

US EPA ARCHIVE DOCUMENT

RESPONSE TO COMMENTS DOCUMENT

Land Disposal Restrictions--Phase IV:
Final Rule Promulgating Treatment Standards for
Metal Wastes and Mineral Processing Wastes;
Mineral Processing Secondary Materials and
Bevill Exclusion Issues; Treatment Standards for
Hazardous Soils; and Exclusion of
Recycled Wood Preserving Wastewaters

Volume 1
Phase III Proposed Rule Comments
March 2, 1995

U.S. Environmental Protection Agency
Office of Solid Waste
401 M Street, S.W.
Washington, D.C. 20460

April 30, 1998

**List of Phase IV Land Disposal Restriction Codes,
Description, and Location by Page Number**

Code	Description	Page Number
FOUN1	Comments on Foundry Sand Issues	1

Index of Commenters and Location of Comment, By Issue

UNITED STEELWORKERS OF AMERICA	
Foundry Sands	13
AMERICAN FOUNDRYMEN'S SOCIETY, INC	
Foundry Sands	38
BEVERIDGE & DIAMOND, P.C.	
Foundry Sands	63
CHESAPEAK SPECIALTY PRODUCTS	
Foundry Sands	71
CYANOKEM	
Foundry Sands	18
ENVIRONMENTAL TECHNOLOGY COUNCIL	
Foundry Sands	61
GMD ENV SYSTEMS, INC	
Foundry Sands	69
NIBCO, INC	
Foundry Sands	20
RMT, INC	
Foundry Sands	50
STEEL STRUCTURES PAINTING COUNCIL	
Foundry Sands	46
TANOAK ENTERPRISES, INC	
Foundry Sands	1
THE TDJ GROUP, INC	
Foundry Sands	32

**Phase III LDR Rule: Comments and Responses
or Issues Related to Foundry Wastes**

Issue: FOUN1-004

Respondent: TTS

Dcn: PH3P004

Extension:

CBI: N

Commenter: TANOAK ENTERPRISES, INC

Comment Number: 00001

//COMM1

//RESPTTS

//SUBJFOUN1-004

THE FEDERAL REGISTER STATES ON PAGE 11731:

'THE AGENCY IS AWARE OF A PRACTICE WITHIN THE FOUNDRY INDUSTRY THAT RECYCLES FOUNDRY SAND BY THERMALLY OXIDIZING IMPURITIES. IT IS EPA'S VIEW THAT THIS PROCESS WOULD VIOLATE THE POLICY AGAINST COMBUSTION OF INORGANICS,'

IT IS RECOGNIZED THAT THE AGENCY'S CONCERN IS DIRECTED TOWARDS AN UNCONTROLLED (AND IMPERMISSIBLE) RELEASE OF LEAD INTO THE ENVIRONMENT. THE AGENCY ALSO RAISES CONCERN WITH RESPECT TO THE TREATMENT OF LEAD CONTAINING SAND BY ADDITION OF IRON DUST AND FINALLY REQUESTS ON PAGE 11732:

'COMMENTS AND DATA ARE ALSO SOLICITED ON WHETHER A TEST METHOD OTHER THAN THE TCLP IS MORE APPROPRIATE FOR MEASURING COMPLIANCE OF THIS WASTE.'

THIS COMMENT ADDRESSES SPECIFICALLY THE SITUATION OF FOUNDRY SAND FROM BRASS AND BRONZE FOUNDRIES WHICH SHOWS TOXICITY CHARACTERISTICS FOR LEAD. IT OFFERS THE FOLLOWING CONSIDERATIONS:

- 1 TREATMENT OF SAND IN 'HIGH TEMPERATURE' THERMAL DEVICES
- 2 TREATMENT OF SAND IN AN ALTERNATIVE METHOD, USING 'LOW

TEMPERATURE' 3 CONSIDERATION OF AN ALTERNATE TESTING METHOD

1 TREATMENT OF SAND IN 'HIGH TEMPERATURE' THERMAL DEVICES

THIS AGENCY'S PROPOSAL STATS ON PAGE 11731:

'IS EPA'S VIEW THAT THIS PROCESS WOULD VIOLATE THE POLICY AGAINST COMBUSTION OF INORGANICS,'.

MUCH OF THE WORK CARRIED ON WITH RESPECT TO 'HIGH TEMPERATURE PROCESSING' IS BASED ON US PATENT 4408985 OF OCT. 11, 1983 WHERE LEAD BEARING FOUNDRY SAND WAS THERMALLY PROCESSED AND WHERE THE FOLLOWING CLAIMS ARE MADE:

'(2) THE METHOD OF CLAIM 1, AND FURTHER WHEREIN THE ROASTING IS CARRIED OUT IN AN OXYGEN ATMOSPHERE'

'(4) THE METHOD OF CLAIM 3, AND FURTHER WHEREIN THE ROASTING IS CONDUCTED AT A TEMPERATURE OF AT LEAST 710°C'

'(5) THE METHOD OF CLAIM 4, AND FURTHER WHEREIN THE ROASTING IS CONDUCTED AT A TEMPERATURE OF APPROXIMATELY 800°C FOR A PERIOD OF APPROXIMATELY 45 MINUTES' '(7) A SAND COMPOSITION HAVING LEAD COMPOUNDS THEREIN, THE TOTAL LEAD COMPOUNDS BEING PRESENT IN EXCESS OF 5 PPM BUT THE ACETIC ACID SOLUBLE LEAD COMPOUNDS BEING PRESENT IN NO GREATER THAN 5 PPM'.

WHILE THIS PATENT REQUIRES AN OXIDIZING ATMOSPHERE AND PRESCRIBES A MINIMUM TEMPERATURE OF 710°C, IT DOES NOT PROVIDE A MATERIAL BALANCE WHICH LEAVES THE POSSIBILITY OF LEAD EMISSIONS VIA THE EXHAUST GAS STREAM.

"LANGE'S HANDBOOK OF CHEMISTRY", 14TH EDITION [MCGRAW-HILL] PROVIDES ON PAGES 3.36 AND 3.37 BOILING POINTS FOR CERTAIN LEAD OXIDES OF 595°C AND ALSO SUGGESTS THAT SUCH OXIDES WOULD DISSOCIATE. SINCE THE PREVIOUSLY SUGGESTED MINIMUM TEMPERATURE, COMBINED WITH THE REQUIREMENT FOR AN OXIDIZING ATMOSPHERE, IS SUBSTANTIALLY ABOVE THE BOILING POINT FOR THOSE LEAD OXIDES, THIS WOULD SUGGEST STRONG POSSIBILITY FOR THE GENERATION OF A LEAD COMPOUND VAPOR PHASE.

RESEARCH PUBLISHED IN SEPTEMBER 1992 ['DEVELOPMENT OF A STEEL-FOUNDRY WASTE SAND RECLAMATION PROCESS', MICHIGAN TECHNOLOGICAL UNIVERSITY, INSTITUTE OF MATERIALS PROCESSING], REPORTS ABOUT LEAD ACCUMULATION ON THE SAND FROM A LEAD CONTAINING BINDER IN MULTI-CYCLE PROCESSING. HOWEVER, THE CONDITIONS IN THIS CASE WERE

DIFFERENT FROM THOSE REQUESTED IN THE BEFORE MENTIONED PATENT, NAMELY

- * THERMAL RECLAMATION WAS IN THE LABORATORY IN A LINDBERG BOX FURNACE (PAGE 61 OF REPORT). NO INFORMATION IS PROVIDED WITH RESPECT TO THE PROCESSING ATMOSPHERE OR EXHAUST GAS FLOW RATES.
- * ALL CYCLING TESTS WERE PERFORMED AT A RECLAMATION TEMPERATURE OF 600°C (PAGE 69 OF REPORT)
- * LEACHATE VALUES IN THE RECLAIMED SAND AS HIGH AS 700 PPM WERE DETERMINED (TABLE 80 OF REPORT). HOWEVER, IT MUST ALSO BE STATED THAT THE PB LEACHATE VALUES FROM PROCESSING A LEAD FREE BINDER WERE DETERMINED TO BE AS HIGH AS 39 PPM!

IF WE DISREGARD THE INCONSISTENCY JUST STATED, IT IS QUITE POSSIBLE THAT AN ACCUMULATION OF LEAD WAS OBSERVED, KEEPING IN MIND THE UNCERTAINTY WITH RESPECT TO THE EXISTING FURNACE ATMOSPHERE AS WELL AS THE FACT THAT THE PROCESSING TEMPERATURE WAS VERY CLOSE TO (AND POSSIBLY BELOW) THE BOILING TEMPERATURE OF THE LOWEST BOILING LEAD OXIDES.

IF WE ASSUME THAT THE GENERALLY APPLIED THERMAL PROCESSING CONDITIONS WOULD BE AMENABLE TO VAPOR GENERATION, WE MUST NOW CONSIDER WHAT THE CONSEQUENCES OF SUCH VAPOR GENERATION MIGHT BE.

FIRST, THERMAL 'RECLAIMERS' ARE SUBJECT TO THE EMISSION LIMITATIONS SPECIFIED BY THE CLEAN AIR ACT 1990 (CAA 1990). TITLE III DOES LIST 'LEAD COMPOUNDS'. THUS, ANY VAPORS WHICH MAY BE GENERATED BY THE HIGH TEMPERATURE PROCESSING MUST BE CONTROLLED AND CANNOT BE LEGALLY RELEASED TO THE ENVIRONMENT.

LEAD EMISSIONS FROM THERMAL PROCESSES ARE NOTHING NEW AND WE FIND FOR EXAMPLE IN "STANDARD HANDBOOK OF HAZARDOUS WASTE TREATMENT AND DISPOSAL" [MCGRAW-HILL] ON PAGE 8.63 THE FOLLOWING STATEMENTS:

'AT CEMENT-KILN TEMPERATURES, MATERIALS WHICH ARE ORDINARILY CONSIDERED NONVOLATILE NOT ONLY MELT, BUT BOIL'.

BUT THIS SAME ARTICLE WHICH REPORTS ABOUT THE COMBUSTION OF LEAD CONTAINING MATERIALS IN A CEMENT KILN THEN CONTINUES TO EXPLAIN:

'EXHAUST GASES EXITING THE KILN STACK ARE TYPICALLY AT TEMPERATURES BETWEEN 150°C (300°F) AND 250°C (480°F). CONSEQUENTLY, POTASSIUM

CHLORIDE, LEAD OXIDE, OR OTHER MATERIALS VOLATILIZED IN THE BURNING ZONE WILL CONDENSE ONTO PARTICLE SURFACES RATHER THAN BEING EMITTED WITH THE STACK GASES'.

THIS SITUATION IS COMPARABLE TO THE SITUATION IN 'THERMAL RECLAIMERS' IN THE FOUNDRY INDUSTRY AND SUGGESTS THAT, EVEN IF LEAD COMPOUND VAPORS WOULD BE EMITTED FROM THE HIGH TEMPERATURE ZONE, SUCH LEAD COMPOUNDS WOULD NOT BE RELEASED TO THE ENVIRONMENT AS VAPORS BUT WILL LIKELY CONDENSE ONTO OTHER PARTICULATE SURFACES (OR MAY CONDENSE INTO LEAD OXIDE PARTICLES). HOWEVER, THE CAA 1990 CLEARLY IMPOSES LIMITS WITH RESPECT TO MAXIMUM PERMISSIBLE LEAD COMPOUND EMISSIONS.

BEYOND THESE REGULATIONS, WE ALREADY HAVE THE REGULATION UNDER 40 CFR PART 60, SUBPART UUU WHICH APPLIES TO ALL 'CALCINERS' PROCESSING 'INDUSTRIAL SAND' (I.E. THERMAL RECLAIMERS AS USED IN FOUNDRIES). THIS REGULATION APPLIES TO ALL INSTALLATIONS AFTER APRIL 23, 1986. THE OPERATION OF A CONTINUOUS OPACITY MONITORING SYSTEM (COM) AS MANDATED UNDER THIS RULE WILL CONTROL THE EMISSION LIMITS FOR PARTICULATE MATTER - AND IT IS IN THIS FORM THAT THE LEAD WOULD BE EMITTED AFTER THE POLLUTION ABATEMENT SYSTEM IF NOT RETAINED BY SUCH SYSTEM. THUS, WE HAVE TWO PIECES OF LEGISLATION WHICH GOVERN AND CONTROL THE OPERATION OF THERMAL RECLAIMERS AND WE CAN THEREFORE ASSUME THAT UNCONTROLLED RELEASE OF LEAD IN ANY FORM TO THE ENVIRONMENT IS POSITIVELY AVOIDED (PREDICATED UPON COMPLIANCE WITH EXISTING LEGISLATION).

HOWEVER, THERE IS ALSO ANOTHER TECHNICALLY POSSIBLE FORM FOR 'LEAD CONTROL' WHICH IS PRODUCTION PROVEN AND WHICH SHALL BE DESCRIBED IN THE FOLLOWING CHAPTER 2.

2 TREATMENT OF SAND IN AN ALTERNATIVE METHOD, USING 'LOW TEMPERATURE'

THE DEVICE USED IN THIS PROCESS IS COVERED IN US PATENT 4,681,267 OF JULY 21, 1987 AND US PATENT 4,709,862 OF DECEMBER 1, 1987. IN CONTRAST TO THE AFOREMENTIONED 'HIGH TEMPERATURE' APPROACH, THIS SYSTEM USES THERMAL ENERGY ONLY TO ESSENTIALLY DRY THE FOUNDRY SAND AND EMBRITTLE ANY RESIDUAL BINDER SO THAT IT CAN BE PROPERLY REMOVED BY MEANS OF ATTRITION. THERMAL PROCESSING AND ATTRITION OCCUR SIMULTANEOUSLY IN THE SAME PROCESSING VESSEL. THE ATTRITION PRODUCT, WHICH NOW CONTAINS THE CONTAMINANT IN CONCENTRATED FORM IS COLLECTED IN AN APPROPRIATE DEVICE (CLOTH FILTER OR SIMILAR).

THE FACT THAT THE CONTAMINANT, FOR EXAMPLE LEAD, IS NOW CONCENTRATED IN A MUCH SMALLER VOLUME PERMITS TO CONSIDER METAL EXTRACTION FROM THIS PROCESS STREAM OR, IF STILL JUDGED UNECONOMICAL, PERMITS TO TREAT A MUCH SMALLER STREAM TO ACHIEVE COMPLIANCE WITH ENVIRONMENTAL REGULATIONS.

GIVEN THE FACT THAT ALREADY TODAY SUBSTANTIAL QUANTITIES OF PROCESS BY-PRODUCTS FROM BRASS AND BRONZE FOUNDRIES ARE BEING CHANNLED TOWARDS METAL RECOVERY SUCH AS GRINDINGS, TRIMMINGS, AND DROSS, MAKES METAL RECOVERY ALSO FROM THIS SMALL STREAM FROM SAND PROCESSING A REALISTIC POSSIBILITY.

PERFORMANCE OF 'LOW TEMPERATURE' SYSTEM (ENCL. A)

ENCL. A1 SHOWS HOW LEACHABLE LEAD CAN BE REDUCED IN SPENT SAND FROM A BRASS FOUNDRY FROM 24 PPM TO 3.1 PPM BY LEAD REMOVAL, USING COMBINED THERMAL (DRYING) PLUS ATTRITION AS PER US PATENTS 4,681,267 AND 4,709,862. LEAD REDUCTION TO EVEN LOWER RESIDUAL LEVELS IS POSSIBLY BY SIMPLE EXTENSION OF THE PROCESSING TIME. THE PROCESSING TEMPERATURE APPLIED IN DRYING IS CLEARLY BELOW THE BOILING POINT OF VARIOUS LEAD OXIDES. IT IS ALSO BELOW THEIR MELTING POINTS AND THE GENERATION OF LEAD COMPOUND VAPORS IS THEREFORE ELIMINATED. HOWEVER, WITH THE MUCH LOWER PROCESSING TEMPERATURES, THE POTENTIAL EMISSION OF HYDROCARBONS MUST BE CONSIDERED.

CONTRARY TO FLUID BEDS OR ROTARY KILNS, THIS PROCESS IS A BATCH PROCESS. A UNIT WITH CAPACITY 1 T/H IS SHOWN IN ENCL. A2. TESTING WAS PERFORMED BY MEASURING EXHAUST GAS TEMPERATURE AT POINT "A", I.E. IMMEDIATELY AT THE EXIT FROM THE PROCESS VESSEL AND WITHOUT ANY DILUTION. SAMPLES OF THE "PRODUCT OF COMBUSTION" [POC] WERE TAKEN AT POINT "B", THAT IS FROM THE EXHAUST GAS DUCT LEADING FROM THE PROCESSING VESSEL AND BEFORE THE GAS STREAM ENTERS EITHER CYCLONE OR CLOTH FILTER. THUS, THE TESTED STREAM REPRESENTS AN UNDILUTED POC SAMPLE.

THE GRAPH AS PER ENCL. A3 SHOWS THE TEMPERATURE RANGES FOR BOTH, SAND AND POC, FROM A TEST WHICH WAS PERFORMED OVER TEN (10) OPERATING HOURS, REPRESENTING 120 BATCHES.

THE POC TEMPERATURE IS LOW ENOUGH THAT NO FURTHER DILUTION IS REQUIRED PRIOR TO ENTERING A CLOTH FILTER. ENCL. A4 PROVIDES AN EVALUATION FROM THIS TEST AND DOCUMENTS THAT TOTAL EXHAUST GAS FLOW IN THIS SYSTEM IS ON THE ORDER OF 15 LBS PER MINUTE OR, BASED ON

THE PROCESSING CAPACITY OF 1 T/H, ON THE ORDER OF APPROX. 1,000 LBS/H POC FOR EACH TON OF SAND PROCESSED. THUS, THE POC TO SAND RATIO IS ON THE ORDER OF 0.5 VS. 5 (AND MORE) FOR FLUID BED OR ROTARY KILN SYSTEMS. THIS MEANS THAT POLLUTION ABATEMENT EQUIPMENT CAN BE HELD TO VERY SMALL SIZES. IT ALSO DOCUMENTS THAT, IF HYDROCARBON EMISSIONS FROM INCOMPLETE COMBUSTION (DUE TO THE LOW PROCESSING TEMPERATURE) WOULD BE A PROBLEM, THE GAS FLOW RATE SUBJECT TO 'POST TREATMENT' IN THE FORM OF AN AFTER BURNER WOULD BE VERY SMALL AND THE ENERGY REQUIRED FOR SUCH PROCESS WOULD BE ON THE ORDER OF 340,000 BTU PER TON OF SAND PROCESSED.

THUS, IF WE COMBINE ENERGY REQUIREMENT FOR SAND DRYING AND AFTER BURNER, WE WOULD HAVE A TOTAL ENERGY CONSUMPTION OF 700,000 BTU PER TON OF SAND PROCESSED. THIS IS, AT A MINIMUM, 30% LOWER THAN HIGH TEMPERATURE PROCESSING AND IN ALL LIKELIHOOD 50% OR MORE LOWER! A PROPER EVALUATION ABOUT ENERGY CONSUMPTION CAN ONLY BE ESTABLISHED IF WE DOCUMENT ALL ENERGY STREAMS AS PER ENCL. A5. THERE ARE NO KNOWN PUBLICATIONS WHERE THIS HAS BEEN DONE. HOWEVER, FROM NUMEROUS PAPERS IT CAN BE GLEANED THAT WHILE ENERGY CONSUMPTION RATES OF 106 BTU PER TON OF SAND ARE FREQUENTLY QUOTED, ACTUAL CONSUMPTION RATES IN OPERATING SYSTEMS ARE SIGNIFICANTLY HIGHER. THE AUTHOR OF THE REPORT 'SAND RECLAMATION CONCEPT DEFINITION STUDY' (GAS RESEARCH INSTITUTE, OCTOBER 1990) STATES ON PAGE 51:

'4. HEAT BALANCES ON MANY UNITS DO NOT APPEAR TO BE REALISTIC.'

THE QUESTION STILL REMAINS: DO WE NEED POST TREATMENT OF POC? IN A SECOND TEST, THE FOLLOWING DATA WAS ESTABLISHED:
POC COMPOSITION: 4.1% CO₂; 14.1% O₂; 0% CO [USING AN ORSAT APPARATUS]. THIS INDICATES A REASONABLE COMBUSTION EFFICIENCY. O₂ LEVELS ARE ACTUALLY LOWER THAN THOSE REPORTED FROM FLUID BED SYSTEMS WITH THEIR HIGH PROCESSING TEMPERATURE. THIS DOES NOT SURPRISE BECAUSE TURBULENCE IN THIS EQUIPMENT IS MUCH HIGHER AND THE TEMPERATURE GRADIENT DUE TO DIRECT FLAME IMPINGEMENT AT VERY LOW EXCESS AIR RATES MUCH HIGHER. THUS, THE GOOD EMISSION VALUES REPORTED FROM FLUID BED SYSTEMS WHICH ARE GENERALLY MEASURED AT THE CLEAN AIR EXIT ARE THE RESULT OF DILUTION. IF THE CONTAMINANT LEVEL WOULD BE EXPRESSED AT A CONSTANT O₂ DILUENT RATE, FLUID BEDS AND ROTARY KILNS WOULD HAVE CLEARLY HIGHER EMISSION RATES.

THE POC ANALYSIS PERFORMED IN ONE SPECIFIC TEST WHEN SAMPLING AT POINT "B" AS SHOWN IN ENCL. A2 RESULTED IN A HYDROCARBON EMISSION OF

34 MG/M3, EXPRESSED AS METHANE EQUIVALENT. THIS WAS EQUIVALENT TO 6.6 LBS METHANE PER 106 LBS PROCESSED SAND. AS WAS SHOWN IN ENCL. A4, 106 LBS SAND CORRESPONDED TO 500,000 LBS POC OR, IN OTHER WORDS, HYDROCARBON EMISSIONS (EXPRESSED AS METHANE EQUIVALENT) AMOUNTED TO 13 LBS PER 106 LBS POC.

IT MUST BE RECALLED THAT THIS CONTAMINANT LEVEL WAS MEASURED IN THE UNDILUTED POC STREAM PRIOR TO DUST FILTER. IT IS SAFE TO ASSUME THAT A PORTION OF THIS CONTAMINANT WOULD BE ADSORBED ONTO THE DUST PARTICLES COLLECTED IN A CLOTH FILTER AND CONSEQUENTLY, HYDROCARBON CONTAMINANTS DISCHARGED TO THE ENVIRONMENT CAN BE ESTIMATED TO BE LESS THAN 6 LBS METHANE EQUIVALENT PER 1,000,000 LBS POC.

WE MUST NOW CONSIDER WHAT THE EFFECT WOULD BE IF AN EFFORT WOULD BE MADE TO FURTHER REDUCE THOSE CONTAMINANTS BY WAY OF AFTER BURNER. THE ENERGY REQUIRED FOR POST TREATMENT OF POC IS GIVEN IN ENCL. A4 AS 340,000 BTU PER TON OF SAND PROCESSED. IF WE EMPLOYED A THERMAL OXIDIZER FOR THIS APPLICATION, WE WOULD GENERATE FROM THE USE OF PROPANE AN ADDITIONAL LEVEL OF APPROX. 51 LBS CO₂ PER TON OF SAND OR FROM THE USE OF NATURAL GAS 47.5 LBS CO₂ PER TON OF SAND. THUS, POC POST TREATMENT WOULD GENERATE ON THE ORDER OF 25,000 LBS CO₂ IN AN EFFORT TO ELIMINATE 6 TO 10 LBS HYDROCARBON CONTAMINANT (AS METHANE EQUIVALENT). THE JUSTIFICATION FOR THIS WOULD HAVE TO BE QUESTIONED.

HOWEVER, IT MUST BE STRESSED THAT THE BEFORE STATED NUMBERS NEED TO BE CONSIDERED WITH SOME CAUTION. THE POC TO SAND RATIO OF UNDER 1 FOR THIS TYPE SYSTEM VS. 5 AND MORE FOR FLUID BEDS AND ROTARY KILNS CAN BE TAKEN FOR GRANTED FOR ALL APPLICATIONS. HOWEVER, THE 'WASTE STREAMS', BOTH SOLIDS AND GASES, WILL VARY WITH APPLICATION.

SOLIDS MAY BE AS LOW AS 3-4% IN SOME CASES (HIGH QUALITY SANDS IN 'CHEMICALLY BONDED' APPLICATIONS) BUT COULD EASILY REACH 15% AND MORE IF THE PROCESSED SAND WOULD HAVE HIGH CLAY LEVELS (OR OTHER FINES WHICH MAY BE ADDED FOR SPECIFIC TECHNOLOGICAL REASONS).

THE GENERATION OF HYDROCARBON CONTAMINANTS DEPENDS ON THE CHEMICAL COMPOSITION OF THE BINDER USED. SOME (SUCH A SHELL RESIN) WILL GENERATE VERY LITTLE CONTAMINANT SINCE THE COMPOUNDS ARE QUITE HEAT RESISTANT. OTHERS, WITH HIGHER LEVELS OF SOLVENTS, MAY GENERATE MORE. AT ANY RATE: THE PROCESSING AT TEMPERATURES OF APPROX. 400 °F WILL ALWAYS GUARANTEE THAT THE MAJORITY OF THE

CONTAMINANT IS REMOVED AS SOLID WASTE AND NOT AS POC. IF POST TREATMENT OF POC WOULD BE REQUIRED, THIS COULD BE ACCOMPLISHED AT LOWER COST THAN IN ANY OTHER PROCESSING SYSTEM DUE TO THE INHERENT LOW POC TO SAND RATIO.

REFERENCE WAS MADE EARLIER TO A REPORT FROM MICHIGAN TECHNOLOGICAL UNIVERSITY WHERE A LEAD CONTAINING BINDER RESULTED IN LEAD BUILD-UP AND ULTIMATELY LEACHATE TOXIC SAND DUE TO AN ACCUMULATION OF LEAD. IN ANOTHER MICHIGAN FOUNDRY, USING THIS SAME TYPE OF BINDER, THE TECHNOLOGY DESCRIBED IN THIS SECTION WAS IMPLEMENTED AND THE SAND NEVER EXCEEDED A LEAD LEACHATE VALUE OF 1 PPM. THE MICHIGAN DEPARTMENT OF NATURAL RESOURCES REPORTED ABOUT THIS INSTALLATION WITH THEIR CASE STUDY #9303 OF NOVEMBER 1993 (AVAILABLE FROM OFFICE OF WASTE REDUCTION SERVICES, ENVIRONMENTAL SERVICES DIVISION, DEPARTMENTS OF COMMERCE AND NATURAL RESOURCES, PHONE (517)335-1178.

3 CONSIDERATION OF AN ALTERNATE TESTING METHOD

THE "STANDARD HANDBOOK OF HAZARDOUS WASTE TREATMENT AND DISPOSAL" [MCGRAW-HILL] PRESENTS IN FIG. 8.5.2 ON PAGE 8.69 THE LEACHING CHARACTERISTICS OF LEAD AS A FUNCTION OF PH. IT DOCUMENTS THAT SOLUBILITY OF LEAD INCREASES WITH BOTH HIGH AND LOW PH VALUES. THIS CERTAINLY MUST CAUSE US TO QUESTION THE PRESENT TCLP TEST WITH ONLY ONE TESTING POINT AT PH 5. ALSO, THIS FIGURE PRESENTS DATA FROM SAMPLES WITH DIFFERENT LEAD MASS CONTENTS AND INDICATES THAT THE LEAD LEACHATE VALUES DO INCREASE WITH INCREASING LEAD MASS CONTENTS. THIS LATTER STATEMENT IS IN CONTRAST TO FINDINGS IN THE US FOUNDRY INDUSTRY.

IN 1980 A STUDY WAS CONDUCTED BY EPA AND DATA WAS SHARED WITH THE UNIVERSITY OF WISCONSIN IN MADISON WHICH INVESTIGATED LEACHATE BEHAVIOR FROM LEAD BEARING FOUNDRY WASTES. THE FULL INVESTIGATION IS CONTAINED IN THE 1981 TRANSACTIONS OF THE AMERICAN FOUNDRYMEN'S SOCIETY, PAGES 767 TO 786. ONE OF THE IMPORTANT FINDINGS WAS (ITEM 5 OF CONCLUSIONS):

'THERE WAS BASICALLY NO RELATIONSHIP BETWEEN THE PERCENTAGE OF CADMIUM OR LEAD RELEASED IN THE EP TEST AND THE CONCENTRATION OF THAT METAL IN THE WASTE'.

THUS, A MASS DETERMINATION OF LEAD IN THE FOUNDRY WASTE WOULD NOT SERVE AS A SIMPLER METHOD TO DETERMINE POTENTIAL

ENVIRONMENTAL RELEASES OF THIS SUBSTANCE.

THE FACT THAT THE INTERRELATIONS WITH RESPECT TO MIGRATION OF LEAD (OR OTHER METALS) VIA LEACHATE ARE QUITE COMPLICATED ARE ALSO CONFIRMED IN THE 1993 ANNUAL REPORT OF THE GERMAN ENVIRONMENTAL AUTHORITY ['UMWELT BUNDESAMT']. THIS REPORT COMMENTS ON PAGES 280/281 EXTENSIVELY ON THIS TEST. IT IS CLEARLY STATED THAT THE 'DANGER POTENTIAL' IS NOT PRIMARILY A FUNCTION OF THE MASS CONTENT OF THE CONTAMINANT IN A WASTE STREAM BUT IS SIGNIFICANTLY INFLUENCED BY ITS 'MOBILITY'. A NUMBER OF DIFFERENT (PROPOSED) TEST APPROACHES ARE DESCRIBED WHICH, AMONGST OTHERS, AIM AT BETTER PREDICTING LONG TERM STABILITY OF POTENTIALLY DANGEROUS WASTE CONSTITUENTS. ONE ASPECT OF GREAT IMPORTANCE IS THAT THE LEACHATE TEST ACCORDING TO DIN 38414-S4 IS PERFORMED WITH DISTILLED WATER AND NOT WITH ACETIC ACID. THIS DIFFERENT LEACH MEDIA WOULD GREATLY CHANGE THE RESULTS OF THE LEACHATE TEST.

REFERRING BACK TO THE BEFORE MENTIONED 1981 STUDY PUBLISHED IN THE AFS TRANSACTIONS, WE FIND UNDER CONCLUSIONS:

'3. THE EXTRACTION OF CADMIUM AND LEAD WAS HIGHLY DEPENDENT ON THE PH OF THE SOLUTION. USING THE EP TEST PROCEDURE, BUT USING DISTILLED WATER AS THE EXTRACTION MEDIA INSTEAD OF ACETIC ACID, THE CUPOLA DUSTS OR SLUDGES FROM ONE FOUNDRY WERE FOUND TO BE EP TOXIC WITH RESPECT TO CADMIUM. NO SAMPLES WERE TOXIC WITH RESPECT TO CHROMIUM OR LEAD.'!

THESE REMARKS ARE NOT MEANT TO SUGGEST THAT WE SHOULD FOLLOW THE APPROACH PRACTICED IN GERMANY WITHOUT CAREFUL CONSIDERATION OF ALL RAMIFICATIONS. HOWEVER, IT SHOULD BE HIGHLIGHTED THAT A COUNTRY SUCH AS GERMANY THAT IS CERTAINLY CONCERNED ABOUT ENVIRONMENTAL SAFETY IS APPLYING A STANDARD WHICH PLACES A MUCH LESS ONEROUS BURDEN ON ITS INDUSTRY WHICH COMPETES HEAD ON WITH NORTH AMERICAN COMPANIES - AND OBVIOUSLY WITHOUT SACRIFICING ENVIRONMENTAL SAFETY.

CERTAINLY, IN THE ABSENCE OF SUBSTANTIATING DATA, NO DECISIONS CAN (OR SHOULD) BE MADE. HOWEVER, VALUABLE DOCUMENTATION ALREADY EXISTS.

THE UNIVERSITY OF MICHIGAN-DEARBORN CONDUCTED EXTENSIVE STUDIES WITH RESPECT TO THE LEACHATE BEHAVIOR OF SANDS FROM BRASS AND BRONZE FOUNDRIES. A NUMBER OF PAPERS WERE PUBLISHED ON THIS SUBJECT

IN THE EARLY EIGHTIES AND ONE PAPER, PUBLISHED IN THE 1987 TRANSACTIONS OF THE AMERICAN FOUNDRYMEN'S SOCIETY, IS APPENDED AS ENCL. B TO THIS COMMENT.

THE AUTHORS POINT OUT THAT THE LOGIC FOR SUGGESTING ACETIC ACID LEACHING IS PREDICATED UPON THE ASSUMPTION THAT THE SAND WOULD BE MIXED WITH TRASH AND GARBAGE IN A MUNICIPAL LANDFILL AND THAT ACETIC ACID MIGHT BE GENERATED AS A DECOMPOSITION PRODUCT OF THE COMMINGLED ORGANIC WASTE (PAGE 712). THE AUTHORS ALSO STATE (PAGE 712):

'THAT IS TO SAY, THE LEACHABILITY IS NOT ONLY A FUNCTION OF THE PH BUT IS ALSO RELATED TO THE AMOUNT OF ACETATE ION SINCE ITS PRESENCE IS SOLELY DEPENDENT UPON THE ACID ADDITION'.

THE AUTHORS THEN PROCEED TO SUGGEST (PAGE 715) THAT A MORE LIKELY SCENARIO MIGHT BE THE EXPOSURE OF DEPOSITED WASTE TO SULFURIC AND NITRIC ACID FROM ACID RAIN. A TEST WAS THEREFORE CONDUCTED WITH 'AN ARTIFICIAL ACID RAIN'. CONCLUSIONS REACHED FROM THIS TEST WERE:

'IN ALL CASES THE ACID RAIN LEACHES LESS LEAD THAN THAT FOUND FROM THE EP TOXICITY TEST. THE MOST SENSITIVE LEAD FORM TO SYNTHETIC ACID RAIN LEACHING WAS PBO. HOWEVER, ONLY 16.4% OF THE LEAD WAS EXTRACTED BY THE ACID RAIN WHEN COMPARED TO THE EP TOXICITY TEST'.

'SINCE THE PH OF ACID RAIN VARIES IN DIFFERENT PARTS OF THE COUNTRY, A TEST AT PH OF 3.0 HAS ALSO BEEN CONDUCTED FOR THE CDA 83600 ALLOY. THE SAME VALUE OF 6 PPM LEAD HAS BEEN OBTAINED AT BOTH 3.0 AND 5.0 PH LEVELS'.

'THESE DATA SUGGEST THAT A MONOFILL CONTAINING ONLY FOUNDRY WASTE STREAMS MAY NOT LEACH SIGNIFICANT LEAD EVEN WHEN EXPOSED TO ACID RAIN'.

FIG. 8 (PAGE 716) OF THIS PAPER SHOWS COMPARISONS OF 'ACID RAIN' VS. 'STANDARD' LEACHING AND SUGGESTS THAT SANDS MIGHT INDEED BE CLASSIFIED AS NON-HAZARDOUS UNDER THIS TESTING PROCEDURE, USING 'ARTIFICIAL ACID RAIN' IN STEAD OF THE ACIDS NOW USED.

BASED ON THESE FACTS IT IS SUGGESTED THAT FOUNDRY WASTES BEING DEPOSITED IN MONOFILLS SHOULD BE EVALUATED USING A LEACHING MEDIA SUCH AS THE 'ACID RAIN' GENERATED IN THIS STUDY SINCE THE PRESENCE OF ACETIC ACID CAN VIRTUALLY BE RULED OUT. THIS WOULD BE AN

INTERMEDIATE SOLUTION.

IN THE LONGER TERM, A MORE CAREFUL INVESTIGATION MIGHT BE CARRIED ON TO EVALUATE THE LEACHATE PROCEDURES NOW APPLIED (AND UNDER INVESTIGATION) IN OTHER INDUSTRIALIZED COUNTRIES WHICH OBVIOUSLY RENDER QUITE DIFFERENT RESULTS FROM THE APPROACH TAKEN IN THE US AND PLACE A MUCH LESS COSTLY BURDEN ON INDUSTRY. THIS APPEARS TO BE THE CASE WITHOUT JEOPARDIZING THE SAFETY OF THE PUBLIC. IT WOULD CERTAINLY BE SUBJECT TO SOME SERIOUS DEBATE WHETHER WE CAN ASSUME THAT A HIGHLY INDUSTRIALIZED COUNTRY (AND DENSELY POPULATED) SUCH AS GERMANY WOULD DELIBERATELY PERMIT 'LAX STANDARDS' SUCH AS USE OF DISTILLED WATER AS A LEACHING MEDIA IF IT WOULD NOT GUARANTEE PROPER SAFEGUARDS FOR THE HEALTH OF ITS CITIZENS.

//ENDC1

RESPONSE

[The commenter expressed the following opinions concerning EPA's position with respect to treatment of foundry sand:

1. The commenter questioned EPA's concern regarding uncontrolled and impermissible releases of lead into the atmosphere as a result of treatment of foundry sands in high temperature thermal devices. The commenter stated that the Clean Air Act (CAA) 1990 emission limitations for thermal reclaimers, and 40 CFR Part 60, Subpart UUU (requirement for continuous opacity monitoring for particulates) "govern and control the operation of thermal reclaimers" and therefore, the commenter assumes that uncontrolled releases of lead will be avoided.
2. The commenter asserted that low temperature thermal processing is viable for treatment of foundry sand and presented various technical points to illustrate that hydrocarbon emissions could be readily controlled.
3. The commenter suggested that EPA use an alternative testing method to demonstrate leaching potential of metals such as a leach test using sulfuric or nitric acid to demonstrate the acid rain scenario, rather than the simulation of acetic acid generation via the EP toxicity test using acetic acid.

With respect to the uncontrolled release of lead into the atmosphere, the Agency remains concerned about the volatilization of lead and the potential for releases of lead to the atmosphere during thermal treatment or reclamation of foundry sand. In the Phase III LDR rule the Agency stated that combustion of inorganics violates EPA's policy unless the combusted waste contains

toxic organics or has significant organic composition.

Regarding the commenter's assertion that low temperature thermal processing is viable for treatment of foundry sand, the Agency notes that the treatment standards finalized in today's rulemaking are concentration-based and not technology-based. Therefore, any type of treatment technology can be used to meet the treatment standards provided the treatment unit, if required, is properly permitted. EPA also notes that to the extent the process involves solely the recovery of metals (as defined in 266.100), metal recovery devices are not presently subject to RCRA regulation. This assumes that the device involved is an industrial furnace.

Regarding the comment on test methods, EPA disagrees with the commenter's assertion that an alternative testing method in lieu of the TCLP should be allowed for assessing the potential leaching of iron-treated foundry sand. The Agency has established the TCLP as the required method for determining whether a waste will be considered toxicity characteristic hazardous (40 CFR 261.24(a)). EPA's determination of the use of the TCLP was finalized on March 29, 1990 (55 FR 11798). This issue is not being reopened in this rulemaking. However, EPA reviewed the suitability for testing the leachability of lead in foundry sand and continues to believe that TCLP testing is appropriate for determining whether the waste meets the treatment standards. This issue is discussed in the Technical Memorandum entitled "Iron Dust Treatment of Lead-Bearing Foundry Sand," dated September 15, 1995, and can be found in the Administrative Record for this rulemaking.

Issue: FOUN1-005

Respondent: TTS

Dcn: PH3P005

Extension:

CBI: N

Commenter: UNITED STEELWORKERS OF AMERICA

Comment Number: 00001

//COMM1

//RESPTTS

//SUBJFOUN1-005

PROBLEMS WITH TCLP TEST

ADDITION OF IRON TO D008 WASTE SAND MAY MASK THE PRESENCE OF LEAD IN TWO WAYS. FIRST, IRON IS MORE EASILY OXIDIZED THAN LEAD. UNDER THE CONDITIONS OF THE TCLP TEST, IRON MAY BE PREFERENTIALLY LEACHED OUT INTO SOLUTION, LEAVING THE LEAD IN AN INSOLUBLE, AND THEREFORE UNDETECTABLE, STATE. THE GIBBS FREE ENERGIES FOR THE RELEVANT REACTIONS AT T=298K ARE:



WHILE THE NEGATIVE FREE ENERGIES INDICATE THAT BOTH REACTION ARE THERMODYNAMICALLY FAVORABLE, IN FACT ONLY THE OXIDATION OF IRON PROCEEDS AT A MEASURABLE RATE AT ROOM TEMPERATURE. (THIS IS WHY IRON OBJECT RUST WITHIN DAYS IF LEFT OUTSIDE, BUT LEAD PIPES IN ROMAN BATHS ARE STILL IN SERVICE). UNDER THE MILDLY ACIDIC CONDITIONS AND SHORT DURATION OF THE TCLP TEST, WE EXPECT THAT THE IRON OXIDATION WILL PROCEED MUCH MORE QUICKLY THAN THE LEAD OXIDATION, WITH THE RESULT THAT LESS LEAD WILL BE LEACHED OUT OF THE SAMPLE THAN IF EXCESS IRON WERE NOT PRESENT.

A SECOND PROBLEM WITH THE PRESENCE OF IRON IN THE TCLP TEST IS SPECTRAL INTERFERENCE WITH THE ANALYSIS OF LEAD. THE INSTRUMENTAL TECHNIQUES MOST LIKELY TO BE USED TO ANALYZE LEAD ARE GRAPHITE

FURNACE ATOMIC ABSORPTION (GFAA) AND INDUCTIVELY COUPLED PLASMA (ICP). THE WAVELENGTHS RECOMMENDED FOR LEAD IN EPA METHOD 239.1 (LEAD BY GFAA) ARE 283.3 NM, 217.0 NM, AND 261.4 NM. THE CONTRACT LABORATORY PROGRAM ICP METHOD FOR LEAD (BASED ON EPA METHOD 200.7) RECOMMENDS A WAVELENGTH OF 220.353. IRON HAS A LARGE NUMBER OF SPECTRAL LINES THAT MIGHT OVERLAP THE RECOMMENDED WAVELENGTHS FOR LEAD (SEE CRC HANDBOOK OF CHEMISTRY AND PHYSICS, 75TH EDITION, PP. 10-44 THROUGH 10-48). A LARGE AMOUNT OF IRON IN A SAMPLE BEING ANALYZED FOR LEAD COULD RESULT IN A POSITIVE INTERFERENCE, AND A RAISED DETECTION LIMIT FOR LEAD.

HAZARDS OF INADEQUATELY TREATED D008 WASTE SAND

WHEN D008 WATER IS "TREATED" BY ADDITION OF IRON, THE CHEMICAL AND PHYSICAL FORM OF THE WASTE IS NOT CHANGED. AT MOST, THE PROPENSITY OF THE LEAD TO LEACH INTO GROUND WATER IS REDUCED. BUT GROUND WATER IS NOT THE MOST IMPORTANT POTENTIAL ROUTE OF EXPOSURE TO LEAD IN SOLID WASTE. AS EPA HAS RECOGNIZED, "GENERALLY, THE GROUND WATER PATHWAY WILL NOT POSE A SIGNIFICANT RISK..." FROM LEAD IN SURFICIAL SOILS. [REVISED INTERIM SOIL LEAD GUIDANCE FOR CERCLA SITES AND RCRA CORRECTIVE ACTION FACILITIES, JULY 14, 1994]. INHALATION OF DUST AND DIRECT INGESTION OF SOIL, ESPECIALLY BY CHILDREN, ARE FAR MORE IMPORTANT ROUTES OF EXPOSURE TO LEAD IN THE GROUND. TREATED D008 WASTES, ESPECIALLY CONTAMINATED SOILS, COULD BE USED AS FILL, ROAD BASE, ETC., MAKING SUCH EXPOSURE ROUTES HIGHLY PLAUSIBLE.

THE TCLP DOES NOT MEASURE THE RISKS POSED BY DIRECT INGESTION OR DUST INHALATION, BUT ONLY THE PROPENSITY TO CONTAMINATE GROUNDWATER. CONSEQUENTLY, TREATMENT METHODS THAT SPECIFICALLY ALTER TCLP RESULTS WITHOUT REDUCING THE INGESTION AND INHALATION HAZARDS ARE NOT PROTECTIVE OF PUBLIC HEALTH /1. TREATMENT METHODS FOR D008, AND OTHER LEAD-BEARING WASTES SUCH AS K061 AND K069, SHOULD BE ACCEPTED ONLY IF THEY CHANGE THE CHEMICAL OR PHYSICAL FORM OF THE WASTE IN A WAY THAT SUBSTANTIALLY REDUCES THE HAZARD FROM DUST INHALATION AND DIRECT INGESTION.

PHOSPHATE TREATMENTS FOR D008

THE USE OF PHOSPHATE-BASED ADDITIVES AS TREATMENT FOR D008 WASTES RAISES THE SAME QUESTIONS AS THE IRON ADDITIVES AND SHOULD BE ADDRESSED IN THE SAME RULE. SUCH TREATMENT HAS BEEN PROPOSED FOR LEAD-CONTAMINATED SOILS THAT ARE CLASSIFIED AS D008 WASTES AT

THE REVERE SMELTING AND REFINING SITE IN WALKILL, NEW YORK, WHICH IS SUBJECT TO REMEDIATION UNDER RCRA CORRECTIVE ACTION. THE SAME TREATMENT METHOD HAS BEEN PROPOSED FOR SIMILAR MATERIALS AT THE AVANTI SITE IN INDIANAPOLIS, INDIANA, WHICH IS UNDERGOING A CERCLA REMOVAL ACTION. THE COMPANIES UNDERTAKING BOTH OF THESE CLEAN-UPS ARE SUBSIDIARIES OF RSR CORPORATION. OUR UNION REPRESENTS EMPLOYEES AT RSR'S INDIANAPOLIS PLANT AND IS ON STRIKE AGAINST A RELATED COMPANY, BAYOU STEEL CORPORATION, IN LAPLACE, LOUISIANA.

A COPY OF THE PROPOSED CORRECTIVE MEASURES PLAN FOR THE WALKILL, NEW YORK SITE IS ENCLOSED. THE TREATMENT INVOLVES THE ADDITION OF A PHOSPHATE FIXATION AGENT AND BUFFER, IN A POWDER FORM, TO LEAD-CONTAMINATE SOIL, FOLLOWED BY THOROUGH MIXING. ORDINARILY, WATER WOULD BE ADDED TO FACILITATE THIS REACTION, BUT THE WALKILL PROPOSAL NOTES ONLY THAT "MOISTURE WILL BE ADDED AS NEEDED FOR DUST SUPPRESSION." THE FIXATION AGENT/BUFFER AND CONTAMINATED SOIL ARE APPARENTLY MIXED IN A RELATIVELY DRY STATE.

CURRENT RESEARCH ON THE USE OF PHOSPHATE ROCK TO REMEDIATE LEAD CONTAMINATED SOIL/2 INDICATES THAT THIS TREATMENT IS NOT YET A MATURE TECHNOLOGY. COLUMN LEACHING STUDIES IN THE LABORATORY INDICATE THAT SOLUBLE LEAD IS REDUCED IN CONTAMINATED SOILS TREATED WITH PHOSPHATE. HOWEVER, THE REDUCTION IN SOLUBLE LEAD CAN BE AS SMALL AS 38%. THE IMPORTANT FACTORS THAT GOVERN THE FORMULATION OF INSOLUBLE LEAD MINERALS IN SUCH LABORATORY STUDIES (SUCH AS THE PHOSPHATE ROCK-TO-CONTAMINATED SOIL RATIO), ARE AS YET IMPERFECTLY UNDERSTOOD. THE BEHAVIOR OF LEAD IN CONTAMINATED SOIL TREATED IN SITU WITH PHOSPHATES CANNOT YET BE PREDICTED WITH CONFIDENCE. CONTROL SAMPLES (LEAD CONTAMINATED SOIL WITH NO PHOSPHATE ADDED) IN THE CITED STUDIES ALSO SHOWED DECREASES IN SOLUBLE LEAD OVER TIME. THIS RAISES QUESTIONS ABOUT THE ABILITY OF THE LABORATORY STUDIES TO REPRESENT REAL ENVIRONMENTAL CONDITIONS, AND WHETHER THE DECREASE IN LEAD CONCENTRATION IS COMPLETELY ATTRIBUTABLE TO THE PHOSPHATE TREATMENT.

OF COURSE, THE WHOLE DISCUSSION OF REDUCING LEAD LEACHING INTO THE GROUND OR SURFACE WATERS FROM CONTAMINATED SOILS DOES NOT ADDRESS THE MOST LIKELY EXPOSURE SCENARIOS. THE DUST INHALATION AND DIRECT INGESTION HAZARDS WOULD REMAIN EVEN AFTER PHOSPHATE TREATMENT. EVEN IF PHOSPHATE TREATMENT EFFECTIVELY REDUCES LEAD LEACHING UNDER REAL ENVIRONMENTAL CONDITIONS (WHICH HAS NOT BEEN ADEQUATELY DEMONSTRATED), THERE IS NO EVIDENCE OF LONG-TERM EFFECTIVENESS. IT MUST BE DEMONSTRATED THAT THE TREATED SOILS POSE

NO HAZARD FROM INHALATION OR INGESTION.

//ENDC1

RESPONSE

[The commenter made the following comments:

1. asserted that the addition of iron dust to D008 waste foundry sand may mask the presence of lead, and thus the D008 waste may be inadequately treated;
2. asserted that the TCLP analysis does not measure the risks posed by dust inhalation or ingestion; and
3. expressed skepticism about the effectiveness of phosphate treatment for D008 waste and had similar concerns with respect to phosphate treatment as with the addition of iron to D008 wastes.

The Agency agrees with the commenter that the addition of iron dust to D008 waste sand may mask the presence of leachable lead. The Agency reviewed several comments and research studies for and against the "impermissible dilution" designation for iron treatment of characteristic metal wastes, and has concluded that addition of iron metal, in the form of fines, filings, or dust fails to provide long-term treatment for lead characteristic metal wastes, regardless of their origin, and constitutes a form of "impermissible dilution." EPA notes that RCRA requires that the TCLP analysis for determination of TC hazardousness be determined at the point of waste generation (55 FR 11830 March 29, 1990). Further, EPA notes that the TCLP testing by the foundry industry to demonstrate whether the waste is in fact TC hazardous (and hence, require treatment) is typically performed after the addition of the iron dust. The argument that the addition of iron dust is part of the process generating the waste is not valid.

As shown by the field studies conducted by Dr. Drexler and Dr. Kendall, the addition of iron filing results in no modification of the physical, chemical, or biological character of the waste. The addition of irons filing facilitates the adsorption of soluble lead on to the iron surface. However, once the iron surfaces oxidize, the ability of the additive to scavenge soluble metals is diminished, which is a dilution effect - See Drexler Report, pp. 14, 16, 18. Therefore, this is a reversible reaction and is not permanent. In addition, adsorption alone is not a reliable method of permanently immobilizing lead. Therefore, in the long-term, the migration of hazardous constituents is not retarded and thus, the requirements of RCRA 3004(m) are not fulfilled.

The type of treatment that only masks the test but does not actually reduce hazardous constituent mobility to any meaningful extent is not a type of waste management that can be said to minimize threats to human health and the environment. Therefore, the Agency, in today's final Phase IV rule, is promulgating regulatory language that confirms that the practice of iron addition as the sole form of treatment for lead in characteristic metal wastes is a type of impermissible dilution.

The Agency is also codifying this determination by amending 40 CFR 268.3 to read as follows:

40 CFR 268

§ 268.3 Dilution prohibited as a substitute for treatment

* * *

(d) It is a form of impermissible dilution, and therefore prohibited, to add iron filings or other metallic forms of iron to lead-containing hazardous wastes in order to achieve any land disposal restriction treatment standard for lead. Lead-containing wastes include D008 wastes (wastes exhibiting a characteristic due to the presence of lead), all characteristic wastes containing lead as an underlying hazardous constituent, listed wastes containing lead as a regulated constituent, and hazardous media containing any of the aforementioned lead-containing wastes.

* * *

In response to the commenter's remark about the TCLP test, EPA has established the TCLP as the required method for determining whether a waste is a toxicity characteristic hazardous waste (40 CFR 261.24 (a)). The TCLP test is designed to reflect the potential for the waste to leach at levels that pose a threat to human health and the environment. EPA's determination of the appropriateness of the use of TCLP was finalized on March 29, 1990 (55 FR 11798). This issue is not being reopened in this rulemaking. However, EPA reviewed the suitability for testing the leachability of lead in foundry sand and continues to believe that TCLP testing is appropriate for determining the characteristic of hazardousness for metal-bearing wastes. This issue is discussed in the Technical Memorandum entitled "Iron Dust Treatment of Lead-Bearing Foundry Sand," dated September 15, 1995, and can be found in the Administrative Record for this rulemaking. The Agency agrees with the commenter that the TCLP test does not measure the risks posed by direct ingestion. However, TCLP test is appropriate for testing materials placed in a landfill, since the principal threat to the environment is the leaching of toxic materials.

The Agency acknowledges the commenter's points relating to the phosphate treatment of foundry sands. However, because the Agency has inadequate data with respect to phosphate treatment, the Agency is not addressing the issue of phosphate-based additives as treatment for D008 wastes in this rulemaking. However, the Agency notes that any type of treatment including phosphate treatment of foundry sands, that temporarily masks the test methods and does not result in long-term treatment would be considered impermissible dilution.

Issue: FOUN1-009

Respondent: TTS

Dcn: PH3P009

Extension:

CBI: N

Commenter: CYANOKEM

Comment Number: 00003

//COMM3

//RESPTTS

//SUBJFOUN1-009

CLASSIFICATION OF ADDITION OF IRON DUST AS IMPERMISSIBLE DILUTION

CYANOKEM SUPPORTS EPA'S PROPOSAL TO CLASSIFY AS IMPERMISSIBLE DILUTION THE USE OF IRON DUST OR FILINGS AS STABILIZING AGENTS FOR CERTAIN CHARACTERISTIC WASTES. CYANOKEM AGREES FULLY WITH EPA'S DISCUSSION IN THE PREAMBLE AT PAGE 11731 AND ADDS FURTHER THAT NO CHEMICAL REACTION OR POZZOLANIC REACTION IS POSSIBLE FROM IRON DUST OR FILINGS. THEREFORE MICROENCAPSULATION OR STABILIZATION IS NOT TAKING PLACE, ONLY DILUTION. THERE IS NO CHEMISTRY THAT CAN BE CONTRIVED TO JUSTIFY THAT METALS SUCH AS LEAD ARE BEING PERMANENTLY BOUND IN A NON-LEACHABLE MATRIX, WHEN USING IRON DUST OR FILINGS AS A STABILIZING AGENT.

CYANOKEM HAS ENCOUNTERED MANY CASES WHERE GENERATORS HAVE AVOIDED TREATMENT COSTS BY ADDING IRON TO THEIR METAL AND CYANIDE BEARING WASTE STREAMS. THIS PROVIDES THE SHORT TERM ABILITY TO FOOL THE TESTS FOR BOTH AMENABLE CYANIDE AND LEACHABLE METALS. EPA'S ADOPTION OF A TOTAL CYANIDE TREATMENT STANDARD HAS ESSENTIALLY SOLVED THE ISSUE OF MASKING EFFECTIVE TREATMENT OF CYANIDE USING IRON, BUT THE ISSUE OF METALS STILL REMAINS. CYANOKEM WELCOMES THIS PROHIBITION ON USE OF IRON DUST AND FILINGS, AND AGREES WITH EPA THAT IT WOULD PROMOTE MORE TREATMENT OF TOXIC METAL BEARING WASTES.

//ENDC3

RESPONSE

The Agency thanks the commenter for supporting EPA's position on the issue of designating the addition of iron dust to D008 waste sand as impermissible dilution. The Agency reviewed several comments (from Phase III and Phase IV NODA) and research studies for and against the "impermissible dilution" designation for iron treatment of characteristic lead wastes, and has concluded that addition of iron metal, in the form of fines, filings, or dust fails to provide long-term treatment for D008 characteristic metal waste, regardless of their origin, and constitutes a form of "impermissible dilution." Therefore, the Agency, in today's final Phase IV rule, is promulgating regulatory language that designates addition of iron filings to characteristic lead wastes as "impermissible dilution."

Dcn: PH3P010 Extension: CBI: N
Commenter: NIBCO, INC

Comment Number: 00001

//COMM1
//RESPTTS
//SUBJFOUN1-010

LONG TERM TREATMENT

TO VERIFY LONG TERM TREATMENT. TWO OPTIONS WERE AVAILABLE. THE FIRST WAS THE LABORATORY APPROACH OF PERFORMING THE TCLP OR THE PREVIOUS EP-TOXICITY TEST, EACH INTENDED TO PREDICT THE WORST CASE SCENARIO FOR 100 YEARS OF STORAGE IN AN IMPROPERLY DESIGNED AND OR MANAGED MUNICIPAL LANDFILL. MATERIALS STABILIZED WITH METALLIC IRON HAVE CONSISTENTLY PASSED THESE TESTS.

TO FURTHER THIS WORST CASE APPROACH, MULTIPLE LEACHING PROCEDURES HAVE BEEN PERFORMED UNDER SEVERAL PROTOCOLS. ONE PROCEDURE WAS PERFORMED ON EXTRACTS USING SW-846 METHOD 1390 IN WHICH THE WASTE SAMPLES WERE EXTRACTED ACCORDING TO THE EXTRACTION PROCEDURE TOXICITY TEST, FOLLOWED BY 4 ADDITIONAL SYNTHETIC RAIN EXTRACTIONS. THE RESULTS OF THESE TESTS CAN BE FOUND IN APPENDIX A SECOND PROCEDURE SERIALLY SUBJECTED A SAMPLE OF WASTE SAND TO 5 SUCCESSIVE TCLP TESTS. THE CONCLUSION REACHED ON PAGE TWO (2) OF THE REPORT WHICH IS ATTACHED IN APPENDIX F STATES THAT " THE SAND WAS STILL NON-HAZARDOUS AFTER FIVE SUCCESSIVE TOXICITY TESTS, USING THE MORE RIGOROUS TEST PROCEDURE."

AN ADDITIONAL STUDY WAS PERFORMED BY TURPIN, P. D., AND B. E. DUDZIK. 1987 "CASE STUDIES IN SUCCESSFUL FOUNDRY WASTE TREATMENT." -- AMERICAN FOUNDRYMEN'S SOCIETY (AFS) TRANSACTIONS, 95:695-698. THE AFS STUDY WAS REFERENCED ON PAGE 38 OF THE BATTELLE REPORT OF FEBRUARY 22, 1994. WHILE THE BATTELLE REPORT APPEARS TO BE MUCH OF THE BASIS FOR THE PUBLICATION IN THE FEDERAL REGISTER OF MARCH 2, 1995, THE RESULTS OF THE AFS STUDY DO NOT SUPPORT THE CONCLUSIONS REACHED BY

THE AGENCY. IN THE CITED AFS STUDY, "THE LEAD LEACHING FROM THE WASTE WAS CONTROLLED OVER NINE ACIDIC LEACHING STEPS IN THE EP MULTIPLE EXTRACTION PROCEDURE."

THE SECOND OPTION THAT CAN BE USED IS EXISTING FIELD STUDIES THAT HAVE BEEN CONDUCTED ON FOUNDRY SAND LANDFILLS THAT HAVE BEEN STABILIZED WITH IRON DUST; LANDFILLS THAT HAVE BEEN IN EXISTENCE SINCE THE MID 80'S (THE INCEPTION OF METALLIC IRON STABILIZATION). ONE SUCH CHARACTERIZATION WAS PERFORMED ON FOUNDRY WASTE DISPOSED AT THE NACOGDOCHES MUNICIPAL LANDFILL. THE CHARACTERIZATION WAS PREPARED BY RMT INC. -- MADISON, WISCONSIN FOR NIBCO INC., NACOGDOCHES TEXAS IN DECEMBER OF 1993. THE CONCLUSION REACHED IN THIS CHARACTERIZATION WAS THAT THE WASTE DISPOSED OF IN THIS LANDFILL IS NOT A HAZARDOUS WASTE. A COPY OF THE BODY OF THIS REPORT IS ENCLOSED IN APPENDIX G. THIS REPORT WAS SUBMITTED TO THE USEPA REGION VI IN DECEMBER OF 1993.

MASKING OF THE TCLP RESULTS

IT HAS BEEN SUGGESTED BY THE EPA THAT THE LEAD IN THE TCLP TEST IS BEING MASKED BY THE PRESENCE OF IRON OR OTHER TREATMENT CHEMISTRIES IT APPEARS THAT THE SUPPORTING DOCUMENTATION IS A LETTER WRITTEN TO MR. JOHN GAUTHIER OF US EPA, REGION 17 OFFICE OF SOLID WASTE DATED SEPTEMBER 8, 1992 FROM DATANET ENGINEERING, INC. OF BALTIMORE, MD. THE LETTER STATES THAT "ACCORDING TO GAIL HANSEN OF EPA OFFICE OF SOLID WASTE, THE PRESENCE OF IRON MAKES THE TCLP QUITE IMPRACTICAL AS ESTABLISHED BY SPIKED SAMPLES HAVING EXCEEDINGLY POOR RECOVERY RATES." A COPY OF THIS LETTER IS INCLUDED IN APPENDIX K. THIS STATEMENT BY MS. HANSEN HAS NOT BEEN SUBSTANTIATED AND NO TEST RESULTS WERE USED TO CONFIRM THE SUPPOSED STATEMENT. THE JUSTIFICATION FOR THE CLAIM THAT THE IRON DUST IS MASKING THE TCLP TEST IS THE IMPLICATION THAT WHEN THE SAMPLE IS SPIKED WITH A KNOWN AMOUNT OF DISSOLVED LEAD,(MATRIX SPIKE) THE RECOVERY RATE IS EXTREMELY LOW. ENCLOSED IN APPENDIX J ARE SAMPLES OF TCLP TEST RESULTS PERFORMED ON FOUNDRY SAND WITH IRON PRESENT. ALL OF THESE TESTS WERE RUN WITH MATRIX SPIKE ADDITIONS. THE RECOVERY RATES ON THE MATRIX SPIKE RANGED FROM 90% TO 105%. THESE EXCELLENT RECOVERY RATES CONTRADICT THE SUGGESTION THAT THE IRON MASKS THE ANALYTICAL DATA. AT NO TIME DURING NLBCO'S 10 YEARS OF EXPERIENCE WITH EP-TOXICITY OR TCLP TESTING WAS THERE ANY EVIDENCE OF POOR RECOVERY RATES ON MATRIX SPIKE ADDITIONS. THE ONLY APPARENT POTENTIAL FOR POOR RECOVERY WOULD OCCUR IF THE LAB SPIKED THE SAMPLE PREMATURELY (BEFORE FILTRATION) IN WHICH CASE THE TREATMENT

CHEMISTRY WOULD LIKELY CAUSE THE LEAD TO BE PRECIPITATED.

THE AGENCY STATED THAT "... THE ADDITION OF IRON HAS BEEN DEMONSTRATED TO RESULT IN FALSE NEGATIVES FOR LEAD..." WHILE THE SUGGESTION OF FALSE NEGATIVES APPEARS IN THE AFOREMENTIONED LETTER OF SEPTEMBER 8, 1992, NO SUPPORTING LAB DATA ACCOMPANIED THE LETTER. IN ADDITION, NOWHERE IN THE BATTELLE REPORT, OR ANY OTHER SUPPORT DOCUMENTATION HAS THIS DEMONSTRATION BEEN CONFIRMED. A PROPERLY PERFORMED TCLP TEST BY A COMPETENT LAB WILL YIELD ACCURATE DATA.

ENCLOSED IN APPENDIX L ARE COPIES OF TEST RESULTS PERFORMED BY THE US EPA HOUSTON BRANCH. MOST OF THESE TESTS WERE PERFORMED ON FOUNDRY WASTE STREAMS THAT HAD BEEN STABILIZED USING METALLIC IRON. THESE LAB REPORTS DO NOT SPECIFY ANY QA/QC DATA, WHICH WOULD SUGGEST THAT QA/QC PROCEDURES WERE PERFORMED WITH NO QUESTIONABLE RESULTS. ANY OTHER CONCLUSION WOULD SUGGEST THAT THESE TESTS WERE IMPROPERLY CONDUCTED AND ARE THUS NOT ACCEPTABLE TESTS.

IT APPEARS THAT THE ORIGINAL PURPOSE OF THE TCLP TEST, I E. TO PREDICT POTENTIAL WORST CASE SCENARIO OF LEACHABILITY IN A MISMANAGED MUNICIPAL SOLID WASTE LANDFILL DURING THE NEXT 100 YEARS, HAS BEEN FORGOTTEN. THE ACETIC ACID IN THE TEST SIMULATES LANDFILL CONDITIONS TO WHICH THE WASTE FOUNDRY SAND WOULD BE SUBJECTED IN A MUNICIPAL WASTE LANDFILL. THE ADDITION OF IRON DUST (OR ANY OTHER APPROPRIATE CHEMISTRY) EFFECTIVELY PREVENTS THE LEAD IN THE LANDFILL FROM LEACHING EVEN IN THE PRESENCE OF ACETIC ACID, AS IS EVIDENCED BY THE RESULTS OF THE EXISTING TCLP TEST.

WEAK BONDS NOT LIKELY TO BE PERMANENT

PAGE 11731 STATES THAT "...THE AGENCY BELIEVES THAT THIS 'STABILIZATION' IS TEMPORARY, BASED UPON THE NATURE OF THE COMPLEXING. IN FACT, A REPORT PREPARED BY EPA ON IRON CHEMISTRY IN LEAD CONTAMINATED MATERIALS (FEB. 22, 1994), WHICH SPECIFICALLY ADDRESSED THIS ISSUE, FOUND THAT IRON LEAD BONDS ARE WEAK, ADSORPTIVE SURFACE BONDS, AND THEREFORE NOT LIKELY TO BE PERMANENT." THE REPORT IN QUESTION IS THE BATTELLE REPORT OF JANUARY 1994 WHICH WAS SUBMITTED IN AN INTERAGENCY MEMO ON FEBRUARY 22, 1994. A COPY OF THIS REPORT IS INCLUDED IN APPENDIX M.

IN ADDITION TO STABILIZATION THROUGH THE DEVELOPMENT OF SURFACE BONDS, IRON REACTS IN A LANDFILL SITUATION IN MUCH THE SAME WAY THAT ZINC ACTS IN GALVANIZED STEEL. THE PRESENCE OF METALLIC IRON

PREVENTS LEAD FROM LEACHING THROUGH A REDOX REACTION. NO CHEMICAL REACTION NEEDS TO TAKE PLACE UNTIL THE LEACHING CONDITIONS ARISE AT WHICH TIME THE PRESENCE OF IRON WILL EFFECTIVELY PREVENT LEAD FROM LEACHING.

THE CONCLUSION REACHED BY THE AGENCY DISREGARDED THE CONCLUSIONS REACHED IN THE BATTELLC REPORT. THE FOLLOWING ARE DIRECT QUOTATIONS FROM THE REPORT WHICH CONTRADICT THE AGENCY'S BELIEFS. "THE ATTRACTIVE FORCE OPERATING BETWEEN THE ADSORBED SPECIES ON THE ADSORBENT IS RELATIVELY WEAK, BEING ON THE SAME ORDER AS VAN DER WAALS FORCES."... "HOWEVER, LONG-TERM STABILITY OF THIS SITUATION IS UNKNOWN." ALTHOUGH THE BATTELLE REPORT STATES THAT THE ADSORPTIVE FORCES ARE RELATIVELY WEAK THE REPORT DID NOT REACH THE SAME CONCLUSION AS THE AGENCY THAT THE BONDS ARE "THEREFORE NOT LIKELY TO BE PERMANENT." THE AGENCY'S CONCLUSION ALSO NEGLECTED TO CONSIDER THE ADDITIONAL SURFACE PROCESS DISCUSSED ON PAGE 18 OF THE BATTELLE REPORT "IMMOBILIZATION OCCURS BY TWO SURFACE PROCESSES, ADSORPTION AND LATTICE SUBSTITUTION (HEM, 1977)."

BESIDES THE SURFACE PROCESSES, THE BATTELLE REPORT ALSO DISCUSSES THE EFFECTIVENESS OF THE FE-PB REDOX COUPLE (PAGE 92). "TABLE 7 SHOWS THE STANDARD STATE ELECTRICAL AND GIBBS FREE ENERGY CHANGES FOR THE REACTIONS WHICH DESCRIBE THE REDUCTION OF PB(II) TO PB(O) IN PURE WATER AND WHEN ACETATE IS PRESENT. IN THE ABSENCE OF ACETATE, REDUCTION OF PB(II) BY IRON METAL IS STRONGLY FAVORED..." THIS WOULD BE THE SITUATION IN A MONOFILL OR NEARLY ANY LAND DISPOSAL WITH THE EXCEPTION OF A MUNICIPAL LANDFILL WHERE THE ACETATE IS MORE LIKELY TO BE PRESENT. THE BATTELLE REPORT GOES ON TO SAY THAT "IN GENERAL, REDUCTION OF PB(II) IS LESS STRONGLY FAVORED WHEN ACETATE IS PRESENT, BUT THE REACTION WILL STILL PROCEED IN THE DIRECTION OF LEAD REDUCTION." THE BATTELLE REPORT CONFIRMS THAT LEAD REDUCTION IS LIKELY TO OCCUR, CONTRARY TO THE "BELIEFS" OF THE AGENCY. THE BATTELLE REPORT CONTINUES ON PAGE 99 TO CONCLUDE THAT "THE EQUILIBRIUM PHASES SHOWN IN FIGURES 5 THROUGH 8 ARE CONSISTENT WITH LEAD SOLUBILITY REDUCTION BY EITHER A REDOX COUPLE MECHANISM OR SORPTION ON $Fe(OH)_3$." THE BATTELLE REPORT REACHED NO CONCLUSIONS AS TO THE LONG TERM STABILITY OF THE IRON STABILIZATION, BUT DID SUGGEST AN ADDITIONAL STUDY TO ELIMINATE DATA GAPS. THESE SUGGESTIONS WERE APPARENTLY OVERLOOKED BY THE AGENCY IN AN ATTEMPT TO REACH A CONCLUSION WITHOUT THE BENEFIT OF THE FACTS OR SCIENTIFIC EVIDENCE.

IMPERMISSIBLE DILUTION

IN ITS PUBLICATION IN THE FEDERAL REGISTER OF MARCH 9, 1995, THE AGENCY PROPOSED TO CLARIFY THAT THE ADDITION OF IRON DUST IS 'IMPERMISSIBLE DILUTION'. THIS INTERPRETATION OF THE WORD DILUTION IS TOTALLY CONTRARY TO SCIENCE AND THE ENGLISH LANGUAGE. THE DEFINITION OF DILUTION AS FOUND IN 'CHAMBERS DICTIONARY OF SCIENCE AND TECHNOLOGY' IS AS FOLLOWS: "DILUTION (1) DECREASE IN CONCENTRATION" IF THE TREATMENT WERE TO BE BASED ON DILUTION A TEN PERCENT ADDITION OF IRON DUST SHOULD YIELD A TEN PERCENT REDUCTION OF THE TOXICITY CHARACTERISTIC. IN PRACTICE, TESTING HAS PROVEN THAT MATERIALS WITH A TCLP CHARACTERISTIC FOR LEAD AS HIGH AS 1000 MG/L BEFORE IRON ADDITION, YIELDS A TCLP FOR LEAD OF LESS THAN 1 MG/L WITH AS LITTLE AS 10% IRON DUST ADDITION IT SHOULD BE OBVIOUS, TO EVEN THE MOST CASUAL OBSERVER, THAT SOME CHEMICAL MECHANISM OTHER THAN SIMPLE DILUTION IS OCCURRING.

IN DEFINING THE ADDITION OF 10% IRON DUST AS DILUTION. THE AGENCY IS REACTING CONTRARY TO IT'S ACCEPTED TREATMENT TECHNOLOGY USING LIME OR CEMENT KILN DUST (CKD). THESE TECHNOLOGIES REQUIRE AS MUCH AS 30% ADDITIONS TO BE EFFECTIVE AND WOULD MORE LIKELY BE CANDIDATES FOR THE DESIGNATION AS DILUTION. OF THE TWO TECHNOLOGIES, IRON DUST STABILIZATION NOT ONLY PROVIDES ACCEPTABLE TREATMENT, BUT MINIMIZES THE RESULTANT VOLUME OF THE WASTE DISPOSED.

INTERSTITIAL WATER WOULD LIKELY ACIDIFY

THE FOLLOWING PARAGRAPH IS ANOTHER EXAMPLE OF AN ASSUMPTION BEING MADE WITHOUT SCIENTIFIC BASIS. THE ASSUMPTION WAS SUBSEQUENTLY USED TO JUMP TO THE WRONG CONCLUSION. THE FOLLOWING PARAGRAPH IS CITED FROM THE MARCH 2, 1995 FEDERAL REGISTER. "FURTHERMORE, AS THIS IRON-RICH MIXTURE IS EXPOSED TO MOISTURE AND OXIDATIVE CONDITIONS OVER TIME, INTERSTITIAL WATER WOULD LIKELY ACIDIFY, WHICH WOULD POTENTIALLY REVERSE ANY TEMPORARY STABILIZATION, AS WELL AS INCREASE THE LEACHABILITY OF THE LEAD FROM THE FOUNDRY SAND."

NOWHERE IS THE ISSUE OF ACID FORMATION, CAUSED BY THE PRESENCE OF IRON IN LANDFILLS, MENTIONED IN THE BACKGROUND DOCUMENTATION AND IS CONTRARY TO ACTUAL EXPERIENCE. ACID FORMATION ASSOCIATED WITH IRON COMES FROM HYDROLYSIS OF THE FERRIC IRON OR FROM THE OXIDATION OF FERROUS TO FERRIC IRON. AS EVIDENCED IN THE BATTELLE REPORT, STABILIZATION WITH METALLIC IRON CREATES REDUCING CONDITIONS IN WHICH IRON WOULD NOT BE OXIDIZED TO THE FERROUS TO FERRIC IRON. IN ADDITION, EXPERIENCE WITH THE TCLP TEST SHOWS THAT IRON NEUTRALIZES

THE ACETIC ACID (AS MAY BE EXPECTED TO BE FOUND IN A MUNICIPAL LANDFILL) AND RAISES THE PH RATHER THAN LOWERING IT AS SUGGESTED IN THE AGENCY'S CONCLUSION.

IN PRACTICE THE NATURAL BUFFERING CAPABILITIES OF FOUNDRY SAND, CAUSED BY THE CLAYS AND NATURAL BINDERS, HAS A TENDENCY TO STABILIZE THE PH IN THE NEUTRAL TO SLIGHTLY BASIC RANGE.

ALTERNATIVE TESTING PROCEDURES

BASED ON SUPPORTING DATA THAT THE RECOVERY RATES FOR SPIKED SAMPLES ARE WELL WITHIN ACCEPTABLE RANGES THERE IS NO EVIDENCE THAT THE TCLP TEST RESULTS ARE MASKED. IN FACT IT CONFIRMS THAT THE IRON IS DOING AN ACCEPTABLE JOB OF PREVENTING THE LEAD FROM LEACHING. THE TCLP WAS DESIGNED TO PREDICT WORST CASE SCENARIO OF MISMANAGED MUNICIPAL LANDFILL DISPOSAL AND ALTHOUGH IT IS EXTREMELY AGGRESSIVE IT APPEARS TO BE AN ACCEPTABLE TEST METHOD FOR DISPOSAL IN A MUNICIPAL SOLID WASTE LANDFILL.

WASTE FOUNDRY SAND IS COMMONLY DISPOSED OF IN A MONOFILL WHERE ACETIC ACID IS NOT LIKELY TO BE PRESENT. PERHAPS EITHER A DISTILLED WATER LEACHING PROCEDURE OR A SYNTHETIC ACID RAIN LEACHING PROCEDURE, WHICH MORE CLOSELY SIMULATES IN-SITU CONDITIONS. WOULD BE MORE APPROPRIATE. TO HELP SUBSTANTIATE THIS RECOMMENDATION, TEST RESULTS PERFORMED ON A LEAD BEARING, SLUDGE FROM A STORM WATER RETENTION BASIN ARE ENCLOSED. THE TEST RESULTS SHOW TCLP LEAD TO BE 4L.9 MG/L, WHILE ALTERNATIVE LEACHING METHODS SUCH AS THE STATE OF INDIANA LEACHING METHOD USING DE-IONIZED LEACHATE FLUID YIELDED <0.01 MG/L, THE SULFURIC ACID LEACHING PROCEDURE YIELDED <0.1 MG/L AND THE LEACHATE PROCEDURE USING RAINWATER YIELDED LEACHABLE LEAD AT 0.918 MG/L. I HOSE TESTS WERE ALL PERFORMED ON A SAMPLE THAT CONTAINED 1880 MG/L OF TOTAL LEAD. A COPY OF THESE LAB RESULTS IS INCLUDED IN APPENDIX N. THE ABOVE DATA SUPPORT THE CLAIM THAT THE TCLP IS NOT APPROPRIATE FOR ANY DISPOSAL METHOD OTHER THAN A MUNICIPAL SOLID WASTE LANDFILL. EXPERIENCE HAS SHOWN THAT IT IS ONLY THE AGGRESSIVE NATURE OF ACETIC ACID WHICH CAUSES THE LEAD TO LEACH. IN ANY OTHER DISPOSAL SCENARIO, A DISTILLED WATER OR SYNTHETIC RAINWATER LEACHATE TEST WOULD BE MORE APPROPRIATE.

AS FURTHER PROOF OF THE IMMOBILITY OF LEAD IN FOUNDRY SAND, ESPECIALLY IN MONOFILLS, MONITORING WELL DATA FROM A GWQAP AT THE NIBCO NACOGDOCHES SITE IS PROVIDED IN APPENDIX H. PRIOR TO THE HAZARDOUS WASTE REGULATIONS, WASTE FOUNDRY SAND WAS

ACCUMULATED IN ON-SITE SURFACE IMPOUNDMENTS AND LATER DRIED AND DISPOSED OF IN AN ON-SITE LANDFILL. THESE PONDS WERE ACTIVE FOR A TWENTY-FIVE TO THIRTY YEAR PERIOD, INITIALLY WITHOUT TREATMENT WITH IRON DUST. SUBSEQUENT TO THE HAZARDOUS WASTE REGULATIONS, PROCESS MODIFICATIONS WERE INSTALLED TO INTRODUCE IRON DUST INTO THE MATERIAL PRIOR TO GENERATION AS A WASTE. AS PART OF CLOSURE OF THESE SURFACE IMPOUNDMENTS AND LANDFILL A GROUND WATER QUALITY ASSESSMENT PROGRAM WAS IMPLEMENTED. THE RESULTS OF THIS PROGRAM CONFIRMED THAT NO LEACHING OF LEAD HAD OCCURRED AT THE SITE. DISSOLVED LEAD LEVELS, WERE EXTREMELY LOW IN ALL OF THE MONITORING WELL SAMPLES. IN FACT, MOST OF THE WATER SAMPLES TAKEN FROM THE ACTUAL POND WATER WERE ABLE TO MEET DRINKING WATER CRITERIA FOR LEAD. THIS REPORT WAS SUBMITTED TO THE TEXAS WATER COMMISSION (TWC) ON AUGUST 3, 1988. THE TWC CONCLUDED FROM THIS REPORT THAT "...COMPARISONS BETWEEN BACKGROUND AND DOWNGRADIENT WELLS INDICATE NO STATISTICALLY SIGNIFICANT DIFFERENCES FOR THE METALS CONCENTRATION." A COPY OF THE CONFIRMATION LETTER FROM SAMUEL B. POLE, CHIEF; HAZARDOUS AND SOLID WASTE ENFORCEMENT SECTION, HAZARDOUS AND SOLID WASTE DIVISION OF THE TWC IS ALSO ENCLOSED IN APPENDIX H.

OTHER AGENCY CONCERNS

OTHER CONCERNS RAISED BY THE AGENCY INCLUDE MIXING, SEPARATION, CONSISTENCY AND THE ABILITY TO CONTROL THE PROCESS. THESE CONCERNS APPEAR TO COME FROM COMPARISONS MADE BETWEEN FOUNDRY SAND AND LEAD PAINT REMOVAL WASTE. THE ISSUE RAISED ON PAGE 21 OF THE BATTELLE REPORT COMPARES FOUNDRY SAND AND LEAD PAINT REMOVAL WASTE AS BEING SIMILAR. CONCLUSIONS REACHED IN THE ASSESSMENT OF PAINT REMOVAL WASTE WOULD NOT BE APPROPRIATE IN ASSESSING THE EFFECTIVENESS OF FOUNDRY SAND STABILIZATION. THE PAINT REMOVAL WASTE WOULD BE EXPECTED TO BE VERY DISSIMILAR IN SIZE AND HULK DENSITY TO THE STEEL SHOT, AND WOULD LIKELY SEPARATE DURING THE BLASTING OPERATION AS WELL AS DURING TRANSPORTATION AND DISPOSAL. THE STABILIZATION OF FOUNDRY SAND IS PERFORMED UNDER CONTROLLED CONDITIONS. THE SAND AND IRON ARE SIMILAR IN SIZE AND BULK DENSITY, AND ARE THOROUGHLY BLENDED IN AN ENGINEERED SYSTEM. FOLLOWING ARE TYPICAL FOUNDRY PRACTICES WHICH ASSURE A HETEROGENEOUS MIXTURE OF FOUNDRY SAND AND IRON DUST.

TECHNIQUE FOR ADDITION AND TESTING OF IRON

THE MATERIAL DISPOSED OF IN THE ABOVE MENTIONED CITY OF

NACOGDOCHES LANDFILL CAME FROM VARIOUS PROCESSES WITHIN NLBCO'S OPERATIONS. THE MAJORITY OF THE MATERIAL WAS GENERATED IRON THE CLOSURE OF THE LONG TERM ON-SITE SURFACE IMPOUNDMENTS AND LANDFILL. THE MATERIAL WAS MIXED WITH IRON UTILIZING SEVERAL ACCEPTED FOUNDRY PRACTICES FOR MATERIAL ADDITIONS AND MIXING INCLUDING SCREW FEEDERS, BELT CONVEYORS, MULLOR MIXERS, AND VOLUMETRIC ROTARY FEEDERS. RANDOM SAMPLES WERE GATHERED ON A REGULAR BASIS TO TEST FOR THE PRESENCE OF AN ACCEPTABLE AMOUNT OF IRON DUST. THE SAMPLES WERE WEIGHED AND DRIED. THE IRON WAS THEN REMOVED FROM THE SAMPLES USING A MAGNET ALLOWING FOR A RELIABLE FIELD DETERMINATION OF IRON DUST PERCENTAGE. NORMAL PROCEDURE WAS TO TEST FOR IRON DUST PERCENTAGE ON AN HOURLY BASIS FOR CONTINUOUS OPERATIONS AND ON EACH BATCH FOR BATCH PROCESSES.

QUALITY CONTROL

INITIAL QUALITY CONTROL PROCEDURES FOR THE ADDITION OF IRON DUST WERE NOT FORMALIZED. IT WAS DETERMINED THAT 2.5% TO 5% IRON WAS NEEDED TO ADEQUATELY TREAT MOST OF THE MATERIAL TO BELOW REGULATORY LIMITS. BECAUSE OF THE POTENTIAL IMPLICATIONS OF HAZARDOUS WASTE REGULATIONS, A GOAL OF 10% IRON WAS PLACED ON THE ADDITION SYSTEM TO PROVIDE A SUFFICIENT LEVEL OF SAFETY AND ALLOW FOR POTENTIAL UNCERTAINTIES IN THE MATERIAL MIX. WHILE UNTREATED FOUNDRY SAND WILL TYPICALLY YIELD A TCLP TEST OF LESS THAN 100 MG/L FOR LEAD, CONCENTRATED WASTE STREAMS WITH AN INITIAL TCLP OF NEARLY 1000 MG/L WERE ABLE TO BE TREATED TO WITHIN REGULATORY LIMITS WITH THE 10% IRON ADDITION. AS THE PROCESS PROGRESSED, QUALITY CONTROL PROCEDURES WERE INITIATED TO FURTHER ASSURE PROPER ADDITIONS OF IRON DUST. ATTACHED IN APPENDIX I ARE COPIES OF AVERAGE AND RANGE CHARTS THAT WERE UTILIZED IN THE PROCESS FROM THREE SEPARATE WASTE STREAM INPUTS. THE CHARTS ARE A SAMPLE OF THE CHARTS USED DURING THE ACTIVE OPERATION OF THIS PROCESS.

TCLP TESTING

IN ADDITION TO IRON DUST PERCENTAGE TESTING, COMPOSITE SAMPLES WERE REGULARLY SENT TO A LAB TO PERFORM THE APPROPRIATE EP-TOXICITY OR TCLP TEST. THESE TESTS WERE PERFORMED APPROXIMATELY TWICE A MONTH. ATTACHED IN APPENDIX J ARE COPIES OF THE COVER PAGE OF THESE TESTS FOR 1995 UNTIL SUSPENSION OF OPERATION OF THE LANDFILL FOR DISPOSAL. THE TCLP FOR THESE SAMPLES RANGED FROM BELOW DETECTION TO 0.2 MG/L. THE PERCENT IRON IN THE SAMPLES AS REPORTED BY NIBCO BASED ON SEPARATION TESTS RANGED FROM 14.2% TO 22.6%. THESE RESULTS ARE WELL

ABOVE THE REQUIRED 10%, BECAUSE IT WAS DETERMINED THAT THE COST OF ADDITIONAL IRON WAS MINIMAL COMPARED WITH THE ADDED ASSURANCE OF SUFFICIENT TREATMENT.

//ENDC1

RESPONSE

NIBCO does not agree with EPA's classification of iron dust treatment of foundry sands as impermissible dilution, and made the following points:

1. Iron dust treatment provides long-term treatment of foundry sands and is not impermissible dilution as EPA asserts;
2. Data does not support EPA's position that lead is masked by the addition of iron;
3. EPA's conclusion about iron-lead bonds are not the same as the conclusion reached in the Battelle report, which, acknowledges weak iron-lead bonds, however, concludes that long-term stability is unknown;
4. NIBCO disagrees with EPA's assertion that over time when exposed to moisture and oxidative conditions, interstitial water would likely acidify and thus, reverse stabilization and increase leachability of the lead from the foundry sand;
5. Because waste foundry sand is commonly disposed of in a monofill, acetic acid is not likely to be present and therefore, an alternative testing procedure should be used;
6. NIBCO also disagrees with the agency's concern with regards to controlling the process such as blending and mixing. The commenter believed that foundry sand waste and wastes from lead paint removal operations are dissimilar and that comparisons of these wastes should not be used to characterize the foundry sand operations.

EPA disagrees with the commenter's position that iron dust treatment provides long-term treatment. The Agency believes that it is unlikely that a chemical reaction occurs when iron dust is added to foundry sands. Because the waste foundry sand would likely contain only lead, silica, microscopic pieces of castings, and binders (clays, phenols, and tars) from the molds, EPA is not convinced that the simple addition of iron would provide treatment for the lead or the organics (i.e., phenol and tar). While it may be argued that iron could form temporary and weak, ionic complexes with silica and/or phenol, so that when analyzed by the TCLP test the lead appears to have been stabilized; however, EPA believes that this "stabilization" is temporary, based upon the nature of the complexing. In a report by EPA on Iron Chemistry in Lead Contaminated Materials (Feb. 22, 1994), which specifically addressed this issue, EPA found that iron-lead bonds are weak, adsorptive, surface bonds. EPA believes that these iron-lead bonds are not likely to be permanent. Studies conducted by Dr. Drexler and Dr. Kendall also concluded that adding iron filings to spent foundry sand is not a

permanent treatment for hazardous constituents, and indeed that "the lead is in mmo way altered or immobilized." Kendall Report p. 2. EPA continues to believe that if this iron-rich mixture is exposed to moisture and oxidative conditions over time, interstitial water would likely acidify, which could potentially reverse any temporary stabilization, as well as increase the leachability of the lead from the foundry sand.

Further, EPA continues to believe that the conditions exist that will allow such chemical reactions to proceed to the extent whereby the stability of the treated lead-bearing waste deteriorates which could result in lead leaching. The Battelle report's equilibrium diagrams indicate that dissolved species predominate at pH levels below 6, and lead would likely remain as lead metal at pH of 6 or greater. Further, the scientific literature has shown that under waterlogged conditions, naturally occurring lead becomes reduced and mobile (Hazardous Waste Treatment, 1983. Brown, Kirk, G. Evans and B. Frentrup, eds). In consideration of the above, EPA continues to believe that the addition of iron dust or filings to D008 waste foundry sand does not appear to provide, long-term treatment\stabilization.

The Agency has concluded that this form of stabilization is only a short-term solution, and that it is inadequate to minimize the threats posed by land disposal of metal-containing hazardous wastes. Because the short-term effect is a dilution phenomenon (Drexler Report, pp. 14, 16, 18), EPA, therefore considers this technology "impermissible dilution" in accordance with 40 CFR 268.3. Although the addition of iron dust or filings is considered treatment under 260.10, the Agency does not believe it is adequate treatment; but merely the addition of material as a substitute for adequate treatment and therefore constitutes impermissible dilution. See 40 CFR 268.3 (B), 54 FR at 48494 (November 1989), and 55 FR at 22532 (June 1, 1990). As discussed above, the Agency does not believe any reaction occurs, and that the simple addition of iron does not provide adequate or long-term, treatment.

The available data indicates that analytical masking (i.e., analytical interference) may not be a problem, as evidenced by the available matrix spike recovery data. EPA has studied the chemistry relative to this iron treatment process which indicates that when the mixture is dry there is no reaction at all. e.g., See Kendall Report, p.2. However, once acetic acid is added (during TCLP analysis) some oxidation reduction type chemistry may occur that may mask the lead from getting into solution and hence, not be revealed in analytical analysis. However, the Agency points out that the analytical method for lead is sufficient and it is during the extraction process that masking occurs. EPA believes that iron treatment masks the TCLP results in that it passes the TCLP test initially but may fail over the long-term. EPA also notes that RCRA requires that the TCLP analysis for determination of TC hazardousness be determined at the point of waste generation (55 FR 11830 March 29, 1990). EPA notes that the TCLP testing by the foundry industry to demonstrate whether the waste is in fact TC hazardous (and hence, require treatment) is typically performed after the addition of the iron dust. The argument that the addition of iron dust is part of the process is not valid and believes that the addition of iron dust or filings masks the presence of lead.

The commenter is correct in that the Battelle report did not state that the bonds are not

permanent, but concluded that the long-term stability is unknown. However, the Agency remains unconvinced about the long-term stability of this technology. The Agency realizes that this technology has been in use only since the early 1980's and thus, there is little data available on long-term effectiveness. The Agency compiled information on two different studies conducted on this issue, one by Dr. John Drexler of the University of Colorado and the other by Dr. Douglas Kendall of the National Enforcement Investigation Center (NEIC). These studies found that even after treatment, high concentrations of lead remained available to the environment and also leached in the units receiving the spent foundry wastes (measured by TCLP testing). Therefore, these studies concluded that the addition of iron filings or iron dust to lead-contaminated spent foundry sands did not constitute adequate treatment of the waste. See the March 5, 1997 NODA (62 FR 10004) for a full discussion of these studies. The conclusions reached by these studies were peer reviewed by an expert panel. The peer reviewers agreed that adding iron filings to spent foundry sand is not treatment of hazardous constituents in the sense of actually impeding lead mobility. The peer reviewers also found that the scientific data presented in the studies support the conclusions reached and the studies are based on sound scientific research and fact. Therefore, the Agency reaffirms its conclusion that the addition of iron filing constitutes impermissible dilution

The Agency is also codifying this determination by amending 40 CFR 268.3 to read as follows:

40 CFR 268

§ 268.3 Dilution prohibited as a substitute for treatment

* * *

(d) It is a form of impermissible dilution, and therefore prohibited, to add iron filings or other metallic forms of iron to lead-containing hazardous wastes in order to achieve any land disposal restriction treatment standard for lead. Lead-containing wastes include D008 wastes (wastes exhibiting a characteristic due to the presence of lead), all characteristic wastes containing lead as an underlying hazardous constituent, listed wastes containing lead as a regulated constituent, and hazardous media containing any of the aforementioned lead-containing wastes.

* * *

The Agency does not agree with the commenter's suggestion that an alternative analytical testing procedure be used since the waste is disposed of in a monofill. EPA has established the TCLP as the official required method for determining whether a waste is toxicity characteristic hazardous. EPA's determination of the use of the TCLP was finalized on March 29, 1990 (55 FR 11798). This issue is not being reopened in this rulemaking. However, EPA reviewed the suitability for testing the leachability of lead in foundry sand and continues to believe that TCLP testing is appropriate for determining the characteristic of hazardousness for metal-bearing waste streams. This issue is further discussed in the Technical Memorandum entitled "Iron Dust Treatment of Lead-Bearing Foundry Sand," dated September 15, 1995, and can be found in the Administrative Record for this rulemaking. With regard to the comment on the MELP, the Agency agrees that both TCLP and MELP are acceptable analytical procedures. However, the Agency notes that the MELP is designed to test the leachability of constituents on a longer term and therefore, a sample that passes the MELP is very

unlikely to fail the TCLP. In addition, the Agency notes that the RCRA regulations, as stated in 40 CFR 261.4(a), require TCLP, test method 1311 to determine whether the leachate exhibits a hazardous characteristic.

With respect to the comment on the absence of current groundwater contamination, the Agency notes that studies have shown leachate testing to be an ineffective measure of long-term metal mobility and future monitoring may show contamination, should any landfill liner fail or contamination reach the monitoring well.

Issue: FOUN1-017

Respondent: TTS

Dcn: PH3P017

Extension:

CBI: N

Commenter: THE TDJ GROUP, INC

Comment Number: 00001

//COMM1

//RESPTTS

//SUBJFOUN1-017

1) CRITICISM OF EPA WASTE CHARACTERIZATION PROCEDURES

AS YOU ARE AWARE, A PERFECT CHARACTERIZATION TEST FOR TOXICITY DOES NOT EXIST. IN AN EFFORT TO PROVIDE A REASONABLE CONSERVATIVE TEST THAT SIMULATES CONDITIONS IN AN ACIDIC LANDFILL, THE EPA IMPLEMENTED THE CURRENT TCLP TEST NOW USED TO CHARACTERIZE D008 WASTES. ALTHOUGH THE TCLP TEST REPLACED A PROCEDURE WHICH SIMULATED APPROXIMATELY 100 YEAR IN AN ACIDIC LANDFILL, THE SHORT-TERM NATURE OF THE TCLP TEST DOES NOT TAKE INTO ACCOUNT THE POSSIBILITY FOR SHORT AND MEDIUM TERM CHEMICAL CHANGE IN THE WASTE WHICH COULD LEAD TO AN UNACCEPTABLE RELEASE OF LEAD OR OTHER INORGANICS. IN ADDITION, THE ACIDIC NATURE OF THE TEST DOES NOT ALLOW CONSIDERATION OF THE PERFORMANCE OF THE WASTE IN A MORE ALKALINE ENVIRONMENT. THIS IS OF SOME CONCERN, SINCE THE D--9 BDAT RECOMMENDED BY TEN AGENCY INVOLVES THE USE OF BASIC SILICATE STABILIZATION TECHNOLOGIES, SUCH AS PORTLAND CEMENT, AND LEAD IS AMPHOTERIC. EXCESSIVE ELEVATION OF PH WITH NO OTHER CHANGES MAY CREATED CONDITIONS OF ELEVATED LEAD MOBILITY IN BASIC ENVIRONMENTS.

IT IS THE EXPERIENCE OF THE AUTHORS OF THIS LETTER THAT TESTING PROCEDURES CAN BE USED TO MAKE A SERIES OF POINTS FOR AND AGAINST CURRENT AGENCY TESTING METHODS, BUT MORE THOUGHTFUL AND CAREFUL APPLICATION OF VARIOUS AGENCY TEST METHODS SEEMS TO SUPPORT THE CONCENTRATION THAT THE TCLP OFFERS A REASONABLY CONSERVATIVE (BUT INCOMPLETE) VIEW OF WASTE STABILITY. FOR EXAMPLE, IN A RECENT FHWA REPORT (REVIEWED BY EPA STAFF), SAMPLES OF SILICATE AND IRON TREATED D008 WASTES WERE SUBJECTED TO SINGLE AND MULTIPLE TCLP TESTING AND MEP

TESTING.

SILICATE ADDITIONS TO ABRASIVE USED ON LEAD BASED PAINT CREATES A WASTE WHICH EXHIBITS LONG TERM STABILITY. THIS IS EVIDENT BY THE WASTE'S ABILITY TO WITHSTAND CYCLED ACIDIC ENVIRONMENTS IN FIVE SEQUENTIAL TCLP TESTS AND THE MEP TEST. IN BOTH CASES THE WASTE SHOWED NO TRENDS TOWARDS INCREASING LEAD LEACHABILITY.

IN THE SAME SET OF TESTS, IRON TREATED ABRASIVE WAS UNABLE TO SURVIVE THE MEP TEST, APPARENTLY DUE TO THE PROGRESSIVE CORROSION OF THE IRON FILLING USED IN THE WASTE DURING THE TEST. THIS SAME WASTE PASSED THE TCLP TEST, AND WAS CAPABLE OF PASSING MULTIPLE TCLP TESTS AS LONG AS THE TESTS WERE PERFORMED OVER A SHORT SPAN OF TIME.

THERE APPEARS TO BE SUFFICIENT INFORMATION AVAILABLE TO THE AGENCY IN PUBLISHED FORM THAT SUGGESTS THAT IRON TREATED WASTES WILL NOT REMAIN STABLE IN ACIDIC ENVIRONMENTS. IT ALSO SEEMS CLEAR THAT WE DO NOT HAVE CORRESPONDING TESTING DATA TO ADDRESS THE SAME ISSUE IN A PH NEUTRAL OR ALKALINE DISPOSAL ENVIRONMENT.

FROM THE STANDPOINT OF TESTING PROCEDURES, THE AUTHORS OF THIS LETTER SUGGEST THAT THE TCLP TEST IS NECESSARY BUT NOT SUFFICIENT FOR TESTING IRON TREATED D008 WASTES. THIS WASTE MATERIAL IS SOMEWHAT EXCEPTIONAL IN THAT WE CAN CLEARLY SEE THE PROCESS THAT WILL ALLOW THE MATERIAL TO FAIL (RUSTING OF THE IRON), AND WE NOTE THE INABILITY OF THE TEST TO SIMULATE THE SAME. RATHER THAN DAMNING THE EXISTING TESTING PROCEDURE, WE WOULD ADVISE THE AGENCY TO CONSIDER THESE WASTES AS A SEPARATE MATERIAL UNDER THE REGULATIONS, AND TO USE THAT STATUS TO MODIFY THE TESTING AND TREATMENT REQUIRED FOR LAND DISPOSAL.

2) ARGUMENTS SUGGESTING THAT THE PROPOSED RULING DOES NOT OR SHOULD NOT APPLY TO PARTICULAR CONDITIONS OF DISPOSAL

PRELIMINARY DATA FROM THE FOUNDRY INDUSTRY (OUTLINED IN THE AMERICAN FOUNDRYMANS SOCIETY RESPONSE) SUGGESTS THAT MONOFILLING OF THESE WASTES SHOWS NO EVIDENCE OF LEAD MOBILITY IN SOIL TESTS AND IN GROUNDWATER MONITORING. THESE DATA NEED TO BE UNDERSTOOD WITHIN THE CONTEXT OF THE LARGER PROBLEM THE AGENCY FACES. LIMITED DATA ON GROUNDWATER MONITORING FROM THE FOUNDRY INDUSTRY (BOTH HARD AND ANECDOTAL DATA) APPEAR TO SHOW LITTLE EVIDENCE THAT THE MOST COMMON LEADED ALLOYS IN USE BY THE INDUSTRY HAVE MIGRATED WHEN DISPOSED TO MONOFILLS. THESE DATA COULD INCLUDE EVIDENCE OF A LACK OF MOBILITY OVER PERIODS OF TIME THAT EXTEND BEFORE RCRA AND THE ADOPTION OF IRON

TREATMENT PRACTICES (PRE-1978). NO CONCLUSIVE DATA ARE AVAILABLE TO REFLECT THE PERFORMANCE OF IRON TREATMENT OVER DECADES, SINCE THE PRACTICE WAS FIRST INTRODUCED IN THE FOUNDRY INDUSTRY IN 1985. NO CONCLUSIVE DATA ARE AVAILABLE TO CLEARLY MODEL THE MOBILITY OR LACK OF MOBILITY OF COMMON FOUNDRY LEAD ALLOYS IN LESS ACIDIC LAND DISPOSAL ENVIRONMENTS. IT WOULD SEEM CLEAR, HOWEVER, THAT DISPOSAL OF IRON-TREATED BRASS CONTAMINATED FOUNDRY WASTES IN ALKALINE MONOFILLS SHOULD BE ANALYZED DIFFERENTLY THAN DISPOSAL OF SPENT LEAD-CONTAMINATED ABRASIVE IN ACIDIC LANDFILLS.

3) ARGUMENTS SURROUNDING POINT OF GENERATION ISSUES

POINT OF GENERATION ISSUES HAVE ALREADY SURFACED AS A MATERIAL PORTION OF THIS RULEMAKING.

IT SHOULD BE NOTED THAT PROCESS CHANGE FOR THE PURPOSES OF WASTE REDUCTION OR MOTIVATION IS ALREADY AN AREA OF SUBSTANTIVE ACTIVITY IN BOTH THE FOUNDRY AND STEEL MAINTENANCE INDUSTRIES. IN THE SUBJECT AREAS OF OPERATION (RECYCLING OF MOLDING SANDS, APPLICATION OF STEEL GRIT, APPLICATION OF SILICA BASED ABRASIVE WITH IRON ADDITIONS), IRON DUST AND/OR STEEL GRIT CAN SURVIVE THE ENTIRE USE ENVIRONMENT. IN SHORT, THIS MEANS THAT NO MATTER WHERE THE "POINT OF GENERATION" IS DEFINED BY THE AGENCY, IT WILL BE POSSIBLE TO ADD IRON DUST UPSTREAM OF THAT POINT, THEREBY AVOIDING SUBTITLE C REGULATION OF THE WASTE. IF THE AGENCY FEELS THAT THIS PROCESS OF WASTE CHANGE OR TREATMENT IS NOT AN ACCEPTABLE PRACTICE, USE OF POINT OF GENERATION ISSUES MAY NOT BE EFFECTIVE IN RESTRICTING THESE ACTIVITIES.

4) SUGGESTIONS THAT THE PROPOSED RULE DOES NOT PROMOTE WASTE MINIMIZATION

IF THE AGENCY ACTS TO DISCOURAGE THE USE OF IRON MATERIALS AS TREATMENT AGENTS, THIS MAY HAVE AN IMPACT ON THE SALE AND USE OF RECYCLABLE STEEL ABRASIVE IN STEEL MAINTENANCE AND DELEADING APPLICATIONS. ONE OF THE ARGUMENTS OFFERED IN THIS AREA IS THE SUGGESTION THAT RECYCLABLE STEEL GRIT REPRESENTS AN OPPORTUNITY TO MINIMIZE WASTES GENERATED THROUGH THE USE OF "NON-RECYCLABLE" ABRASIVE. IN TRUTH, ALL OF THE SLAG "NON-RECYCLABLE" ABRASIVE IS IN FACT, A RECYCLED WASTE MATERIAL IN ITS OWN RIGHT. THESE MATERIALS INCLUDE RECYCLED COAL SLAGS, COPPER SLAGS, STEEL SLAGS, AND NICKEL SLAGS. NO MATTER WHICH WAY THE AGENCY FINALLY RULES ON THIS MATTER, IT WILL BE PROVIDING SUPPORT FOR ONE OR MORE OF A SERIES OF RECYCLING EFFORTS.

WE WOULD MAKE A SERIES OF OBSERVATIONS AND CONCLUSIONS BASED ON THE ABOVE INFORMATION:

THE TCLP TEST IS A CONSERVATIVE, BUT IMPERFECT MEASURE OF HEAVY METALS MOBILITY POTENTIAL IN LANDFILLS;

THE TCLP TEST MAY NOT ACCURATELY REFLECT THE POTENTIAL MOBILITY OF HEAVYMETALS IN MONOFILLS AND NON-LANDFILL ENVIRONMENTS;

IRON TREATED WASTES FROM BOTH THE FOUNDRY INDUSTRY AND THE LEAD PAINT ABATEMENT OF STEEL STRUCTURES (SPENT ABRASIVE WASTE) ARE BEING DISPOSED IN SANITARY LANDFILLS WITH ACID LEACHATES PRESENT;

IN ACIDIC ENVIRONMENTS WITH SUFFICIENT MOISTURE AND OXYGEN, IRON WILL RUST AND THE TREATMENT REACTIONS WILL BE REVERSED;

IF THE LEAD COMPOUNDS ARE MOBILE WITHOUT TREATMENT, THEY WILL LEACH AFTER THE IRON IS OXIDIZED;

GOVERNMENT EFFORTS TO STOP THE PROCESS OF IRON DUST TREATMENT THROUGH AGGRESSIVE DEFINITION OF POINTS OF WASTE GENERATION WILL PROBABLY NOT BE EFFECTIVE;

STOPPING THIS TREATMENT PROCESS FOR LEADED WASTES WILL PROBABLY HAVE NOT IMPACT ON WASTE MINIMIZATION ACTIVITIES.

//COMM2
//RESPRIA
//SUBJREGR1

WHAT CAN THE AGENCY DO TO RESTRICT THESE IRON TREATMENT ACTIVITIES? IF THE OBSERVATION THAT POINT OF GENERATION IS NOT AN EFFECTIVE MEANS OF REGULATING THIS PRACTICE, THEN WE WOULD SUGGEST THAT THE GOVERNMENT CONSIDER LISTING IRON AND LEAD RICH WASTE STREAMS (FROM BRASS FOUNDRY CASTING SANDS, BRASS FOUNDRY STEEL GRIT CLEANING SYSTEMS, IRON TREATED SPENT ABRASIVE AND THE RESIDUE FROM MOBILE STEEL GRIT SYSTEMS USED IN LEAD PAINT ABATEMENT) AS HAZARDOUS, WITH A CLEARLY DEFINED PATH FOR DELISTING. OUR DATA SUGGEST THAT THERE ARE THREE POTENTIAL TYPES OF WASTE GENERATORS THAT WOULD BE IMPACTED BY SUCH A DECISION: LARGE FOUNDRIES WITH THEIR OWN MONOFILLS, SMALLER FOUNDRIES USING OFFSITE COMMERCIAL DISPOSAL FACILITIES, AND SAND BLASTING CONTRACTORS THAT MOVE FROM JOB SITE TO JOB SITE. LARGER FOUNDRIES WITH MONOFILLS ARE DISPOSING OF THE MATERIAL IN A POTENTIALLY LESS ACIDIC ENVIRONMENT AND

HAVE THE RESOURCES TO GO THROUGH A DELISTING PROCESS. SMALLER FOUNDRIES DO NOT HAVE THE ABILITY TO DELIST, BUT THE AGENCY COULD PRESCRIBE A METHOD OF TREATMENT (SILICATE STABILIZATION) NECESSARY TO DISPOSE OF THE MATERIAL. ABRASIVE APPLICATORS WORK MULTIPLE SITES IN A GIVEN YEAR, SO DESLISTING WOULD NOT BE AN OPTION. SINCE THIS IS THE AREA OF GREATEST USE OF IRON DUST TREATED WASTES, THIS WOULD DISCOURAGE THE PRACTICE.

BASED ON THE SPEED OF NEW TECHNOLOGY DEVELOPMENT IN THIS AREA, AS WELL AS THE AVAILABILITY OF EXISTING TECHNOLOGIES, THIS ACTION BY THE GOVERNMENT WOULD PROBABLY HAVE LITTLE ECONOMIC IMPACT ON THE REGULATED COMMUNITY. CURRENTLY METHODS NOT UTILIZING IRON TREATMENT IN THE ABRASIVE INDUSTRY NOW COST ABOUT THE SAME PER SQUARE FOOT OF PAINT REMOVAL AS METHODS UTILIZING THE PRACTICE OF IRON ADDITION. FOR EXAMPLE, THE DIFFERENCE IN COST OF PAINT REMOVAL BETWEEN IRON AND NON-IRON ADDITION IS ABOUT \$0.15 TO \$0.25 PER SQUARE FOOT (IRON ADDITION IS SLIGHTLY CHEAPER). ON A PROJECT WHERE THE AVERAGE COST OF PAINT REMOVAL TYPICALLY RUNS FROM \$6.00 TO \$15.00 PER SQUARE FOOT, A SMALL CHANGE IN THE COST OF DISPOSAL WILL NOT MATERIALLY AFFECT THE USE OF TECHNOLOGY.

//ENDC1

RESPONSE

The TDJ Group submitted comments making the following observations and conclusions:

1. The TCLP test is an imperfect measure of heavy metals mobility potential at landfills, monofills, and non-landfill environments;
2. Iron-treated foundry sands disposed of in alkaline monofills should be analyzed differently than spent lead-contaminated abrasives disposed of in acidic landfills;
3. Defining the point of generation will not be effective in stopping the use of the process to avoid Subtitle C jurisdiction; and
4. The proposed rule may not have an impact on waste minimization.

The Agency has determined that the TCLP test is the approved analytical procedure for determining whether a waste exhibits the toxicity characteristic for metal-bearing wastes. EPA's determination of the use of the TCLP was finalized on March 29, 1990 (55 FR 11798). This issue is not being reopened in this rulemaking. However, EPA reviewed the suitability for testing the leachability of lead in foundry sand and continues to believe that TCLP testing is appropriate for determining the characteristic of hazardousness for metal-bearing waste streams. This issue is further discussed in the Technical Memorandum entitled "Iron Dust Treatment of Lead-Bearing Foundry Sand," dated September 15, 1995, and can be found in the Administrative Record for this rulemaking.

In any case, the Agency is not reopening the issue of the proper test for determining toxicity. Rather, the issue is whether a particular method of treatment minimizes threats posed by land disposal of a hazardous waste. The ultimate conclusion in this proceeding is that addition of iron filings is an inadequate method for treating D008 wastes since lead is not immobilized. Rather, the analytic compliance method is blinded. This is a form of dilution. See also Drexler Report at pp. 14, 16, 18 (addition of iron filings results in a dilution effect, not actual immobilization).

As stated above the Agency has determined that the TCLP test is the approved analytical procedure for determining whether a waste exhibits the toxicity characteristic for metal-bearing wastes. Again, the issue in this proceeding is entirely different: evaluation of the adequacy of a type of treatment process. The Agency is not reopening the question of a method for identifying which wastes are hazardous, and comment responses are included only in the event a response to these unsolicited points is considered to be necessary. Regarding the point of generation issues, EPA notes that RCRA requires that the TCLP analysis for determination of TC hazardousness be performed at the point of waste generation (55 FR 11830 March 29, 1990).

EPA acknowledges the comment that curtailing treatment of lead-containing foundry sand by addition of iron dust process may not impact waste minimization activities.

Issue: FOUN1-040

Respondent: TTS

Dcn: PH3P040

Extension:

CBI: N

Commenter: AMERICAN FOUNDRYMEN'S SOCIETY, INC

Comment Number: 00001

//COMM1

//RESPTTS

//SUBJFOUN1-040

IRON ADDITION TO FOUNDRY WASTE IS NOT DILUTION

EPA'S REFERENCE TO IRON FILINGS TREATMENT USED BY THE FOUNDRY INDUSTRY AS BEING IMPERMISSIBLE DILUTION IS NOT VALID. NO SUPPORTING DOCUMENTATION CITED IN THE FEDERAL REGISTER NOTICE JUSTIFIES THE EPA'S POSITION. THE REPORT, CITED BY EPA AS SUPPORTING IT'S POSITION IS BATTELLE'S "IRON CHEMISTRY IN LEAD CONTAMINATED MATERIALS" (DATED FEBRUARY 22, 1994, PREPARED FOR EPA S RISK REDUCTION ENGINEERING LABORATORY, CINCINNATI, OHIO AND REFERRED TO IN THIS LETTER AS THE BATTELLE REPORT). THIS REPORT SPECIFICALLY INDICATES DOSAGE RATES USED BY FOUNDRIES OF 1 TO 10% AS EFFECTIVELY LOWERING THE LEAD LEACHABILITY FROM THE ORIGINAL LEVEL OF WELL OVER 100 PPM TO LESS THAN 5 PPM IN THE WASTE TESTED. IF THE TWENTY-FOLD REDUCTION IN LEAD CONCENTRATIONS WAS SOLELY DUE TO DILUTION, AN 800% TO 5000% ADDITION WOULD BE REQUIRED, 10% WOULD NOT BE SUFFICIENT. IT IS A CHEMICAL REACTION, NOT SIMPLE DILUTION, THAT IS STABILIZING THE LEAD IN THE FOUNDRY WASTES. THE SCIENTIFIC AND TECHNICAL DISCUSSION OF THE CHEMICAL REACTIONS INVOLVED ARE CONTAINED IN COMMENTS SUBMITTED BY RMT, INC. REGARDING THE MARCH 2ND FEDERAL REGISTER.

IRON IS NOT MASKING TCLP RESULTS

IT IS OUR UNDERSTANDING THAT SINCE THE PUBLICATION OF THE MARCH 2ND FEDERAL REGISTER, EPA HAS ESTABLISHED THAT THE CONCLUSIONS IN THE DATANET REPORT ARE INCORRECT, I.E IRON DOES NOT INTERFERE WITH THE TCLP ANALYSIS FOR LEAD (SEE PHONE MEMOS ON DISCUSSIONS BETWEEN EPA STAFF

AND RMT IN APPENDIX E). BASED ON THIS DETERMINATION, THE ARGUMENT THAT IRON IS MASKING THE TCLP TEST IS UNFOUNDED AND SHOULD 'BE REMOVED FROM DISCUSSION.

BATTELLE REPORT

THE JANUARY, 1994 BATTELLE REPORT RECOGNIZES THAT THERE ARE DATA GAPS AND ISSUES AND PROPOSES SIX EXPERIMENTS TO ANSWER QUESTIONS ON TOPICS INCLUDING: IRON SEGREGATION IN WASTES, ECONOMIC FEASIBILITY, EMPLOYEE SAFETY AND HEALTH, OPTIMAL PROPERTIES OF THE IRON, AND STABILITY OVER TIME. ANOTHER ISSUE IS RAISED BY THE COMMENT ON PAGE 21 OF THE BATTELLE REPORT. "WASTE GENERATED BY REMOVAL OF LEAD PAINT FROM STRUCTURES HAS SOME SIMILARITIES TO SPENT CASTING SAND. BOTH THE CASTING SAND AND ABRASIVE BLASTING MEDIA WASTE ARE A SILICATE MATRIX CONTAINING LEACHABLE LEAD CONTAMINATION. HOWEVER, THE LEAD SPECIES PRESENT AND THE TYPE AND CONDITION OF THE SAND ARE DIFFERENT."

THE ABOVE PROCESSES ARE QUITE DIFFERENT IN CHARACTER. FOUNDRY SAND STABILIZATION IS PERFORMED UNDER CONTROLLED CONDITIONS WITH DISPOSAL PLACEMENT CAREFULLY CONTROLLED. THE ADDED SAND GRAINS AND IRON PARTICLES ARE APPROXIMATELY THE SAME SIZE AND DENSITY, ARE THOROUGHLY BLENDED IN AN ENGINEERED SYSTEM, AND WILL NOT SEPARATE AFTER STABILIZATION. THE PAINT, ON THE OTHER HAND, IS NOT TREATED BUT TAKES ADVANTAGE OF IRON PRESENT DUE TO THE USE OF IRON OR STEEL SHOT TO REMOVE THE PAINT. THIS BLASTING PROCESS IS MUCH LESS CONTROLLED THAN THE FOUNDRY SAND STABILIZATION PROCESS. PAINT FLAKES AND IRON PARTICLES ARE NOT OF THE SAME SIZE AND DENSITY SO MIXING IS LESS EFFECTIVE. THE DIFFERENCES IN LEAD SPECIES IN PAINT AND FOUNDRY PRODUCTS EXPLAIN WHY IRON STABILIZES LEAD BEARING FOUNDRY WASTES, BUT DOES NOT IMMOBILIZE LEAD IN PAINT FLAKES.

IN LIGHT OF THE RECOMMENDATIONS MADE IN THE BATTELLE REPORT AND WITH NO DOCUMENTATION REFERENCED IN THE FEDERAL REGISTER NOTICE THAT SUBSTANTIATES ENVIRONMENTAL HARM DUE TO FOUNDRIES USING THIS STABILIZATION TECHNIQUE, WE QUESTION THE EPA'S DECISION TO MAKE A DETERMINATION THAT IRON ADDITIONS TO FOUNDRY WASTE IS IMPERMISSIBLE DILUTION.

IF EPA FEELS THAT 10% IRON ADDITIONS TO FOUNDRY WASTES IS DILUTION, THEN THEY SHOULD ALSO CONSIDER REEVALUATING OTHER COMMONLY USED TREATMENT TECHNOLOGIES, SUCH AS LIME ADDITIONS, TO DETERMINE IF THE STABILIZATION OBTAINED MIGHT ALSO BE MASKING THE TCLP TEST OR BE DILUTION.

EPA HAS MORE FOUNDRY INFORMATION THAN IS REFERENCED IN MARCH 2, 1995 FEDERAL REGISTER

DURING THE LAST THREE YEARS, EPA HAS REQUESTED AND RECEIVED THOUSANDS OF PAGES OF INFORMATION FROM BRASS FOUNDRIES IN BOTH REGIONS V AND VI REGARDING THEIR USE OF IRON TO STABILIZE LEAD IN FOUNDRY WASTES. THIS INFORMATION INCLUDES LABORATORY ANALYSIS, TREATMENT METHODS AND PROCESSES, QUALITY ASSURANCE PROGRAMS, DAILY RECORDS OF QUANTITIES OF MATERIAL STABILIZED, LANDFILL DATA, GROUND WATER MONITORING DATA AND OPERATIONAL HISTORY. NONE OF THIS INFORMATION IS CITED BY EPA IN THE MARCH 2, 1995 FEDERAL REGISTER.

WE CAN ONLY ASSUME THAT EPA IN WASHINGTON IS EITHER NOT AWARE OF THIS DATA, OR HAS CHOSEN TO IGNORE IT IN THE PROPOSED RULE MAKING. MANY OF THE CRITICAL QUESTIONS RAISED BY BATTELLE IN THEIR JANUARY, 1994 REPORT TO EPA MIGHT HAVE BEEN ANSWERED HAD EPA CHOSEN TO INCLUDE THIS INFORMATION AS PART OF A COMPLETE AND THOROUGH INVESTIGATION ON THE USE OF IRON TO IMMOBILIZE LEAD IN FOUNDRY WASTES.

CASE STUDIES FROM FROUNDRIES PRACTICING IRON TREATMENT OPERATIONS

IN AN ATTEMPT TO ALLEVIATE THIS SITUATION, AFS IS SUBMITTING ACTUAL DATA FROM FOUR FOUNDRIES AS CASE STUDIES. THIS DATA IS INCLUDED IN APPENDICES A-D AND WILL SHOW THE FOLLOWING:

1. IRON ADDED TO LEAD BEARING WASTE FOUNDRY SAND EFFECTIVELY IMMOBILIZES THE LEAD AND YIELDS A PRODUCT THAT CONSISTENTLY PASSES TCLP.
2. THE PROCESS OF MIXING WASTE FOUNDRY SAND WITH IRON IN THE FOUNDRY ENVIRONMENT IS A CONTROLLED PROCESS COMPARABLE TO THE MULLING AND MIXING OF THE SAND IN THE PRODUCTION PROCESS.
3. RECENT TCLP TESTS, RUN ON FOUNDRY SAND THAT WAS TREATED WITH IRON AND LANDFILLED 8-10 YEARS AGO, YIELD LEAD RESULTS BELOW THE 5 PPM LEVEL.
4. GROUNDWATER DATA FROM MONITORING WELLS AT ON-SITE PERMITTED DISPOSAL FACILITIES CONFIRM THAT LEAD LEVELS ARE WELL BELOW FEDERAL DRINKING WATER STANDARDS.
5. MONITORING WELL DATA ALSO SUGGESTS GROUNDWATER IS NOT IMPACTED BY PAST SURFACE IMPOUNDMENTS THAT CONTAINED LEAD BEARING WASTE

FOUNDRY SAND WHICH HAD NOT BEEN TREATED WITH IRON.

6. ANALYSIS FOR TOTAL IRON FROM LANDFILL SAMPLES PROVIDE RESULTS THAT CLEARLY SHOW THE IRON HAS NOT OXIDIZED AFTER SEVERAL YEARS.

THE MATERIAL CONTAINED IN APPENDICES A-D IS BEING SUBMITTED TO CLARIFY ISSUES AND PROVIDE THE DATA SUPPORTING AFS' POSITION FOR EPA REVIEW.

IRON TREATMENT HAS LONG TERM STABILITY

EPA HAS EMPHASIZED THAT IRON TREATMENT IS NOT EFFECTIVE DUE TO THE POTENTIAL FOR OXIDATION OF IRON IN A LANDFILL. THIS WOULD ALLOW THE LEAD TO LEACH OUT OVER TIME. ON PAGE 11731 EPA'S POSITION IS THAT THE STABILIZATION IS TEMPORARY. AFS HAS NOT BEEN ABLE TO FIND DOCUMENTATION TO SUPPORT THE AGENCY'S POSITION. AFS DOES NOT KNOW OF ANY TECHNICAL EVIDENCE SUPPORTING THE EPA'S POSITION AND BELIEVES THAT LONG-TERM STABILITY HAS BEEN DEMONSTRATED. THE FOUNDRY INDUSTRY HAS A DEMONSTRATION OF LONG-TERM EFFECTIVENESS IN THE LANDFILL BASED ON ACTUAL BORINGS AND ANALYSES CONDUCTED UNDER EPA APPROVAL. APPENDIX C CONTAINS A REPORT ENTITLED CHARACTERIZATION OF FOUNDRY WASTE DISPOSED AT THE NACOGDOCHES MUNICIPAL LANDFILL." THE RESULTS DOCUMENT THAT THE IRON TREATED FOUNDRY WASTES PLACED IN THE LANDFILL ARE STILL PROVIDING EFFECTIVE LEAD STABILIZATION AND THE IRON HAS NOT OXIDIZED. THE REPORT CLEARLY INDICATES THAT EFFECTIVE TREATMENT IS IN PLACE AND THAT THE TCLP RESULTS CORRELATE DIRECTLY WITH THE LEVEL OF TOTAL IRON.

TO DATE AFS CONTINUES TO REVIEW DATA RELATIVE TO IRON FILINGS TREATMENT AND HAS ALSO REVIEWED RMT'S RESULTS FROM MULTIPLE EXTRACTION PROCEDURE (MEP). MEP IS THE ONLY MODEL AVAILABLE AND INDICATES EFFECTIVE TREATMENT FOR 1000 YEARS. FIELD STUDIES SUPPORT THE MODEL. WE SIMPLY DO NOT SEE THE JUSTIFICATION FOR THIS RULING. ON WHAT TECHNICAL BASIS IS EPA PROMOTING THIS RULEMAKING AND WHERE ARE THE FACTS?

DISCUSSIONS NEEDED ON THERMAL SAND RECLAMATION

IN THE MARCH 2, 1995 FEDERAL REGISTER, EPA REFERENCES THE FOUNDRY INDUSTRY'S PRACTICE OF RECYCLING FOUNDRY SAND BY THERMALLY OXIDIZING IMPURITIES (PAGE 11731). THIS TECHNOLOGY HAS BEEN FOUND TO BE AN EFFECTIVE POLLUTION PREVENTION MEASURE THAT REDUCES WASTES BY 80% WHILE RETURNING RAW MATERIALS TO THE CASTING PROCESS. LETTERS FROM THE STATES OF CALIFORNIA AND NORTH CAROLINA SPECIFICALLY COMMENDING

FOUNDRIES IN THEIR STATES FOR IMPLEMENTATION OF THIS TECHNOLOGY AND ARE FOUND IN APPENDIX E. OTHER FOUNDRIES ARE PRESENTLY CONSIDERING INSTALLATION OF THIS TECHNOLOGY AS AN INTEGRAL PART OF THEIR SAND SYSTEMS TO REDUCE SOLID WASTES. THERMAL TREATMENT OF FOUNDRY SAND IS A CALCINING OPERATION AND NOT INCINERATION. AS EXPRESSED IN THE GMD COMMENTS, SUBMITTED IN RESPONSE TO THIS PROPOSAL, "THE CALCINING PROCESS DOES NOT CHANGE THE CHEMICAL, BIOLOGICAL, OR PHYSICAL CHARACTER OR COMPOSITION OF THE SAND, I.E. SILICA, SILICON DIOXIDE (SIO₂)." GMD'S COMMENTS CLARIFY THE DIFFERENCES BETWEEN THERMAL RECLAMATION OF FOUNDRY SANDS AND HAZARDOUS WASTE INCINERATION AS PRACTICED BY OTHER INDUSTRIES.

//ENDC1

RESPONSE

AFS submitted comments objecting to EPA's position against addition of iron dust to foundry sand. The main points of contention are:

Iron addition to foundry sand is not dilution as EPA categorizes the process, and, the Battelle report recognizes that there are data gaps on issues, and therefore, AFS questions how EPA was able to make the determination that iron dust treatment of foundry sand is impermissible dilution; The commenter pointed out that many data were not cited in the March 2, 1995 Federal Register, and submitted some data of their own;

1. Iron is not masking lead analysis in TCLP results;
2. Lead species are different in the foundry product from that of spent abrasive blasting media, and this difference explains why iron dust treatment works for stabilizing foundry sands;
3. Iron dust treatment of foundry sands provides long-term stability; and
4. Thermal reclamation of foundry sand is an effective pollution prevention measure.

EPA continues to believe that iron dust should be classified as impermissible dilution, as well as a method of treatment that in fact fails to minimize the threats posed by land disposal of D008 wastes. It is unlikely that a chemical reaction occurs when iron dust is added to foundry sands. See, e.g. Kendall Report p. 2. Because the waste foundry sand would likely contain only lead, silica, microscopic pieces of castings, and binders (clays, phenols, and tars) from the molds, EPA is not convinced that the simple addition of iron would provide treatment of the lead or the organics (i.e., phenol and tar). Although it is arguable that iron could form temporary and weak, ionic complexes with silica and/or phenol, so that when analyzed by the TCLP test the lead appears to have been stabilized, EPA believes that this "stabilization" is temporary, based upon the nature of the complexing. In fact, a report by EPA on Iron Chemistry in Lead Contaminated Materials (Feb. 22, 1994), which specifically addressed this issue, found that iron-lead bonds are weak, adsorptive surface

bonds. Furthermore, as this iron-rich mixture is exposed to moisture and oxidative conditions over time, interstitial water would likely acidify, which could potentially reverse any temporary stabilization, as well as increase the leachability of the lead from the foundry sand. EPA, therefore believes that the iron-lead bonds are not likely to be permanent.

With respect to the masking issue, the available data indicate that analytical masking (i.e., analytical interference) may not be a problem, as evidenced by the available matrix spike recovery data. EPA has studied the chemistry relative to iron dust treatment which indicates that when the mixture is dry there is no reaction at all. However, once acetic acid is added (during TCLP analysis) some oxidation reduction type chemistry may occur that may mask the lead from getting into solution and hence, not be revealed in analytical analysis. EPA believes that iron treatment masks the TCLP results in that it passes the TCLP test initially but may fail in a longer term. EPA also notes that RCRA requires that the TCLP analysis for determination of TC hazardousness be determined at the point of waste generation.

The Agency acknowledges that there are data gaps with respect to iron dust treatment of foundry sands. To EPA's knowledge, this technology has been in use only since the early 1980's and, thus, there is little data available on long-term effectiveness. The Agency reviewed available data for promulgating this rule including data submitted by commenters that included data from Regions V and VI. The Agency also compiled information on two different studies conducted on this issue, one by Dr. John Drexler of the University of Colorado and the other by Dr. Douglas Kendall of the National Enforcement Investigation Center (NEIC). These studies found that even after treatment, high concentrations of lead remained available to the environment and also leached in fact from spent foundry wastes in actual disposal units. Therefore, these studies concluded that the addition of iron filings or iron dust to lead-contaminated spent foundry sands did not constitute adequate treatment of the waste; there is palpable failure to minimize threats posed by land disposal due to inability to immobilize lead. See the March 5, 1997 NODA (62 FR 10004) for a full discussion of these studies.

The Agency strongly believes that this form of stabilization is only a short-term measure at best, and that it is inadequate to minimize the threats posed by land disposal of metal-containing hazardous wastes. EPA, therefore considers this technology "impermissible dilution" in accordance with 40 CFR 268.3, given the dilutive nature of the phenomenon. Drexler pp. 14, 16, 18. Although the addition of iron dust filings is considered treatment under 260.10, the Agency does not believe it is adequate treatment under section 3004 (m); but merely the addition of material as a substitute for adequate treatment, and therefore constitutes impermissible dilution. See 40 CFR 268.3 (b), 54 FR at 48494 (November 1989), and 55 FR at 22532 (June 1, 1990).

The Agency is also codifying this determination by amending 40 CFR 268.3 to read as follows:

40 CFR 268

§ 268.3 Dilution prohibited as a substitute for treatment

* * *

(d) It is a form of impermissible dilution, and therefore prohibited, to add iron filings or other metallic forms of iron to lead-containing hazardous wastes in order to achieve any land disposal restriction treatment standard for lead. Lead-containing wastes include D008 wastes (wastes exhibiting a characteristic due to the presence of lead), all characteristic wastes containing lead as an underlying hazardous constituent, listed wastes containing lead as a regulated constituent, and hazardous media containing any of the aforementioned lead-containing wastes.

* * *

With respect to the comment on lead species, EPA acknowledges the commenter's point that lead species are different in the foundry product from that of the lead in spent abrasive blasting media. However, EPA does not believe that iron dust treatment of foundry sands is effective for reasons described below. Because the waste foundry sand would likely contain only lead, silica, microscopic pieces of castings, and binders (clays, phenols, and tars) from the molds, EPA is not convinced that the simple addition of iron would provide treatment for the lead or the organics (i.e., phenol and tar). While it may be argued that iron could form temporary and weak, ionic complexes with silica and/or phenol, so that when analyzed by the TCLP test the lead appears to have been stabilized; however, EPA believes that this "stabilization" is temporary, based upon the nature of the complexing. In a report by EPA on Iron Chemistry in Lead Contaminated Materials (Feb. 22, 1994), which specifically addressed this issue, EPA found that iron-lead bonds are weak, adsorptive, surface bonds. EPA believes that these iron-lead bonds are not likely to be permanent. EPA continues to believe that if this iron-rich mixture is exposed to moisture and oxidative conditions over time, interstitial water would likely acidify, which could potentially reverse any temporary stabilization, as well as increase the leachability of the lead from the foundry sand.

The commenter is correct in that the Battelle report did not state that the bonds are not permanent, but concluded that the long-term stability is unknown. However, the Agency remains unconvinced about the long-term stability of this technology. The Agency realizes that this technology has been in use only since the early 1980's and thus, there is little data available on long-term effectiveness. The Agency compiled information on two different studies conducted on this issue, one by Dr. John Drexler of the University of Colorado and the other by Dr. Douglas Kendall of the National Enforcement Investigation Center (NEIC). These studies found that even after treatment, high concentrations of lead remained available to the environment and also leached in the units receiving the spent foundry wastes. Therefore, these studies concluded that the addition of iron filings or iron dust to lead-contaminated spent foundry sands did not constitute adequate treatment of the waste. See the March 5, 1997 NODA (62 FR 10004) for a full discussion of these studies. The conclusions reached by these studies were peer reviewed by an expert panel. The peer reviewers agreed that adding iron filings to spent foundry sand is not treatment of hazardous constituents. The peer reviewers also found that the scientific data presented in the studies support the conclusions reached and the studies are based on sound scientific research and fact. Therefore, the Agency reaffirms its conclusion that the addition of iron filing constitutes impermissible dilution

Regarding the comment on foundry industry's practice of reclaiming foundry sand by thermal

oxidization of impurities, the Agency notes that this issue is outside the scope of this rulemaking. This rulemaking only addresses the issues related to the addition of iron filings to spent foundry waste as a method of treatment.

Issue: FOUN1-050

Respondent: TTS

Dcn: PH3P050

Extension:

CBI: N

Commenter: STEEL STRUCTURES PAINTING COUNCIL

Comment Number: 00001

//COMM1

//RESPTTS

//SUBJFOUN1-050

BACKGROUND

SSPC HAS IDENTIFIED LEAD PAINT REMOVAL AS A MAJOR ISSUE FOR OUR MEMBERS. OUR ORGANIZATION HAS STRIVED TO IDENTIFY AND ESTABLISH COST EFFECTIVE AND COMPLIANT TECHNIQUES AND STRATEGIES TO REMOVE LEAD PAINT FROM INDUSTRIAL STRUCTURES. IN PARTICULAR, SSPC HAS UNDERTAKEN MAJOR EFFORTS TO EDUCATE OUR MEMBERSHIP ON THE REQUIREMENTS FOR PROPERLY HANDLING AND DISPOSING LEAD BEARING WASTE.

USE OF STEEL GRIT

THE TRADITIONAL MEANS OF REMOVING LEAD PAINT FROM INDUSTRIAL STRUCTURES (E.G. BRIDGES, WATER TOWERS) INCLUDE USE OF NON-METALLIC, EXPENDABLE ABRASIVES SUCH AS SILICA SAND, COAL SLAG AND COPPER SLAG. THE ABRASIVE BLASTING OPERATION CREATES LARGE AMOUNTS OF DUST AND DEBRIS. EVEN WITH ENVIRONMENTAL AND WORKER HEALTH AND SAFETY CONTROLS AS MANDATED BY EPA AND OSHA, IT REMAINS THE MOST PRODUCTIVE AND EFFECTIVE MEANS FOR REMOVING LEAD PAINT. ABRASIVE BLASTING TYPICALLY USES 2-10 POUNDS OF ABRASIVES PER SQUARE FOOT OF SURFACE. WITH SURFACES SPANNING HUNDREDS AND THOUSANDS OF SQUARE FEET, THE AMOUNT OF WASTE IS OFTEN QUITE LARGE. IF THE WASTE IS HAZARDOUS, IT MUST BE TREATED AND DISPOSED, THE COST POTENTIAL OF WHICH IS OFTEN VERY HIGH.

USE OF RECYCLABLE STEEL GRIT

DURING THE PAST 5 TO 10 YEARS MANY OF THE PAINT REMOVAL FIRMS HAVE CONVERTED TO USING RECYCLABLE STEEL ABRASIVES IN PLACE OF EXPENDABLE ABRASIVES. STEEL GRIT AND STEEL SHOT CAN BE RECYCLED 50 OR MORE TIMES,

RESULTING IN A 90%+ REDUCTION OF THE AMOUNT OF WASTE GENERATED. THIS MEETS A KEY RCRA OBJECTIVE OF REDUCING THE AMOUNT OF WASTE PRODUCED. THE MAJOR CHALLENGE IN THE USE OF RECYCLABLE STEEL ABRASIVE IS THE COLLECTION OF THE ABRASIVE AFTER BLASTING AND REMOVING THE PAINT CHIPS AND ABRASIVE FINES FROM THE AFFECTED ABRASIVE. THE INDUSTRY HAS EXPENDED MAJOR RESOURCES IN DEVELOPING IMPROVED TECHNIQUES FOR THESE OPERATIONS. MANY SSPC MEMBERS USE RECYCLABLE STEEL GRIT FOR REMOVING LEAD PAINT FROM INDUSTRIAL STRUCTURES. WE BELIEVE THAT THIS PROCESS IS CONSISTENT WITH THE INTENT AND SPIRIT OF RCRA. NOTE: STEEL ABRASIVE IS, BY NO MEANS, A NEW MATERIAL FOR ABRASIVE BLAST CLEANING. RECYCLABLE STEEL IS COMMONLY USED IN FABRICATING SHOPS TO REMOVE MILL SCALE FROM HOT ROLLED STEEL PRIOR TO APPLYING THE COATING.

SSPC RECOMMENDATIONS

SSPC SUGGEST THE FOLLOWING LANGUAGE FOR A RULE:

WASTE, DEFINED AS SPENT ABRASIVE THAT IS NOT INTENDED FOR RECYCLING, AND MEETING ALL THREE OF THE FOLLOWING REQUIREMENTS, SHALL REQUIRE SPECIAL TREATMENT AS DEFINED BELOW:

- 1.THE WASTE IS GENERATED DURING BLAST CLEANING REMOVAL OF PAINT USING ABRASIVES WITH 1% BY WEIGHT OR GREATER IRON OR STEEL GRIT OR SHOT;
- 2.THE WASTE GENERATED WHEN REMOVING PAINT CONTAINING 0.5% BY WEIGHT OR MORE LEAD; AND
- 3.THE GENERATED WASTE CONTAINS 2% BY WEIGHT OR MORE IRON AS DETERMINED BY AA OR ICP.

WASTE, AS DEFINED ABOVE AND MEETING THE THREE REQUIREMENTS LISTED ABOVE, SHALL REQUIRE A PERMANENT STABILIZATION PROCESS BY AN EPA APPROVED METHOD, SUCH AS TREATMENT WITH PORTLAND CEMENT.

NOTES:

A MINIMUM LEVEL OF 1% IRON OR STEEL GRIT HAS BEEN SELECTED FOR CONDITION 1 FOR THE FOLLOWING REASON: AT TWO PERCENT (2%) ADDITION OF IRON FILINGS TO LEAD WASTE, A NONHAZARDOUS WASTE WAS GENERATED (PRIOR TO THE ADDITION OF THE IRON FILINGS THE WASTE HAD BEEN DETERMINED TO BE HAZARDOUS BY THE TCLP TEST.). HOWEVER, AT 1% ADDITION OF IRON FILINGS, THE WASTE CHARACTERISTIC WAS NOT CHANGED FROM HAZARDOUS TO NONHAZARDOUS. THIS IS BASED ON DATA FROM A FHWA REPORT (FHWA-RD-94-100).

A LEVEL OF 0.5% LEAD-IN-PAINT THRESHOLD HAS BEEN SELECTED BECAUSE THAT

IS THE DEFINITION OF LEAD PAINT BEING USED BY EPA IN THE TITLE X REGULATION (40 CFR 745, PROPOSED 9/2/94).

A LEVEL OF 2% HAS BEEN SELECTED FOR THE LEVEL OF IRON IN PAINT TO ALLOW FOR THE PRESENCE OF IRON OXIDE (E.G. FROM RUST OR IRON OXIDE PIGMENTS IN PAINT). THIS FORM OF IRON WOULD BE PRESENT IN ADDITION TO ANY RESIDUE FROM THE METALLIC ABRASIVE USED FOR BLAST CLEANING.

PROPOSED MODIFICATION TO TCLP

AN ALTERNATIVE SUGGESTED BY SEVERAL OF OUR MEMBERS IS TO MODIFY THE TCLP TEST AS FOLLOWS: MAGNETICALLY REMOVE THE METALLIC IRON PRIOR TO RUNNING THE TCLP TEST. THIS WOULD PREVENT A "MASKING" OF THE TCLP TEST BY THE REACTION BETWEEN METALLIC IRON AND LEAD. IF EPA CONSIDERS THIS A REASONABLE APPROACH, SSPC WOULD MAKE AN EFFORT TO INITIATE A PROTOCOL AND EVALUATION OF SUCH A TREATMENT. NOTE: SSPC LABORATORY PERSONNEL HAVE PERFORMED SOME RELATED WORK WHICH INVOLVED USING MAGNETS TO SEPARATE NON-MAGNETIC IMPURITIES FROM METALLIC ABRASIVES AS PART OF A STANDARD ACCEPTANCE CRITERION.

SSPC BELIEVES THAT A RULE BASED ON THE ABOVE CRITERIA WILL BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND CONSISTENT WITH EPA'S GOALS. IN ADDITION, IT WILL ENABLE THE PROTECTIVE COATINGS INDUSTRY TO CONTINUE TO USE A PROVEN PROCESS WHICH HAS RESULTED IN SIGNIFICANT REDUCTION IN THE QUANTITY OF LEAD CONTAINING HAZARDOUS WASTE GENERATED. THIS RULE WILL PERMIT THE INDUSTRY TO MEET THE GOALS OF EPA WITHOUT SACRIFICING THE QUALITY, PRODUCTIVITY AND COST EFFECTIVENESS OF THIS METHOD OF LEAD PAINT REMOVAL.

//ENDC1

RESPONSE

The Steel Structures Painting Council suggested the Agency propose specific language (supplied by the commenter) as a rule for spent abrasive waste generated from lead paint removal operations.

The Agency disagrees with the commenter's suggestion to specify compositions and criteria of the as generated waste. EPA maintains that if the waste meets the definition of a toxicity characteristic hazardous waste, then it will be subject to the land disposal restrictions for the particular characteristic waste (e.g., lead-D008). The commenter's suggestion would be tantamount to "listing" a waste, and as such is beyond the scope of this land disposal restrictions rule. Further, the suggestion to require a specific disposal method such as a permanent stabilization technology for these spent abrasive wastes will preclude the use of other applicable and demonstrated technologies, and hence, not provide treaters with maximum flexibility for selection of treatment./disposal options.

EPA wishes to note that, should the commenter believe that their waste is unique to the extent that the current treatment standards for characteristic waste is in appropriate, then they may petition the Agency for a treatability variance as per 40 CFR 268.44 on a case-by-case basis.

EPA disagrees with the commenter's suggestion that EPA modify the TCLP analysis with respect to these wastes whereby metallic iron could be magnetically removed prior to running the TCLP test. The Agency notes that RCRA requires that the TCLP analysis for determination of TC hazardousness be performed at the point of waste generation (55 FR 11830, March 29, 1990). The modification the commenter suggests would result in treatment prior to analysis for TC hazardousness.

Issue: FOUN1-051

Respondent: TTS

Dcn: PH3P051

Extension:

CBI: N

Commenter: RMT, INC

Comment Number: 00001

//COMM1

//RESPTTS

//SUBJFOUN1-051

RMT'S RESPONSE

FIRST, TREATMENT OF BRASS FOUNDRY SAND WITH IRON TO IMMOBILIZE LEAD IS NOT DILUTION IN THE STANDARD USE OF THE TERM. TREATMENT TYPICALLY INVOLVES THE ADDITION OF BETWEEN 1 AND 10 PERCENT METALLIC IRON. LEAD CONCENTRATIONS IN THE TCLP TEST ARE REDUCED FROM HUNDREDS OF MILLIGRAMS PER LITER (MG/L) TO LESS THAN 1 MG/L. THERE IS A CHEMICAL REACTION OCCURRING WITH THE ADDITION OF THE IRON OTHERWISE THE ADDITION OF 10% OF AN ADDITIVE COULD NOT REDUCE THE LEAD CONCENTRATION BY A FACTOR OF OVER 100 DUE TO DILUTION ALONE. THE IRON CLEARLY REACTS VERY STRONGLY WITH THE LEAD FOR SUCH A SMALL DOSAGE TO REDUCE THE CONCENTRATION BY SUCH A LARGE FACTOR. METALLIC IRON IS MORE EFFECTIVE AT STABILIZING LEAD THAN MOST OTHER TREATMENT ADDITIVES INCLUDING THE ADDITIVES MOST COMMONLY USED AS STABILIZATION/SOLIDIFICATION AGENTS, SUCH AS LIME OR CEMENT. UNDERSTANDING THE CHEMISTRY OF THE REACTION BETWEEN THE LEAD AND IRON BECOMES KEY TO DISCUSSING WHETHER THE TREATMENT PROCESS IS A VIABLE STABILIZATION OR IS SIMPLY "MASKING" THE LEAD IN THE TCLP TEST. IF IT IS SIMPLY MASKING THE LEAD WITHOUT A REAL STABILIZATION OCCURRING, WHICH WOULD PROTECT LEAD FROM LEACHING IN THE REAL WORLD, IT WOULD BE CONSIDERED AN "IMPERMISSIBLE DILUTION" UNDER THE EPA'S DEFINITION.

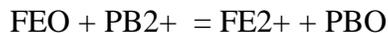
A. METALLIC IRON DOES NOT REACT WITH LEAD; THEREFORE, IT IS AN IMPERMISSIBLE DILUTION.

THE EPA'S POSITION STATED IN THE FEDERAL REGISTER IS THAT "IRON COULD

FORM TEMPORARY, WEAK, IONIC COMPLEXES WITH SILICA AND/OR PHENATE, SO THAT WHEN ANALYZED BY THE TCLP TEST THE LEAD APPEARS TO HAVE BEEN STABILIZED, THE AGENCY BELIEVES THIS "STABILIZATION" IS TEMPORARY, BASED UPON THE NATURE OF THE COMPLEXING. IN FACT, A REPORT PREPARED BY THE EPA IN IRON CHEMISTRY OF LEAD CONTAMINATED MATERIALS (FEB 22, 1994), WHICH SPECIFICALLY ADDRESSED THIS ISSUE, FOUND THAT IRON-LEAD BONDS ARE WEAK, ADSORPTIVE SURFACE BONDS, AND THEREFORE NOT LIKELY TO BE PERMANENT."

FIRST, THE EPA'S STATEMENT QUOTED ABOVE MAKES NO TECHNICAL SENSE WITHOUT FURTHER EXPLANATION. EVEN ASSUMING THAT IRON DOES FORM WEAK COMPLEXES WITH SILICA OR PHENOL, WHAT INFLUENCE DOES SUCH A REACTION HAVE ON THE LEACHING BEHAVIOR OF LEAD IN A TCLP TEST? IS LEAD SUPPOSEDLY TRAPPED IN THE COMPLEX? IF SO, HOW CAN SO WEAK A COMPLEX SO STRONGLY IMMOBILIZE LEAD IN A TCLP TEST? THE RELATIONSHIP OF THE WEAK COMPLEX BETWEEN IRON AND SILICA OR PHENOL AND LEAD LEACHING IS NOT EXPLAINED.

MOREOVER, THE EPA'S POSITION IS NOT SUPPORTED BY THE BACKGROUND REPORT CITED IN THE FEDERAL REGISTER. THE REPORT MENTIONED IS A COVER MEMO ON A REPORT BY THE COLUMBUS, OHIO, OFFICE OF BATTELLE INC. TITLED "SUMMARY OF DATA ANALYSIS AND EXPERIMENTAL DESIGN FOR INVESTIGATION OF IRON CHEMISTRY IN LEAD CONTAMINATED MATERIALS (JANUARY, 1994)." THERE IS NO MENTION OF A REACTION BETWEEN IRON AND SILICA OR PHENOL IN THE BATTELLE REPORT. THE BATTELLE STUDY INCLUDES A LITERATURE REVIEW AND THERMODYNAMIC MODELING OF THE REACTION BETWEEN IRON AND LEAD IN BRASS FOUNDRY SAND TREATMENT. THERE ARE NO NEW DATA PRESENTED IN THE BATTELLE REPORT. THE STUDY FINDS THAT THERE ARE TWO REACTION MECHANISMS THAT MAY IMMOBILIZE LEAD: AN OXIDATION-REDUCTION REACTION BETWEEN METALLIC IRON AND DISSOLVED LEAD, AND AN ADSORPTION REACTION BETWEEN FERRIC HYDROXIDE (OR MORE TECHNICALLY HYDROUS FERRIC OXIDE) AND DISSOLVED LEAD. SINCE METALLIC IRON IS ADDED DURING THE TREATMENT PROCESS, IT IS CLEARLY THE REDOX REACTION THAT IS IMMOBILIZING LEAD DURING THE TCLP TEST. THIS SAME CONCLUSION HAS BEEN FOUND BY ALL OF THE OTHERS WHO HAVE INVESTIGATED THE REACTION (NAGEL, ET AL., 1983; STEPHENS, ET AL., 1984; OSTROM AND TROJAN, 1988; SMITH, ET AL., 1991). THE REACTION BETWEEN HYDROUS FERRIC OXIDES AND LEAD HAS BEEN FOUND TO BE EFFECTIVE IN SOME CASES (OSTROM AND TROJAN, 1988) BUT NOT IN OTHERS (OSTROM ET AL., 1985). THE REACTION MECHANISM FOR THE STABILIZATION REACTION IS THEREFORE A REDOX REACTION, IN WHICH THE METALLIC IRON REDUCES DIVALENT LEAD TO THE METALLIC FORM AND IS ITSELF OXIDIZED, I.E.



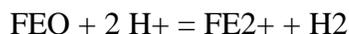
THE REACTION BETWEEN METALLIC IRON AND DISSOLVED METALS IS WELL KNOWN. THERE IS A WASTEWATER TREATMENT PROCESS, IRON CEMENTATION, THAT USES METALLIC IRON TO REMOVE HEAVY METALS (E.G. COPPER, LEAD) FROM A WASTEWATER (AGELIDIS, ET AL., 1988; KU AND CHEN, 1992). IN ADDITION, STANDARD INTRODUCTORY CHEMICAL TEXTBOOKS DISCUSS THE OXIDATION-REDUCTION (REDOX) REACTION BETWEEN IRON AND OTHER METALS (E.G., SIENKO AND PLANE, 1966). THIS REDOX REACTION WOULD OCCUR IN A LANDFILL IN THE PRESENCE OF IRON IF LEAD WERE SOLUBILIZED FROM THE WASTE MATERIAL, AND IT OCCURS IN THE TCLP TEST.

THE EPA'S SUGGESTION THAT IRON FORMS "TEMPORARY, WEAK, IONIC COMPLEXES WITH SILICA AND/OR PHENATE" INDICATES THAT THEY DO NOT UNDERSTAND THE REACTION CHEMISTRY THAT HAS BEEN PRESENTED IN THE DOCUMENT THAT THEY CITE AS SUPPORTING THEIR POSITION. THE EPA'S POSITION THAT THERE IS NO REACTION BETWEEN IRON AND LEAD IS CONTRADICTED BY THEIR OWN REFERENCE, AS WELL AS BY THE OTHER RESEARCHERS ON THE SUBJECT. A SEPARATE QUESTION IS APPROPRIATE AS TO THE LONG-TERM EFFECTIVENESS OF IRON TREATMENT, BUT TO CLAIM THE REACTION DOES NOT OCCUR IS SIMPLY INCORRECT.

B. ACID FORMATION IN LANDFILLS

THE EPA'S SECOND REASON FOR PROPOSING TO BAN THE USE OF METALLIC IRON IS THAT THE IRON MAY GENERATE ACID CONDITIONS IN A LANDFILL. HOWEVER, THE EPA GIVES NO SUPPORTING DOCUMENTATION FOR THIS ASSERTION. THERE IS NO OBVIOUS BASIS FOR THE ASSERTION, AND IT IS CONTRARY TO EXPERIENCE THAT METALLIC IRON WILL GENERATE ACID CONDITIONS.

ACIDIC CONDITIONS CAN BE GENERATED FROM SOME FORMS OF IRON, PARTICULARLY FROM THE OXIDATION OF FERROUS SULFIDE (PYRITE) AS OCCURS IN ACID MINE DRAINAGE, OR FROM THE HYDROLYSIS OF FERRIC IRON TO FORM FERRIC HYDROXIDE AS OCCURS DURING WASTEWATER TREATMENT WITH FERRIC SALTS. NEITHER OF THESE SITUATIONS OCCURS IN THE SCENARIO WHEN METALLIC IRON IS USED FOR TREATING BRASS FOUNDRY WASTES. METALLIC IRON, IN FACT, WILL REACT WITH ACIDS TO GENERATE HYDROGEN GAS, AND IN THE PROCESS, WILL NEUTRALIZE THE ACID, I.E.



THE EVOLUTION OF HYDROGEN GAS WHEN METALS ARE ADDED TO AN ACIDIC SOLUTION IS A WELL-KNOWN PHENOMENON. AS AN EXAMPLE, IRON USED TO TREAT FOUNDRY WASTES WILL FREQUENTLY NEUTRALIZE THE ACETIC ACID USED IN THE TCLP TEST AND RAISE THE PH ABOVE 5. FOR THE EPA TO SUGGEST THAT METALLIC IRON WILL GENERATE ACIDS IS SIMPLY CONTRARY TO EXPERIENCE AND BASIC CHEMISTRY.

FURTHERMORE, IF METALLIC IRON IN THE ENVIRONMENT GENERATED ACIDS, THEN ONE WOULD EXPECT TO FIND ACIDIC LEACHATES ARISING FROM SITUATIONS WHERE METALLIC IRON OCCURRED OR WAS DISPOSED IN THE ENVIRONMENT. IRON FOUNDRY LANDFILLS OFTEN CONTAIN SIGNIFICANT AMOUNTS OF METALLIC IRON, EITHER IN THE FORM OF METAL GRINDING WASTES OR AS WASTE FROM THE MELTING AND CASTING PROCESS. THESE LANDFILLS DO NOT BECOME ACIDIC OVER TIME, NOR DO THE WASTES APPEAR TO CONTRIBUTE HYDROGEN ION TO THE GROUNDWATER (HAM, ET AL., 1985). IF METALLIC IRON IN LANDFILLS GENERATED ACIDIC CONDITIONS, THEN ONE WOULD EXPECT THAT THE MANY IRON FOUNDRY LANDFILLS THROUGHOUT THE COUNTRY WOULD BE EXPERIENCING ENVIRONMENTAL PROBLEMS DUE TO ACID GENERATION. THIS IS SIMPLY NOT THE CASE.

ONE OF THE MORE INTERESTING APPLICATIONS OF METALLIC IRON FOR ADDRESSING ENVIRONMENTAL PROBLEMS IS IN THE USE OF REACTION WALLS BUILT INTO THE SOIL FOR THE DEHALOGENATION OF CHLORINATED SOLVENTS IN GROUNDWATER. AT A SYMPOSIUM ENTITLED "CONTAMINANT REMEDIATION WITH ZERO-VALENT METALS" HELD AT THE 209TH AMERICAN CHEMICAL SOCIETY'S NATIONAL MEETING IN ANAHEIM, CALIFORNIA (APRIL 2-7, 1995), THIRTY-THREE PAPERS WERE PRESENTED ON THE USE OF METALLIC IRON FOR THE DESTRUCTION OF ORGANIC COMPOUNDS. IF METALLIC IRON GENERATED ACID IN SUBSURFACE CONDITIONS, THEN SURELY THE ISSUE WOULD BE OF MAJOR CONCERN IN THESE PAPERS. IF THE ACID GENERATION POTENTIAL FROM METALLIC IRON USED TO TREAT FOUNDRY WASTES IS OF SUFFICIENT CONCERN TO BAN THE PROCESS, THEN THE POSSIBILITY OF ACID GENERATION FROM THE METALLIC IRON REACTION WALLS WOULD BE EXPECTED TO BE OF SUFFICIENT CONCERN FOR THIS PROCESS. HOWEVER, THE POSSIBILITY OF ACID FORMATION FROM THE USE OF IRON WAS NOT MENTIONED IN THE ABSTRACTS.

AGAIN, THE EPA IN THEIR PRESENTATION IN THE FEDERAL REGISTER DOES NOT UNDERSTAND THE CHEMISTRY OF IRON IN FOUNDRY WASTES, AND MISREPRESENTS THE ACTUAL REACTIONS.

C. IRON INTERFERES WITH LEAD ANALYSIS IN TCLP TEST LEACHATES, THEREBY GENERATING FALSE NEGATIVES

THE EPA ASSERTS THAT METALLIC IRON INTERFERES WITH THE ANALYSIS OF IRON IN TCLP TEST LEACHATES. THE CITATION IN THE FEDERAL REGISTER IS A LETTER FROM JOHN CIGNATTA, OF DATANET, TO JOHN GAUTHIER OF REGION I, EPA. THE LETTER CITES MS. GAIL HANSEN, OF THE EPA OFFICE OF SOLID WASTE, FOR THE ASSERTION THAT METALLIC IRON INTERFERES WITH THE ANALYSIS OF LEAD IN TCLP TEST LEACHATES. MR. CIGNATTA STATES THAT "ACCORDING TO MS. GAIL HANSEN OF EPA OFFICE OF SOLID WASTE, THE PRESENCE OF IRON MAKES THE TCLP TEST QUITE IMPRACTICAL AS ESTABLISHED BY SPIKED SAMPLES HAVING EXCEEDINGLY POOR RECOVERY RATES." WHEN FIRST ASKED ABOUT MR. CIGNATTA'S STATEMENT, MS. HANSEN SAID THAT SHE DID NOT RECALL MAKING THIS STATEMENT. UPON SEVERAL DAYS REFLECTION, HOWEVER, MS. HANSEN VAGUELY RECALLED A REPORT BY AN OUTSIDE LABORATORY THAT MAY HAVE INDICATED AN ANALYTICAL INTEREFERENCE BETWEEN IRON AND LEAD. SHE COULD NOT LOCATE THE REPORT, AND DOES NOT RECALL SPECIFICALLY WHAT LABORATORY WROTE THE REPORT, OR THE DETAILS OF THE INTEREFERENCE. SINCE THE REPORT IS NOT AVAILABLE FOR REVIEW, IT IS DIFFICULT TO DETERMINE ON WHAT BASIS THE CLAIM WAS MADE AS TO THE INTEREFERENCE. OLLIE FORDHAM, NATIONAL PROGRAM MANAGER FOR INORGANIC SW846 ANALYSIS, STATED THAT THERE IS NO ANALYTICAL INTEREFERENCE IN THE AA OR ICP ANALYSIS BETWEEN IRON AND LEAD AFTER THE TCLP TEST LEACHATE IS FILTERED UNLESS THE IRON IS PRESENT IN HIGH CONCENTRATIONS (ABOVE A THOUSANDS MG/L). AS A PRACTICAL MATTER, IF IRON DID INTEREFERE WITH THE ANALYSIS OF LEAD IN TCLP TEST LEACHATES, THEN EVERY LABORATORY IN THE COUNTRY THAT RUNS IRON-TREATED MATERIALS SHOULD BE REPORTING THE FACT, SINCE SPIKING TCLP TEST LEACHATES IS PART OF THE STANDARD QC PROTOCOL FOR TCLP TEST. AS ONE EXAMPLE, THE RMT LABORATORY DOES NOT HAVE ANY DIFFICULTY IN OBTAINING EXCELLENT SPIKE RECOVERIES FROM TCLP TEST LEACHATES OF IRON TREATED WASTES. SINCE THERE IS NO DOCUMENTATION OF A PROBLEM IN THE ANALYSIS OF LEAD IN TCLP LEACHATES FROM IRON TREATED WASTES, AND SINCE THE RMT LABORATORY HAS NEVER ENCOUNTERED ANY DIFFICULTIES, OUR CONCLUSION IS THAT THERE IS NO PROBLEM WITH THE ANALYSIS.

IN SUMMARY, ALL OF THE TECHNICAL ARGUMENTS THAT THE EPA PRESENTS FOR JUSTIFYING BANNING THE USE OF METALLIC IRON ARE NOT TRUE AND ARE NOT SUPPORTED BY THE BACKGROUND DOCUMENTATION PRESENTED BY THE EPA.

OTHER CONCERNS ABOUT IRON TREATMENT

THERE ARE CONCERNS THAT ARE IMPLIED BUT NOT DIRECTLY STATED BY THE EPA ABOUT THE USE OF METALLIC IRON FOR TREATING WASTES. THESE ISSUES HAVE BEEN RAISED AT LEAST IN PART BY SOME OF THE AUTHORS WHO DISCUSS IRON TREATMENT, PARTICULARLY SMITH ET AL.(1991). THE CONCERNS ABOUT IRON

TREATMENT ARE TWOFOLD, AS FOLLOWS:

NO REACTION OCCURS WHEN IRON IS ADDED TO WASTE, AND THE TREATMENT IS THUS "MASKING" LEAD IN THE TCLP TEST. FURTHERMORE, THE ADDITIVE AND WASTE COULD SEPARATE DURING TRANSPORT.

FIRST, THERE IS NO REACTION BETWEEN LEAD AND ANY DRY ADDITIVE, BE IT LIME, CKD, PORTLAND CEMENT, OR METALLIC IRON. THE REACTIONS DO NOT OCCUR UNTIL THE SAMPLE GETS WET. THE ARGUMENT THAT IRON IS NOT EFFECTIVE COULD EQUALLY WELL BE APPLIED TO ANY DRY ADDITIVE. LEAD WILL NOT LEACH FROM THE WASTE UNTIL THE WASTE GETS WET, SO THAT THE CONCERN ABOUT NO REACTION OCCURRING UNTIL THE SAMPLE IS WETTED IS IRRELEVANT, PROVIDED THAT THE WASTE AND ADDITIVE DO NOT SEPARATE PRIOR TO WETTING.

IT IS UP TO THE GENERATOR TO ENSURE GOOD MIXING BETWEEN THE WASTE AND ADDITIVE, NO MATTER WHAT TYPE OF ADDITIVE IS USED. THE EPA SHOULD NOT BAN A PROCESS BECAUSE THEY ARE CONCERNED ABOUT MIXING EFFECTIVENESS.

IRON MAY OXIDIZE IN A LANDFILL AND THUS NOT PROVIDE REAL LONG-TERM TREATMENT

THE CONCERN THAT IRON USED FOR TREATMENT WILL OXIDIZE AFTER DISPOSAL AND THEREFORE NOT PROVIDE LONG-TERM TREATMENT FOR THE WASTE, WILL NOT OCCUR FOR A BRASS FOUNDRY WASTE. IN ORDER TO OXIDIZE THE IRON, AN OXIDIZING AGENT IS REQUIRED. SINCE THE IRON CONSTITUTES ABOUT 10 PERCENT OF THE WASTE, THE OXIDIZING AGENT HAS TO BE PRESENT AT A SUFFICIENT CONCENTRATION TO OXIDIZE THE LARGE AMOUNT OF IRON. THE MOST COMMON OXIDIZING AGENT IS, OF COURSE, ATMOSPHERIC OXYGEN. HOWEVER, THE WASTE IS EFFECTIVELY ISOLATED FROM THE AIR WHEN IT IS PLACED IN A LANDFILL. IN ORDER TO MOVE SUFFICIENT OXYGEN INTO THE LANDFILL TO OXIDIZE THE IRON, SEVERAL HUNDRED PORE VOLUMES OF AIR WOULD BE REQUIRED TO PASS THROUGH THE WASTE. SINCE THERE IS NO MAJOR DRIVING FORCE FOR THE AIR TO MOVE IN OR OUT OF THE LANDFILL, THE LARGE VOLUMES OF AIR REQUIRED TO OXIDIZE THE IRON WILL NOT PASS THROUGH THE LANDFILL. THE METALLIC IRON ESTABLISHES AND MAINTAINS ANOXIC CONDITIONS IN THE LANDFILL.

MODELING LONG-TERM LEACHING

THE EPA HAS ESTABLISHED THE MULTIPLE EXTRACTION PROCEDURE (MEP) (SW846 METHOD 131) TO MODEL THE LONG-TERM LEACHING POTENTIAL OF WASTES. IF IRON-TREATED WASTES WERE NOT STABLE, THEN THE TREATED WASTES SHOULD

NOT BE STABLE IN AN MEP TEST. HOWEVER, SUCH IS NOT THE CASE. THE RESULTS OF AN MEP TEST CONDUCTED ON AN IRON-TREATED BRASS FOUNDRY SAND ARE PRESENTED IN TABLE 1. THE TEST WAS CONDUCTED AS PART OF A SUBMITTAL TO REGION V OF THE EPA, AND WAS ACCOMPANIED BY THE FULL QC PACKAGE. AS CAN BE SEEN, THE IRON-TREATED WASTE DID NOT LEACH LEAD ABOVE THE DETECTION LIMIT IN ANY OF THE TEN ELUTIONS. IF IRON WERE EASILY OXIDIZED, THEN ONE WOULD EXPECT IT TO BE OXIDIZED IN THE MEP TEST, AND ONE WOULD LIKEWISE EXPECT THE TEST RESULTS TO DEMONSTRATE THE FAILURE OF THE TREATMENT.

FURTHERMORE, CASE STUDIES ON BRASS FOUNDRY LANDFILLS IN WHICH IRON TREATMENT HAS BEEN EMPLOYED HAVE NOT SHOWN PROBLEMS DUE TO OXIDATION OF THE IRON. THESE CASE STUDIES ARE PRESENTED IN THE SUBMITTAL FROM THE AMERICAN FOUNDRYMENS SOCIETY ON THE SAME ISSUE.

THUS, THERE IS NO EVIDENCE, EITHER FROM LEACHING TESTS OR FROM REAL-WORLD EXPERIENCE, THAT IRON TREATMENT IS NOT A SUCCESSFUL LONG-TERM TREATMENT FOR BRASS FOUNDRY SAND, WHEN THE TREATMENT IS CONDUCTED IN AN APPROPRIATE MANNER.

IRON VS. LIME TREATMENT

TREATMENT WITH METALLIC IRON PARALLELS IN MANY ASPECTS TREATMENT WITH A LIME-BASED ADDITIVE, SUCH AS LIME ITSELF OR CEMENT KILN DUST (CKD) BOTH COMMONLY USED TREATMENT ADDITIVES. WHILE IRON REACTS WITH LEAD TO FORM LEAD METAL, LIME SIMPLY MAINTAINS THE PH OF THE LEACHING TESTS IN A REGION WHERE LEAD OXIDE/HYDROXIDE IS NOT SOLUBLE. LIME OR A LIME-BASED ADDITIVE DOES NOT REACT DIRECTLY WITH THE LEAD IN THE WASTE TO FORM AN INSOLUBLE PRECIPITATE. (THE ARGUMENT THAT LIME CONVERTS THE LEAD TO A LEAD OXIDE OR HYDROXIDE IS NOT RELEVANT, SINCE BOTH COMPOUNDS ARE QUITE SOLUBLE AT PH 5, THE NOMINAL PH OF THE TCLP TEST AND SO IF THE PH OF THE TCLP TEST WERE NOT RAISED BY THE LIME TO A RANGE WHERE LEAD IS NOT SOLUBLE, THE WASTE WOULD STILL BE HAZARDOUS. IN ADDITION, LEAD IN THE ENVIRONMENT WILL CONVERT TO AN OXIDE OR HYDROXIDE IF IT EXISTS IN A MORE SOLUBLE FORM TO START WITH. THEREFORE TO STATE THAT LIME "CONVERTS" THE LEAD TO AN OXIDE FORM IS NOT TECHNICALLY CORRECT.) IN THE SAME MANNER THAT CONCERNS CAN BE RAISED ABOUT IRON OXIDIZING, LIME MAY BE LEACHED OUT A WASTE, LEAVING BEHIND AN "UNTREATED" WASTE THAT WOULD FAIL A TCLP TEST IF THE WASTE WERE RETESTED.

ACTUALLY, IRON TREATMENT MAY BE SUPERIOR TO LIME TREATMENT. LIME IS A VERY CAUSTIC MATERIAL, AND DURING TREATMENT WILL RAISE THE PH OF THE

TREATED MATERIAL TO ROUND 12.5 THE TCLP TEST USES A STRONGLY BUFFERED ACID SOLUTION (0.1M ACETATE). SUCH HIGH BUFFERING CAPACITY IS NOT NORMALLY ENCOUNTERED IN FOUNDRY WASTE LANDFILLS, SINCE THERE IS NO DEGRADING ORGANIC MATTER TO GENERATE THE VOLATILE ORGANIC ACIDS. RATHER THE LEACHING SOLUTION IN FOUNDRY WASTE LANDFILLS IS LIKELY TO BE SIMILAR TO THE SYNTHETIC ACID RAIN USED IN THE SYNTHETIC PRECIPITATION LEACHING PROCEDURE (SPLP - SW 846 METHOD 1312). IF SUFFICIENT LIME IS ADDED TO A WASTE TO NEUTRALIZE THE ACID IN THE TCLP TEST AND BRING THE PH TO THE RANGE WHERE LEAD IS NOT SOLUBLE IN THE TCLP TEST LEACHATE, THEN THE LIME WILL RAISE THE PH OF AN SPLP TEST LEACHATE TO AROUND 12.5 (THE PH OF A LIME-SATURATED SOLUTION). LEAD IS AN AMPHOTERIC METAL, AND IS SOLUBLE UNDER BOTH ACIDIC AND BASIC PH CONDITIONS. AT A PH OF 12.5, DISSOLVED LEAD CONCENTRATION IN SOLUTION CAN REACH TENS OF MG/L. THE USE OF LIME TO REDUCE LEACHING IN A TCLP TEST MAY RESULT IN THE TREATED WASTE LEACHING HIGH CONCENTRATIONS OF LEAD IN AN SPLP TEST, OR IN THE NATURAL ENVIRONMENT. IRON TREATMENT, ON THE OTHER HAND, HAS NO SUCH CONCERNS. LEAD IS NOT "AMPHOTERIC" ON A REDOX SCALE--IT DOES NOT GO BACK INTO SOLUTION AS THE REDOX POTENTIAL IS LOWERED PAST A CERTAIN POINT.

A DEMONSTRATION OF THIS DIFFERENCE IS GIVEN IN TABLE 2. SPLP TESTS WERE RUN ON A SAMPLE OF BRASS FOUNDRY SAND TREATED WITH BOTH METALLIC IRON (60%) AND LIME (6%). THE UNTREATED FOUNDRY SAND LEACHED LEAD AT 400 MG/L IN A TCLP TEST. IN AN SPLP TEST ON THE TREATED WASTE SAMPLES, THE IRON-TREATED WASTE GAVE A LEAD CONCENTRATION IN THE SPLP LEACHATE OF < 0.003 MG/L, WHILE THE LIME-TREATED WASTE GENERATED A LEAD CONCENTRATION OF 23 MG/L. THE LIME HAS RAISED THE PH OF THE SPLP TEST LEACHATE TO THE POINT WHERE LEAD IS RESOLUBILIZED, WHILE THE IRON EFFECTIVELY STABILIZES THE LEAD IN THE WASTE TO VERY LOW LEVELS DURING THE TEST. IRON TREATMENT IS CLEARLY SUPERIOR TO LIME TREATMENT FOR THIS WASTE (A TYPICAL BRASS FOUNDRY SAND).

TO FURTHER DEMONSTRATE THE COMPARISON BETWEEN LIME AND IRON, MEP LEACHING TESTS WERE CONDUCTED ON THE SAMPLE OF BRASS FOUNDRY SAND TREATED WITH BOTH IRON (10% DOSE) AND LIME (6% DOSE). THIS TESTING IS STILL UNDERWAY, AND THE COMPLETE RESULTS WILL BE PROVIDED TO EPA.

APPROPRIATE LEACHING TEST FOR FOUNDRY WASTES GOING TO A MONOFILL IS THE SPLP TEST

THE EPA REQUESTED THAT SUBMITTERS RECOMMEND A MORE APPROPRIATE LEACHING TEST FOR BRASS FOUNDRY SAND THAN THE TCLP TEST. WE RECOMMEND THAT THE SPLP TEST BE USED FOR EVALUATING THE LEACHING

POTENTIAL OF FOUNDRY WASTES GOING TO NON-MUNICIPAL ONLY LANDFILLS, INCLUDING FOUNDRY WASTE-ONLY LANDFILLS. THE ACETIC ACID USED IN THE TCLP TEST MODELS THE ACID GENERATED DURING THE FACULTATIVE DECOMPOSITION STAGE OF A MUNICIPAL LANDFILL. LEACHATES FROM THIS STAGE OF THE LANDFILL DECOMPOSITION MAY CONTAIN HIGH CONCENTRATIONS OF VOLATILE ORGANIC ACIDS, SUCH AS ACETIC ACID, FROM THE DECOMPOSITION OF ORGANIC MATERIALS PLACED IN THE LANDFILL. HOWEVER, FOUNDRY WASTE-ONLY LANDFILLS DO NOT CONTAIN LARGE AMOUNTS OF PUTRESCIBLE ORGANIC MATTER, AND THEREFORE DO NOT GENERATE LEACHATES WITH HIGH CONCENTRATIONS OF VOLATILE ORGANIC ACIDS. FOUNDRY WASTE LANDFILLS TEND TO HAVE BASIC RATHER THAN ACIDIC PH VALUES (HAM, ET AL.). THEREFORE, A TEST THAT USES A HIGHLY ORGANIC ACID LEACHING SOLUTION DOES NOT PROVIDE A REALISTIC EVALUATION OF THE LEACHING ENVIRONMENT OF A FOUNDRY WASTE LANDFILL, OR OF MANY OTHER WASTE DISPOSAL CONDITIONS EITHER. THE SPLP TEST USES A SYNTHETIC ACID RAIN AS A LEACHING MEDIUM, AND PROVIDES A LEACHING SOLUTION THAT IS FAR MORE REALISTIC THAN THE ACETIC ACID USED IN THE TCLP TEST. AS DISCUSSED ABOVE FOR THE COMPARISON BETWEEN LIME AND IRON TREATMENT, THERE MAY BE SITUATIONS WHERE A WASTE TREATMENT PROCESS EFFECTIVELY IMMOBILIZES LEAD IN THE TCLP TEST, BUT INCREASES THE LEACHING POTENTIAL OF LEAD IN THE MORE REALISTIC SPLP TEST (E.G., LIME TREATMENT). SUCH A TREATMENT PROCESS SOLVES A REGULATORY PROBLEM, BUT MAY CREATE A REAL ENVIRONMENTAL PROBLEM. USE OF THE SPLP TEST FOR EVALUATING THE LEACHING POTENTIAL OF WASTES IN FOUNDRY WASTE-ONLY LANDFILLS WOULD PROVIDE A MUCH MORE REALISTIC VIEW OF THE LEACHING POTENTIAL OF THE WASTE. USE OF THE SPLP TEST, OR A SIMILAR WATER LEACHING TEST HAS BEEN PROPOSED BY OTHERS (HAM, ET AL., 1979). WE WOULD STRONGLY SUPPORT THE USE OF THE SPLP TEST AS AN ALTERNATIVE OR A COMPLEMENT TO THE TCLP TEST FOR EVALUATING THE LEACHING POTENTIAL OF FOUNDRY WASTES.

//ENDC1

RESPONSE

RMT, Inc., submitted comments objecting to EPA's position against addition of iron dust to foundry sand. The main points raised by RMT, Inc. were:

1. Iron addition to foundry sand is not dilution as EPA categorizes the process;
2. Iron addition to foundry sand will not create acidic conditions in landfills;
3. Iron addition to foundry sand will not mask lead analysis in TCLP testing;
4. The iron added to the foundry sand will not separate out during transport;
5. Landfill conditions will not allow the iron to oxidize to the extent that long-term stability will

- be adversely impacted;
6. Iron treatment is more effective at treating the foundry sands than pozzolonic treatment; and
 7. The SPLP leach test is a more appropriate test than TCLP for foundry wastes going into a monofill.

The Agency's determination that the addition of iron filing constitutes impermissible dilution is predicated on the fact that the adsorption of soluble lead on to the iron surface is a reversible reaction and once the iron surfaces oxidize, the ability of the additive to scavenge soluble metals is diminished. Therefore, the treatment is not permanent. In addition, adsorption alone is not a reliable method of permanently immobilizing lead. The longevity of treatment cannot be measured by the TCLP test, which provides only a snapshot of the leachable constituents under the test condition at the time of analysis.

The commenter is correct in that the Battelle report did not state that the bonds are not permanent, but concluded that the long-term stability is unknown. However, the Agency remains unconvinced about the long-term stability of this technology. The Agency realizes that this technology has been in use only since the early 1980's and thus, there is little data available on long-term effectiveness. Recent studies conducted by Dr. Drexler, concluded that the addition of iron filings changes the leaching fluids characteristics by increasing the pH and lowering Eh and DO to levels that are unlike most natural environments where the wastes would be disposed (e.g., an environment where iron is constantly added to the landfill). The study found that the increase in pH (lowering of hydrogen ion activity) alone will lower the solubility of Pb in the test and insure a greater frequency of "passes." The Agency infers from this that the immediate test conditions would not be representative of the long-term landfill conditions. In the actual landfill, oxygen would diffuse in to oxidize the metal filings increasing Eh and DO, decreasing pH. This would act to remove the initial adsorption of lead on the iron filings and results in leaching toxic levels of lead into the environment. This is evident from the TCLP tests done on waste sand from the Nacogdoches landfill that showed lead concentrations in the extracts ranging from 2.81 mg/l to 11.6 mg/l. Therefore, the addition of filings gives but a temporary effect unlike the long lasting effects obtained through microencapsulation or other true treatment technologies which substantially reduce metal mobility.

The Agency continues to believe that this treatment should be classified as impermissible dilution. The Agency has concluded that this form of stabilization is inadequate to minimize the threats posed by land disposal of metal-containing hazardous wastes. EPA, therefore considers this technology "impermissible dilution" in accordance with 40 CFR 268.3. Although the addition of iron dust filings is considered treatment under 260.10, the Agency does not believe it is adequate treatment; but merely the addition of material as a substitute for adequate treatment and therefore constitutes impermissible dilution. See 40 CFR 268.3 (b), 54 FR at 48494 (November 1989), and 55 FR at 22532 (June 1, 1990).

The Agency is codifying this determination by amending 40 CFR 268.3 to read as follows:

40 CFR 268

§ 268.3 Dilution prohibited as a substitute for treatment

* * *

(d) It is a form of impermissible dilution, and therefore prohibited, to add iron filings or other metallic forms of iron to lead-containing hazardous wastes in order to achieve any land disposal restriction treatment standard for lead. Lead-containing wastes include D008 wastes (wastes exhibiting a characteristic due to the presence of lead), all characteristic wastes containing lead as an underlying hazardous constituent, listed wastes containing lead as a regulated constituent, and hazardous media containing any of the aforementioned lead-containing wastes.

* *

The Agency does not agree with the commenter's suggestion that an alternative analytical testing procedure be used since the waste is disposed of in a monofill. EPA has established the TCLP as the official required method for determining whether a waste is toxicity characteristic hazardous. EPA's determination of the use of the TCLP was finalized on March 29, 1990 (55 FR 11798). This issue is not being reopened in this rulemaking. However, should this comment be deemed to require a response, EPA reviewed the suitability for testing the leachability of lead in foundry sand and continues to believe that TCLP testing is appropriate for determining the characteristic of hazardousness for metal-bearing waste streams. This issue is further discussed in the Technical Memorandum entitled "Iron Dust Treatment of Lead-Bearing Foundry Sand," dated September 15, 1995, and can be found in the Administrative Record for this rulemaking.

Issue: FOUN1-069

Respondent: TTS

Dcn: PH3P069

Extension:

CBI: N

Commenter: ENVIRONMENTAL TECHNOLOGY COUNCIL

Comment Number: 00021

//COMM21

//RESPTTS

//SUBJFOUN1-069

THE ETC SUPPORTS EPA'S PROPOSAL TO CLASSIFY AS IMPERMISSIBLE DILUTION THE USE OF IRON DUST OR FILINGS AS STABILIZING AGENTS FOR CERTAIN CHARACTERISTIC WASTES. ETC AGREES FULLY WITH EPA'S DISCUSSION IN THE PREAMBLE, 60 FR 11731, AND ADDS FURTHER THAT NO CHEMICAL REACTION OR POZZOLANIC REACTION IS POSSIBLE FROM IRON DUST OR FILINGS. THEREFORE MICROENCAPSULATION OR STABILIZATION IS NOT TAKING PLACE, ONLY DILUTION. THERE IS NO CHEMISTRY THAT CAN BE CONTRIVED TO JUSTIFY THAT METALS SUCH AS LEAD ARE BEING PERMANENTLY BOUND IN A NON-LEACHABLE MATRIX, WHEN USING IRON DUST OR FILINGS AS A STABILIZING AGENT.

//ENDC21

RESPONSE

[The Agency thanks the commenter for their support.]

Issue: FOUN1-086

Respondent: TTS

Dcn: PH3P086 Extension: CBI: N
Commenter: HERITAGE ENV SERVICES, INC

Comment Number: 00007

//COMM7
//RESPTTS
//SUBJFOUN1-086

REGULATING SPECIFIC PRACTICES BY RULE, RATHER THAN RIGOROUSLY ENFORCING EXISTING ADEQUATE STATUTORY AND REGULATORY PROVISIONS, WILL ADD REDUNDANT REGULATIONS THAT WILL ONLY SERVE TO COMPLICATE THE LDR PROGRAM. EPA HAS PROPOSED TO PROHIBIT THE SPECIFIC PRACTICE OF ADDING IRON AS A STABILIZATION REAGENT. EPA MADE A CONVINCING ARGUMENT (60 FR 11731) THAT THIS PRACTICE CONSTITUTES IMPERMISSIBLE DILUTION. IF THIS IS THE CASE, EPA, OR THE APPROPRIATE STATE REGULATORY AGENCY, SHOULD TAKE ENFORCEMENT ACTION AGAINST FACILITIES EMPLOYING THIS METHOD USING THE EXISTING DILUTION PROHIBITION AND THE TECHNICAL ARGUMENT PRESENTED IN THE PROPOSED RULE. CURRENT REGULATORY PROVISIONS AND THE TCLP TEST METHOD ARE SUFFICIENT TO DETERMINE COMPLIANCE WITH LDR.

//ENDC7

RESPONSE

The Agency thanks the commenter for their support on this issue. The Agency is codifying the determination that the addition of iron to a characteristically hazardous lead waste is impermissible dilution (i.e. confirming that the practice already is prohibited under existing dilution prohibition rules).

Issue: FOUN1-100

Respondent: TTS

Dcn: PH3P100 Extension: CBI: N
Commenter: BEVERIDGE & DIAMOND, P.C.

Comment Number: 00001

//COMM1
//RESPTTS
//SUBJFOUN1-100

OUR CLIENT IS PARTICULARLY CONCERNED ABOUT ONE ASPECT OF EPA'S PHASE III PROPOSED RULE, RELATING TO THE PROPOSED CODIFICATION OF THE PRINCIPLES SET FORTH IN ITS MAY 23, 1994 "RCRA POLICY STATEMENT: CLARIFICATION OF THE LAND DISPOSAL RESTRICTIONS" ["LDR"] DILUTION PROHIBITION AND COMBUSTION OF INORGANIC METAL-BEARING HAZARDOUS WASTES." IN THE COURSE OF ITS PREAMBLE DISCUSSION OF THE LDR DILUTION PROHIBITION AS IT RELATES TO THE COMBUSTION OF INORGANIC METAL-BEARING HAZARDOUS WASTES, EPA STATES THAT:

[T]HE AGENCY IS AWARE OF A PRACTICE WITHIN THE FOUNDRY INDUSTRY THAT RECYCLES FOUNDRY SAND BY THERMALLY OXIDIZING IMPURITIES. IT IS EPA'S VIEW THAT THIS PROCESS WOULD VIOLATE THE POLICY AGAINST COMBUSTION OF INORGANICS, UNLESS THE FOUNDRY SAND BEING OXIDIZED CONTAINS TOXIC ORGANIC CONSTITUENTS OR HAS A SIGNIFICANT ORGANIC COMPONENT.

60 FED. REG. AT 11,731.

EPA IN THE PREAMBLE DOES NOT ELABORATE ON THE BASIS FOR ITS IMPLICIT DETERMINATION -- REFLECTED IN THE FOREGOING STATEMENT -- THAT RECYCLED FOUNDRY SAND IS A SOLID AND HAZARDOUS WASTE SUBJECT TO RCRA SUBTITLE C REGULATION, INCLUDING THE REQUIREMENTS OF THE LDR PROGRAM. NEVERTHELESS, IT APPEARS THAT THE AGENCY'S INCLUSION OF THAT STATEMENT IN THE PROPOSED PHASE III RULE IS AN OUTGROWTH OF ITS ONGOING DISCUSSIONS WITH THE FOUNDRY INDUSTRY CONCERNING THE REGULATORY STATUS OF RECYCLED FOUNDRY SAND, REUSED IN CASTING AND MOLDING OPERATIONS. OUR CLIENT IS CONCERNED THAT, BY INTERJECTING ISSUES INTO THE PHASE III SAND, EPA IS SHORT-CIRCUITING THOSE ONGOING DISCUSSIONS IN A

MANNER THAT COULD UNDULY HINDER THE AGENCY'S AND INDUSTRY'S ISSUES THAT HAVE BEEN RAISED TO DATA BY EPA CONCERNING FOUNDRY JUDGEMENTS IN THE PHASE III RULE CONCERNING ISSUES RELATING TO THE THERMAL RECONDITIONING OF FOUNDRY SAND, INCLUDING WHETHER SUCH PROCESSING IMPLICATES THE "DILUTION PROHIBITION" AS IT RELATES TO THE "COMBUSTION" OF INORGANIC METAL-BEARING "WASTES", EPA SHOULD ADDRESS SUCH ISSUES COMPREHENSIVELY IN THE CONTEXT OF ITS ONGOING DISCUSSIONS WITH THE FOUNDRY INDUSTRY CONCERNING RCRA ISSUES PERTAINING TO RECYCLED FOUNDRY SAND.

//ENDC1

RESPONSE

The commenter requested clarification of its policy regarding the recycling of foundry sand by thermal oxidation. The commenter points out that there have been ongoing discussions with the Foundry industry with respect to the regulatory status of recycled foundry sand that is reused in casting and molding operations.

The Agency acknowledges that there have been ongoing discussions between foundry industry representatives and the Agency regarding the regulatory status of the practice of recycling foundry sand by thermal oxidization of the impurities. However, the Agency notes that this issue is outside the scope of this rulemaking. This rulemaking only addresses the issues related to the addition of iron filings to spent foundry waste as a method of treatment.

Issue: FOUN1-105

Respondent: TTS

Dcn: PH3P105

Extension:

CBI: N

Commenter: NON-FERROUS FOUNDERS" SOCIETY

Comment Number: 00001

//COMM1

//RESPTTS

//SUBJFOUN1-105

THE FOUNDRY INDUSTRY AS A WHOLE IS ONE OF THE NATION'S LEADING RECYCLERS. THE BASIC FEEDSTOCK FOR MOST CASTINGS IS SCRAP METAL, WHICH IN THE ABSENCE OF A VIABLE METALCASTING INDUSTRY, WOULD OTHERWISE BE DESTINED FOR DISPOSAL IN LANDFILLS. IN ADDITION, THE OVERWHELMING MAJORITY OF FOUNDRIES EMPLOY A SAND MOLDING PROCESS WHEREIN MOLTEN METAL IS POURED INTO A SAND MOLD AND SOLIDIFIES INTO A DESIRED SHAPE. THE SAND USED IN THIS PROCESS IS TYPICALLY RECYCLED AND REUSED BY THE FOUNDRY UP TO AS MANY AS 100 TIMES. FEW OTHER INDUSTRIES CAN BOAST AS HIGH AS RECYCLING RATE IN THEIR MANUFACTURING PROCESSES.

METALCASTING OPERATIONS ARE SUBJECT TO A HOST OF ENVIRONMENTAL AND SAFETY AND HEALTH STANDARDS, REFLECTING TO SOME DEGREE THE EXTREME CONDITIONS AND COMPLEX MATERIALS INHERENT IN THE INDUSTRY'S CORE ACTIVITIES. THE FACT THAT SUCH STANDARDS ARE NEITHER UNIFORMLY IMPOSED NOR AS STRINGENTLY ENFORCED ON FOUNDRIES IN OTHER COUNTRIES AROUND THE WORLD PLACES U.S. FOUNDRIES AT A SEVERE COMPETITIVE DISADVANTAGE IN INTERNATIONAL TRADE. THAT THE INDUSTRY PERSISTS AT ALL IN SPITE OF THESE PRESSURES IS SIMPLY BECAUSE FOUNDRIES PROVIDE GOODS WHICH HAVE NO ECONOMIC SUBSTITUTES.

DESPITE THE BURDEN THEY IMPOSE, FOUNDRIES MAKE CONCERTED EFFORTS TO BE GOOD NEIGHBORS AND TO COMPLY WITH ALL ENVIRONMENTAL REGULATIONS. HOWEVER, THE INDUSTRY IS CONCERNED THAT PROPOSED NEW REGULATIONS BE BASED ON SOUND SCIENCE AND VALID COST/BENEFIT ANALYSES. REGRETTABLY, THIS DOES NOT APPEAR TO BE THIS CASE WITH REGARD TO THE AGENCY'S PROPOSED RULE "LAND DISPOSAL RESTRICTIONS - PHASE III: DECHARACTERIZED WASTEWATERS, CARBAMATE AND ORGANOBROMINE WASTES AND SPENT

POTLINERS" AS PUBLISHED IN THE MARCH 2, 1995 FEDERAL REGISTER (VOLUME 60, NUMBER 41), PAGES 11702-11766.

THE NON-FERROUS FOUNDERS" SOCIETY FULLY SUPPORTS THE POSITIONS AND ARGUMENTS PUT FORTH BY THE AMERICAN FOUNDRYMEN"S SOCIETY IN RESPONSE TO THIS PROPOSED RULE, AS WELL AS THE SCIENTIFIC AND TECHNICAL DISCUSSION OF THE CHEMICAL REACTIONS OF THE USE OF IRON FILINGS TO LEAD BEARING WASTE A SUBMITTED BY RMT, INC. WE ARE CONFIDENT THAT A THOROUGH REVIEW OF THE DOCKET WILL CLEARLY DEMONSTRATE THAT THE AGENCY"S PROPOSAL TO DISALLOW THIS PRACTICE AS IMPERMISSIBLE DILUTION UNDER 40 CFR 268.3 IS NEITHER SUPPORTED NOR JUSTIFIED. RATHER, RECORDS CLEARLY SHOW THAT THE ADDITION OF SMALL AMOUNTS OF IRON FILINGS IS AN EFFECTIVE TREATMENT FOR LEAD-BEARING WASTES, AND TCLP RESULTS REGULARLY AND ROUTINELY SUPPORT THIS FACT.

WE ALSO BELIEVE THAT THE AGENCY"S COMMENTS ON THE INDUSTRY"S PRACTICE OF RECYCLING FOUNDRY SAND BY THERMALLY OXIDIZING IMPURITIES ARE SIMILARLY UNFOUNDED. MOREOVER, IT IS SOMEWHAT IRONIC THAT THE DEVELOPMENT OF THIS TECHNOLOGY, WHICH EFFECTIVELY REDUCES WASTE BY MORE THAN 80% WHILE RETURNING RAW MATERIALS TO THE CASTING PROCESS, HAS BEEN BOTH LAUDED AND, IN FACT, PARTIALLY FUNDED BY OTHER GOVERNMENT AGENCIES IN RECENT YEARS. ONCE AGAIN, NFFS DRAWS SPECIFIC ATTENTION AND FULLY CONCURS WITH THE AFT COMMENT IN THIS REGARD.

THE NON-FERROUS FOUNDERS" SOCIETY REMAINS CONVINCED THAT THE AGENCY CAN SHOW NO EVIDENCE OF ENVIRONMENTAL HARM CAUSED BY THE THERMAL RECLAMATION OF FOUNDRY SAND, NOR CAN IT JUSTIFY THE DISALLOWANCE OF THE PROVEN TREATMENT METHOD OF ADDING IRON FILINGS TO FOUNDRY WASTE PRIOR TO THEIR DISPOSAL. WE ARE CONFIDENT THAT UPON PROPER CONSIDERATION OF THE FACTS IN THE DOCKET, THE AGENCY WILL COME TO REALIZE THAT NEITHER SOUND SCIENCE NOR VALID COST/BENEFIT ANALYSES HAVE BEEN APPLIED IN THIS REGARD, AND THAT THIS PROPOSED RULE IS BOTH UNNECESSARY AND UNJUSTIFIED.

//ENDC1

RESPONSE

The NFFS objected to EPA's position against addition of iron dust to foundry sand and requested clarification of its policy regarding the recycling of foundry sand by thermal oxidation. The main points raised by NFFS are:

1. supports the positions and arguments put forth by the American Foundrymen's Society (AFS)

- response, which objected to EPA's position against addition of iron dust to foundry sand;
2. A valid cost/benefit analysis has not been applied in this proposed rule.

The Agency's determination that the addition of iron filings constitutes impermissible dilution is predicated on the fact that the adsorption of soluble lead on to the iron surface is a reversible reaction and once the iron surfaces oxidize, the ability of the additive to scavenge soluble metals is diminished. Therefore, the treatment is not permanent. In addition, adsorption alone is not a reliable method of permanently immobilizing lead. The longevity of treatment cannot be measured by the TCLP test, which provides only a snapshot of the leachable constituents under the test condition at the time of analysis.

Studies conducted by Dr. Drexler, concluded that the addition of iron filings changes the leaching fluids characteristics by increasing the pH and lowering Eh and DO to levels that are unlike most natural environments. The study found that the increase in pH (lowering of hydrogen ion activity) alone will lower the solubility of Pb in the test and insure a greater frequency of "passes." The Agency infers from this that the immediate test conditions would not be representative of the long-term landfill conditions. In the actual landfill, oxygen would diffuse in to oxidize the metal filings increasing Eh and DO, decreasing pH. This would act to remove the initial adsorption of lead on the iron filings and results in leaching toxic levels of lead into the environment. This is evident from the TCLP tests done on waste sand from the Nacogdoches landfill that showed lead concentrations in the extracts ranging from 2.81 mg/l to 11.6 mg/l. Therefore, the addition of filings gives but a temporary effect unlike the long lasting effects obtained through microencapsulation or other true treatment technologies which substantially reduce metal mobility.

The Agency continues to believe that this treatment should be classified as impermissible dilution. The Agency has concluded that this form of stabilization is inadequate to minimize the threats posed by land disposal of metal-containing hazardous wastes. EPA, therefore considers this technology "impermissible dilution" in accordance with 40 CFR 268.3. Although the addition of iron dust filings is considered treatment under 260.10, the Agency does not believe it is adequate treatment; but merely the addition of material as a substitute for adequate treatment and therefore constitutes impermissible dilution. See 40 CFR 268.3 (b), 54 FR at 48494 (November 1989), and 55 FR at 22532 (June 1, 1990).

The Agency is codifying this determination by amending 40 CFR 268.3 to read as follows:

40 CFR 268

§ 268.3 Dilution prohibited as a substitute for treatment

* * *

(d) It is a form of impermissible dilution, and therefore prohibited, to add iron filings or other metallic forms of iron to lead-containing hazardous wastes in order to achieve any land disposal restriction treatment standard for lead. Lead-containing wastes include D008 wastes (wastes exhibiting a characteristic due to the presence of lead), all characteristic wastes containing lead as an underlying hazardous constituent, listed wastes containing lead as a regulated constituent, and

hazardous media containing any of the aforementioned lead-containing wastes.

* *

Regarding the comment on foundry industry's practice of reclaiming foundry sand by thermal oxidization of impurities, the Agency notes that this issue is outside the scope of this rulemaking. This rulemaking only addresses the issues related to the addition of iron filings to spent foundry waste as a method of treatment.

With respect to the comment on cost/benefit analysis, the Agency disagrees that a valid cost/benefit analysis was not performed. The reader is referred to the Regulatory Impact Analysis (RIA) published as part of the proposed rule, which also includes a cost/benefit analysis.

Issue: FOUN1-108

Respondent: TTS

Dcn: PH3P108 Extension: CBI: N
Commenter: GMD ENV SYSTEMS, INC

Comment Number: 00001

//COMM1
//RESPPGS
//SUBJFOUN1-108

IN THAT MARCH 2, 1995 PROPOSED, ON PAGE 11731, THE AGENCY MAKES THE FOLLOWING STATEMENT.

"THE AGENCY IS AWARE OF A PRACTICE WITHIN THE FOUNDRY INDUSTRY THAT RECYCLES FOUNDRY SAND BY THERMALLY OXIDIZING IMPURITIES. IT IS EPA'S VIEW THAT THIS PROCESS WOULD VIOLATE THE POLICY AGAINST COMBUSTION OF INORGANICS, UNLESS THE FOUNDRY SAND BEING OXIDIZED CONTAINS TOXIC ORGANIC CONSTITUENTS OR HAS A SIGNIFICANT ORGANIC COMPONENT (AS DESCRIBED ABOVE).

THE FIRST SENTENCE IS A CORRECT STATEMENT. THERE ARE FOUNDRIES WITHIN THE FOUNDRY INDUSTRY WHO RECYCLE (REUSE) FOUNDRY SAND BY CALCINING A PORTION OF THE RETURN SAND. HOWEVER, THE REMAINDER OF THAT STATEMENT IS NOT CORRECT. RECYCLING RETURN SAND IN A FOUNDRY PROCESS IS NOT A "TREATMENT" OF WASTE, THEREFORE, A FOUNDRY UTILIZING THIS RECYCLING EQUIPMENT IS NOT IN VIOLATION OF THE POLICY AGAINST COMBUSTION OF INORGANIC.

THE PROCESS OF CALCINING A RETURN SAND WITHIN THE FOUNDRY PROCESS IS NOT TREATMENT OF A WASTE, I.E. RETURN SAND IS NOT A WASTE.

THE PROCESS REFERRED TO IS A PART OF THE FOUNDRY PROCESS. IT MERELY DIRECTS A CERTAIN PORTION OF THE RETURN SAND TO THE RECYCLING EQUIPMENT WHICH CALCINES THE FEED MATERIAL. AFTER THE SAND IS PROCESSED THROUGH THE CALCINER, IT IS RETURNED TO THE FOUNDRY PROCESS FOR REUSE IN IT'S ORIGINAL STATE.

FURTHERMORE, THE RECYCLING PROCESS DOES NOT OXIDIZE THE INORGANIC, IN THIS CASE SILICA, I.E. SILICON DIOXIDE (SiO₂).

WE WISH TO DIRECT YOUR ATTENTION TO THE AGENCY'S DEFINITION OF THERMAL TREATMENT

"THERMAL TREATMENT IS ANY METHOD, TECHNIQUE, OR PROCESS, INCLUDING NEUTRALIZATION, DESIGNED TO CHANGE THE PHYSICAL, CHEMICAL, OR BIOLOGICAL CHARACTER OF COMPOSITION OF THE WASTE".

ALSO PLEASE NOTE THE DEFINITION OF CALCINING,

"TO HEAT TO A TEMPERATURE BUT WITHOUT FUSING IN ORDER TO DRIVE OFF VOLATILE MATTER".

IT SHOULD BE NOTED THAT THE CALCINING PROCESS DOES NOT CHANGE THE CHEMICAL, PHYSICAL OR BIOLOGICAL CHARACTER OR COMPOSITION OF THE SAND, I.E. SILICA, I.E. SILICON DIOXIDE (SiO₂).

BASED ON THAT DEFINITION, THE FOUNDRY PROCESS OF USING EQUIPMENT DESIGNED FOR THE EXPRESS PURPOSE OF RECOVERING AND REUSING A MATERIAL PRODUCT, IN THIS CASE A NATURAL RESOURCE, DOES NOT CONSTITUTE TREATMENT.

//ENDC1

RESPONSE

The commenter requested clarification of EPA's policy regarding the recycling of foundry sand by thermal oxidation. The commenter asserts that thermal treatment of foundry sand is a calcining operation and not incineration. The calcination process takes place at a lower temperature than glassification. There is no melting of the solid materials but a volatilization of some waste components. The Agency notes that this issue is outside the scope of this rulemaking. This rulemaking only addresses the issues related to the addition of iron filings to spent foundry waste as a method of treatment.

Issue: FOUN1-123

Respondent: TTS

Dcn: PH3P123

Extension:

CBI: N

Commenter: CHESAPEAK SPECIALTY PRODUCTS

Comment Number: 00001

//COMM1

//RESPTTS

//SUBJFOUN1-123

SSPC RECOMMENDATIONS

SSPC SUGGESTS THE FOLLOWING LANGUAGE FOR A RULE:

ALL WASTE GENERATED DURING BLAST CLEANING OF LEAD PAINTED STEEL STRUCTURES SHALL BE DISPOSED OF A HAZARDOUS WASTE REGARDLESS OF THE TYPE; STEEL, MINERAL, SLAG, ETC. ABRASIVE USED FOR BLAST CLEANING. WASTE IS DEFINED AS SPENT ABRASIVE, PAINT CHIPS, RUST, MILL SCALE, DUST, AND OTHER DEBRIS NOT INTENDED FOR RECYCLING.

//ENDC1

RESPONSE

The Agency recognizes that the waste residues resulting from blast cleaning could contain a mixture of lead paint and metallic iron fines and therefore, could exhibit toxicity characteristic for lead. However, the Agency notes that the use of iron abrasives for removing lead paint from steel is part of the blast cleaning process and therefore, the presence of iron fines in the residues would not result in impermissible dilution. The current rulemaking only addresses dilution prohibition as it applies to processes that treat hazardous wastes and not for processes that generate a waste. The Agency also notes that it is beyond the scope of this rulemaking to list all lead abatement waste as hazardous.