Lead in Soil: Issues and Guidelines

A Special Two-and-One-Half-Day
Conference to be Held at

The Hotel Europa in
Chapel Hill, North Carolina, U.S.A.

on
7-9 March 1988

Sponsored by
The United States Environmental Protection Agency
International Lead Zinc Research Organization Inc.
Lead Industries Association
The Society for Environmental Geochemistry and Health
and
College of Sciences and College of Engineering
Clemson University, Clemson, South Carolina

TRAVEL and ACCOMMODATIONS

Chapel Hill, North Carolina, U.S.A., is accessible via the Raleigh/Durham Airport which connects to all major U.S. airports. The Symposium will be held at the Omni Europa in Chapel Hill, North Carolina. Omni Europa provides complimentary transportation to and from Raleigh/Durham Airport for all hotel guests between the hours of 7 am and 11 pm. Arrangements can be made directly with the reservations office. This is *not* a shuttle so exact dates, times and flight numbers must be received in advance. The hotel is convenient to the state capital of Raleigh, Research Triangle Park, and the Raleigh/Durham Airport.

Hotel Europa
Europa Drive
Chapel Hill, NC 27514, U.S.A.
919/968-4900

Direct toll-free numbers:
Continental United States 1-800-334-4280
North Carolina 1-800-672-4240

Telex 57951 Cable EUROPOTEL

Please make your reservations early. Overnight accommodations held for the symposium are subject to cutoff dates and cannot be guaranteed after February 12. In order to guarantee a room, each individual reservation must be accompanied by a deposit in the amount of one night's stay.

COSTS

Registration for the Conference is $90 for the two and one-half days or $45 for a single day. The room rates for the Omni Europa are $55 single or $65 double. In order to guarantee a room, each individual reservation must be accompanied by a deposit in the amount of one night's stay.

LOCAL ATTRACTIONS

Chapel Hill is a beautiful city in its own right, but it is also the home of the University of North Carolina, one of the oldest universities in the United States. Close to Chapel Hill is Durham, home of Duke University, a prestigious private university, and Raleigh, the state capital, which is also home of North Carolina State University. These three cities form the Research Triangle which includes the Research Triangle Park, the largest research park in the world, with numerous research facilities of some of the major companies, associations, and governmental organizations.

PUBLICATION

The proceedings will be published in a special edition of *Environmental Geochemistry and Health*, the journal of the Society for Environmental Geochemistry and Health (SEGH) and mailed to all paid registrants.

College of Sciences
OFFICE OF THE DEAN

CLEMSON UNIVERSITY

February 26, 1988

MEMORANDUM

To: Speakers and Session Leaders
Lead in Soil: Issues and Guidelines

From: Janie Dillon

A continental breakfast has been planned on Monday, Tuesday and Wednesday mornings for the speakers and session leaders for that day. Breakfast will be available from 6:30 am (for you early birds) until 8:00 am. We will have a projector available as well as a carrousel so that you can arrange your slides for your talk later in the day.

Attached is a list of the session leaders with addresses. Would you please send a brief biography (preferable on an index card) to your session leader? Should you forget to do this, please bring it with you to the conference.

CLEMSON, SOUTH CAROLINA 29631 • TELEPHONE 803/656-3472

Session Leaders - Lead in Soil

Lester D. Grant, Director V
Environmental Criteria & Assessment
Office, USEPA, MD 52
3200 Hwy. 54
Research Triangle Park, NC 27711
919/541-4173 FAX 919/541-5078

Rosalind Volpe IV
Manager, Environmental Health
International Lead Zinc Research
Organization, Inc.
2525 Meridian Parkway, P.O. Box 12036
Research Triangle Park, NC 27709
919/361/4647

John Yoder, Director II
Environmental Health
Lead Industries Assoc., Inc.
292 Madison Avenue
New York, NY 10017
212/578-4750

Betsy T. Kagey, MSPH III
Mentor, SUNY-Empire State College
44 Horicon Avenue
Glens Falls, NY 12801
518/793-4404(O);798-5290(H)

J. Charles Jennett I
Dean, College of Engineering
109 Riggs Hall, Clemson University
Clemson, SC 39634
803/656-3201

Lead in Soil Folder

College of Sciences
OFFICE OF THE DEAN

February 10, 1988

CLEMSON UNIVERSITY

MEMORANDUM

To: Speakers for Conference on Lead in Soil

From: Janie Dillon, Assistant to the Dean

Attached is the tentative lineup for the conference to be held on 7,8,9 March, 1988.

We have made reservations for you at the Omni Europa in Chapel Hill, N.C. for the nights of 6,7,8 March. The hotel will furnish transportation from the Raleigh-Durham airport. However this is not regular limousine service so they will need to know exact dates, times and flight numbers. Their toll free number is 1-800-672-4280.

If you have questions, please call me. I shall try to provide answers.

em

attachment

CLEMSON, SOUTH CAROLINA 29631 • TELEPHONE 803/656-3472

Lead in Soil: Issues and Guidelines
March 7-9, 1988

DAY 1

Plenary Session I — **Introduction and Statement of Problem**
Chairman - Bobby Wixson

8:00 a.m.	Registration
8:30 - 8:45	Overview/Ground Rules - Bobby Wixson
8:45 - 9:15	U.S. Government Perspective - Sandra Lee
9:15 - 9:45	Canadian Perspectives - Pamela Stokes
9:45 - 10:15	Lead in Soil: A European Perspective - Dennis Simms
10:15 - 10:30	Break
10:30 - 11:00	Industry Perspective - Robert Putnam
11:00 - 11:30	Landfill Superfund Sites - Ranking EPA - To be Announced
11:30 - 12:00	Panel Discussion
12:15 - 1:30	Lunch

Plenary Session II — **Sources and Pathways of Lead into Soil**
Chairman - John Yoder

1:30 - 2:00	Overview of Sources and Pathways - Brian Davies, Nord Gale
2:00 - 2:30	Point Sources and Deposition - Gale Hoffnagle
2:30 - 3:00	Herculaneum, Mo. Study and Blood Lead Reduction Strategy - Dan Vornberg
3:00 - 3:15	Break
3:15 - 4:00	Speciation, Soil Mobility, Bioavailability - Rufus Chaney
4:00 - 4:30	Isotope Ratio Analyses - Michael Rabinowitz
4:30 - 5:00	The Classification of Lead Bearing Particles by Automated Scanning Electron Microscopy and Energy Dispursive X-Ray Spectroscopy - Andrew Hunt, et.al.
6:00 - 7:00	Reception (Hosted by the Sponsoring Organizations)

DAY II

Plenary Session III — **Assessment of Human Exposure**
Chairman B. Kagey

8:30 - 9:00	Overview of Human Exposure Pathways - Paul Hammond
9:00 - 9:30	Cincinnati Study - Pathways to Elevated Blood Lead and Role of Social Behavior Factors in Children - Robert Bornschien, et.al.
9:30 - 10:00	British Study - Donald Barltrop
10:00 - 10:30	Modeling the Soil/Lead-Blood/Lead Relationship - Alan Marcus et.al.
10:30 - 10:45	Break
10:45 - 11:15	To be Announced
11:15 - 11:45	Lead Exposure in Young Children from Dust and Soil in the U.K. - Iain Thornton et.al.
11:45 - 12:15	Baltimore Data - Lead Based Paint - Mark Farfel
12:15 - 1:30	Lunch

Plenary Session IV	Soil Lead Abatement Case Studies Chairman - Rosalind Volpe
1:30 - 2:00	Bunker Hill - Kellogg, Idaho - Gene Baker
2:00 - 2:30	Management of Soil Lead Contamination in Port Pirie, Australia - Tom Farrell
2:30 - 3:00	Overview of Soil Lead Removal Program in Toronto: Guidelines and Practical Aspects - Goff Jenkins
3:00 - 3:15	Break
3:15 - 3:45	Minnesota Study - Howard Mielke et. al.
3:45 - 4:15	Soil Lead in Minnesota - Dale Trippler et. al.
4:15 - 4:45	Baltimore Study - Julian Chisolm
4:45 - 5:15	Cincinnati Study - Scott Clark
6:00 - 7:00	Social Hour - Cash Bar

DAY III

Plenary Session V	**Abatement and Control Strategies** **Chairman - Lester Grant**
8:30 - 9:00	Soil Abatement Overview - Rob Elias
9:00 - 9:30	Abatement Procedures and Costs - Allen Hathaway
9:30 - 10:00	Economic Analysis - Ken Wise
10:00 - 10:15	Break
10:15 - 11:00	Discussion on Possible Approaches to Criteria and Guidelines - Panel Discussion
11:00 - 11:45	General Audience Discussion
11:45 - 12:00	Summary - Closing Remarks - Bobby Wixson

College of Sciences
OFFICE OF THE DEAN

February 12, 1988

CLEMSON UNIVERSITY

MEMORANDUM

To: Lead in Soil Conference Speakers

From: Janie Dillon, Assistant to the Dean

Attached is a copy of the final (I hope) draft of the program for the conference. I really appreciate your patience and cooperation.

Please note that the Omni Europa has cancelled their toll free number and arrangements for transportation from the Raleigh-Durham Airport can be made by calling them at 919/968-4900.

Those of you who have not notified me of the amount of your airfare, please do so by the first of next week.

CLEMSON, SOUTH CAROLINA 29631 • TELEPHONE 803/656-3472

Lead in Soil: Issues and Guidelines
March 7-9, 1988

DAY 1

Plenary Session I	**Introduction and Statement of Problem** **Chairman - J.C. Jennett**
8:00 a.m.	Registration
8:30 - 8:45	Overview/Ground Rules - Bobby Wixson
8:45 - 9:15	U.S.E.P.A. Perspective - Sandra Lee
9:15 - 9:45	Canadian Perspectives - Pamela Stokes
9:45 - 10:15	Lead in Soil: A European's View - Dennis Simms
10:15 - 10:30	Break
10:30 - 11:00	Lead in Soil: The Unanswered Question- Robert D. Putnam
11:00 - 11:30	Landfill Superfund Sites - Ranking - To be Announced
11:30 - 12:00	Panel Discussion
12:15 - 1:30	Lunch
Plenary Session II	**Sources and Pathways of Lead into Soil** **Chairman - John Yoder**
1:30 - 2:00	Overview of Sources and Pathways - Brian Davies, Nord Gale
2:00 - 2:30	Real World Modelling of Blood-Lead from Environmental Sources - Gale F. Hoffnagle, C.C.M.
2:30 - 3:00	Herculaneum, Mo. Study and Blood Lead Reduction Strategy - Dan Vornberg
3:00 - 3:15	Break
3:15 - 4:00	Speciation, Soil Mobility, Bioavailability of Lead in Soils - Rufus Chaney
4:00 - 4:30	Stable Isotopes of Lead in Soil - Michael Rabinowitz
4:30 - 5:00	The Classification of Lead Bearing Particles by Automated Scanning Electron Microscopy and Energy Dispursive X-Ray Spectroscopy - Andrew Hunt, et.al.
6:00 - 7:00	Reception (Hosted by the Sponsoring Organizations)

DAY II

Plenary Session III	**Assessment of Human Exposure** **Chairman B.T. Kagey**
8:30 - 9:00	Overview of Human Exposure Pathways - Paul Hammond
9:00 - 9:30	Soil/Lead-Blood/Lead Relationships in an Urban Community and in a Mining Community - Robert Bornschein, et.al.
9:30 - 10:00	British Study - Donald Barltrop
10:00 - 10:30	Modeling the Soil/Lead-Blood/Lead Relationship - Alan Marcus, et.al.
10:30 - 10:45	Break

10:45 - 11:15	To be Announced
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12:15 - 1:30	Lunch

Plenary Session IV — Soil Lead Abatement Case Studies
Chairman - Rosalind Volpe

1:30 - 2:00	Bunker Hill Study - Kellogg, Idaho - Gerald L. Lamb and Brian Kiernan
2:00 - 2:30	Management of Soil Lead Contamination in Port Pirie, Australia - Tom Farrell
2:30 - 3:00	Establishment of Lead in Soil Guidelines in Ontario: Summary of Soil Removal Programs- Goff Jenkins
3:00 - 3:15	Break
3:15 - 3:45	Soil Dust Lead and Childhood Exposure as a Function of Size and Community Location: The Case for Abatement in Minnesota - Howard F. Mielke, et. al.
3:45 - 4:15	Soil Lead in Minnesota - Dale Trippler, et.al.
4:15 - 4:45	Interrelationships Among Paint, Dust and Soil in Childhood Lead Poisoning- Julian Chisolm
4:45 - 5:15	Cincinnati Soil Lead Abatement Demonstration Project - Scott Clark, et.al.
6:00 - 7:00	Social Hour - Cash Bar

DAY III

Plenary Session V — **Abatement and Control Strategies**
Chairman - Lester Grant

8:30 - 9:00	Alternatives to the Removal of Lead-Contaminated Soil - Rob Elias
9:00 - 9:30	Remedial Engineering for Lead-Contaminated Soil Sites - Allen Hathaway
9:30 - 10:00	Economic Analysis - Ken Wise
10:00 - 10:15	Break
10:15 - 11:00	Discussion on Possible Approaches to Criteria and Guidelines - Panel Discussion
11:00 - 11:45	General Audience Discussion
11:45 - 12:00	Summary - Closing Remarks - Bobby Wixson

Dan:

Attached was delivered on Saturday morning to the office in St. Louis. Did not appear to be anything requiring emergency attention, so I did nothing further.

Jim Steele

Lead in Soil:Issue and Guidelines
March 7-9, 1988

Format Guidelines for Authors

The Proceedings of the **Lead in Soil: Issues and Guidelines** will be published as a monograph by the Society for Environmental Geochemistry and Health, who recommend the following guidelines.

1. Typescripts should be on good quality white paper, using a carbon ribbon. Allow 30 mm (1.1 inch) margins all round. Do not use a dot matrix printer.

2. Use double spacing for the main text and single spacing for references and for the abstract which should come at the start of the paper.

3. Figures, graphs, structural formula and tables should be on separate sheets of paper. Indicate with a pencil where they should fall in the text. For line drawings use indian ink. If photographs are used, ensure they have good contrast.

4. Captions should be on separate sheets of paper.

iidelines ›

IMPORTANCE

At the present time there are no recognized U.S. guidelines for lead in soil. This conference will focus on the issues of lead in soil with the intent of bringing together the most current scientific knowledge and data, to evaluate case studies of soil lead abatement programs presently used in the United States and in other countries and suggest possible approaches to be used for the development of criter a and guidelines.

OBJECTIVES

The objectives of this special U.S. conference on "Lead in Soil: Issues and Guidelines" are to:

- Summarize present government and industry perspectives of the problem
- Identify major sources and pathways of lead into soil
- Assess human exposure pathways and indices
- Evaluate soil lead abatement case studies
- Discuss cost-effective abatement and control strategies
- Suggest possible approaches to developing criteria and guidelines

WHO SHOULD PARTICIPATE?

The focused presentations, discussions and audience participation will be of great applied value to people in federal, state and municipal governments, industries concerned with lead, public health agencies, the medical community, special waste control groups, and anyone concerned with the question of lead in soil.

HOW THIS CONFERENCE IS ORGANIZED

Internationally recognized scientists concerned with the issues of lead in soil and the development of realistic guidelines, have been invited to present a summary of current knowledge on their subject. Each presentation will be followed by a discussion session with audience participation.

To receive the program circular, please complete and return.

1988: Lead in Soil: Issues and Guidelines
March 7, 8, 9, 1988 • Chapel Hill, NC 27514, U.S.A.

Name _____

Address _____

_____

Telephone _____

Telex _____

SPONSORS

The United States Environmental Protection Agency
The International Lead Zinc Research Organization, Inc.
Lead Industries Association
The Society for Environmental Geochemistry and Health
The College of Sciences and the College of Engineering, Clemson University, Clemson, South Carolina

CONFERENCE CHAIRMAN

Dr. Bobby G. Wixson, Dean, College of Sciences, Clemson University, S.C.

CONFERENCE SESSIONS

Monday, March 7, 1988

AM
Plenary Session I — Introduction and Statement of Problem

PM
Plenary Session II — Sources and Pathways of Lead into Soil

Tuesday, March 8, 1988

AM
Plenary Session III — Assessment of Human Exposure

PM
Plenary Session IV — Soil Lead Abatement Studies

Wednesday, March 9, 1988

AM
Plenary Session V — Abatement and Control Strategies

Adjourn at Noon

To receive program circular, mail to

PLACE
STAMP
HERE

Ms. Janie Dillon or
Ms. Melody Cox
College of Sciences
119 Kinard Laboratory
Clemson University
Clemson, SC 29634-1901, U.S.A.
803/656-3676 Telex: 981694

residential wells located onsite and all estimated 1,000 people who live within a three-mile radius west of the Site are dependent upon private domestic wells. The Schuylkill River is utilized as a drinking water source for the Philadelphia area as well as Pottstown, Spring City, Norristown, and Phoenixville. Mill Creek is stocked with trout by the Pennsylvania Fish Commission and is ranked by PADER as a recreation water course.

N. The primary contaminants of concern at the Site are lead and lead compounds. Lead is a toxic metal that tends to accumulate in the tissues of man and other animals. It enters the body through two routes: ingestion and inhalation. Under normal conditions, 5 to 10 percent of the lead ingested is absorbed and approximately 37 percent of the lead inhaled is retained. Acute (short term) lead overexposure can produce severe neurological damage (encephalopathy and convulsions) and death. Chronic (long term) overexposure to lead may result in severe damage to the circulatory, nervous, renal and reproductive systems. Common symptoms of chronic overexposure include loss of appetite, anemia, intestinal cramps, fatigue, paralysis of nerves and colic. Children are more susceptible than adults to lead intoxication because they absorb higher lead levels through the gastrointestinal system (approximately 50%), retain lead in the body longer and have a greater proportional food intake. Studies have suggested that lead exposure over a long term can produce sub-clinical or difficult to detect effects on the central nervous system of children, particularly relating to intelligence and behavioral activity. Severe lead intoxication in children can result in irreversible brain damage.

IV. CONCLUSIONS OF LAW

SLIDE I

MAJOR COMMUNITY REGULATORY & LITIGATION CONCERNS FOR LEAD EMITTING POINT SOURCES

1. 0.5 UG/M3 Air Lead Standard

2. An independent soil lead standard for soil around point sources

3. CERCLA Clean up/The Dioxin Strategy Concept

4. Civil Liability Suits

5. TOSCA product ban

SLIDE II

INDUSTRY RESPONSE OPTIONS

1. Wait and See

2. Defend against each action as a separate effort

3. Attempt to resolve regulatroy concerns with positive constructive response which may diffuse adversarial regulations

4. Some mix of the above

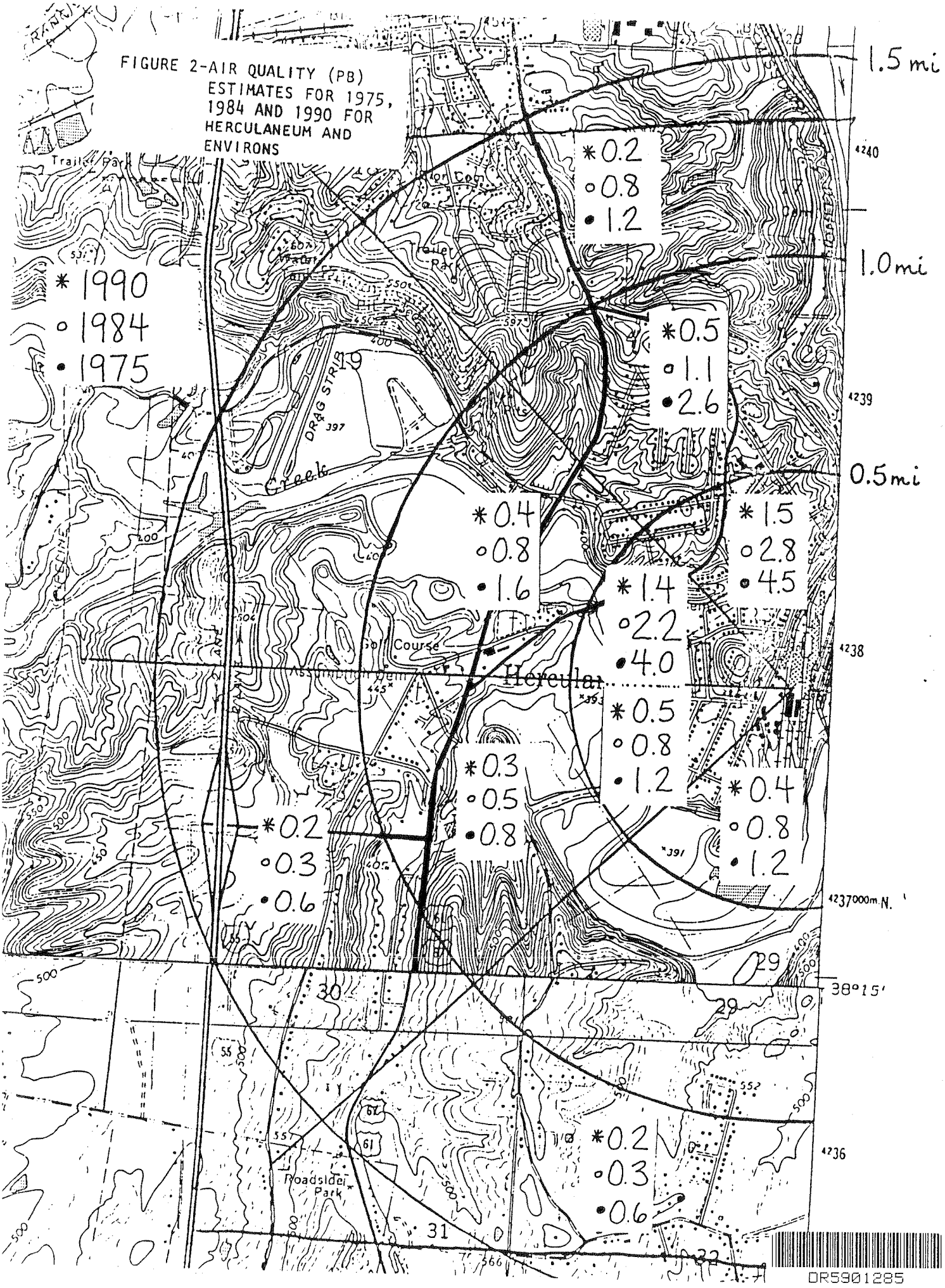
FIGURE 2-AIR QUALITY (PB) ESTIMATES FOR 1975, 1984 AND 1990 FOR HERCULANEUM AND ENVIRONS
* 1990
○ 1984
• 1975
1.5 mi
1.0mi
0.5mi
*0.2
○0.8
•1.2
*0.5
○1.1
•2.6
*0.4
○0.8
•1.6
*1.5
○2.8
•4.5
*1.4
○2.2
•4.0
*0.5
○0.8
•1.2
*0.3
○0.5
•0.8
*0.4
○0.8
•1.2
*0.2
○0.3
•0.6
*0.2
○0.3
•0.6
Golf Course
Herculaneum
Roadside Park
DRAG STRIP
Creek
4240
4239
4238
4237000m.N.
4236
38°15'

Table III Predictive Model for Blood Lead

Sector-miles from plant stack	N-NW 0.0-0.5	N-NW 0.5-1.0	N-NW 1.0-1.5
1. Outdoor air lead (ug/m3)	2.8 2.8	1.1 1.1	0.8 0.8
2. Indoor air lead (ug/m3)	0.84 0.84	0.33 0.33	0.24 0.24
3. Time spent outdoor (hours/day)	2 4	2 4	2 4
4. Time weighted average (ug/m3)	1.00 1.17	0.39 0.46	0.29 0.33
5. Volume of air respired (m3/day)	4 5	4 5	4 5
6. Lead intake from air (ug/day)	4.01 5.83	1.58 2.29	1.15 1.67
7. % deposition/absorption in lungs	45 75	45 75	45 75
8. Ttl. lead uptake from lungs (ug/day)	1.8 4.4	0.7 1.7	0.5 1.3
9. Dietary lead Consumption (ug/day)			
a) natural lead,indirect atmosphere	2.4 2.4	2.4 2.4	2.4 2.4
b) from solder or other metals	20.4 20.4	20.4 20.4	20.4 20.4
c) atomospheric lead	7 7	7 7	7 7
d) undetermined sources	1.2 1.2	1.2 1.2	1.2 1.2
10. % absorption in gut	42 53	42 53	42 53
11. Dietary lead uptake (ug/day)	13 16	13 16	13 16
12. Street dust/soil lead (ug/g)	500 500	275 275	150 150
13. Indoor dust lead (ug/g)	500 500	275 275	150 150
14. Time weighted average (ug/g)	500 500	275 275	150 150
15. Amount of dirt ingested (g/day)	0.2 0.2	0.2 0.2	0.2 0.2
16. Lead intake from dirt (ug/day)	100 100	55 55	30 30
17. % dirt lead absorption in gut	30 30	30 30	30 30
18. Lead uptake from dirt (ug/day)	30 30	17 17	9 9
19. Total lead uptake from lung and gut (ug/day)	45 51	30 35	23 27
20. Predicted Blood Lead	18 20	12 14	9 11
21. Observed Blood Lead	19.2 19.2	12.6 12.6	9.9 9.9
22. Ratio Predicted:Observed Blood Lead	0.9 1.1	1.0 1.1	0.9 1.1
23. Number of children tested	13	15	33

TABLE IV PREDICTED AND ACTUAL BLOOD LEAD VALUES

Miles from Stack	1975 Predict	1975 Actual	1984 Predict	1984 Actual	1990 Predict
N-NW					
0.0-0.5	27.5	30.0	19.0	19.2	14.0
0.5-1.0	22.0	19.3	13.0	12.6	8.0
1.0-1.5	18.0	16.9	10.0	9.9	5.0
NW-W					
0.0-0.5	25.5	24.3	17.0	17.4	12.5
0.5-1.0	19.5	32.3	11.5	11.3	7.0
1.0-1.5	-	-	-	-	-
W-SW					
0.0-0.5	30.0	17.3	22.0	22.3	17.0
0.5-1.0	-	-	10.5	10.4	5.5
1.0-1.5	16.0	11.1	7.5	7.4	3.0
SW-S					
0.0-0.5	25.0	21.3	17.0	16.8	12.5
0.5-1.0	-	-	-	-	-
1.0-1.5	-	-	8.5	8.4	4.0

SLIDE III

CONCLUSIONS FROM EPA SOIL LEAD MODEL EFFORT AT HERCULANEUM

1. Their model may be generally applicable when calibrated

2. Air lead reductions from 1.5 to 0.5 will have very little impact on children's blood lead levels

3. Additional drops in blood lead levels(5 ug/dl) can be expected (based on EPA predicted food lead reductions) in children throughout the United States including around point sources.

4. Soil lead/house dust levels account for a substantial portion of the remaining children uptake around point sources.

5. In order to reduce children's blood lead levels you must impact on their uptake from soil or house dust levels.

SLIDE IV

PROPOSAL

Adopt a progressive stand on community children's blood lead levels as the ultimate goal of all of the regulatory activity and deal directly with problem through education and intervention.

QUESTIONS AND CRITICISM OF APPROACH

1. Could possibly speed up advent of regulatory intervention
2. Could it be potentially more expensive than air lead standard
3. Would EPA accept such an approach
4. Under what authority could the approach be legitimized

IN DEFENSE

1. The Dallas Story
2. The Bunker Hill Story
3. Industry could have five separate standards or actions to deal with

SLIDE V

WAYS TO REDUCE CHILDREN'S UPTAKE

1. Remove the impacted child from the neighborhood

2. Remove the house from the marketplace

3. Better housekeeping

4. Reduce dust potential in the yard through soil replacement, sodding or reseeding

5. Remove or cover leaded paint in house if present

6. Educate parents about the above

7. Screen children and intervene on a case by case basis as necessary

ATTENDANCE

Aug 26, 1986; LIA Regulatory activities on Environmental Health.

Bailey W. Lewis	LIA	212 532 2373
Robert Wilbur	SCI	202 857-1100
Richard Nelsinger	Alpha Metals	201-434-6778
Ed Sezzar	Atty. for LIA	202/296-0500
Dan Vornberg	St. Joe	314-479-5311
Bob Muth	Asarco	212 [illegible]
Werner T. Meyer	LIA	212-578-4750
John A. De Paul	RSR	214-631-6070
Pete Wilke	HLP	219-931-5360
Jean M. Beaudoin	Johnson Controls	414-228-2745
W. Pallies	Exide	215-441-7453
Chris Beatty	St. Joe	202-955-9317
Jerry Pfeifer	St. Joe	314 729 9555
Don Robbins	Asarco	801-262-2459
John Butler	General Battery	215-378-0760
Dave Crouch	Homestake	(415) 981-8150
Mike Kearney	Homestake Lead	314 626 4851
Jerome F. Cole	ILZRO	212-532-2373
Robert D. Putnam	LIA	212-532-2373

August 20, 1986

STATIONARY LEAD SOURCE PROGRAM

STATUS/PROBLEM

EPA is reviewing the current air quality standard for lead of 1.5 ug/m^3, and the review should be completed in early 1987. Any revision would then be formally proposed by EPA.

To date, all signs point to a significant lowering of the standard, conceivably as low as 0.5 ug/m^3, based on the apparent conclusion of EPA's staff that the present blood-lead threshold for adverse effects is probably too high. EPA acknowledges that the lead in gasoline phasedown will largely resolve the lead exposure problem in the general population, and the brunt of a revised standard, therefore, will fall on stationary lead sources. Compliance with a lower air quality standard would be extremely costly (the Bureau of Mines estimates combined capital costs of $250 million for the four primary lead plants), and there is no reason to believe that a lower standard would cure the blood-lead problem.

The purpose of this paper is to propose an alternative to revision of the air lead standard which would be both feasible for the lead industry and more responsive to the blood-lead problem.

PROPOSAL

A. Maintain and require compliance with the current 1.5 ug/m^3 air lead standard.

B. Establish a stationary lead source program designed to keep exposed children's blood leads at acceptable levels.

C. Implement both the air standard and stationary source program through the SIP process.

DISCUSSION OF PROPOSAL

A. Maintain the current air lead standard

- EPA would reaffirm the current standard based on its findings that the remaining lead problem involves blood leads of children living near stationary sources of lead and that there is an absence of convincing data that a lower air lead standard will resolve that problem.

- Stationary lead sources would be required to comply with the current standard.

B. Establish a stationary lead source program

- Legal Authority. There is authority under at least three statutes for EPA to establish a stationary lead source program (see attached legal analysis).

- Objective. Maintain blood leads of children aged 1-6 living near stationary lead sources below the acceptable maximum.

- Key Elements

  --Programs would be implemented through the SIP process.

  --States would have the flexibility to address site-specific conditions in determining the type of program needed in each community.

  --Programs would be developed in consultation with representatives of the affected facility and appropriate state and local authorities.

  --Programs would have to contain adequate measures to (1) identify the target population, nature of the problem, necessary remedial actions and the results of those remedial actions; and (2) demonstrate that children aged 1-6 living in the impact area will have blood-lead levels below the acceptable maximum.

  --Such measures could include, but would not be limited to, blood-lead testing, local educational programs, land acquisition, relocation assistance, personal hygiene counseling, residential maintenance and indoor air quality improvement programs, street dust control, physician training and local teachers' education. If necessary and cost-effective, such measures could also include additional work at the facility as negotiated with the state.

  --Absent information to precisely identify areas of concern around each stationary source, the initial program would focus on all children aged 1-6 living within 2 kilometers of primary plants, 1 kilometer of secondary plants and 0.5 kilometers of battery plants. The measures the state adopts to identify problem children and measure the results of the program would be used to more accurately determine the areas of concern.

  --The program would have to be structured so as to be enforceable and provide for suitable penalties for noncompliance.

  --Facility owners would be required to cost-share on an equitable basis the additional expenses incurred by state and local authorities to implement and enforce the stationary lead source program.

RELATED ISSUES FOR DISCUSSION

- Should the program specifically provide for mandatory or voluntary blood-lead testing of children aged 1-6? Are there other ways to identify problem children, determine the results of remedial actions and ensure ultimate compliance with the program's objective?

- What studies/analyses/data are available or needed to support the stationary lead source program and the claim that further lowering of the air lead standard will not resolve the blood-lead problem?

- Under which statute should the stationary lead source program be "housed"?

TABLE IV PREDICTED AND ACTUAL BLOOD LEAD VALUES

Miles from Stack	1975 Predict	1975 Actual	1984 Predict	1984 Actual	1990 Predict
N-NW					
0.0-0.5	27.5	30.0	19.0	19.2	14.0
0.5-1.0	22.0	19.3	13.0	12.6	8.0
1.0-1.5	18.0	16.9	10.0	9.9	5.0
NW-W					
0.0-0.5	25.5	24.3	17.0	17.4	12.5
0.5-1.0	19.5	32.3	11.5	11.3	7.0
1.0-1.5	-	-	-	-	-
W-SW					
0.0-0.5	30.0	17.3	22.0	22.3	17.0
0.5-1.0	-	-	10.5	10.4	5.5
1.0-1.5	16.0	11.1	7.5	7.4	3.0
SW-S					
0.0-0.5	25.0	21.3	17.0	16.8	12.5
0.5-1.0	-	-	-	-	-
1.0-1.5	-	-	8.5	8.4	4.0

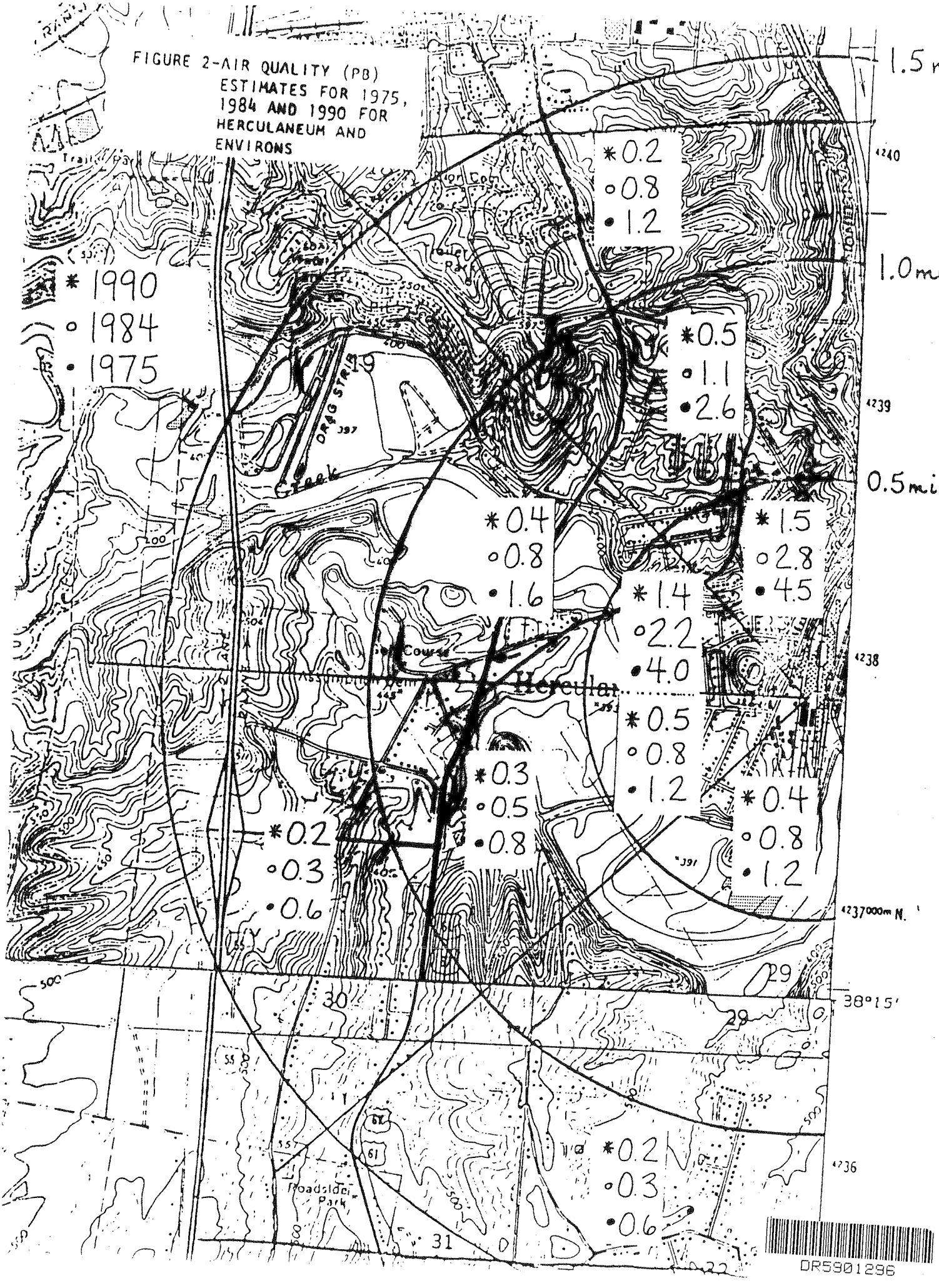
FIGURE 2-AIR QUALITY (PB) ESTIMATES FOR 1975, 1984 AND 1990 FOR HERCULANEUM AND ENVIRONS
* 1990
° 1984
• 1975
*0.2
°0.8
•1.2
*0.5
°1.1
•2.6
*0.4
°0.8
•1.6
*1.5
°2.8
•4.5
*1.4
°2.2
•4.0
*0.5
°0.8
•1.2
*0.3
°0.5
•0.8
*0.4
°0.8
•1.2
*0.2
°0.3
•0.6
*0.2
°0.3
•0.6
1.5 mi
1.0mi
0.5mi
4240
4239
4238
4237000m N.
4236
38°15'
DRAG STRIP
Creek
Course
Herculaneum
Roadside Park
61
DR5901296

SLIDE V

WAYS TO REDUCE CHILDREN'S UPTAKE

1. Remove the impacted child from the neighborhood

2. Remove the house from the marketplace

3. Better housekeeping

4. Reduce dust potential in the yard through soil replacement, sodding or reseeding

5. Remove or cover leaded paint in house if present

6. Educate parents about the above

7. Screen children and intervene on a case by case basis as necessary

Table III Predictive Model for Blood Lead

Sector-miles from plant stack	N-NW	0.0-0.
1. Outdoor air lead (ug/m3)	2.8	2.8
2. Indoor air lead (ug/m3)	0.84	0.84
3. Time spent outdoor (hours/day)	2	4
4. Time weighted average (ug/m3)	1.00	1.17
5. Volume of air respired (m3/day)	4	5
6. Lead intake from air (ug/day)	4.01	5.83
7. % deposition/absorption in lungs	45	75
8. Ttl. lead uptake from lungs (ug/day)	1.8	4.4
9. Dietary lead Consumption (ug/day)		
a) natural lead,indirect atmosphere	2.4	2.4
b) from solder or other metals	20.4	20.4
c) atomospheric lead	7	7
d) undetermined sources	1.2	1.2
10. % absorption in gut	42	53
11. Dietary lead uptake (ug/day)	13	16
12. Street dust/soil lead (ug/g)	500	500
13. Indoor dust lead (ug/g)	500	500
14. Time weighted average (ug/g)	500	500
15. Amount of dirt ingested (g/day)	0.2	0.2
16. Lead intake from dirt (ug/day)	100	100
17. % dirt lead absorption in gut	30	30
18. Lead uptake from dirt (ug/day)	30	30
19. Total lead uptake from lung and gut (ug/day)	45	51
20. Predicted Blood Lead	18	20
21. Observed Blood Lead	19.2	19.2
22. Ratio Predicted:Observed Blood Lead	0.9	1.1
23. Number of children tested	13	

SLIDE II

INDUSTRY RESPONSE OPTIONS

1. Wait and See

2. Defend against each action as a separate effort

3. Attempt to resolve regulatroy concerns with positive constructive response which may diffuse adversarial regulations

4. Some mix of the above

SLIDE III

CONCLUSIONS FROM EPA SOIL LEAD MODEL EFFORT AT HERCULANEUM

1. Their model may be generally applicable when calibrated

2. Air lead reductions from 1.5 to 0.5 will have very little impact on children's blood lead levels

3. Additional drops in blood lead levels(5 ug/dl) can be expected (based on EPA predicted food lead reductions) in children throughout the United States including around point sources.

4. Soil lead/house dust levels account for a substantial portion of the remaining children uptake around point sources.

5. In order to reduce children's blood lead levels you must impact on their uptake from soil or house dust levels.

SLIDE IV

PROPOSAL

Adopt a progressive stand on community children's blood lead levels as the ultimate goal of all of the regulatory activity and deal directly with problem through education and intervention.

QUESTIONS AND CRITICISM OF APPROACH

1. Could possibly speed up advent of regulatory intervention
2. Could it be potentially more expensive than air lead standard
3. Would EPA accept such an approach
4. Under what authority could the approach be legitimized

IN DEFENSE

1. The Dallas Story
2. The Bunker Hill Story
3. Industry could have five separate standards or actions to deal with

SLIDE I

MAJOR COMMUNITY REGULATORY & LITIGATION CONCERNS FOR LEAD EMITTING POINT SOURCES

1. 0.5 UG/M3 Air Lead Standard

2. An independent soil lead standard for soil around point sources

3. CERCLA Clean up/The Dioxin Strategy Concept

4. Civil Liability Suits

5. TOSCA product ban

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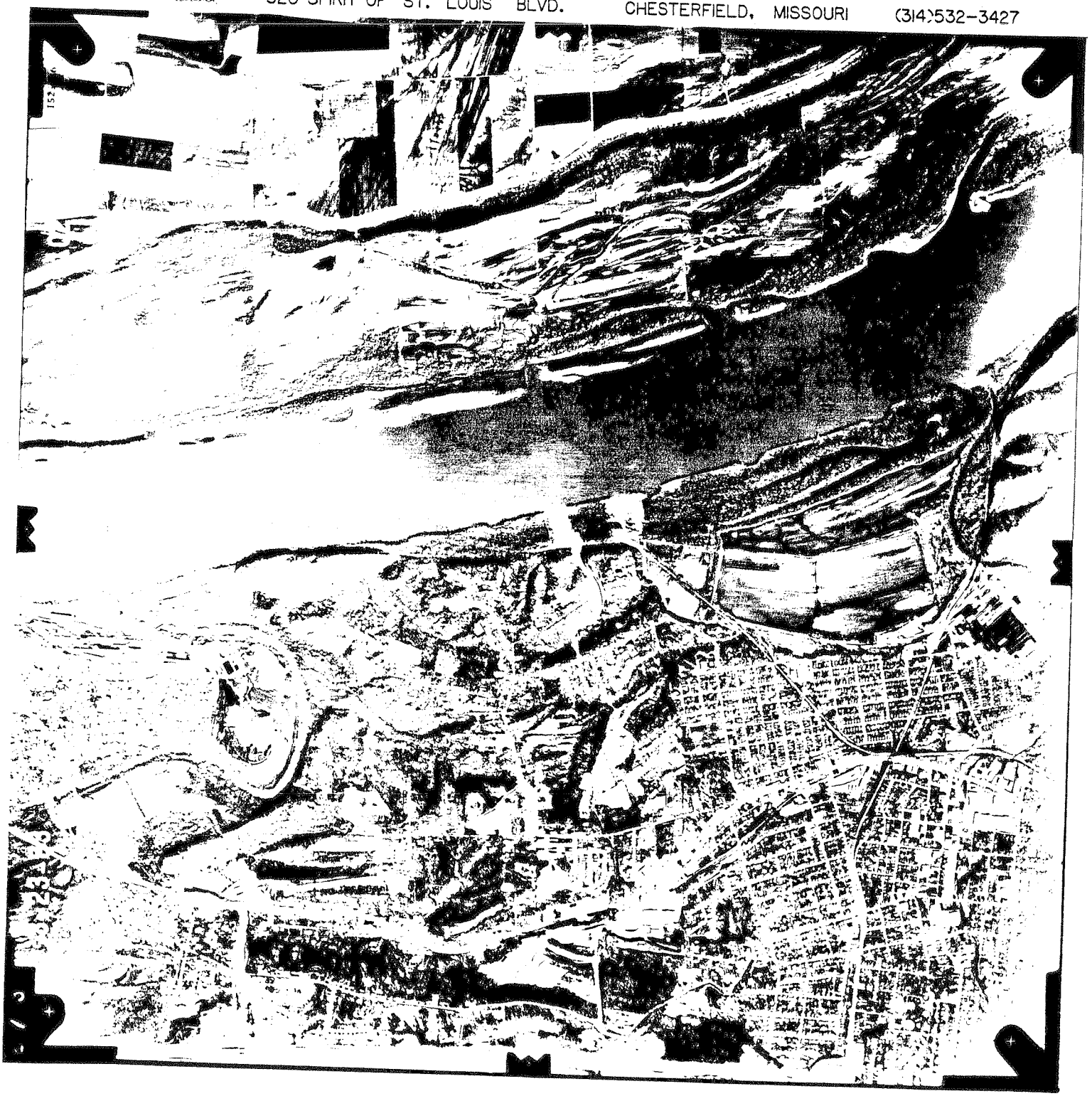

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