 2000 have been revised to 33,300 t from 2,550 t, and value data have been revised to $23,100 from $9,900.

[5]Less than 1/2 unit.

Source: U.S. Census Bureau.

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TABLE 18
U.S. EXPORTS OF COPPER SCRAP, BY COUNTRY[1]

Country	Unalloyed copper scrap				Copper-alloy scrap			
	2001		2002		2001		2002	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Belgium	1,260	$2,860	2,210	$5,540	1,470	$1,870	7,050	$10,800
Canada	38,700	40,900	20,100	18,900	33,100	43,900	19,900	25,200
China	156,000	146,000	122,000	136,000	136,000	94,800	155,000	92,600
Germany	6,500	9,150	14,200	16,800	9,480	8,030	16,400	19,600
Hong Kong	4,300	11,000	7,180	17,100	5,440	4,650	6,140	3,810
India	2,770	2,300	3,920	3,920	33,400	25,500	43,500	34,800
Japan	13,800	20,400	11,000	15,900	13,200	19,280	9,120	14,500
Korea, Republic of	24,400	37,400	14,900	21,100	37,800	25,000	18,700	25,700
Mexico	2,760	7,960	2,280	5,260	4,370	3,550	248	555
Taiwan	9,120	12,300	10,100	13,200	5,870	8,320	9,060	13,000
Other	2,290	3,130	4,840	4,740	11,700	9,250	12,500	9,910
Total	262,000	294,000	213,000	258,000	272,000	244,000	298,000	250,000

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau.

TABLE 19
U.S. IMPORTS FOR CONSUMPTION OF COPPER SCRAP, BY COUNTRY[1]

Country or Territory	Unalloyed copper scrap		Copper-alloy scrap		
	Quantity (metric tons)	Value[2] (thousands)	Gross weight (metric tons)	Copper content[e, 3] (metric tons)	Value[2] (thousands)
2001	30,300	$41,700	84,400	60,800	$102,000
2002:					
Canada	13,900	22,200	38,700	27,900	50,300
Chile	631	916	78	56	99
Costa Rica	1,100	973	458	330	485
Dominican Republic	1,360	1,260	884	636	603
Germany	118	19	1,110	795	2,870
Guatemala	536	332	1,190	853	1,520
Honduras	399	518	347	250	946
Italy	116	679	--	--	--
Jamaica	362	413	239	172	141
Japan	97	844	195	139	133
Mexico	9,250	8,830	18,300	13,200	18,500
Nicaragua	321	428	170	122	202
Panama	173	155	792	571	884
Philippines	--	--	96	69	1,260
United Kingdom	155	451	1,760	1,270	2,850
Venezuela	93	110	2,090	1,500	1,710
Other	647	680	4,440	3,200	6,280
Total	29,300	39,000	70,900	51,000	88,800

[e]Estimated. -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Cost, insurance, and freight value at U.S. port.
[3]Content is estimated by the U.S. Geological Survey to be 72% of gross weight.

Source: U.S. Census Bureau.

TABLE 20
COPPER: WORLD MINE PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country	1998	1999	2000	2001	2002[e]
Albania[e]	3,200	900	--	--	--
Argentina	170,273	210,126	145,397	191,677 [r]	204,027 [3]
Armenia	9,158 [r]	9,830 [r]	12,234 [r]	12,400 [r, e]	12,800
Australia:					
Concentrates	552,000	655,900	751,300	782,100	787,000 [r]
Leaching, electrowon	55,000	83,100	77,700	86,900	96,000
Total	607,000	739,000	829,000	869,000	883,000
Bolivia	48	252	110 [r]	18 [r, e]	--
Botswana[4]	25,043	20,960 [r]	20,977 [r]	17,057 [r]	19,700
Brazil	34,446	31,371	31,786	30,121 [r]	30,100
Bulgaria	88,000	96,000 [r]	92,000 [r]	88,000 [r]	96,000
Burma:					
Concentrates	--	97	100 [r]	-- [r]	--
Leaching, electrowon	6,700 [r]	26,736	26,711	26,300 [r]	28,000
Total	6,700 [r]	26,833	26,811	26,300 [r]	28,000
Canada:					
Concentrates	703,966	620,085	633,855	633,531 [r]	600,187 [3]
Leaching, electrowon	1,800	--	--	--	--
Total	705,766	620,085	633,855	633,531 [r]	600,187 [3]
Chile:[5]					
Concentrates	2,570,800	3,029,100	3,229,800	3,200,800	2,979,000 [3]
Leaching, electrowon	1,108,000	1,362,100	1,372,600	1,538,200	1,602,000 [3]
Total	3,686,800	4,391,200	4,602,400	4,739,000	4,581,000 [3]
China:[4]					
Concentrates	486,000	520,000	593,000	587,000 [r]	560,000
Leaching, electrowon	18,000	13,000	20,000	18,000	25,000
Total	504,000	533,000	613,000	605,000 [r]	585,000
Colombia	1,400 [r]	2,295	2,062	2,000 [r]	2,000
Congo (Kinshasa), leaching, electrowon[e]	34,994	32,000 [r]	21,000 [r]	20,988	29,000
Cuba	1,351	1,090	1,346	1,000 [r]	1,000
Cyprus, leaching, electrowon	4,936 [r]	5,004 [r]	5,200 [r, e]	5,200 [r, e]	5,200
Ecuador[e]	100	100	100	100	100
Finland[e]	9,000	10,500	14,354 [r]	13,715 [r]	14,400 [3]
Georgia[e]	6,000	7,000	8,000	8,000	8,000
Honduras	(7)	(7)	-- [r]	-- [r]	--
India	39,900	34,100 [r]	31,900	32,400 [r]	34,100 [3]
Indonesia[6]	780,780	766,027	1,012,054	1,081,040 [r]	1,160,000
Iran:[e]					
Concentrates	128,300 [r, 3]	131,000 [r]	125,000 [r]	121,000 [r]	121,000
Leaching, electrowon	10,000	10,000	10,000	12,000	12,000
Total	138,380 [r, 3]	141,000 [r]	135,000 [r]	133,000 [r]	133,000
Japan	1,070	1,038	1,211	744	750
Kazakhstan	337,600	374,000 [r]	430,000 [r]	470,100	490,000
Korea, North[e]	14,000	14,000	13,000	13,000	13,000
Korea, Republic of	41	--	--	--	--
Macedonia	9,100	10,200	10,000 [r]	10,000 [r]	10,000
Malaysia	13,907	4,600	--	--	--
Mexico:					
Concentrates	335,822	330,232	308,966 [r]	310,623 [r]	260,574 [3]
Leaching, electrowon	48,819	50,952	55,600 [r]	60,500 [r]	69,000
Total	384,641	381,184	364,566	371,123 [r]	329,574 [3]
Mongolia	125,400	126,700	125,227	133,503	131,705 [3]
Morocco	8,200	7,747 [r]	7,080 [r]	5,800 [r]	5,500
Namibia	7,500	--	5,620	12,392	18,012 [3]
Norway[e]	2,698 [3]	--	--	--	--
Papua New Guinea	157,200	187,921	200,900	218,000 [r]	211,311 [3]
Peru:					
Concentrates	381,501	421,470	426,614	590,896	686,748 [3]
Leaching, electrowon	101,837	114,917	127,310	131,139	156,465 [3]
Total	483,338	536,387	553,924	722,035	843,213 [3]

See footnotes at end of table.

TABLE 20—Continued

COPPER: WORLD MINE PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country	1998	1999	2000	2001	2002[p]
Philippines	43,400	34,600	30,644	20,322	18,364 [3]
Poland	435,800 [r]	463,200 [4]	454,100 [r]	474,000	502,800 [3]
Portugal	114,637	99,500 [r]	76,200	82,900	77,000
Romania[5]	19,065	16,807 [4]	16,079	19,185 [r]	20,000
Russia[e]	500,000 [3]	530,000	570,000	600,000 [r]	695,000
Saudi Arabia	782	821	900 [e]	800 [e]	800
Serbia and Montenegro[5]	70,900	51,700 [3]	41,000	22,000	23,000
Slovakia[e]	155	124	--	--	--
South Africa	166,000	144,263	137,092	141,865	129,589 [3]
Spain	37,000	1,738	23,312	9,700	5,000
Sweden	73,685	71,200	77,765 [r]	74,269 [r]	72,100 [3]
Tanzania, in concentrates and bullion	--	--	--	2,645 [r]	3,900
Turkey[5]	40,000 [e]	73,051	76,253	69,000 [e, 4]	60,000
United States:[6]					
Concentrates	1,250,000	1,010,000	887,000	714,000	601,000 [3]
Leaching, electrowon	609,000	586,000	557,000	624,000 [r]	542,000 [3]
Total	1,850,000	1,600,000	1,440,000	1,340,000	1,140,000 [3]
Uzbekistan[e]	65,000 [3]	60,000	65,000	65,000	65,000
Zambia:					
Concentrates	258,000	213,000	184,100 [r]	233,000 [r]	251,100 [3]
Leaching, electrowon	57,000	67,000 [3]	65,000 [r]	79,000 [r]	78,900 [3]
Total	315,000 [3]	280,000 [4, 3]	249,100 [r]	312,000 [r]	330,000 [3]
Zimbabwe:					
Concentrates	3,600 [e]	3,491	2,104	2,057	2,502 [3]
Leaching, electrowon[7]	2,400	1,020 [3]	--	--	-- [3]
Total	6,000 [e]	4,511	2,104	2,057	2,502 [3]
Grand total	12,100,000	12,800,000 [r]	13,200,000	13,700,000	13,600,000
Of which:					
Concentrates	10,100,000	10,400,000	10,900,000	11,100,000	11,000,000
Leaching	2,060,000	2,350,000	2,340,000	2,600,000	2,640,000

[e]Estimated. [r]Revised. -- Zero.

[1]World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Table represents copper content by analysis of concentrates produced (includes cement copper, if applicable), except where otherwise noted. Table includes data available through July 22, 2003.

[3]Reported figure.

[4]Copper content of pelletized nickel-copper matte produced in smelter.

[5]Reported by Comision Chilena del Cobre. Includes recoverable copper content of nonduplicative mine and metal products produced from domestic ores and concentrates and leach production for electrowinning.

[6]Recoverable content.

[7]Less than 1/2 unit.

[8]Excludes copper content of pyrite.

[9]Data are for fiscal years beginning April 1 of year stated.

TABLE 21

COPPER: WORLD SMELTER PRODUCTION, BY COUNTRY[1, 2]

(Metric tons, gross weight)

Country	1998	1999	2000	2001	2002[e]
Albania, primary	1,632	1,281	--	-- [e]	--
Australia, primary	211,000	332,000	394,000	455,000	458,000
Austria, secondary	54,800 [r]	77,573	70,000 [e]	68,642 [r]	65,000
Belgium:					
Primary	-- [r]	-- [r]	-- [r]	-- [r]	--
Secondary	138,400	143,300	144,700	138,200	126,000
Total	138,400 [r]	143,300 [r]	144,700 [r]	138,200 [r]	126,000
Botswana, primary[3]	22,124	20,960	20,977	17,057	19,700
Brazil, primary	167,205	193,014	185,345	204,300 [r]	174,000
Bulgaria:					
Primary	114,500	107,000	173,000 [r]	152,000 [r]	150,000
Secondary[4]	5,000	5,000	5,000	5,000	5,000
Total	119,500	112,000 [r]	178,000 [r]	157,000 [r]	155,000
Canada:					
Primary	553,133 [r]	550,200	543,600	601,400 [r]	513,900 [e]
Secondary	71,338 [r]	66,800	60,100	41,600 [r]	24,800 [e]
Total	624,471 [r]	617,000	603,700	643,000 [r]	538,700 [e]
Chile, primary	1,403,100	1,473,900 [r]	1,460,400	1,503,300	1,439,000 [e]
China:[5]					
Primary	839,000	837,000	1,030,000	1,120,000	1,240,000
Secondary	170,000	190,000	180,000	190,000	250,000
Total	1,009,000	1,027,000	1,200,000	1,310,000	1,490,000
Congo (Kinshasa), primary, electrowon[6]	40,000	32,000	21,000	20,988 [e]	29,000
Finland:					
Primary	156,000	149,600	155,400	169,300	160,900 [e]
Secondary[4]	2,000	2,000	2,000	2,000	2,000
Total	158,000 [e]	151,600	157,400	171,300	162,900 [e]
France, secondary[4]	2,000	1,000	--	--	--
Germany:					
Primary	258,600	266,400	275,000 [e]	270,000 [e]	312,000
Secondary[4]	80,000	60,000	75,000	60,000	60,000
Total	338,600	326,400	350,000 [e]	330,000 [e]	372,000
India, primary	107,600	224,400	256,000 [e]	293,000 [e]	380,000
Indonesia, undifferentiated	--	126,739	173,726	217,500	211,200 [e]
Iran, undifferentiated[6, 5]	138,000 [r]	132,000 [r]	135,000 [r]	135,000 [r]	146,000
Japan:					
Primary	1,171,657	1,256,276	1,331,352	1,328,489	1,317,291 [e]
Secondary	131,979	133,188	149,282	139,764	182,069 [e]
Total	1,303,636	1,389,464	1,480,634	1,468,253	1,499,360 [e]
Kazakhstan, undifferentiated	351,336	383,457	413,859	433,600 [r]	446,200 [e]
Korea, North, primary and secondary[6]	14,000	14,000	13,000	13,000	13,000
Korea, Republic of, undifferentiated	293,000	370,000	410,000 [e]	430,000 [e]	410,000
Mexico:					
Primary	381,400 [r]	322,000 [r]	312,000 [r]	310,000 [r]	271,000
Secondary[4]	4,000	5,000	5,000	5,000	5,000
Total	385,400 [r]	327,000 [r]	317,000 [r]	315,000 [r]	276,000
Namibia, primary[6]	8,014	-- [e]	5,082	27,015	17,850 [e]
Norway, primary	-- [r]	-- [r]	-- [r]	-- [r]	--
Oman, primary	24,400	16,818	23,790	24,200 [r]	24,000
Peru, primary	357,100 [r]	363,100 [r]	366,700 [r]	396,400 [r]	370,300 [e]
Philippines, primary	161,600	162,000	168,000	165,000 [r]	165,800 [e]
Poland:					
Primary	432,200 [r]	466,200 [r]	462,800 [r]	485,900 [r]	486,000
Secondary[4]	19,300 [r]	27,300 [r]	19,700 [r]	27,900 [r]	29,000
Total	451,500 [r]	493,500 [r]	482,500 [r]	513,800 [r]	515,000
Romania:					
Primary	18,708	24,010 [r]	16,429 [r]	9,279 [r]	10,000
Secondary[6]	1,000	2,000	2,000	2,000	2,000
Total	19,708	26,010 [r]	18,429 [r]	11,279 [r]	12,000

See footnotes at end of table.

TABLE 21—Continued

COPPER: WORLD SMELTER PRODUCTION, BY COUNTRY[1,2]

(Metric tons, gross weight)

Country	1998	1999	2000	2001	2002[e]
Russia:[e]					
Primary	520,000 r	580,000 r	600,000 r	650,000 r	660,000
Secondary	80,000 r	158,000	220,000	245,000 r	200,000
Total	600,000 r	738,000 r	820,000 r	895,000 r	860,000
Serbia and Montenegro:[e]					
Primary	101,000	54,000	45,000	34,000	36,000
Secondary	10,000	49,780 [3]	45,000	35,000	30,000
Total	111,000	103,780 [3]	90,000 r	69,000	66,000
Slovakia, primary[7]	10,000	10,000	--	--	--
South Africa, primary	152,300	149,300	136,100 r	143,500	98,000
Spain:					
Primary	291,400	292,800	258,600 r	255,200 r	281,000
Secondary	23,800	25,000 [4]	31,300 r	24,700	16,700
Total	315,200	317,800	289,900 r	279,900 r	298,000 r
Sweden:[e]					
Primary	90,000	85,000	95,000	173,000	188,000
Secondary	35,000	30,000	35,000	35,000	35,000
Total	125,000	115,000	130,000	208,000	223,000
Turkey, undifferentiated[4]	32,900 r	32,900	32,900	33,500 r	30,000
United States:					
Primary	1,490,000	1,090,000	W	W	W
Secondary	232,000	205,000	W	W	W
Total	1,720,000	1,290,000	1,000,000	919,000	683,000 r
Uzbekistan:[e]					
Primary	89,930 [3]	72,000	75,000	75,000 r	75,000
Secondary	5,000	5,000	5,000	5,000	5,000
Total	94,930 [3]	77,000	80,000	80,000 r	80,000
Zambia, primary:[7]					
Electrowon	51,736	60,200	50,000	50,000 [e]	60,000
Other	206,871	289,000	308,300	306,000 r	311,400 r
Total	258,607	349,200	358,300	356,000 r	371,400 r
Zimbabwe, primary:[e,8]	14,500	14,500	14,500	2,160	2,502 r
Grand total:	11,300,000 r	11,700,000 r	11,000,000 r	11,500,000 r	11,500,000
Of which					
Primary:					
Electrowon	91,700	92,200	71,000	71,000	89,000
Other	9,350,000 r	9,400,000 r	8,690,000 r	9,170,000 r	9,160,000
Secondary	1,070,000 r	1,190,000 r	1,050,000 r	1,020,000 r	1,040,000
Undifferentiated	829,000 r	1,060,000 r	1,180,000 r,9	1,240,000 r,9	1,260,000

[e]Estimated. r Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." — Zero.

[1]World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]This table includes total production of smelted copper metal, including low-grade cathode produced by electrowinning methods. The smelter feed may be derived from ore, concentrates, copper precipitate or matte (primary), and/or scrap (secondary). To the extent possible, primary and secondary output of each country is shown separately. In some cases, total smelter production is officially reported, but the distribution between primary and secondary has been estimated. Table includes data available through July 22, 2003.

[3]Copper content of nickel-copper matte exported to Norway for refining.

[4]Reported figure.

[5]Data are for year beginning March 21 of that stated. Secondary production is estimated to be about 5% of total.

[6]Secondary production is estimated to be about one-third of total.

[7]For 1998 and 1999, fiscal year beginning April 1 of year stated. Electrowon is total electrowon production reported less the quantity reported as "finished production, leach cathodes."

[8]Includes impure cathodes produced by electrowinning in nickel processing.

[9]Includes U.S. production undifferentiated.

TABLE 22
COPPER: WORLD REFINERY PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country	1998	1999	2000	2001	2002[e]
Albania, primary	1,150	342	–[r]	–[r]	–
Argentina, secondary[e]	16,000	16,000	16,000	16,000	16,000
Australia:					
Electrowon	55,000	84,000	97,000[r]	102,000[r]	96,000
Primary	230,000	335,000	390,000[r]	456,000[r]	449,000
Total	285,000[r]	419,000[r]	487,000[r]	558,000[r]	545,000
Austria:[4]					
Primary	2,000	2,000	2,000	–	–
Secondary	76,000	75,800	77,000	69,000	65,000
Total	78,000	77,800	79,000[r]	69,000	65,000
Belgium:[4]					
Primary	185,000	201,100	236,100	236,000[r]	207,000
Secondary[4]	183,000[r]	187,000	187,000	187,000	216,000
Total	368,000	388,100	423,100	423,000	423,000
Brazil, primary	167,205[r]	193,014	185,345	212,243[r]	187,700[p]
Bulgaria:					
Primary	31,400	16,000[r]	27,500[r, p]	29,400[r]	30,000
Secondary[e]	5,000	5,000	5,000	5,000	5,000
Total	36,400	21,000	32,500[r]	34,500[r]	35,000
Burma, electrowon	6,700[r]	26,736	26,711	26,300[r]	28,000
Canada:					
Electrowon	1,800	–	–[r]	–[r]	–
Primary	489,943[r]	476,079[r]	490,093[r]	524,920[r]	468,503[p]
Secondary	72,635[r]	72,484[r]	61,300	42,800[r]	25,770[p]
Total	564,376[r]	548,563[r]	551,393[r]	567,720[r]	494,273[p]
Chile:					
Electrowon	1,108,000	1,362,100	1,372,600	1,538,200[r]	1,602,000[p]
Primary	1,226,900	1,304,300	1,295,700	1,344,000	1,248,100[p]
Total	2,334,900	2,666,400	2,668,300	2,882,200[r]	2,850,100[p]
China:[4]					
Electrowon	18,000	13,000	20,800	18,000	20,000
Primary	832,000[r]	823,000[r]	1,003,000[r, p]	1,200,000[r]	1,280,000
Secondary	341,000	338,000	347,000	300,000[r]	350,000
Total	1,210,000	1,170,000	1,370,000	1,520,000[r]	1,650,000
Congo (Kinshasa), primary[3]	38,236	31,225	20,500[r]	21,000[r]	10,000
Cyprus, electrowon	4,936	5,004	5,197	5,176	3,631[p]
Egypt, secondary[e]	6,000	6,000	5,000	5,000	5,000
Finland:[4]					
Primary	108,000	100,000	100,000	105,000[r]	100,000
Secondary	15,000	15,000	14,000	15,000	15,000
Total	123,000	115,000	114,000	120,000[r]	115,000
France, secondary[4]	22,400	1,800	1,500	–	–
Germany:[4]					
Primary	275,800[r]	242,000[r]	245,000[r]	352,000[r]	330,900[p]
Secondary	421,800[r]	454,000[r]	465,000[r]	342,000[r]	364,900[p]
Total	696,000[r]	696,000	710,000	694,000[r]	695,800[p]
Hungary, secondary[e]	12,000	12,000	12,000	10,000	10,000
India:					
Primary, electrolytic	100,000	200,000[r]	234,000[r]	310,000	354,000
Secondary[e]	7,000	8,000	9,000	18,000	20,000
Total[e]	107,000	208,000	243,000	328,000	374,000
Indonesia, primary	–	90,800	158,400	212,500	192,400[p]
Iran:[6]					
Electrowon[e]	9,500[r, 7]	10,000[r]	10,000[r]	12,000[r]	12,000
Primary[7]	129,000	131,700	132,000[r]	132,000[r]	143,000
Total	138,500[r]	141,700[r]	142,000[r]	144,000[r]	155,000
Italy, secondary	29,100[r]	28,500[r]	72,800	35,500	29,000
Japan:					
Primary	1,149,266	1,215,248	1,292,351[r]	1,287,165[r]	1,211,111[p]
Secondary	128,086	126,301	149,260[r]	138,526[r]	189,968[p]
Total	1,277,352	1,341,549	1,441,611[r]	1,425,691[r]	1,401,079[p]

See footnotes at end of table.

TABLE 22—Continued

COPPER: WORLD REFINERY PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country	1998	1999	2000	2001	2002[e]
Kazakhstan, primary	324,900	361,889	394,722	425,700 [r]	451,000 [3]
Korea, North, primary and secondary[e]	16,000 [r]	16,000	14,000 [r]	14,000 [r]	14,000
Korea, Republic of, primary	373,205	450,444	467,900	473,624	500,000
Mexico:					
Primary:					
Electrowon	48,819	50,952	55,600 [r]	59,800 [r]	69,100
Other	383,181	361,000	340,400	349,000 [r]	319,000
Secondary[e]	15,000	14,000	15,000	15,000	35,000
Total	447,000	425,952	411,000 [r]	423,800 [r]	423,100
Mongolia, electrowon	2,319	1,545	641	1,476	1,500 [3]
Norway, primary[7]	31,658	33,262	27,000 [r]	26,700	30,500
Oman, primary	22,700	17,171	24,281	24,000 [4, e]	24,000
Peru, primary:					
Electrowon	101,837	114,425 [r]	127,311	131,139	156,465 [p]
Other	309,594	318,914	324,417	340,736	346,277 [p]
Total	411,431	433,339 [r]	451,728	471,875	502,742 [p]
Philippines, primary	152,400	147,982	150,000 [r]	164,530	144,315 [3]
Poland:					
Primary	426,537	448,300	498,100 [r]	498,451 [r]	508,674 [3]
Secondary[7]	20,300 [r]	22,200	19,700 [r]	30,286 [r]	19,146 [3]
Total	446,837	470,500	517,800 [r]	528,737 [r]	527,820 [3]
Romania:					
Primary	21,028	24,983	13,803	18,500 [r]	21,000
Secondary[1]	2,000	4,000	4,000	4,000	4,000
Total	23,028	28,983	17,803	22,500 [r]	25,000
Russia:					
Primary	543,000	600,000	620,000 [r]	650,000	670,000
Secondary	77,000	160,000 [r]	220,000 [r]	244,500	200,000
Total	620,000	760,000 [r]	840,000 [r]	894,500	870,000
Serbia and Montenegro:					
Primary	49,346	48,002	45,602	32,365	35,897 [3]
Secondary[7]	45,000	1,900	40,000	30,000	17,000
Total	94,346	49,902	85,602	62,365	52,897 [3]
Slovakia, primary[4, 7]	24,100	21,000	-- [r]	-- [r]	--
South Africa, primary[7]	125,600	134,500	126,100	107,000 [r]	101,000
Spain:					
Primary	239,600	250,756	258,000	235,100	272,000
Secondary[7]	64,730 [r]	65,000	58,000	55,600 [r]	37,000
Total	304,330 [r]	315,756 [r]	316,000 [r]	290,700	309,000 [3]
Sweden:[4]					
Primary	100,000	95,000	105,000	179,000 [r]	199,000
Secondary	25,000	20,000	25,000	25,000	25,000
Total	125,000	115,000	130,000	204,000 [5]	224,000
Taiwan, secondary[e]	4,000	4,000	4,000	4,000	4,000
Turkey:[4]					
Primary	82,800 [r]	55,500 [r]	59,100 [r]	54,400 [r]	39,000
Secondary	9,000 [r]	5,000 [r]	5,000 [r]	4,000 [r]	2,000
Total	91,800 [r]	60,500 [r]	64,100 [r]	58,400 [r]	41,000
United Kingdom:					
Primary	8,000	5,000 [r]	--	-- [r]	--
Secondary	44,000	45,000 [r]	3	-- [r]	--
Total	52,000	50,000 [r]	3	-- [r]	--
United States:					
Primary:					
Electrowon	609,000	586,000	566,000 [r]	628,000	601,000
Other	1,530,000	1,300,000	1,030,000	1,000,000	841,000
Secondary	349,000	230,000	208,000	172,000	70,000
Total	2,490,000	2,120,000	1,800,000 [r]	1,800,000	1,510,000

See footnotes at end of table.

TABLE 22—Continued
COPPER: WORLD REFINERY PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country	1998	1999	2000	2001	2002[p]
Uzbekistan:[e]					
Primary	89,930 [3]	72,000	75,000	75,000	75,000
Secondary	5,000	5,000	5,000	5,000	5,000
Total	94,930 [3]	77,000	80,000	80,000	80,000
Zambia, primary:					
Electrowon	80,709	60,200	50,000	79,000 [r]	83,700 [3]
Other	248,820	258,900	227,400	217,500 [r]	253,100 [3]
Total	329,529 [3]	319,100 [3]	277,400	296,500 [r]	336,800 [r]
Zimbabwe:					
Electrowon[5]	2,400	1,000	--	--	3,000
Primary	2,940	7,000	7,200 [e]	5,300 [e]	3,000
Total	5,340	8,000	7,200 [e]	5,300 [e]	6,000
Grand total:	14,100,000	14,600,000	15,000,000 [r]	15,700,000 [r]	15,500,000
Of which:					
Primary:					
Electrowon	2,050,000 [r]	2,310,000	2,330,000 [r]	2,600,000 [r]	2,680,000
Other	10,100,000 [r]	10,400,000 [r]	1,060,000 [r]	11,300,000 [r]	11,100,000
Secondary	1,990,000 [r]	1,920,000 [r]	2,030,000 [r]	1,770,000 [r]	1,730,000

[e]Estimated. [p]Preliminary. [r]Revised. -- Zero.

[1]World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]This table includes total production of refined copper whether produced by pyrometallurgical or electrolytic refining methods and whether derived from primary unrefined copper or from scrap. Copper cathode derived from electrowinning processing is also included. Table includes data available through July 22, 2003.

[3]Reported figure.

[4]Includes reprocessed leach cathode from Congo (Kinshasa).

[5]Excludes leach cathode exported for processing in Belgium.

[6]Data are for Iranian years beginning March 21 of that stated.

[7]May include secondary.

[8]Data are for fiscal year beginning April 1 of that stated. Electrowon covers only high-grade electrowon cathodes reported as "finished production leach cathodes."

COPPER

By Daniel L. Edelstein

Domestic survey data and tables were prepared by Janet D. Richards, statistical assistant, and the world production tables were prepared by Regina R. Coleman and Glenn J. Wallace, international data coordinators.

In 2001, mine production of recoverable copper in the United States continued its downward slide that began in 1998, falling by more than 100,000 metric tons (t) to the lowest level since 1987. In addition to mine closures and cutbacks carried forward from preceding years, rising global inventories that sustained low copper prices led to additional cutbacks and closures. The Morenci Mine in Arizona completed its transition to an all-leach operation, further reducing production. Three companies, Phelps Dodge Corp., ASARCO Incorporated (owned by Mexico's Grupo Mexico, S.A. de C.V.), and Kennecott Utah Copper Corp. (owned by Rio Tinto plc of the United Kingdom), accounted for more than 97% of U.S. copper mine production.

While the United States maintained its position as the world's second largest mine producer of copper, accounting for about 10% of world production, its share of global production continued to decline from its 19% share in 1994. Chile, where mine production increased by 3% in 2001, was the largest mine producer and accounted for 35% of world production. World mine production grew by about 3% in 2001. The world reserves and reserve base for copper were estimated to be 475 million metric tons (Mt) and 950 Mt, respectively. The United States had about 7% each of reserves and reserve base. According to the National Mineral Resource Assessment conducted by the U.S. Geological Survey (2000), the mean estimate of copper in undiscovered deposits in the United States was 290 Mt. More than two-thirds of the copper was thought to be contained in undiscovered porphyry copper deposits. The identified copper resource was estimated to be 260 Mt.

U.S. copper smelter production declined by only about 8%, despite a 20% drop in concentrate production owing to an increase in net imports of concentrates and a drawdown in inventories of concentrate stockpiled during the previous year. This reflects a shift from 2000 when the United States was a net exporter of copper in concentrate. Primary refinery production rose by 2%, supported by an 11% increase in electrowon production following the conversion of Phelps Dodge Corp.'s Morenci, AZ, mine to an all-leach operation. Total refinery production remained unchanged from 2000 owing to a decline in secondary refined production. Contraction of the secondary industry continued with the indefinite closure of Chemetco Inc.'s smelter in November, the sole remaining dedicated secondary smelter in the United States. Though the country retained its position as the second largest refiner and third largest smelter, the U.S. share of world smelter and refinery production fell to 7.4% and 11.7%, respectively.

Twenty-three mines operating in 6 States, down from 27 in 2000, reported recoverable quantities of copper in 2001. Thirteen mines located in Arizona, Utah, and New Mexico, in descending order, accounted for more than 99% of production. The remaining 10 mines were either small leach operations or producers of byproduct copper. Despite the decline in production, capacity utilization at domestic mines was essentially unchanged as capacity was adjusted downward to only 1.6 Mt, reflecting the long-term closure of mines that were not expected to reopen without significant capital investment.

During the year, 4 primary smelters and 1 secondary smelter, 5 electrolytic and 3 fire refineries, and 14 solvent-extraction electrowinning (SX-EW) facilities operated in the United States. By yearend, however, the sole secondary smelter, one primary smelter, and two small electrowinning operations had ceased production. Smelter and refinery capacity was revised downward to 1.04 Mt and 2.3 Mt, respectively, to reflect the permanent closure of the Southwire Company secondary smelter and associated refinery in 2000. Consequently, smelter and refinery capacity utilization rose to 91% and 78%, respectively, in 2001. In 1998, prior to the closure of three primary smelters and three secondary smelters, U.S. smelter capacity was estimated to have been 1.9 Mt.

The conversion of old scrap to alloys and refined copper declined for the fourth consecutive year, falling by 41,000 t (11%) to 316,000 t, and contributed 13% of apparent industrial demand for copper. Lower copper prices in 2001 and secondary copper smelter closures led to the continued downward trend in recovery.

Copper was consumed as refined copper and as direct melt scrap at about 35 brass mills, 13 wire-rod mills, and 600 foundries, chemical plants, and miscellaneous operations. According to data compiled by the Copper Development Association Inc. (CDA) (2002, p. 18), mill and foundry product shipments to the U.S. market, including net imports of mill products, declined by 15% in 2001 to 3.8 Mt, from the record-high shipments reported in 2000. Shipments, which in 2001 were at their lowest level since 1996, had risen steadily over the preceding 5 years.

The net import reliance for refined copper, as a percentage of apparent consumption, declined to about 22% from the record-high 37% experienced in 2000 owing to sustained domestic production of refined copper and a sharp dropoff in consumption. Peru, Canada, Chile, and Mexico, in descending order, accounted for 86% of imports for consumption. Canada remained the largest U.S. source for unwrought copper, accounting for 27% of total imports of unwrought copper. China (including Hong Kong), owing to a large growth in U.S. scrap exports, became the largest recipient for unwrought exports, accounting for 48% (copper content) of total exports.

Legislation and Government Programs

On January 26, 2000, as authorized by the Coin Act of 1997, the U.S. Mint began releasing its new Golden Dollar coin (88.5% copper) to replace the Susan B. Anthony dollar coin that had been introduced in 1979. By the end of September 2001, more than 1.5 billion Golden Dollar coins had been minted and more than 1 billion placed in circulation (U.S. Mint, 2001).

However, after minting more than 1 billion coins in 2001, initial demand for the coin was satisfied and the mint ceased commercial production of coins. Future demand for the Golden Dollar was estimated at only 150 to 200 million coins per year, and as of April 2002, the Mint had stores of 300 million coins. According to the Mint, demand for all coins has been declining over the past few years, falling from 28 billion coins in 2000 to 20 billion in 2001. Demand in 2002 was anticipated to fall to only 12 billion coins (American Metal Market, 2002).

In May, the U.S. Environmental Protection Agency (EPA) issued a final rule, effective November 23, 2001, that will provide regulatory flexibility under the Resource Conservation and Recovery Act (RCRA) for metal recycler, U.S. Filter Recovery Services (USFRS), Roseville, MN. The purpose of the rule is to encourage the use of the USFRS wastewater treatment ion exchange resin process by exempting the handling of the loaded resins and associated canisters and filters from designation as a listed hazardous waste, and therefore encouraging the recycling of metals, including copper, nickel, and zinc, derived from the treatment of electroplating solutions. Use of this process is also anticipated to reduce consumption of energy and potable water by the plating industry. The ruling is part of EPA's Project XL (Excellence and Leadership), announced in 1995, that provides a limited number of private and public regulated entities an opportunity to develop their own pilot projects that require regulatory flexibility and that will result in environmental protection that is superior to what could be achieved through compliance with existing and reasonably anticipated future regulations. The regulation will temporarily exempt the resins and associated filters and canisters from existing RCRA regulatory requirements through a new waste code designation for these materials while at Minnesota generators and during its processing at, and transport to, the USFRS plant in Roseville (U.S. Environmental Protection Agency, 2001).

Production

In response to a continuing slide in copper prices, temporary shutdowns initiated in 2000 were continued and further cutbacks announced. Mine production declined by about 100,000 t and was at the lowest level since 1987. Mine production capacity was adjusted downward by about 130,000 metric tons per year (t/yr) to about 1.6 Mt/yr, principally owing to completion of the conversion of the Morenci Mine to an all-leach operation during the first quarter of the year. The reduction also reflects lowered capacity from changes in long-term mine plans and reduced recoveries at residual leach operations at shuttered mines. The net result was that capacity utilization was essentially unchanged at 84%.

Smelter production continued its downward trend following the closure in 2000 of Southwire's secondary smelter. The three primary smelters that closed in 1999 remained shuttered. At the end of October 2001, Chemetco Inc. abruptly closed its secondary copper smelter near Hartford, IL. Chemetco had been ordered to pay $3.8 million in fines for dumping hazardous wastes over a 10-year period, ending in 1996, through a pipe that ran from the plant to an area about 150 yards away. Six company employees, and the company itself, were charged in 1999 with discharging wastewater containing lead, cadmium, and zinc into a lake and wetland adjacent to the plant (Platts Metals Week, 2001b). Chemetco, with a capacity of about 135,000 t/yr of copper anode, was the last dedicated secondary copper smelter operating in the United States. It processed a variety of copper materials including radiators, no. 2 copper, and low-grade residues.

Refinery production, however, remained unchanged in 2001 as increased electrowon production and increased concentrate and blister imports helped to sustain production in light of falling domestic concentrate and secondary smelter production. Electrowon production accounted for a record 47% and 35%, respectively, of mine and refinery production.

Phelps Dodge Corp. reported copper production of 1.28 Mt in 2001, including minority participants share of 228,000 t, from its worldwide operations, down from 1.32 Mt and 230,000 t, respectively, in 2000. U.S. production amounted to 764,000 t (231,000 t concentrate, 533,000 t electrowon), down from 851,000 t (387,000 t concentrate, 464,000 t electrowon) in 2000. In the United States, production was adversely affected by high energy costs and lower copper prices. Despite reducing implied unit costs by $0.13 per pound from the first quarter to the fourth quarter, average annual implied costs rose to $0.75 from $0.72 per pound of copper in 2001, primarily owing to higher energy and depreciation costs (Phelps Dodge Corp., 2002b).

In response to a volatile U.S. energy market that carried forward from 2000, Phelps Dodge implemented a power cost stabilization program in March that reduced electricity-related costs at domestic mining operations. The plan entailed the construction of a 40-megawatt, co-generation plant in New Mexico; an additional negotiated firm power contract; short-term alternating production curtailments at the Tyrone, NM, Sierrita, AZ, and Bagdad, NM, mines; and longer-term production curtailment at the Chino, NM, mine that would cut 2001 production by about 79,000 t. At Chino, concentrator operations and associated sulfide mining were suspended immediately, reducing 2001 production by 61,000 t. Mining in feed leach stockpiles continued in support of SX-EW operations (Phelps Dodge Corp., 2001b). While annual production of concentrate at Chino fell by 62,000 t to only 17,000 t, the other production cuts were not realized. The combined production at Tyrone (72,000 t electrowon and precipitate), Sierrita (86,000 t concentrate, 24,000 t electrowon), and Bagdad (107,000 t concentrate, 9,500 t electrowon) remained essentially unchanged from that of 2000 at 330,000 t (Phelps Dodge Corp., 2002a, p. 11).

In May, Phelps Dodge announced that its newly constructed mine-for-leach project at Morenci had been completed in March and was expected to be at full capacity by the fourth quarter of the year. The $220 million project, which includes crushing, stacking, leaching, and SX-EW facilities, took only 19 months to design, engineer, and construct. At capacity, Phelps Dodge expected to produce 172,000 t/yr of electrowon copper. The project included expansion of the mine's current crushing and conveying system; installation of "stackers," a mobile conveyor system that distributes crushed ore onto leach piles; expansion of existing solvent extraction facilities; and construction of an additional electrowinning tank house. The mine's Metcalf concentrator was permanently closed in 1999, while its crushing facility continued to process 75,000 tons per day (t/d) of leach ore (Phelps Dodge Corp., 2001a). With conversion to all-leach, the Morenci concentrator was placed on care and

In September, Southwire Company announced that it had signed an agreement to purchase the building wire assets of General Cable Corp. in Kingman, AZ; Plano, TX; and Watkinsville, GA. At the end of October, Southwire confirmed completion of the acquisition. According to Southwire, the acquisition "solidified its position as the number one building wire producer in North America" and increased its presence in the Western United States (Southwire Company, 2001). According to preliminary CDA data (2002, p. 18), building electrical wire is the single largest end-use category for copper, accounting for about 22% (on a contained copper basis) of copper mill products shipped to the United States in 2001, and the only growth segment in the 2001 depressed market. In return for its building wire assets, General Cable reported receiving an initial cash payment of $82 million, anticipated cash receivables of $28 million, and certain assets of Southwire's Cyber Technologies Division. General planned to pay down its indebtedness and reduce exposure from "a low return business unit" (General Cable Corp., 2001).

Prices and Stocks

The upward trend in copper prices that began in mid-1999 stalled during the fourth quarter of 2000, and prices began a 10-month descent in January 2001. The London Metal Exchange Ltd. (LME) price tracked that of the COMEX Div. of the New York Mercantile Exchange, generally trading at a one to two cent discount to COMEX, though trading at a slight premium in June. The COMEX spot price, which averaged $0.87 in December 2000, averaged only $0.84 in January and by August fell to an average of only $0.67 per pound. On September 10, the COMEX price averaged only $0.65 per pound. Copper prices remained stable for the first weeks following the terrorist attacks of September 11, when trading was halted for the remainder of the week, but resumed their downward trend. On November 7, the COMEX spot averaged only $0.604 per pound, the lowest level in 15 years. Copper prices strengthened in the second half of November following an announcement by BHP Billiton Base Metals that it would temporarily reduce copper production by 170,000 t/yr. Effective immediately, production at the Escondida Mine in Chile was to be reduced by 10%, about 80,000 t/yr, and effective January 8, total sulfide production activities (90,000 t/yr) were to be curtailed at the Tintaya operations in Peru. At Escondida, production was to be lowered by selectively mining lower-grade material while maintaining mill throughput (BHP Billiton Base Metals, 2001).

Though the onset of the price decline preceded the rise in global inventories by several months, for the most part, the decline in copper prices paralleled a rise in domestic and global inventories. According to the International Copper Study Group (ICSG) (2002a), world inventories of refined copper, which totaled 1.32 Mt at yearend 2000, dipped slightly during January and February 2001, but rose to 1.50 Mt by midyear and reached a total of 2.10 Mt by yearend. At the prevailing rate of consumption, global inventories at yearend represented about 51 days of supply, up from 32 days in 2000. Most of the increase in inventories held in commodity exchange warehouses occurred in the United States. At LME warehouses located in the United States, inventories in 2001 rose by 412,000 t to 616,000 t and accounted for 94% of the global LME stock rise. At yearend, U.S. LME warehouses held 77% of total LME stocks, up from 58% at yearend 2000. COMEX inventories rose to 244,000 t, up by 185,000 t.

Trade

Following 5 years of sustained growth, where net imports of refined copper rose from 212,000 t in 1995 to 962,000 in 2000, net imports in 2001 of 968,000 t, were essentially unchanged. General imports of refined copper of 1.2 Mt were 208,000 t higher than imports for consumption as bonded material entered U.S.-located LME warehouses. Owing to weak U.S. demand, U.S. import reliance as a percent of apparent demand fell in 2001 to 22%, down from its peak of 37% in 2000.

Reduced domestic capacities led to shifts in the trade patterns of several copper products. Cutbacks in domestic mine production of copper in concentrates balanced preceding years cutbacks in operating smelter capacity. As a result, net trade in copper concentrate in 2001 was virtually zero. In 2000, U.S. net exports of concentrate had amounted to about 175,000 t. Reduced secondary processing capacity led to continued growth in scrap exports; combined scrap exports (alloyed and unalloyed) of 534,000 t in 2001 were up from 486,000 t for 2000 and 288,000 t in 1998.

According to U.S. Census Bureau data compiled by the Copper and Brass Fabricators Council Inc. (2002, p. 1-9), the United States imported 308,000 t of copper and copper-alloy semifabricated products, excluding wire-rod mill products, and exported 261,000 t. Net imports fell to 171,000 t, down from a revised value of 220,000 t in 2000. Canada and Mexico accounted for 62% of semifabricated copper exports and 28% of imports. Germany was the largest source of imports, accounting for 17% of the total.

The Andean Trade Preference Act (ATPA) expired on December 4, 2001. The ATPA was enacted on December 4, 1991, and was to extend for no more than 10 years. It provided duty-free treatment to eligible products, including refined copper, from participating countries (Bolivia, Colombia, Ecuador, and Peru). The Act explicitly requires that participating countries satisfy narcotics cooperation certification criteria. Effective February 15, 2002, the U.S. Customs Service issued a 90-day temporary rule, that extended duty-free entry status to eligible articles from beneficiary countries under the ATPA. In issuing the rule, the Customs Service determined that there was a national security interest to be furthered by the interim deferral of collection of applicable duties, and it anticipated that the duty-free status for applicable merchandise, including refined copper, would be restored retroactive to its expiration (U.S. Customs Service, 2002). In 2001, Peru was the largest source of U.S. copper imports, accounting for 280,000 t (28%) of refined copper imports.

World Review

Following a respite in 2000 when global inventories of refined copper declined, the global production oversupply for refined copper, which had developed at midyear 1997, resumed in 2001. (More information can be found in the section on prices and stocks.) The transition from production deficit to production surplus in 2001 reflects both an increase in world refined production and a decline in copper demand. According to ICSG data (2002a), following a 9-year period of sustained

Province of Zambia, is one of Zambia's oldest known mines and has yielded about 80,000 t of copper from intermittent mining of high-grade copper zones. Current estimates indicate open pit minable reserves of 267 Mt of ore grading 1.28% copper and 0.16 g/t gold (First Quantum Minerals Ltd., 2001).

Smelter Production.—Despite a decline in U.S. smelting capacity, world smelter capacity, which had declined in 2000, renewed its upward trend to a record-high of 1.56 Mt. In Japan, expansion at Mitsubishi Materials Corp.'s Naoshima smelter and Nippon Mining and Metals Co. Ltd.'s Saganoseki smelter boosted capacity by about 55,000 t/yr of copper anode. In Australia, capacity rose by 100,000 t owing to modest expansions of the Mount Isa (Mount Isa Mines Ltd.) and Olympic Dam (Western Mining Ltd.) smelters and a full year's operation of the Port Kembla (Port Kembla Pty. Ltd., 52.5% owned by Furukawa Mining Company Ltd.) smelter commissioned in 2000. In Chile, CODELCO's El Teniente (Caletones smelter) completed an expansion that boosted annual capacity by 100,000 t to 490,000 t. Other expansions included: Norddeutsche Affinerie AG's smelter in Germany (30,000 t) and Sterlite Industries Ltd. (20,000 t) and Indo Gulf Fertilizers and Chemicals Corp.'s (20,000 t) smelters in India (International Copper Study Group, 2002b, p. 45-58). The Gresik smelter in Indonesia (Mitsubishi, 75%, PT Freeport Indonesia, 25%), commissioned in 1999, operated at 109% of its design capacity of 200,000 t/yr in 2001, up from 87% in 2000 (Freeport-McMoran Copper & Gold Inc., 2002, p. 30). In Peru, SPCC produced a record 325,000 t, up by 30,000 t from the previous year and commissioned a detailed feasibility study for modernizing and expanding capacity (Southern Peru Copper Corp., 2002, p. 11).

Despite reduced mine output, world smelter production increased by about 330,000 t or 2.7%, in part sustained by a drawdown in raw material inventories. According to CRU International Ltd. (2002, p. 54-55), the supply of copper concentrates from new mine production, in a reversal from the previous year, was insufficient to meet smelter demand, and inventories of copper concentrate fell by about 130,000 t. While annual contractual treatment and refining charges rose by about 1 cent per pound to 19.2 cents per pound of copper, owing to supply shortages, spot charges fell to about 15 cents per pound by yearend.

Refinery Production.—World refinery capacity rose by about 500,000 t/yr (3%), principally owing to expansion of electrowinning capacity in Chile (115,000 t/yr) and Mexico (40,000 t/yr); expanded electrolytic refining in Australia (80,000 t/yr), Canada (40,000 t/yr), China (70,000 t/yr), and India (40,000 t/yr); and small incremental increases at refineries in other countries. There were no new electrolytic refineries commissioned in 2001, and for the most part expansions followed expanded smelter capacities (International Copper Study Group, 2002b, p. 59-79). Increased capacity and record production of 323,000 t at Noranda Inc.'s CCR refinery in Quebec followed completion of a modernization program that included the introduction of stainless steel starter sheets (Noranda Inc., 2002).

Outlook

U.S. mine production is expected to decline by about 220,000 t in 2002 owing to continued cutbacks from 2001 and additional cutbacks announced at yearend 2001. Barring a significant recovery in copper prices, production is anticipated to decline further in 2003 as cutbacks are sustained and leach recoveries fall at several mines that have ceased mining but continue to leach existing stockpiles. Lower mill-head grades at several mines that had been high-grading could further reduce production. The four primary smelters that have closed since 1999 are expected to remain shuttered. As of the end of October 2002, Asarco and the U.S. Department of Justice had yet to resolve issues surrounding the sale of SPCC. Asarco was facing a mid-November due date for repayment of $450 million in debt and faced potential default without the sale of SPCC (Platts Metals Week, 2002).

Primary refined production in 2002 is expected to decline by about 11% owing to a shortage of concentrate for smelting. Production had risen in 2001 owing to a rise in SX-EW production, a drawdown in concentrate inventories, and a sharp decline in net concentrate exports. Secondary refined production is expected to fall by nearly 50% following the November 2001 closure of Chemetco's secondary smelter.

Domestic consumption of refined copper during the first 7 months of 2002 was down by about 10% from the same period in 2001 and is expected to be down by about 5% for the full year, the sharp drop in consumption having begun in the second half of 2001. According to data compiled by the American Bureau of Metal Statistics (2002b), U.S. apparent consumption of copper wire-rod for the first 6 months of 2002 was down by 6.2% from the comparative period in 2001.

Preliminary ICSG data (2002a) for the first 6 months of 2002 indicates that world refined copper use remained weak, falling by about 1% from that in the first half of 2001. Inventories, which continued to rise during the first 4 months of the year, peaking at 2.36 Mt, indicated a continued surplus of production. By midyear, however, inventories had fallen by about 130,000 t, reflecting the impact of production cutbacks in restoring a more balanced market.

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Minerals Information

Copper
Statistics and Information

Copper is usually found in nature in association with sulfur. Pure copper metal is generally produced from a multistage process, beginning with the mining and concentrating of low-grade ores containing copper sulfide minerals, and followed by smelting and electrolytic refining to produce a pure copper cathode. An increasing share of copper is produced from acid leaching of oxidized ores. Copper is one of the oldest metals ever used and has been one of the important materials in the development of civilization. Because of its properties, singularly or in combination, of high ductility, malleability, and thermal and electrical conductivity, and its resistance to corrosion, copper has become a major industrial metal, ranking third after iron and aluminum in terms of quantities consumed. Electrical uses of copper, including power transmission and generation, building wiring, telecommunication, and electrical and electronic products, account for about three quarters of total copper use. Building construction is the single largest market, followed by electronics and electronic products, transportation, industrial machinery, and consumer and general products. Copper byproducts from manufacturing and obsolete copper products are readily recycled and contribute significantly to copper supply.

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Ship to shore - Nonferrous - North American copper scrap seeks market overseas - Brief Article - Statistical Data Included

The closing of the Chemetco refinery in Illinois this fall has eliminated the last sizable U.S. destination for some grades of copper-bearing scrap. The bad news for dealers who like to keep their copper scrap in North America continues to hit, as Noranda has announced that it will close its Gaspe, Quebec, smelter for six months in 2002 due to slack demand.

A scrap dealer in Nebraska--about as far from a deep-water port as is possible in the U.S.--notes that the majority of his copper is heading offshore now. "Our aluminum has mostly stayed domestic, but all the coppers from number two grades down has mostly gone overseas," he notes.

Exporting is not new for this dealer, but the trend has been overwhelming even in the Cornhusker State. "We've been exporting for seven or eight years now, but it has moved toward overseas a lot in the last 12 to 24 months."

China's hunger for copper scrap continues unabated. Even domestic wire choppers are having difficulty procuring material while competing against export brokers shipping primarily to China, with South Korea and India also growing as destinations for copper-bearing scrap.

Dealers are hoping that a price bump could help bring out some more material, no matter where it is shipped. Early December has seen Comex copper make a move upward by several cents per pound, with dealers hopeful the extra few cents will stick.

It is unclear what effect, if any, Enron's troubles will have on the nonferrous markets. The company may be sitting on some copper inventory it needs to liquidate, but announced primary production cutbacks might more than offset the release of this material.

U.S. Copper Scrap Export Destinations, 1st Half 2001

(metric tons of both alloyed and unalloyed scrap)

China	150,200
Canada	45,300
South Korea	20,860
India	16,720
Japan	13,800
Germany	8,640
Taiwan	7,670
Mexico	4,720
Hong Kong	4,210
Switzerland	2,541

Source: USGS; U.S. Census Bureau

Note: Table made from a bar graph.

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SIC 3341
SECONDARY SMELTING AND REFINING OF NONFERROUS METALS

This classification comprises establishments primarily engaged in recovering nonferrous metals and alloys from new and used scrap and dross, or in producing alloys from purchased refined metals. This industry includes establishments engaged in both the recovery and alloying of precious metals. Also included in this industry are plants involved in the recovery of tin through secondary smelting and refining, as well as by chemical processes. Excluded from this classification are establishments primarily engaged in assembling, sorting, and breaking up scrap metal without smelting and refining the metal. These establishments are classified in **SIC 5093: Scrap and Waste Materials.**

NAICS CODE(S)

331314 (Secondary Smelting and Alloying of Aluminum)

331423 (Secondary Smelting, Refining, and Alloying of Copper)

331492 (Secondary Smelting, Refining, and Alloying of Nonferrous Metals (except Copper and Aluminum)

INDUSTRY SNAPSHOT

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Metal, utilized by nearly every manufacturing industry in the United States and abroad, is produced through two

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basic production methods: primary and secondary. Primary manufacturers produce metal by subjecting particular extracted ores to various metallurgical processes, creating metal in large block or bar form. Secondary manufacturers smelt, refine, and sometimes blend metal recovered from either the shaping and trimming of primary metal during production and fabrication, or from recycled metal. The secondary smelting and refining of nonferrous metals, as defined by SIC 3341, comprises the secondary production of metals that do not contain iron, such as aluminum, copper, gold, lead, nickel, silver, tin, and zinc. These metals are used in a wide variety of manufactured products, including ammunition, beverage cans, coins, automobiles, household appliances, and a wealth of other products that encompass the breadth of U.S. manufacturing activity.

Copper, possessing superior electrical conductivity, is a strong, durable metal used in a variety of structural applications, as well as for power, lighting, and communications transmissions. Domestically, the major markets for copper are construction, electrical and electronics, and industrial machinery and equipment.

Aluminum, the most widely used nonferrous metal, possesses several positive attributes, such as light weight, corrosion resistance, and high electrical and thermal conductivity that make the metal suitable for a variety of applications. Container and packaging manufacturers purchase a majority of the domestically produced aluminum, while other major end-use markets include the transportation sector, the buildings and construction sector, and the electrical sector.

Lead is primarily used for the manufacture of storage batteries, which in turn are incorporated into automobile ignition starters, uninterruptible power supplies for computer systems, and standby power supplies for emergency lighting systems and telephones. Other market sectors that purchase lead include paint and glass manufacturers and building products manufacturers.

Zinc is primarily used to galvanize products found in the automobile, steel, and construction industries, but a greater percentage of secondary zinc is used to produce brass and bronze, as well as assorted chemicals and dusts. Additional applications include the blending of zinc-based, die-cast alloys and brass alloys.

The industry recorded $7.4 billion in sales in 2001 for products included in this classification, an aggregate value of shipments primarily derived from the production of the industry's five key products: secondary aluminum, secondary precious metals (gold, silver, platinum), secondary copper, secondary lead, and secondary zinc. Although the secondary smelting and refining industry produces other metals, such as nickel and tin, these five metals accounted for the bulk of the industry's total shipments. The industry slumped during 2001, due to poor economic conditions and oversupply, and is not expected to see significant recovery until at least 2004.

Organization and Structure

In terms of the number of people employed per establishment, the secondary smelting and refining industry has been historically populated by relatively small manufacturing facilities. Of the 395 secondary smelting and refining establishments in operation in 1997, 173, or nearly 44 percent, employed less than 20 people, while the remaining 222 employed 20 people or more. These 395 establishments represented all of the individual production facilities operated by the approximately 354 companies engaged in smelting and refining secondary nonferrous metals in 1997. The average number of employees per establishment in the secondary smelting and refining industry in 1997 was 52.

Geographically, a majority of the secondary smelting and refining production facilities in the 1990s were located in a four-state area comprising Michigan, Illinois, Indiana, and Ohio. Together, these states contained 99 production facilities. The mid-Atlantic states of Pennsylvania, New York, and New Jersey formed the second largest regional concentration of facilities, with 65 establishments. The Pacific region was the third largest area of production solely by virtue of the 37 establishments located in California—the greatest number located in any one state and the only state within the region that contained any secondary smelting and refining facilities. When ranked according to the number of establishments per state, California was followed by Pennsylvania, with 34 production facilities, and Ohio, with 33 establishments. The 17 manufacturing facilities in Alabama and

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Georgia together accounted for a whopping $719.4 million in shipments in 1992, 77.5 percent more than the $405.4 million generated by the 37 establishments in California.

The expenses incurred from operating a secondary smelting and refining facility were substantially higher than the amount of money required to operate the average manufacturing facility in the United States. This disparity was most evident in the average cost per establishment, that is, the average amount of money paid for raw manufacturing materials. According to 1994 figures, the average cost per establishment in this industry was $12.8 million, more than three times greater than the $4.2 million averaged by all other manufacturing industries. At $399,225, the average investment per establishment in the secondary smelting and refining industry for production machinery and other equipment necessary in the recovery of primary metal, however, was 43 percent higher than the average investment per establishment in all other manufacturing industries, which required only $278,244.

Background and Development

In the historiography of secondary smelting and refining, one chronicler traces the origins of recovering scrap metal to the seventh descendent of Adam, back to the founder of the iron and steel industry, and by implication, the founder of the scrap metal industry—Tubal-Cain. The writer then proceeds to chart the utilization of scrap metal throughout the span of civilization, making references along the way to documented accounts of scrap metal usage by such notable personages as Moses, Chaucer, Shakespeare, Paul Revere, Captain Kidd, and Thoreau. While this exploration into the depths of scrap metal's history may strike some as overindulgent, it does indicate the pervasiveness and integrality of secondary metal in the history of human existence. It also suggests that scrap metal has been used as long as metal has been used by mankind.

But, obviously, the processing of scrap in the days of Tubal-Cain bore no resemblance to the modern secondary metal industry. The smelting and refining of scrap metal as an organized and structured industry—the type of industry that operated in the 1990s—was a modern creation of the United States. It formed in the early 1900s as secondary smelting and refining manufacturers began to shed their image as junk peddlers, and gradually became regarded as legitimate operators of an enterprise essential to the existence of modern manufacturing industries. This transition was hastened by the formation of the National Association of Waste Material Dealers in 1913, which gave manufacturers, for the first time, formalized rules of operation, a code of ethics, and uniform specifications for scrap metal production. The creation of this governing body, renamed the National Association of Secondary Material Industries (NASMI) in 1960, lent cohesion to a loosely structured group of manufacturers struggling to attain order in a rapidly changing manufacturing environment.

Although the advent of NASMI helped define and shape the industry, the smelting and refining of secondary nonferrous metals had been occurring in an industrial setting for quite some time before NASMI came into existence. No statistical record of scrap consumption in the United States exists prior to 1900, but, in the first year figures were recorded, U.S. manufacturers consumed 5.1 million gross tons of ferrous and nonferrous secondary metal. Indeed, the first American scrap metal company, Cline & Bernheim, based in Nashville, Tennessee, had begun operating nearly 40 years before industry-wide consumption figures were recorded in 1862. According to these records, the first market coverage of the scrap industry was published in 1865, when the *Commercial Bulletin of Boston* began providing scrap metal prices. And, even further back in time, the first commercial use of scrap metal in the United States occurred at an iron works in Lynn, Massachusetts, in 1642.

Although some of these early uses of scrap metal were of the ferrous variety, the tradition of scrap metal usage had its roots stretching back to the founding of the United States. Accordingly, the scrap metal industry gathered more than a modicum of momentum by the time NASMI emerged. Once it did emerge, however, the modern version of the secondary nonferrous metal industry began and the recovery, smelting, and refining of such metals became distinguished from the production of primary metals, rather than lumped together under the more general and generic metal industry umbrella.

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Following the founding of NASMI, secondary non-ferrous production occurred at a predictable, steady rate,

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without any significant influence from external market forces that would have otherwise proportionately boosted the industry's production volume. Military build-up during World War I, which had a positive effect on many manufacturing industries, provided less than its expected impact on secondary metal producers, largely due to the conspicuous absence of wartime scrap metal drives. A tremendous increase in secondary nonferrous metal production did occur however, as a result of America's entrance into World War II. By early summer in 1942, the first summer after the Japanese bombed Pearl Harbor, the nation embarked on a virtually uninterrupted campaign to recover scrap metal, elevating the importance of secondary producers in the metal manufacturing industry.

During the immediate post-war years, a majority of American manufacturing industries flourished, and the secondary nonferrous metal industry, as a supplier of the raw material for much of the accelerated production, shared in the explosive growth of the American economy. By 1950, primary manufacturers of nonferrous metals held a commanding lead in the global market, producing nearly half of the world's supply of refined copper, aluminum, and zinc, and more than 25 percent of the world's supply of lead. Secondary producers of these metals, who literally benefited from the crumbs of the prodigious production volume, were well positioned to profit from the increased demand for nonferrous metals, converting "old" scrap, or metal recovered from recycled products, and converting "new" scrap gleaned from the trimming and shaping of primary nonferrous ingot (referred to as "home" scrap).

This closely knit, interdependent relationship secondary producers maintained within the nonferrous metal industry, which had matured and strengthened in the nearly four decades since the establishment of NASMI, invigorated production during robust economic conditions, but also made industry participants vulnerable to the vagaries of the overall metal industry. Although conditions were favorable in the 1950s, several portentous developments arose during this time that would create a somewhat bleaker future for all manufacturers of non-ferrous metal.

The consumption of nonferrous metals increased exponentially since the turn of the century, fueled by a rapidly growing population and its need for products manufactured with this type of metal. By the time the United States entered World War II, this increased demand had depleted the country's metal ore reserves to the extent that the self-sufficient production of several key nonferrous metals, such as zinc and lead, was no longer possible. To compound this problem, the manufacturing of another key nonferrous metal, aluminum, required an ore more commonly found in countries other than the United States.

During the 1950s, this development persuaded many primary manufacturers of nonferrous metals to either affiliate with foreign metal manufacturers to meet existing U.S. demand or to establish wholly owned operations overseas, where ore deposits were plentiful. While this expansion into foreign metal markets narrowed the gap between supply and demand and sparked the overall metal industry's growth, it also fostered the growth of the global nonferrous metal market, establishing the first manufacturing facilities in less-developed countries and encouraging output in more sophisticated, foreign markets. Repercussions from this shift overseas were not immediate, but, in the years ahead, the evolution of a genuine global metal industry would create a highly competitive nonferrous metal market.

Another development affecting industry participants was a technological innovation developed by primary manufacturers in the 1950s that promised to impinge directly on the demand for secondary nonferrous metal. The underlying principle behind this innovation was relatively simple: introduce oxygen into the furnaces in which pig iron is converted to steel.

The addition of oxygen quickened the conversion process, reducing the energy requirements of metal production. Most harmful to secondary producers, however, was that the process required far less scrap metal with which to manufacture ingot. Without oxygen, primary manufacturers needed a high percentage of scrap metal to efficiently produce metal, but with oxygen the proportion of scrap metal dropped to as low as 40 percent. Initially, steel manufacturers employed this new process, but, by the mid- and late 1960s, the utilization of oxygen in the production of nonferrous metals had begun, as aluminum manufacturers also adopted the

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process. Of course, the use of oxygen also reduced the conversion time in the production of secondary metals, but the losses suffered as a result of the diminished role scrap metal played in the manufacturing of primary metal were significant.

Fortunately for secondary metal producers, the popularity of this new production method was roughly concurrent with the increased interest in consumer product recycling efforts, which bolstered the industry's production output and marked the beginning of a movement that would serve as a linchpin to the industry's existence and success into the 1990s. To varying degrees, the recycling of used products and materials had been occurring for many decades prior to the late 1960s and early 1970s—the existence of the secondary metal industry itself, comprised of former junk peddlers, was a testament to the long tradition of recycling. But these efforts were intensified due to the growing outcry against pollution and waste, as landfills dotting the nation's landscape brimmed with refuse. Also, recycling had been generally limited to the recovery of industrial, or commercial byproducts, not the recycling of consumer products such as storage batteries, aluminum, and tin cans.

Once recycling began in earnest, secondary producers of nonferrous metals began to play a more dominant role in the overall nonferrous metals industry, outpacing primary manufacturers in terms of production volume and capitalizing on governmental efforts aimed at reducing the amount of national waste. Federally led and financed attempts to reduce waste received an initial push from the creation of the Office of Solid Waste Management in 1965, which was strengthened in 1970 by the promulgation of the Resource Recovery Act. The Resource Recovery Act of 1970 authorized a three-year budget of $461 million, but, most important to secondary nonferrous metal producers, the act changed the Office of Solid Waste Management's primary objective from the sanitary dumping of solid wastes to the recycling of those wastes. In a short time, the effect of this concerted push toward recovering solid wastes improved the secondary nonferrous industry's position, driving scrap manufacturer's production output upwards. By 1971, roughly 50 percent of the total lead consumption in the United States was supplied by secondary metal producers and the proportional representation of other secondary nonferrous metals were no less impressive: 45 percent of secondary copper, 35 percent of secondary aluminum, and 23 percent of secondary zinc.

By the mid-1970s, however, a recession and a worldwide energy crisis nearly crippled all sectors of the ferrous and nonferrous metal industry, as successive oil shocks shook the foundations of an industry that relied on relatively large amounts of energy to exist. Indeed, the deleterious effects of the energy crises plagued metal manufacturers for the rest of the decade and stood as a turning point for the health of metal manufacturers worldwide. The annual growth rates in the consumption of nonferrous metals from 1979 to 1988 stood well below the pace recorded from 1950 to 1974. Indeed the annual consumption rate of aluminum, worldwide, from 1950 to 1974 was 9 percent, while from 1979 to 1988 the rate dropped to 2.3 percent; copper fell from 3.9 percent to 1.1 percent; lead from 2.7 percent to 0.5 percent; and zinc from 3.9 percent to 1.2 percent.

Entering the 1980s, a period of corporate restructuring began, as companies purchased, sold, and merged operations to enhance their competitiveness. Still, the key metals within the industry were each affected, either negatively or positively, by conditions peculiar to their markets. The production of secondary copper suffered a decline in total shipments in the early 1980s after effecting a rebound from the pernicious 1970s. By 1989, however, shipments eclipsed the one-year surge experienced at the start of the decade, as manufacturers combated difficulties associated with aging production facilities and environmental regulations. Over the entire decade, secondary production accounted for 26 percent of the total U.S. copper production, a more encouraging representation than the 20 percent share recorded from 1975 to 1979.

Secondary aluminum production fared comparatively better during the 1980s, increasing 40 percent over the decade. Hampered by decreasing primary production of aluminum in the United States and a nearly glutted beverage can market, secondary aluminum manufacturers also experienced capricious fluctuations in demand during much of the decade. Nevertheless, secondary aluminum producers concluded the 1980s with three solid years of production output, during which they recorded much of the production growth of the decade.

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Primary lead manufacturers, struggling with the sharply decreased demand for tetraethyl lead (TEL), which is used to produce leaded gasoline, witnessed secondary manufacturers of lead increase their representation of total lead consumption during the 1980s. The reclamation of lead acid storage batteries, the largest market for lead and typically recyclable, elevated the importance of the secondary lead industry. In 1980, primary and secondary lead production was about equally split, with secondary producers supplying half of the nation's total lead. By the end of the decade, however, secondary lead manufacturers supplied approximately 65 percent of the total lead consumed in the United States.

Secondary zinc manufacturers also figured more prominently within their nonferrous metal niche during the 1980s. The demand for zinc, both from primary and secondary suppliers, increased throughout much of the decade, excluding a temporary decline in 1982. Overall consumption rose 21 percent over the course of the decade, while secondary zinc producers increased their share of the total zinc production to 23 percent.

As the secondary smelting and refining industry entered the late 1990s, an intensified interest in recycling by both the consumer and industrial sectors buoyed the production output of industry participants. From 1990 to 1997, shipments of nonferrous castings rose 9 percent, indicating a revitalization in this sector of the market. Each of the metals within the industry were expected to demonstrate a positive but slow growth forecast by the expected increase in the reclamation of industrial and consumer solid waste. Additional success in this direction will continue to elevate the industry's importance within the overall nonferrous metal industry and fuel its future growth.

While secondary aluminum production accounted for only about 25 percent of total supply in 1989, by 1997 secondary production—at 3.76 million metric tons—had for the first time exceeded primary production, which totaled only 3.6 million metric tons. One of the most important factors spurring increased secondary aluminum production was the 95 percent savings realized in energy costs. Above-average growth is expected for secondary aluminum production in the early years of the new millennium. At the same time, copper is expected to remain steady or increase only modestly into 2000 and beyond. Zinc, on the other hand, is being constantly replaced by plastics and may experience either no growth or limited growth into the new millennium. Lead consumption is expected to experience a continual decline as this metal is removed from various metal formulations for toxicity reasons.

Current Conditions

In 2001 the United States shipped 5.0 billion pounds of nonferrous products, compared to 5.6 billion pounds in 2000, representing a 9 percent decline. Accounting for 72 percent of products, aluminum shipments totaled 3.6 billion pounds, dropping 11 percent from 2000 production levels. Copper-based products totaled 500 million pounds, or 10 percent of total shipments. Copper products declined year-on-year by 9 percent. Lead-based products increased year-on-year from 442.9 million pounds to 461.2 million pounds, a gain of nearly 10 percent. Zinc shipments declined by 15 percent, from 451.1 million pounds to 383.2 million pounds. Magnesium shipments, a very small category, fell off 18 percent, from 59.2 million pounds to 48.7 million pounds.

Total value of shipments in 2001 was $7.2 billion. Aluminum generated $5.4 billion in revenues, 73 percent of total sales; copper, $1.0 billion in revenues, 13 percent of sales; zinc, $765.1 million in revenues, 10 percent of sales; magnesium, $203.2 million in revenues, 3 percent of sales; and lead, $4.7 million in revenues, less than 1 percent of sales.

Since early 2001, the nonferrous metals market has been in a slump. The downtrend in the industry and the economy at large was exacerbated by the terrorist attacks of September 11, 2001, with poor economic conditions continuing into 2003. Lack of demand, combined with overcapacity and oversupply, have kept prices down. Although some producers have idled capacity, the lackluster performance of the manufacturing sector has not allowed nonferrous producers to sell off overstocked inventories.

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As the general economy recovers, and particularly the manufacturing sector, nonferrous sales should pick up. Price increases are dependent on reinvigorated demand cleaning up overstocks. If producers restart idled capacity at the first signs of recovery, oversupply may continue to be a problem for the industry. John Mothersole noted in *Purchasing*, "For individual companies, these decisions may make sense, but collectively, the industry could very well end up slitting its own throat. The pressure on high-cost producers will, therefore, remain intense."

Industry Leaders

Ranked according to sales volume, the largest manufacturer in the secondary smelting and refining industry in 2002 was Commercial Metals Company, located in Dallas, Texas, with 7,728 workers and $2.4 billion in sales.

Second is Connell L.P., located in Boston, Massachusetts. Connell, a holding company with operations involved in fabricating special dies, plate work, and metal forming machine tools, as well as sheet metal production, is engaged in the secondary smelting and refining industry through its Wabash Alloys division, the leading producer of aluminum casting alloys in the United States. Deriving a majority of its business from the automobile industry, Wabash converts aluminum scrap into aluminum casting alloys, which are then sold to major automobile manufacturers or to die-casting companies that cater to the automobile industry. With 2,800 employees, Connell posted roughly $1.1 billion in sales in 2002.

Workforce

Total employment in the secondary smelting and refining industry dropped throughout much of the 1980s, with a slight rise occurring during the late 1980s and into the 1990s. In 1982, the industry's total employment stood at 19,200, then slipped to 12,500 by 1987. The largest precipitous drops occurred during 1982 and 1983, and during 1986 and 1987. After 1987, the nadir of the industry's employment decline, total employment increased by an average of 800 per year. In 1994, the industry's employment base continued to rise, although at a less robust pace than during the late 1980s, reaching 14,400 by the end of the year. Perhaps fueled to some degree by the increasing popularity of recycling, the late 1990s saw a sharp uptrend in the size of the industry's workforce, which swelled to about 20,600 by 1997 before declining once more, to 18,770 in 2001.

Of the nearly 19,000 people employed in the secondary smelting and refining industry in 2001, some 5,170 were salaried employees, or those performing managerial, administrative, or technical duties, while the balance of the industry's workforce comprised just over 13,500 production workers.

Generally, production workers are employed on a full-time basis, averaging 12 percent more hours per year than the average number of hours worked by production workers in all other manufacturing industries. On average, the production workers employed by the secondary smelting and refining industry earned slightly less than the typical production worker. In 2001, a typical production worker employed by the secondary smelting and refining industry earned $15.45 per hour.

Prognostications for the industry's workforce in the year 2005 suggest a general decline for nearly every occupation employed by the primary metals industry, of which the secondary smelting and refining industry is a subdivision. According to the U.S. Bureau of Labor, only furnace operators, metallurgists, and ceramic and materials engineers are expected to proportionately increase their representation in the industry between the years 1994 and 2005. Occupations expected to be affected most severely are machine operators, material movers, bookkeepers, and accounting clerks.

America and the World

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The U.S. nonferrous metal industry, once the prominent, global leader in production volume, entered the 1990s

harried by escalating production costs and mounting foreign competition. Consequently, foreign manufacturers of nonferrous metals, some of whom were located in countries rich in metal ore deposits, were able to gain ground on domestic manufacturers during the 1980s, and, with certain metals, supplant the United States as the leading metal manufacturer. This situation was further exacerbated for U.S. manufacturers because some of the state-owned foreign manufacturing companies pursued political rather than economic objectives. This affected domestic manufacturers of primary nonferrous metals more severely than secondary producers, although any significant cutbacks in primary production eventually and inevitably affect secondary producers.

Despite the increasing competition and the flight of primary manufacturing facilities, secondary producers in the United States maintained a leading position in the international nonferrous market well into the 1990s. With five secondary smelters, two electrolytic refineries, and six fire refineries operating in 1992, the U.S. secondary copper industry ranked as the largest producer in the world, accounting for 35.3 percent of the 1.2 million metric tons of secondary copper produced by all countries with market economies. The Federal Republic of Germany ranked as the second largest producer, supplying an estimated 23 percent of the copper, followed by Japan, which accounted for 6 percent. Other prominent secondary copper-producing nations are the United Kingdom with 2.6 percent and Italy with 6.2 percent. The region responsible for producing most of the secondary copper is Europe with 47.5 percent, followed by North America with 37.8 percent.

The United States' secondary aluminum producers held a larger lead in the global secondary aluminum market than their copper counterparts, manufacturing 44.6 percent of the 6.1 million metric tons produced in 1992. America's closest rival, Japan, produced 17.4 percent of the total, and an estimated 13.7 percent was produced by the Commonwealth of Independent States (CIS). Other important producers of secondary aluminum in 1992 were Italy with 5.7 percent and France with 3.6 percent. The production of this metal was divided regionally between North America with 47.3 percent, Asia with 32.4 percent, and Europe with 18.7 percent.

The production of secondary lead was regionally divided between Europe with 41.2 percent of the 1.7 metric tons produced worldwide in 1992. Asia was responsible for 22.0 percent and North America for 32.8 percent. The United States was the leading producer of secondary lead with 26.7 percent, and the Federal Republic of Germany produced approximately 15.9 percent. The United Kingdom was responsible for an estimated 11.0 percent of the world production of secondary lead, and Italy produced 5.0 percent.

The international secondary zinc market was sharply contested in the late 1980s, as the former U.S.S.R. maintained a precarious lead over its two strongest competitors, the United States and the Federal Republic of Germany. Of the 349,602 metric tons of zinc produced globally in 1992, the United States controlled 36.5 percent of the market, followed closely by the Commonwealth of Independent States (CIS), which accounted for 35.4 percent of total production. The Federal Republic of Germany supplied an estimated 10.0 percent of the international market. Japan accounted for 9.3 percent, and France produced 4.0 percent. The production of secondary zinc was divided regionally between Asia with 44.7 percent, North America with 36.5 percent, and Europe with 17.3 percent.

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Comprehensive General Liability	1997	1998	1999	2000
Named Insured	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America 300 Pike Street Cincinnati, Ohio 45202	SHV North America 300 Pike Street Cincinnati, Ohio 45202	SHV North America 300 Pike Street Cincinnati, Ohio 45202
Amount	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Term	1 Year 10/1/1997 to 10/1/1998	1 Year 10/1/1998 to 10/1/1999	1 Year (ext. 2 mos.) 10/1/1999 to 12/1/2000	1 Year 12/1/2000 - 12/1/2001
Company	Liberty Mutual 175 Berkeley Street Boston, Massachusetts 02116	Travelers Indemnity Co. of IL One Tower Square Hartford, Connecticut 06183	Travelers Indemnity Co. of IL One Tower Square Hartford, Connecticut 06183	Travelers Indemnity Co. of IL One Tower Square Hartford, Connecticut 06183
Policy Number	TB2-681-004143-057	TC2JGLSA134D3326	TC2JGLSA134D3326	TC2JGLSA134D3326
Pollution Exclusion	Pollution Exclusion - Yes	Pollution Exclusion - Yes	Pollution Exclusion - Yes	Pollution Exclusion - Yes
Accidental Language	N/A	N/A	N/A	N/A
Umbrella Coverage				
Named Insured	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202
Amount	$25,000,000	$25,000,000	$50,000,000	$50,000,000
Term	1 Year 10/1/1997 to 10/1/1998	1 Year 10/1/1998 to 10/1/1999	1 Year (ext. 2 mos.) 10/1/1999 - 02/1/2001	10 mos 02/1/2001 - 12/1/2001
Company	Liberty Mutual 175 Berkeley Street Boston, Massachusetts 02116	Gulf Insurance Company 1 State St. Plaza, 9th Fl. New York, NY 10004	Gulf Insurance Company 1 State St. Plaza, 9th Fl. New York, NY 10004	National Union Fire Insurance Co. 1750 CNG Tower Pittsburgh, PA 15222
Policy Number	TH1-681-004143-057	CU0282803	CU0491769	BE 7409361
Pollution Exclusions	Pollution Endorsement 14 & 16	Pollution Exclusion - Yes	Pollution Endorsement 15	Named Peril & Time Element
Language	N/A	Endorsement No. 6 - Accidental	N/A	Pollution Endorsement 7 - Yes
Excess #1				
Named Insured	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Susidiaries 300 Pike Street Cincinnati, Ohio 45202
Amount	$25,000,000	$25,000,000	$50,000,000	$25,000,000
Term	1 Year 10/1/1997 to 10/1/1998	1 Year 10/1/1998 to 10/1/1999	1 Year (ext. 2 mos.) 10/1/1999 - 02/1/2001	10 mos 02/1/2001 - 12/1/2001
Company	National Union Fire Insurance Co. 1750 CNG Tower Pittsburgh, PA 15222	National Union (AIG) 1750 CNG Tower Pittsburgh, PA 15222	National Union Fire Insurance Co. 1750 CNG Tower Pittsburgh, PA 15222	Gulf Insurance Company 1 State St. Plaza, 9th Fl. New York, NY 10004
Policy Number	3101535	3484003	3466905	GAO 719381
Pollution Exclusion	Yes	Yes	Yes	
Accidental Language	N/A	N/A	N/A	

Excess #2

Named Insured	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio
Amount	$25,000,000	$25,000,000	$25,000,000	$50,000,000
Term	1 Year 10/1/1997 - 10/1/1998	1 Year 10/1/1998 - 10/1/1999	1 Year (ext. 2 mos.) 10/1/1999 - 02/1/2001	10 mos 02/01/2001 - 12/01/2001
Company	Federal Ins Co. (Chubb) 15 Mountain View Road Warren, NJ 07059	Federal (Chubb) 15 Mountain View Road Warren, NJ 07059	Fireman's Fund 777 San Marin Dr. Novato, CA 94998	Fireman's Fund 777 San Marin Dr. Novato, CA 94998
Policy Number	8879317474	8879317474	XXK00083943308	XXK00084350727
Pollution Exclusion	Pollution Exclusion Hostile Fire	Pollution Exclusion - Hostile Fire	Pollution Exclusion 178495	Pollution Exclusion 178495
Accidental Language	N/A	N/A	Yes within exclusion	Yes within exclusion

Excess #3

Named Insured	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202	SHV North America & Subsidiaries 300 Pike Street Cincinnati, Ohio 45202
Amount	$25,000,000	$25,000,000
Term	1 Year 10/1/1997 - 10/1/1998	1 Year 10/1/1998 - 10/1/1999
Company	Fireman's Fund 777 San Marin Dr. Novato, CA 94998	Fireman's Fund 777 San Marin Dr. Novato, CA 94998
Policy Number	XXK00083190017	XXK00088125251
Pollution Exclusions	Pollution Absolute Exclusion 178495	Pollution Exclusion 178495
Accidental Language	Yes within exclusion	Yes within exclusion