INDUSTRIAL WASTE NEEDS ASSESSMENT

PHASE 1

**Tennessee Valley Authority
Resource Group**

October 1993

Edited by
Robert J. Radel and Marsha P. Willis
Tennessee Valley Authority
National Environmental Research Center
Muscle Shoals, Alabama

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

INDUSTRIAL WASTE NEEDS ASSESSMENT

PHASE 1

Index of Tables, Figures, and Appendices

Table I	Problem Area List
Table II	Problem Area Ratings
Table III	Top One-Third of Problem Areas
Figure 1	Criteria Used in Analysis of Problem Areas
Figure 2	Average Evaluation Rating
Figure 3	Data Spread for Evaluator's Ratings
Appendix A	Industrial Waste Task Team Members
Appendix B	Process Description and Process Diagram Attachment 1 - Flow Diagram
Appendix C	State Regulators
Appendix D	Waste Reduction Assistance Programs
Appendix E	Regional Planning and Development Agencies (TVA Service Area)
Appendix F	TVA Customer Service Center Managers
Appendix G	Potential Questions for Cooperators
Appendix H	Contact Coordinators
 <i>Reports by Contact Coordinators (Appendices I-O)</i>	
Appendix I	Waste Reduction Assistance Programs Report Attachment 1 - List of Waste Reduction Assistance Programs Attachment 2 - Survey Summary
Appendix J	Regional Planning and Development Agencies Report Attachment 1 - Contacts for Regional Planning and Development Agencies Attachment 2 - Survey Summary
Appendix K	Industrial Development Associations Report Attachment 1 - Contacts for Industrial Development Associations Attachment 2 - Data Analysis
Appendix L	TVA Generating Group Report Attachment 1 - Contacts for TVA Generating Group Attachment 2 - Interview Questionnaire Attachment 3 - Responses to Question 1: Important Waste Management Problems
Appendix M	TVA Power Distributors Report Attachment 1 - List of Contacts of TVA Power Distributors Attachment 2 - Data Summary
Appendix N	Chambers of Commerce Report Attachment 1 - Contacts for Chambers of Commerce
Appendix O	State Environmental Regulatory Agencies Attachment 1 - Contacts for State Environmental Regulatory Agencies Attachment 2 - Survey Summary

INDUSTRIAL WASTE NEEDS ASSESSMENT PHASE 1

Executive Summary

In January of 1992 a team was put together to begin the process of assessing the industrial waste needs of the Tennessee Valley. The team consisted of representatives from the various TVA Resource Group organizations. This initial team recommended as a starting point in the process a two-phase market research effort. A second team was then commissioned to conduct the first phase of this market research effort.

The first phase of that marketing effort is now complete. This report contains an analysis of the data obtained through interviews of more than 168 individuals representing a similar number of organizations. A total of 37 TVA Resource Group employees were involved in the contact process from various organizations. In addition, the appendices provide summaries of the data used in designing the process and the reports of the Contact Coordinators (who were responsible for a series of visits).

As a result of the data analysis, the Review Team makes the following recommendations:

1. Publish this report and distribute to the new management within TVA Resource Group as well as to all those participating as contacts, visitors, and contact coordinators.
2. The Resource Group management team, or management teams within each of the respective organizations within Resource Group, appoint Phase 2 assesement teams for as many of the problem areas listed in Table III as seem appropriate. We further recommend that, where possible, cross-organizational teams be used to examine individual problem areas.
3. Make this report available within Generating and Customer Groups, especially to the Customer Service Centers.
4. Establish a process to continue follow up with each of the contacts made in this assesment.

INDUSTRIAL WASTE NEEDS ASSESSMENT PHASE 1

I. Project Background

TVA Resource Group's research programs are focusing on environmental and waste management needs of the Valley. Refocusing research directions requires a more detailed understanding of the environmental needs of Valley industry. This report and the information gathering process that has led to it, is the first in a series of efforts to begin to develop that understanding.

The Industrial Waste Task Team (IWTT) was chartered on January 19, 1993, and met as a team for the first time on February 3, 1993. Team members (Appendix A), all from the TVA Resource Group, were: Carroll Duggan and Tom Henne, Community Partnerships; Joe Phillips and Jerry Steiner, Water Management; and Darwin Bridges, Byron Parker, Bob Radel, Jim Ransom, and Keith Rylant, National Environmental Research Center (NERC). Keith Rylant was selected as the team leader/coordinator. The review team members are Kathy Isom, Steve Seale, and Ron Williams (NERC).

The charge given to the IWTT was to develop, by April 1, 1993, a specific and systematic plan for gathering information that will help in determining the waste management needs and constraints of the Valley and the environmental concerns associated with these industry problems. The IWTT provided its findings and a proposed plan for an assessment by the April 1 deadline.

The plan suggested by the IWTT involved an industrial waste marketing research project to be completed in two phases as diagrammed and described in Appendix B. The review team from the IWTT was supplemented with additional staff from Community Partnerships and NERC, and a Task Team was designated to conduct Phase 1 of the assessment process. This report describes the results from Phase 1 and provides recommendations for Phase 2 of the project.

II. Phase 1 Activities

Identifying waste problems involves defining, along with the problem, characteristics of the problem that will help potential funding entities understand the depth and breadth of impacts associated with the problems. The information will also help those planning and conducting research, technology transfer, and educational and training activities to more precisely determine the Valley's needs. For this reason, contacting groups or individuals that have knowledge of the problem impacts is necessary. During Phase 1 of this project, representatives for the following groups were contacted:

State Regulators (Appendix C) - Director of the Waste Division
Waste Reduction Assistance Programs (Appendix D) - Executive Director

Industrial Development Associations - Executive Director
Regional Planning and Development Agencies (Appendix E) - Executive Director
Chambers of Commerce - Executive Director
TVA Power Distributors - Customer Service Center Manager (Appendix F)
TVA Generating Group - Janet Watts

Substantial waste management research is being conducted by several Valley universities. Some of these universities which conduct, or are affiliated with, their state's Waste Reduction Assistance Programs (WRAPs) are shown in Appendix D. In addition, state universities not included in the WRAPs list were contacted to determine their waste management activities.

The Northeast Tennessee Regional Integrated Energy and Waste Management/Waste Utilization Program is the only known established waste management consortium in the Valley. This consortium provided another source of valuable waste-related information.

Contact Coordinators were selected from volunteers to administer and participate in the client interviews in Phase 1 of the process. The Contact Coordinators were trained by the Review Team to help facilitate consistency of questions and information from the various sources. Teams of interviewers were selected (again from volunteers) that were representative of both Community Partnerships and the NERC. These teams then scheduled and completed visits and prepared reports for each visit.

A series of potential questions was developed by the original IWTT. These were presented to the Contact Coordinators as a starting point for their further development. For the most part, these questions and the issues contained in them remained in tact with only minor modifications. How they were modified by each of the contact coordinators can be found in their individual reports. These potential questions or issues are listed in Appendix G.

The Contact Coordinators (Appendix H) were responsible for assuring that all visits were made and for preparing the final reports (Appendices I-O). The review team for this process consisted of Carroll Duggan, Kathy Isom, Bob Radel, Steve Seale, and Ron Williams. Dru Gambrell assisted by serving as a facilitator for the weekly Contact Coordinators meetings.

This assessment effort involved approximately 37 individuals within Resource Group and approximately 1.5 Full Time Equivalents (FTEs). This equates to nearly 6 full time staff over the time of the assessment.

III. Results of Assessments

Once the visits were completed and the contact coordinators reports were submitted, the Review Team began to examine the data to determine if any significant inferences could be drawn. Initially, a general examination of the data revealed that information had been obtained which could support the initiation of Research and Development, Technology Transfer, Education and Training, as well as Technology Assessment activities. As such the

data contained in these reports has applicability for all of Resource Group. However, it was difficult to determine and clear winners from such a cursory examination of the data. As a result, the Review Team began a process of matrix analysis in an attempt to prioritize the data further.

A list of problem areas (Table I) was developed from the Contact Coordinators' reports. Criteria were then developed (Figure 1) and a rank score for each criteria assigned to each problem area. The scoring was done by using a 9 for high, 4 for medium, or a 1 for low. A summary of the results is provided in Table II. To test the robustness of the analysis, the data were graphed to show the slope of the scores (Figure 2) and the high-low values (Figure 3). The analysis allows the interpreter to determine that a problem rated as high is indeed significantly more important than one rated as low. A caveat to all of this is that these ratings are dependent on the knowledge bases of the four individuals who were involved in the rating process. One possible followup would be to have a wider group of Resource Group staff involved in the data evaluation.

If one then makes an assumption to choose the top third of the problem areas for further analysis in Phase 2, the problem list in Table III results.

IV. Recommendations for Phase 2

It is the recommendation of this review team that:

1. Publish this report and distribute to the new management within TVA Resource Group as well as to all those participating as contacts, visitors, and contact coordinators.
2. The Resource Group management team, or management teams within each of the respective organizations within Resource Group, appoint Phase 2 assessment teams for as many of the problem areas listed in Table III as seem appropriate. We further recommend that, where possible, cross-organizational teams be used to examine individual problem areas.
3. Make this report available within Generating and Customer Groups, especially to the Customer Service Centers.
4. Establish a process to continue follow up with each of the contacts made in this assessment.

Table I

Problem Area List

Ag wastes (fert & farm chem)	Modelling hydrocarbon degrad. & movement
Aluminum dross	Modelling impact of dams on temp. profiles
Animal wastes (manure, bodies, litter)	Mon./meas. meth. for nonparticulates (air)
Asbestos disposal	Non-attainment (air regs)
Better indicators of water 'bio-quality'	'Municipal' wastes
Biofiltration control technologies	NPS pollution
CFC replacements	Ozone studies
Composites/blends (plastics, textiles, etc.)	Pack'ng material, paper, cdbrd, pallets
Construction wastes	Plating solutions
Contam. sites from closed facilities	Ppt'r, foundry, baghouse dusts
Contam. substation soils (PCB & other)s	Printing ink & solutions
Contaminated mineral acids	Replacements for CFC's
Contaminated soils from LUST's	Replacements for organic solvents
Cost effective remed. techs for LUST's	Scrap steel
Creosote pole disposal & liability	Scrubber wastes
Cured rubber products	Septic tanks
Def. of emissions from incin. of various	Solvent replacements
Definition of metals limits for aq toxicity	Spent antifreeze
Disp of dye chemicals	Spent solvents
Disp. of Sub. D non-haz mat'ls (undiff.)	Stone washing wastewaters
Electromagnetic fields	Sub. D regs (pub ed, cost, siting, space)
Fiber 'tuft' and lint	Thermal pollution from power plants
Fluorescent lighting disposal	TiO ₂ manufacturing wastes
Fly ash	Untreated sewage from marinas
Fugitive Acetone	Used tires
Fugitive air emissions (undiff)	UST regs
Fugitive CS ₂	Waste generator liability
Galvanized cans	Waste oils sep, treat, recycling
Grease trap waste	Waste plastics
Heavy metals (gen burden to landfills)	Water treatment sludge
Heavy metals in sewage sludge	Whey wastes
Help starting recycling programs	Wood pulping liquor
Household chemicals	Wood wastes incl sawdust
Illegal dumping	Yard wastes
In-situ treat. for contam. groundwater	
Lack of air monitoring stations	
Lack of sewers	
Land application of sludges	
Landfill leachate monitoring & control	
Landfills - Is dry tomb or wet cell best?	
Landfill liner lifetimes, install, maint.	
Low DO around dams	
LUST-contaminated soils	
Medical wastes	
Mercury from fossil plants	
Metal shavings	
Metals leach. from soils into groundwater	
Mixed wastes	
Modelling air toxics impacts on ecosystems	

Table II
Problem Area Ratings

I.D. No.	Problem Area	SKS	RJR	KWI	JCD	AVG
1	Disp. of Sub. D non-haz mat'ls (undiff.)	77	64	75	69	71
2	Contam. sites from closed facilities	67	49	70	75	65
3	Replacements for CFC's	61	80	44	69	63
4	Pack'ng material, paper, cdbrd, pallets	67	66	59	53	61
5	Fly ash	67	51	59	67	61
6	Animal wastes (manure, bodies, litter)	72	67	46	57	60
7	Waste plastics	67	57	54	62	60
8	Municipal' wastes	66	61	49	67	60
9	Water treatment sludge	58	72	50	57	59
10	Replacements for organic solvents	64	51	52	65	58
11	Used tires	62	67	49	56	58
12	Plating solutions	52	47	69	65	58
13	Contam. substation soils (PCB & other)s	62	72	49	49	58
14	CFC replacements	47	75	44	59	56
15	Wood wastes incl sawdust	61	53	59	48	55
16	Sub. D regs (pub ed, cost, siting, space)	40	64	64	52	55
17	Non-attainment (air regs)	43	49	54	75	55
18	Creosote pole disposal & liability	72	61	48	39	55
19	Solvent replacements	60	44	52	65	55
20	LUST-contaminated soils	57	62	49	49	54
21	Disp of dye chemicals	41	70	40	57	52
22	Land application of sludges	72	57	34	45	52
23	Composites/blends (plastics, textiles, etc.)	69	51	41	44	51
24	Yard wastes	66	56	31	53	51
25	Contaminated soils from LUST's	52	62	49	44	51
26	Cured rubber products	59	72	28	42	50
27	Heavy metals (gen burden to landfills)	57	61	33	49	50
28	Waste oils sep, treat, recycling	62	36	44	54	49
29	Household chemicals	59	56	49	28	48
30	In-situ treat. for contam. groundwater	56	44	55	37	48
31	Fluorescent lighting disposal	64	53	40	34	47
32	UST regs	40	41	57	46	46
33	Landfill leachate monitoring & control	52	27	39	69	46
34	Grease trap waste	46	57	49	28	45
35	Cost effective remed. techs for LUST's	51	51	30	49	45
36	Ag wastes (fert & farm chem)	65	44	38	30	44
37	Heavy metals in sewage sludge	44	36	50	49	44
38	Spent solvents	55	47	30	47	44
39	Fugitive air emissions (undiff)	56	46	25	43	42
40	Mixed wastes	35	52	41	42	42
41	Septic tanks	43	57	28	39	41
42	Electromagnetic fields	53	40	40	33	41
43	Asbestos disposal	37	40	44	44	41
44	Printing ink & solutions	42	36	27	55	40
45	Mercury from fossil plants	49	44	19	49	40
46	Scrubber wastes	46	44	23	49	40
47	Illegal dumping	53	16	50	38	39
48	Help starting recycling programs	48	49	27	30	38
49	Def. of emissions from incin. of various	46	41	16	50	38
50	Medical wastes	47	30	30	44	37

Table II
Problem Area Ratings

I.D. No.	Problem Area	SKS	RJR	KWI	JCD	AVG
51	Ozone studies	40	24	43	41	37
52	Lanfill liner lifetimes, install, maint.	59	19	28	45	37
53	Ppt'r, foundry, baghouse dusts	24	47	27	47	36
54	Contaminated mineral acids	33	53	19	39	36
55	Fugitive CS2	26	34	47	34	35
56	Definition of metals limits for aq toxicity	39	43	19	39	35
57	NPS pollution	48	16	42	31	34
58	Galvanized cans	57	34	19	28	34
59	Fugitive Acetone	32	38	30	34	33
60	Construction wastes	54	31	16	33	33
61	Lack of sewers	21	27	21	64	33
62	Low DO around dams	27	27	49	31	33
63	Better indicators of water 'bio-quality'	48	38	19	28	33
64	Landfills - Is dry tomb or wet cell best?	49	19	22	39	32
65	Modelling hydrocarbon degrad. & movement	28	54	19	24	31
66	Modelling air toxics impacts on ecosystems	38	30	19	36	30
67	Thermal pollution from power plants	30	24	36	33	30
68	Spent antifreeze	36	39	29	19	30
69	Aluminum dross	24	44	19	30	29
70	Wood pulping liquor	46	51	16		28
71	Metals leach. from soils into groundwater	24	28	19	44	28
72	Waste generator liability	45	10	25	31	27
73	Fiber 'tuft' and lint	24	36	29	19	27
74	Scrap steel	53	21	10	24	27
75	Whey wastes	19	36	19	27	25
76	Lack of air monitoring stations	40	24	16	21	25
77	Untreated sewage from marinas	38	24	16	25	25
78	Stone washing wastewaters	33	31	13	22	24
79	Metal shavings	38	24	10	22	23
80	Mon./meas. meth. for nonparticulates (air)	28	23	16	27	23
81	Biofiltration control technologies	16	27	27	18	22
82	Modelling impact of dams on temp. profiles	27	24	19	18	22
83	TiO2 manufacturing wastes	19	22	13	13	16

Interviewers: SKS - Steve Seale; RJR - Bob Radel; KWI - Kathy Isom; and JCD - Carroll Duggan.
AVG - average.

Table III

Top One-Third of Problem Areas

Disp. of Sub. D non-haz mat'ls (undiff.)
Contam. sites from closed facilities
Replacements for CFC's
Pack'ng material, paper, cdbrd, pallets
Fly ash
Animal wastes (manure, bodies, litter)
Waste plastics
'Municipal' wastes
Water treatment sludge
Replacements for organic solvents
Used tires
Plating solutions
Contam. substation soils (PCB & other)s
CFC replacements
Wood wastes incl sawdust
Sub. D regs (pub ed, cost, siting, space)
Non-attainment (air regs)
Creosote pole disposal & liability
Solvent replacements
LUST-contaminated soils
Disp of dye chemicals
Land application of sludges
Composites/blends (plastics, textiles, etc.)
Yard wastes
Contaminated soils from LUST's
Cured rubber products
Heavy metals (gen burden to landfills)
Waste oils sep, treat, recycling

Figure 1

Criteria Used in Analysis of Problem Areas

- Quantity of the waste or size of the problem?
- Is the impact of the problem widespread?
- Is the problem a regional problem?
- Is technology available to address the problem?
- Is the problem national in scope?
- Does the problem involve a priority pollutant?
- Is research needed to provide an appropriate solution to the problem?
- Is the problem inhibiting economic development?
- Is the problem a disposal problem?
- Does solution of the problem match the technical capabilities of Resource Group?

Figure 2. Problem Area Ratings

Figure 3
Data Spread for Evaluators' Ratings

APPENDIX A
INDUSTRIAL WASTE TASK TEAM MEMBERS

J. Darwin Bridges
NFE 1F-M
Muscle Shoals, AL 35660
(Marketing)
Phone Number: (205) 386-2075
Fax Number: (205) 386-2284

Carroll Duggan (James C.)
HB 2G-C
1101 Market Street
Chattanooga, TN 37402-2801
(VRC Regional Waste)
Phone Number: (615) 751-4574
Fax Number: (615) 751-7479

Byron R. Parker
CEB 3A-M
Muscle Shoals, AL 35660
(Chemical Development)
Phone Number: (205) 386-3577
Fax Number: (205) 386-2815

Joe Phillips (Joseph W.)
CEB 2A-M
Muscle Shoals, AL 35660
(RBO Water Resources)
Phone Number: (205) 386-3035
Fax Number: (205) 386-2499

Bob Radel (Robert J.)
NFE 2J-M
Muscle Shoals, AL 35660
(Chemical Research)
Phone Number: (205) 386-2251
Fax Number: (205) 386-2189

Jim Ransom (James M.)
NFE 1B-M
Muscle Shoals, AL 35660
(Field Programs)
Phone Number: (205) 386-2244
Fax Number: (205) 386-3856

W. Keith Rylant/Team Coordinator
NFE 1F-M
Muscle Shoals, AL 35660
(Marketing)
Phone Number: (205) 386-2835
Fax Number: (205) 386-2284

Jerry Steiner (Gerald R.)
HB 2C-C
311 Broad Street
Chattanooga, TN 37402-2801
(RBO Water Resources)
Phone Number: (615) 751-7314
Fax Number: (615) 751-7479

Tom Henne (Thomas R.)
175 Oakfield Road
Oakfield, Tennessee 38362
(VRC Community Growth & Jobs)
Phone Number: (901) 423-5118
Fax Number: (901) 423-5119

APPENDIX B

PROCESS DESCRIPTION AND PROCESS DIAGRAM

1. Review Team designates Task Team; selects team members; and defines team mission/charge
2. Task Team defines reasons for existence
3. Task Team identifies the approach and develops the plan

Phase 1 - Geographical Approach

4. Identify potential cooperators
  - State Regulators (7 Valley states)
  - Waste Reduction Assistance Programs (EPA Region IV states and Virginia)
  - Industrial Development Associations (IDAs)
  - Regional Planning & Development Agencies (RPDAs)
  - Chambers of Commerce
  - TVA Power Distributors
  - TVA Generating Group
5. Determine method of contact (e.g. mailed questionnaire, telephone call, visit)
6. Determine who makes contacts (determine if tiering/prioritizing contacts, for example, might identify which chambers to contact during contacts with RPDAs; suggest names)
7. Develop list of information needed and questions to ask each group of cooperators
8. Establish working relationship with cooperators as needed (e.g., power distributors should be interviewed through Customer Group; contact Power Service Center representatives to determine if they can incorporate questions into their biannual surveys)
9. Contact cooperators
10. Develop listing of type of problems that need research work (e.g. "general" types of wastes, quantities, location, current disposal, properties)
11. Develop screening criteria
12. Perform preliminary screening
13. Determine types of waste or industries to study in Phase 2

Phase 1 should result in a list of high-priority waste problems and/or a list of industries having significant waste problems requiring further research and screening in Phase 2.

Phase 2 - Specific Industry/Product Approach

14. Identify Phase 2 cooperators
  - Trade associations
  - Manufacturers
15. Determine method of contact
16. Determine who makes contact
17. List information needed, do literature searches, interpret usefulness of information retrieved, and decide what questions remain unanswered
18. Contact Phase 2 cooperators
19. Determine details of problems/wastes/quantities/properties/location
20. Develop list of criteria for final screening
21. Perform final screening of information to narrow list of problem areas
22. Prepare final list of research opportunities

Attachment 1 (Appendix B)

**APPENDIX C
STATE REGULATORS**

ALABAMA

Department of Environmental Management
Land Division
1751 Congressman W. L. Dickinson Drive
Montgomery, Alabama 36130
(205) 217-7730

GEORGIA

(Hazardous Waste)
Natural Resources Department
Environmental Protection Division
205 Butler Street, SE., Suite 1252
Atlanta, Georgia 30334
(404) 656-7802

(Nonhazardous Waste)
Land Protection Branch
Address same as above
(404) 362-2692

KENTUCKY

Natural Resources and Environmental
Protection Cabinet
Waste Management Division
Fort Boone Plaza
18 Reilly Road
Frankfort, Kentucky 40601
(502) 564-4245

NORTH CAROLINA

Department of Environmental, Health
and Natural Resources
Hazardous Waste Section
Post Office Box 27687
Raleigh, North Carolina 27611
919) 733-2178

(Nonhazardous Waste)
Solid Waste Management
Address same as above
(919) 733-0692

TENNESSEE

Division of Solid Waste Management
Department of Conservation
Customs House, 701 Broadway
Nashville, Tennessee 37247
(615) 532-0780

VIRGINIA

Department of Waste Management
Divisions of Technical Services and
Regulations
101 North 14th Street
Richmond, Virginia 23219
(804) 225-2667

MISSISSIPPI

Environmental Quality Division
Pollution Control Office
Hazardous Waste Branch
Post Office Box 10385
Jackson, Mississippi 39289
(601) 961-5171

(Nonhazardous Waste)
Groundwater (Solid Waste) Branch
Address same as above
(601) 961-5190

**APPENDIX D
WASTE REDUCTION ASSISTANCE PROGRAMS**

ALABAMA

Environmental Institute
for Waste Management Studies
Dr. Robert A. Griffin
(205) 348-8403

University of Alabama
Hazardous Material Management and
Resource Recovery Program (HAMMAR)
Dr. William Herz
(205) 348-8401

Retired Engineers Waste Reduction
Assistance Program
Roy Nicholson
(205) 386-2807

GEORGIA

Georgia Hazardous Waste Management
Authority (GHWMA)
Bob Donaghue
(404) 651-5120

Georgia Tech Research Institute (GTRI)
Tech Waste Reduction and Environmental
Compliance (TECH WREC)
Jim Walsh
(404) 894-3806

KENTUCKY

Kentucky Partners, University of
Louisville
Joyce St. Clair
(502) 588-7260

MISSISSIPPI

Mississippi Environmental Protection
Council (EPC)
Thomas Whitten
(601) 961-5241

Mississippi Waste Reduction and
Minimization Program
Hazardous Waste
Chris Bowen
(601) 961-5321
Nonhazardous Waste
Larry Estes
(601) 961-5036

Mississippi State University
Mississippi Technical Assistance
Program (MISSTAP)
Dr. Donald Hill or Dr. Caroline Hill
(601) 325-8454

NORTH CAROLINA

North Carolina Department of
Environmental, Health and
Natural Resources
Office of Waste Reduction
Gary Hunt
(919) 571-4100

University of North Carolina-Charlotte
Urban Institute
Southeast Waste Exchange
Maxie May
(704) 547-2307

University of Louisville Chemical
Engineering Department
Waste Minimization Assessment
Center (WMAC)
Dr. Marvin Fleischman
(502) 588-6357

EPA/TVA

Waste Reduction Resource Center
Raleigh, North Carolina
Bob Carter
(800) 476-8686

TENNESSEE

University of Tennessee
Center for Industrial Services (CIS)
George Smelcer
(615) 242-4816

University of Tennessee
Engineering Mechanics Department
Dr. Richard Jendrucko
(615) 974-7682

APPENDIX E
REGIONAL AREA PLANNING AND DEVELOPMENT AGENCIES
(TVA Service Area)

ALABAMA

Mr. Sam Minor, Executive Director
Northwest Alabama Council of Governments
Post Office Box 2603
Muscle Shoals, Alabama 35662

205-383-3861

Mr. Ronald Matthews, Executive Director
North-central Alabama Regional Council
of Governments
Post Office Box C
Decatur, Alabama 35602

205-355-4515

Mr. Dean Y. Matthews, Executive Director
Top of Alabama Regional Council of Governments
115 Washington Street, Southeast, Suite A
Huntsville, Alabama 35801-4883

205-533-3330

GEORGIA

Mr. Jim Layton, Executive Director
Coosa Valley Regional Development Council
Post Office Drawer 1793
Rome, Georgia 30163-1001

404-295-6485

Mr. Barry Tarter, Executive Director
North Georgia Regional Development Council
503 West Waugh Street
Dalton, Georgia 30720-3495

404-272-2300

Dr. Sam Dayton, Jr., Executive Director
Georgia Mountains Regional Development Council
1010 Ridge Road
Post Office Box 1720
Gainesville, Georgia 30503

404-536-3431

KENTUCKY

Mr. Henry Hodges, Executive Director
Purchase Area Development District
Post Office Box 588
Mayfield, Kentucky 42066

502-247-7171

Mr. John Adams, Executive Director
Pennyrite Area Development District
300 Hammond Drive
Hopkinsville, Kentucky 42240

502-886-9484

Mr. Jack Eversole, Executive Director
Barren River Area Development District
Post Office Box 90005
Bowling Green, Kentucky 42102

502-781-2381

MISSISSIPPI

Mr. Eugene Taylor, Executive Director
Northeast Mississippi Planning and
Development District
Post Office Box 600
Booneville, Mississippi 38829

601-728-6248

Mr. Vernon Kelly, Executive Director
Three Rivers Planning and Development District
Post Office Drawer B
Pontotoc, Mississippi 38863

601-489-2415

Mr. Rupert L. Johnson, Executive Director
Golden Triangle Planning and Development District
Post Office Drawer DN
Mississippi State, Mississippi 39762-5643

601-325-3855

NORTH CAROLINA

Ms. Ellen Gause, Executive Director
Southwestern North Carolina Economic
Development Council
Post Office Box 921
Elizabethtown, North Carolina 28337

919-862-6985

Mr. Robert Shepard, Executive Director
Land of Sky Regional Council
25 Heritage Drive
Ashville, North Carolina 28806

704-254-8131

Mr. Richard Fender, Executive Director
Region D Council of Governments
Executive Arts Building, Box 1820
Boone, North Carolina 28607

704-265-5434

TENNESSEE

Mr. Bob Freeman, Executive Director East Tennessee Development District Post Office Box 19806 Knoxville, Tennessee 37919-2806	615-584-8553
Ms. Susan Roberts, Executive Director First Tennessee Development District 207 North Boone Street, Suite 800 Johnson City, Tennessee 37604	615-928-0224
Mr. Maynard Pate, Executive Director Greater Nashville Regional Council 7th Floor Stahlman Building 211 Union Street, Box 233 Nashville, Tennessee 37201	615-862-8828
Mr. Joe Max Williams, Executive Director South Central Tennessee Development District Post Office Box 1346 Columbia, Tennessee 38402	615-381-2040
Mr. Joe Guthrie, Executive Director Southeast Tennessee Development District Chattanooga Area Regional Council of Governments Post Office Box 4757 Chattanooga, Tennessee 37405-3804	615-266-5781
Mr. Ed Brooks, Executive Director Upper Cumberland Development District 1225 Burgess Falls Road Cookeville, Tennessee 38501	615-432-4111
Mr. John Sicola, Executive Director Memphis Area Association of Governments 157 Poplar Avenue, Room B150 Memphis, Tennessee 38103	901-576-4610
Mr. Robert Brandon, Executive Director Northwest Tennessee Development District Post Office Box 963 Martin, Tennessee 38237	901-587-4215
Mr. Barry K. Matthews, Executive Director Southwest Tennessee Development District 27 Conrad Drive, Suite 150 Jackson, Tennessee 38305-2850	901-668-7112

VIRGINIA

—— Mr. Ron Flonary, Executive Director 703-431-2206
Lenowisco Planning and Development Council
U.S. 58/421 West
Duffield, Virginia 24244

Mr. Andrew Chafin, Executive Director 703-889-1778
Cumberland Plateau Planning and Development Council
Post Office Box 548
Lebanon, Virginia 24266

Mr. Thomas Taylor, Executive Director 703-783-5103
Mount Rogers Planning and Development Council
1021 Terrace Drive, Box 1068
Marion, Virginia 24354

**APPENDIX F
TVA CUSTOMER SERVICE CENTER MANAGERS**

North Area

Peggy S. Pennington
Post Office Box 396
Columbia, Tennessee 38401
(615) 380-8000

Roland H. Streeter
MDB 2D-NSH
Nashville, Tennessee 37222
(615) 360-1682

Myron N. Callaham
Post Office Box 20260
Bowling Green, Kentucky 42102
(502) 782-6559

Gerald R. Kruspe
Post Office Box 1217
Murfreesboro, Tennessee 37133
(615) 893-8161

South Area

H. Harold Williams
108 Woodson Street
Huntsville, Alabama 35804
(205) 534-8434

Michael L. Nabors
SB 1F-M
Muscle Shoals, Alabama 35660
(205) 386-3120

East Area

Francis I. Cable
PSC-C
Chattanooga, Tennessee 37415
(615) 751-4225

East Area (Continued)

Eddie L. Tramel
2107 West Market Street
Johnson City, Tennessee 37604
(615) 928-7351

Esther R. Ruffner
GRN 1D-K
Knoxville, Tennessee 37918
(615) 673-2200

West Area

Don Dickerson
Post Office Box 1160
Tupelo, Mississippi 38802
(601) 844-1528

Van M. Wardlaw
Post Office Box 1160
Tupelo, Mississippi 38802
(601) 844-1528

Terry N. Kemp
Post Office Box 676
West Point, Mississippi 39773
(601) 494-3621

APPENDIX G

POTENTIAL QUESTIONS FOR COOPERATORS

STATE REGULATORS

What are the biggest waste problems in your state?

- Are these problems "specific" to one industry or plant or are they "common" to several industries or plants?
- What quantities of waste are generated?
- What is the location of the waste? Localized or widely separated?
Located in Tennessee Valley?
- Are the problems of a local, regional, or national nature?
- What grouping of waste products give you the most concern, short-term and long-term?
  - Municipal wastes
  - Industrial wastes
  - Hazardous/toxic wastes
  - Agricultural wastes
- What is presently being done to solve these waste problems?

What one specific problem gives you the most "heartburn"?

If there was one research project you could get approved to deal with these problems, what would it be?

What do you see as long-term problems of a "general" nature for which research is needed?

WASTE REDUCTION ASSISTANCE PROGRAMS

What are the biggest waste problems in your area?

- Are these problems "specific" to one industry or plant or are they "common" to several industries or plants?
- What quantities of waste are generated?
- What is the location of the waste? Localized or widely separated?
Located in Tennessee Valley?
- Are the problems of a local, regional, or national nature?
- What grouping of waste products give you the most concern, short-term and long-term?
  - Municipal wastes
  - Industrial wastes
  - Hazardous/toxic wastes
  - Agricultural wastes
- What is presently being done to solve these waste problems?

What one specific problem gives you the most "heartburn"?

If there was one research project you could get approved to deal with these problems, what would it be?

What do you see as long-term problems of a "general" nature for which research is needed?

INDUSTRIAL DEVELOPMENT ASSOCIATIONS

Have you had difficulty retaining an industry, or lost a prospective new industry, because of a waste-related problem?

Describe any such waste-related problems and your attempts to deal with them.

- Do you have any "specific" waste problem in one industry or plant in your area?
- What are "common" waste problems among various industries in your area?
- Types of waste? Quantities? Location (localized or widely separated)?
- What grouping of waste products give you the most concern? Municipal, industrial, hazardous/toxic, agricultural?
- Are problems of a local, regional, or national nature?

What one specific problem gives you the most "heartburn"?

REGIONAL PLANNING AND DEVELOPMENT AGENCIES

What problems have any of your local government entities had in dealing with a specific industrial waste-related problem?

Describe any other waste-related problems and your attempts to deal with them.

- Name the "common" waste problem(s) among various industries in your area?
- Types of waste? Quantities? Location (localized or widely separated)?
- What grouping of waste products give you the most concern? Municipal, industrial, hazardous/toxic, agricultural?
- Are problems of a local, regional, or national nature?

What one specific problem gives you the most "heartburn"?

What Chambers of Commerce would you suggest we contact as a followup?

CHAMBERS OF COMMERCE

Are there waste problems common among your chamber members?

- Please describe them.
- Are these common to various industries/plants or specific to one industry or plant?
- Are these problems local or regional in nature?
- How is waste disposal being handled now?

What one specific problem gives you the most "heartburn"?

Would members be interested in a forum to discuss waste problems with experts? If so, what fields/areas would be best suited for members of an expert panel?

TVA POWER DISTRIBUTORS

Are waste problems inhibiting development in the area where you distribute power?

Are your customers experiencing waste disposal problems that inhibit their use of electricity or that prevent their increased use of electricity?

Describe the problems above.

- Type of waste involved?
- Quantity? Location (one area or widely separated)?
- Is this local, regional, or national problem?
- Are there any areas where assistance would be of benefit in solving a waste-related problem? Technical assistance for short-term solutions? Research for longer term-solutions?

What one specific problem gives you the most "heartburn"?

TVA GENERATING GROUP

Are there waste problems at generating plants that are inhibiting your continued growth or increased efficiency in generating power?

Are there areas where you could use technical assistance (short-term solutions) or research (longer-term solutions) to improve your operation?

Describe any of above problems.

- Type waste? Quantity? Location (one plant or several)? Specific to one location or general in nature?
- Do you see common problems among plants?
- Is the problem local, regional, or national in nature?

What one specific problem gives you the most "heartburn"?

**APPENDIX H
CONTACT COORDINATORS**

P.O. Box 1010
Muscle Shoals, Alabama 35661

TEAM FACILITATOR

Dru S. Gambrell
SEB 1C
(205) 386-3920

WASTE REDUCTION ASSISTANCE PROGRAMS

Sue Hunter
NFE 2J-M
(205) 386-2252
Fax (205) 386-2189

INDUSTRIAL DEVELOPMENT ASSOCIATIONS

Regina Schmidtkofer
NFE 1I
(205) 386-3550
Fax (205) 386-2284

REGIONAL PLANNING AND DEVELOPMENT AGENCIES

Larry L. Gullett
CEB 3A
(205) 386-2680
Fax (205) 386-2284

CHAMBERS OF COMMERCE

Kathy W. Isom
NFE 2F
(205) 386-2810
Fax (205) 386-2284

TVA POWER DISTRIBUTORS

W. Keith Rylant
NFE 2F
(205) 386-2835
Fax (205) 386-2284

TVA GENERATING GROUP

George A. Kennedy

NFE 2J

(205) 386-2374

Fax (205) 386-2189

STATE REGULATORS

Debbie Craft

CEB 3A

(205) 386-2992

(205)386-2815

Carl Cole

NFE 2M

(205) 386-2688

Fax (205) 386-3856

Robert D. Mitchell (Retired)

APPENDIX I

WASTE REDUCTION ASSISTANCE PROGRAMS REPORT

Executive Summary

Sixteen organizations in six of the seven states served by TVA were identified as having Waste Reduction Assistance Programs (WRAPs). Virginia has no programs formally referred to as WRAPs. All sixteen of these organizations were visited as part of the first phase of the Industrial Waste Needs Assessment Project.

This report summarizes information gathered from these visits. The topics addressed include what representatives from these organizations consider to be the biggest waste problems in their area, what industries are the source of those problems, what they believe gives the most "heartburn", what is currently being done to handle these problems, what one research project would they like to see conducted, and what long-term general research would they suggest. The most common response for "biggest problem" was the large quantity of nonhazardous, Subtitle D wastes to landfills. Included in this problem was the prohibitive costs to small businesses and the effect of new landfill regulations due in October. Most also linked municipal waste and industrial waste together as the number one problem because much of the waste going to landfills is generated by industry. Responses to the other topics were varied.

Approximately 0.15 FTEs were required for the WRAP portion of the first phase.

WASTE REDUCTION ASSISTANCE PROGRAMS REPORT

This report summarizes, by topic, information gathered by visits to sixteen Waste Reduction Assistance Program (WRAP) organizations in six of the seven states served by TVA (Virginia has no programs referred to as WRAPs.) The topics addressed include what representatives from these organizations consider to be the biggest waste problems in their area, what industries are the source of those problems, what they believe gives the most "heartburn", what is currently being done to handle these problems, what one research project would they like to see conducted, and what long-term general research would they suggest. Attached is a list of the WRAP organizations visited with the representatives contacted, the TVA representatives making the visits, and the date of the visit (Attachment 1). Also attached is a summary of responses to the topics listed above with a tabulation of the number of times each was mentioned (Attachment 2).

BIGGEST PROBLEM

The most common response for "biggest problem" was the large quantity of nonhazardous, Subtitle D wastes to landfills. Packaging material, waste paper, cardboard, and wooden pallets were given as examples. Included in this problem was the prohibitive costs to small businesses which will become even worse when new landfill regulations take effect in October. Most also linked municipal waste and industrial waste together as the number one problem because much of the waste going to landfills is generated by industry. At least half mentioned composites and blends such as laminated plastics, textiles, and clothing materials; salvage from plastics, screening, fiberglass, film, tape, etc.; wood waste; replacements for solvents or other organics being outlawed; and dye chemicals as major problems in their areas.

SOURCE

The industries generating these wastes include chemical, metal, metal fabrication, automotive, furniture, pulp and paper, textile/carpet, dry cleaners, paint shops, poultry, and coal-fired steam plants.

MOST "HEARTBURN"

The problem causing the most "heartburn" is the volume and high cost due to EPA regulations of disposal of either treated or landfilled waste. No other response was mentioned by at least half of those visited.

CURRENTLY BEING DONE

Recycling, waste exchange, and Waste Reduction and Technology Transfer (WRATT) assessments were said to be the current methods of addressing waste problems. Recycling programs often suffer because of lack of buyers, or lack of knowledge of available buyers, for some types of recyclables. Also, waste exchange programs have a much greater supply than

demand. Assistance needed in these areas includes education and economic analysis of recycling options. The Alabama WRATT program was praised by several and the need for more like it stressed.

ONE RESEARCH PROJECT

No one specific research project was suggested by more than one of the contacts. The list of suggestions is included in the attached summary

LONG-TERM GENERAL RESEARCH

For long-term general research needs several mentioned development of alternatives to products being outlawed or restricted such as freon and 1,1,1-Trichloroethane (degreasers). Also suggested was research on alternatives to solvent based inks and paints. Most often mentioned was process research to eliminate problems at the source.

COMMENTS

The following comments were made by several of the contacts:

- TVA should be a cooperative, supportive entity rather than a source of competition to them.
- Assistance needs to be aimed at small businesses. The large ones handle their own.
- Education of small businesses is important and should include assistance in interpretation of regulations.
- Education efforts should include emphasizing the monetary rewards of eliminating the waste rather than having to dispose of it.
- The niche for federal labs is to provide big ticket items such as pilot plants and constructed wetlands which can be used for cooperative projects between government, universities, and industry.
- Research efforts should be coupled with a WRATT program.

The attitude of the majority of contacts was receptive and cooperative. Many expressed the hope that this assessment would lead to true efforts to address the problems.

Attachment 1 (Appendix I)
WASTE REDUCTION ASSISTANCE PROGRAMS

ALABAMA

Contacts: Dr. Bob Griffin of the Environmental Institute for Waste Management Studies
Dr. Bill Herz of the Hazardous Material Management and Resource Recovery Program

Visitors: Sue Hunter and Mary Jim Beck

Date: June 2, 1993

Contacts: Roy Nicholson of the Retired Engineers Waste Reduction Assistance Program (WRATT)

Visitors: Sue Hunter and Ron Kirkland

Date: May 17, 1993

GEORGIA

Contacts: Bob Donaghue of the Georgia Hazardous Waste Management Authority (GHWMA)

Jim Walsh of the Georgia Tech Research Institute, Tech Waste Reduction and Environmental Compliance (TECH WREC)

Visitors: Joe Gautney and Philip Badger

Date: June 16, 1993

KENTUCKY

Contacts: Joyce St. Clair of Kentucky Partners

Dr. Marvin Fleischman of the University of Louisville, Waste Minimization Assessment Center (WMAC)

Visitors: David Stephenson and Bob Burnell

Date: July 1, 1993

MISSISSIPPI

Contacts: Thomas Whitten of the Mississippi Environmental Protection Council (EPC)
Chris Bowen (hazardous wastes) and Larry Estes (nonhazardous wastes) of the Mississippi Waste Reduction and Minimization Program (WRMP)

Dr. Donald Hill and Dr. Caroline Hill of Mississippi State University, Mississippi Technical Assistance Program (MISSTAP)

Visitors: Brad Hunter and George Farina

Date: June 7, 1993

NORTH CAROLINA

Contacts: Maxie May of Southeast Waste Exchange

Visitors: Bob Radel and Steve Hillenbrand

Date: June 4, 1993

Contacts: Gary Hunt and Vic Young of the NC Dept. of Env., Health, and Natural Resources; Office of Waste Reduction; and Waste Reduction Resource Center.

Visitors: Bob Radel and Steve Hillenbrand

Date: June 3, 1993

TENNESSEE

Contacts: George Smelcer, Jr., Director, Hazardous Waste Extension Program,
Center for Industrial Services, University of Tennessee.

T. C. Parsons, Executive Director, Center for Industrial Services,
University of Tennessee

Angela Pitcock, Director, Pollution Prevention/Environmental Awareness Div,
TDEC

Ernest C. Blankenship, Environmental Assistance Program Administrator,
Bureau of Resources Management, TDEC

Visitors: Steve Seale and Bob Radel

Date: July 23, 1993

Attachment 2 (Appendix I) **WASTE REDUCTION ASSISTANCE PROGRAMS** **SURVEY SUMMARY**

Response and Frequency of Response

BIGGEST PROBLEMS

Sludge from water treatment	1
Dusts - precipitator, baghouse, foundry, etc.	2
Selvage - plastics, screening, film, tape, fiberglass, etc.	3
Nonhazardous, Subtitle D, materials to landfills	5
Packaging	5
Waste paper	2
Cardboard	2
Wooden pallets	1
Off-spec material	1
Composites and blends (plastics, textiles, clothing materials, etc.)	3
Wood waste	3
Waste water treatment plants	1
Replacement for products being outlawed or restricted	4
1,1,1- Trichloroethane (degreasers)	1
Freon	1
Solvent based paints	2
Solvent based inks (deinking)	3
Mineral spirits	1
Dry cleaning	1
Acetone from boat manufacturing	1
Dye chemicals	4
Mineral acids	1
Household chemicals	1
Ag waste - ground water pollution from farm chemicals	1
Septic tanks	1
Air emissions	2
Salt waste/byproduct from secondary aluminum smelters	1
Whey wastes, some of which are acidic	1
Titanium dioxide manufacturing waste	1
Stone washing wastewaters	1
Cured rubber (hoses, rubber consumer products)	1

SOURCES

Chemical, metals, and metal fabrication plants are the major categories

Automotive

Furniture manufacturing

Pulp and paper plants

Textile/carpet industry

Dry cleaners

Paint shops

Poultry

Coal-fired steam plants

CATEGORIES	Ranking			
	1	2	3	4
Municipal waste	4	1	1	
Industrial waste	4	1	1	
Hazardous waste	1		4	1
Agricultural waste	2 (long-term)			4
[Animal>Chemical (Pesticides=Fertilizer)]				

MOST "HEARTBURN"

Develop alternatives to products being outlawed	1
Volume/high cost of disposal due to EPA regulations (either landfilled or treated)	6
What to do with small quantities of waste	1
Lack of implementation (too busy, lack of training)	1
Need to be able to incinerate	1
Auto emissions	1
Pulp and paper	1
Changing hazardous/toxic waste regulations	1
Limited recycling opportunities	1
Difficulty in disposal of hazardous wastes	1
Salt wastes/byproducts from secondary aluminum smelters	1
Titanium dioxide manufacturing wastes	1
Stone washing wastewaters	1

CURRENTLY BEING DONE

Recycling	6
Waste Exchange (minimal)	4
Large industries handling their own	4
WRATT assessments	3

ONE RESEARCH PROJECT

Pelletizing of several types of wastes into a form which can be used for fuel 1 (dusts, salvage, etc.)	
Production of methanol and ethanol from wastes - paper mill sludge, etc.	1
Separation (wastes are mixtures or chemical combinations - mixed plastics)	1
Work with fabric wastes from textiles	1
Implementation of pollution prevention technologies	1
Membrane/electrodialysis research for cleaning dilute acid streams	1
33-50 chemicals and solvents	1
Converting Cr ⁺³ to Cr ⁺⁶	1
Clearinghouse of waste treatment/disposal technology for pulp and paper industry	1
Characterization of industrial/agricultural sludge and determine volumes generated	1
Coatings research to reduce dependence on solvents (water based coatings or powders, etc.)	1
Ways to deal with fugitive emissions	1
Economic analysis of recycling options (recycling doesn't begin to address volume)	1

LONG-TERM "GENERAL" RESEARCH NEEDS

Alternative materials to products being restricted	3
Freon	2
Solvents	3
Paints	1
Inks	2
Constructed wetlands	2
Montsano interested for ammonia disposal and clarification of waste streams	1
Metals in wastes	1
Process research to eliminate problems at source	4
Reuse of waste materials as raw materials	3
Building materials	1
Education packages for small generators (lay terms)	2
NOx, SOx, VOC's for non-attainment areas	1
Pulp and paper ponds	1

NPS and coastal pesticide use	1
Industrial solid waste	1
Ag wastes	1
Municipal sludges	1
Paint/powder coating with no toxic air releases	2
Packaging and/or pallets for use at both ends of process	1

APPENDIX J REGIONAL PLANNING AND DEVELOPMENT AGENCIES

Executive Summary

Twenty-seven (27) regional planning and development agencies (RPDAs) were identified within the 201 county TVA region. Nineteen (19) of the RPDAs were selected for interviews after input from the Waste Reduction and Management staff and the Manufacturing Development staff of the Valley Resource Center.

This report summarizes the information gathered during the visits. The questions addressed by the RPDA representatives include the issues that they consider to be the biggest problems in their area, the source of those problems, the waste group that gives the most concern, current disposal methods, specific issues that cause the most "heartburn," suggestions for long-term R&D projects of a general nature, and suggestions for short-term R&D projects. The most common response for the "biggest problem" was the issues surrounding compliance with Subtitle D regulations. Used tire disposal/utilization was reported to be a major problem all across the Valley also.

Approximately 0.20 FTEs were required to complete the RPDA portion of the first phase of the project.

REGIONAL PLANNING AND DEVELOPMENT AGENCIES

INTRODUCTION

This report summarizes information gathered during visits to Regional Planning and Development Agencies (RPDAs) within the Tennessee Valley. Twenty-seven (27) RPDAs were identified within the 201 county TVA region. Nineteen (19) of the RPDAs were selected for interviews after input from the Waste Reduction and Management staff and the Manufacturing Development staff of the Valley Resource Center. A list of RPDAs visited, contact names, TVA representatives making the visits, and date of each visit are given in Attachment 1.

The questions addressed by the RPDA representatives include the issues that they consider to be the biggest problems in their area, the source of those problems, the waste group that gives the most concern, current disposal methods, specific issues that cause the most "heartburn," suggestions for long-term R&D projects of a general nature, and suggestions for short-term R&D projects. A summary of responses and frequency of responses is given in Attachment 2.

BIGGEST PROBLEMS

The most common response for "biggest problem" included the issues surrounding compliance with the Subtitle D regulations regarding landfills. These issues included costs, siting, education of the public and elected officials, and quantity of industrial waste going to these landfills.

Other significantly recurring problems included utilization of used tires (shredded, crumbed, or whole), recycling issues (separation, bulk reduction, marketing strategies, and lists of reliable purchasers), and separation and treatment of oils and dyes from machining and "cut-and-sew" industries.

SOURCE

The industries generating the bulk of these wastes include chemical plants, textile/apparel/carpet, automotive and automotive support, metal fabrication/machining, and wood-related industries (pulp/paper mills, pallet producers, sawmills, cabinet producers, furniture producers).

WASTE GROUP THAT GIVES THE MOST CONCERN

The most common response to this issue came during the general discussion regarding "biggest problems" and "source." The response was industrial waste. Other waste groups mentioned minimally were municipal, hazardous/toxic, and agricultural nonpoint source pollution.

CURRENT DISPOSAL METHODS

Almost every person interviewed indicated that landfilling was the principal method for waste disposal. Other methods included incineration and recycling. Many larger companies were reported to have their own landfills and wastewater treatment facilities. Many of the smaller companies need financial help and education regarding waste options and responsibilities. Recycling programs are hindered by the lack of understanding by homeowners and municipal officials and by costs. The general public thinks that recycling efforts should pay the recycler handsome dividends and that separation and cleanup should occur at a transfer point. Both assumptions are incorrect. Hazardous waste is transported to special facilities for treatment and disposal. These facilities are usually out of the district, and often out of the state, and very expensive. No one defined the cost of "very expensive."

CAUSES FOR THE MOST "HEARTBURN"

Nearly all of those interviewed indicated that issues surrounding federal mandates (such as Subtitle D) without financial assistance or cost considerations caused the most heartburn. Some of the issues were landfill alternatives, landfill siting, high construction costs, public awareness and education, and bureaucratic delays and intervention.

LONG-TERM R&D PROJECTS OF A GENERAL NATURE

Public education, separation, utilization, and marketing of solid waste recyclables was on almost everyone's list. Several of the people interviewed thought that TVA should take the lead in regional incineration studies.

SHORT-TERM R&D PROJECTS

There were several suggestions for short-term R&D projects that received approximately the same support. They included: oil separation, recycling, and disposal methods; used tire utilization and/or incineration (soon, please!); and technology to identify and assist in the disposal of household chemicals and wastes.

COMMENTS

The overall attitude of the majority of those interviewed was positive. Several participants expressed the hope that this assessment would lead to aggressive, unified efforts to solve some of the pressing concerns and needs of the residents in the Valley. A few of the participants, in an attitude of candidness, said that in the past TVA had sometimes made promises, proposed programs of assistance, then just disappeared. They expressed hope that we would stick around long enough to really help, and that the promise for assistance was not a temporary one. Some participants also indicated that while our work was generally considered good, we needed to really focus on getting the technology into practice rather than just holding it while honing it to perfection.

Almost everyone was relieved to hear that we intended to work through, and in cooperation with, the existing TVA programs with existing contacts. As one person said: "We don't need more meetings with different people; we just need help with the problems already identified, and we need that help as soon as possible."

Attachment 1 (Appendix J)
REGIONAL PLANNING AND DEVELOPMENT AGENCIES

Contacts

ALABAMA

Contacts: Sam Minor, Executive Director; Richard Holst, Assistant; Northwest Alabama Council of Local Governments; Post Office Box 2603; Muscle Shoals, Alabama 35662

Visitors: Larry Gullett and Claude Breed

Date: May 26, 1993

Contact: Mace Neal, Director of Regional Planning; Northcentral Alabama Regional Council of Governments; Post Office Box C; Decatur, Alabama 35602

Visitors: Keith Rylant and Pat Ligon

Date: July 27, 1993

Contacts: Dean Y. Matthews, Executive Director; Bettina Varner, Environmental Specialist; Eddie Coker, Manager of Waste to Energy Facility; Top of Alabama Regional Council of Governments; 115 Washington Street, Southeast, Suite A; Huntsville, Alabama 35801-4883

Visitors: Claude Breed and Jeff Greenhill

Date: July 19, 1993

GEORGIA

Contacts: James H. Layton, Executive Director; Lloyd Frasier, Senior Planner; Russell Cochran, Community Planner; David M. Howerin, Planning Director; Greg Weathersby, Community Planner; Coosa Valley Regional Development Council; Post Office Drawer 1793; Rome, Georgia 30163-1001

Visitors: Steve Seale and Kathy Isom

Date: July 16, 1993

KENTUCKY

Contacts: Mark Davis, Physical Planning Director; Ed Davis; Purchase Area Development District; Post Office Box 588; Mayfield, Kentucky 42066

Visitors: Larry Gullett and Regina Schmidkofer

Date: June 30, 1993

Contact: Jack Eversole, Executive Director; Barren River Area Development District; Post Office Box 90005; Bowling Green, Kentucky 42102

Visitors: Darwin Bridges, Pat Ligon, and Rick Starks
Date: July 21, 1993

MISSISSIPPI

Contacts: Eugene Taylor, Executive Director; Pat Falkner, Director of Planning; Hale Aust, Director, Northeast Mississippi Solid Waste Management Authority; Northeast Mississippi Planning and Development District; Post Office Box 600; Booneville, Mississippi 38829

Visitors: Larry Gullett and Darwin Bridges
Date: July 8, 1993

Contacts: Vernon Kelly, Executive Director; Jay Blissard, Director of Planning; Three Rivers Planning and Development District; Post Office Drawer B; Pontotoc, Mississippi 38863

Visitors: Larry Gullett and Darwin Bridges
Date: July 8, 1993

Contact: Rupert L. Johnson, Executive Director; Golden Triangle Planning and Development District; Post Office Drawer DN; Mississippi State, Mississippi 39762-5643

Visitors: Brad Hunter and George Farina
Date: June 7, 1993

NORTH CAROLINA

Contact: Tom Elmore; Land of Sky Regional Council; 25 Heritage Drive; Ashville, North Carolina 28806

Visitors: Bob Radel and Steve Hillenbrand
Date: June 2, 1993

TENNESSEE

Contact: Dr. Ruth Neff; State of Tennessee Environmental Planning Office; John Sevier Building; 500 Charlotte Avenue; Nashville, Tennessee 37219

Visitors: Sara Hines and Pat Ligon
Date: August 3, 1993

NOTE: Information was not derived from a personal interview but a review of the summary of the Solid Waste Needs Assessment for the Greater Nashville Region, prepared by the Greater Nashville Regional Council (CNRC), and other documents in the State Environmental Planning Office and Library.

Contacts: Susan Reid, Executive Director; Barbara Hundley, Assistant; First Tennessee Development District; 207 North Boone Street, Suite 800; Johnson City, Tennessee 37604

Visitors: Larry Gullett and Regina Schmidtkofer

Date: July 14, 1993

Contacts: Joe Max Williams, Executive Director; Karen Gilbert, Solid Waste Director; Kimball Maynard, Solid Waste Specialist; South Central Tennessee Development District; Post Office Box 1346; Columbia, Tennessee 38402

Visitors: Larry Gullett, Darwin Bridges, and Marvin Jarrett

Date: July 28, 1993

Contacts: Joe W. Guthrie, Executive Director; Gary M. Sexton, Assistant Planning Director; Southeast Tennessee Development District; Chattanooga Area Regional Council of Governments; Post Office Box 4757; 25 Cherokee Blvd.; Chattanooga, Tennessee 37405-3804

Visitors: Larry Gullett and Marvin Jarrett

Date: June 1, 1993

Contacts: Ed Brooks, Executive Director; Ken Shepherd, Director of Regional Planning; Upper Cumberland Development District; 1225 Burgess Falls Road; Cookeville, Tennessee 38501

Visitors: Larry Gullett and Darwin Bridges

Date: July 27, 1993

Contact: Bill Bethel, Solid Waste Planner; Northwest Tennessee Development District; Post Office Box 963; Martin, Tennessee 38237

Visitors: Larry Gullett and Regina Schmidtkofer

Date: June 29, 1993

Contacts: Barry K. Matthews, Executive Director; Karel Pekarek, Solid Waste Planner; Southwest Tennessee Development District; 27 Conrad Drive, Suite 150; Jackson, Tennessee 38305-2850

Visitors: Larry Gullett, Regina Schmidtkofer, and Tom Henne

Date: June 28, 1993

VIRGINIA

Contact: Roger D. Sword, Director, Regional Waste Management Program; Cumberland Plateau Planning and Development Council; Post Office Box 548; Lebanon, Virginia 24266

Visitors: Larry Gullett and Regina Schmidtkofer

Date: July 13, 1993

Contact: Thomas Taylor, Executive Director, Mount Rogers Planning and Development
Council; 1021 Terrace Drive, Post Office Box 1068; Marion, Virginia
24354

Visitor: Larry Gullett

Date: June 14, 1993

Attachment 2 (Appendix J)
REGIONAL PLANNING AND DEVELOPMENT AGENCIES
SURVEY SUMMARY

Response and Frequency of Response

CAUSE OF CLOSINGS

Some service stations having problems with underground storage tank regulations	2
Contamination	1
Waste disposal problems	1
Railcar cleaning company denied expansion until it complies with environmental cleanup regulations	
Waste disposal business closed due to inability to dispose of certain wastes	1
Liquid waste disposal problems	1
Mercury contamination of the Holston River and a "muck island" of dumped waste	1

BIGGEST PROBLEMS:

Complying with Subtitle D mandates for solid waste landfills	11
The way environmental regulations and directives are "rolled out" by the federal government. They arrive on the local level as unfunded mandates.	8
Recycling	10
Marketing help on recycling program	6
Used tire disposal	6
A local tire plant having problems with large quantities of rubber waste in that it backed MSW out of the unit and made it difficult to meet air emission permit limits	1
Machining-type operations and "cut-and-sew" industries - separating and disposing of oils and dyes	5
Industrial wastes	5
Industrial wood wastes	4
Municipal solid waste and industrial solid wastes	3
Hazardous/toxic waste pickup very expensive	3
Increase in disposal costs	2
Utilization and disposal of poultry litter and dead birds	2
Chicken house wastes	1
Some air problems	2

Solid wastes, industrial, commercial, residential textile fiber waste, and carpet trimmings are filling up landfills	2
Fabric and furniture scraps	2
Mobile home industries - disposing of solid construction wastes	1
Lack of, or inadequate sanitary sewer systems	1
Poor soil percolation	1
Runoff from agriculture	1
Galvanized cans	1
Huntsville having problems getting a landfill approved for the ash from their waste to energy plant	1
Textile fibers in sewer systems	1
Waste reduction/management	1
Nonpoint source pollution from agriculture	1
Small-package waste water treatment operations (aren't being monitored)	1
Lack of sewers in some areas	1
Agricultural wastes	1
Agricultural non-point source pollution	1
Meeting the current solid waste plans mandate of a 25 percent reduction in landfill material	1
Need market for waste paper and plastics	1
Sawdust	1
Freon in discarded refrigerators	1
Transfer stations	1
Cadmium and heavy metals in the sludge - suspected dumping	1
Issues concerning incineration and alternatives	1
Finding uses for sludge (sewage)	1
Need for fail-safe sump system	1
Need to prevent leachate and emissions	1
What to do with plastics waste streams	1
Municipal and county amnesty days (what to do with this stuff)	1
Superfund sites from old service stations, dry cleaners, etc.	1
Attaining the National Ambient Air Quality Standard of 0.12 ppm. ozone	1
Managing municipal solid waste	1
Monsanto having problems with phosphate settling ponds	1
Heavy metal waste limits in Maury County because Saturn plant uses most of the allowable tolerances, limiting industrial growth in the area	1
National regulations imposed on local areas require compliance, but solutions require a regional approach	1
Carrier Plant producing air conditioners has been identified as generating volatile carcinogens into the atmosphere	1

Industries need help, both educational and technical, in sorting the waste, separating it economically, getting necessary analyses, and learning about recycling possibilities	1

MOST "HEARTBURN"

Subtitle D compliance	6
Requirements imposed by state/federal agencies (without providing adequate funding)	3
Landfills	3
Siting new facilities	1
Emotional issues, costs, and politics associated with dealing with locating and permitting new landfill sites	1
Regulations and surrounding bureaucracy impose tremendous costs on local communities and surrounding areas	3
Municipal and industrial solid wastes	2
Roadside/illegal dumping	1
Solid wastes	1
Meeting regulations	1
Farm and home wastes (pesticides, herbicides, fertilizers)	1
Wood wastes and sawdust	1
Counties are responsible for all nonhazardous waste	1
Dealing with the state waste assessment program	1
Training needs for retired professionals	1
Lack of trust among the groups	1
Achieving an integrated solid waste management system	1
Local officials and local public desperately need education regarding the reality and urgency of waste management issues	1
Need for assistance and/or training in environmental site assessments	1
Assistance with cleanup when problems are identified	1

LONG-TERM RESEARCH NEEDS

Separation, utilization, and marketing of solid waste recyclables	10
Educational assistance for public (about recycling)	4
Develop useful products from recyclable materials	1
Standardize plastics according to use and color to improve recyclability	1
Recycling uses for "regrind" plastic and rubber	1

Develop a market for recycled materials	1
Research to improve the "waste to energy" alternatives to save existing fuels and conserve landfill space	3
TVA should provide "third party" assistance/guidance on favorable geological site suggestions for new landfills	3
Landfill management	1
Minimizing costs of landfills	1
Methods to extend the life of landfills	1
Tried and tested alternatives to landfilling	1
TVA should take lead in regional incineration studies	2
Studies on air pollution and cost of scale operation	2
Decrease the amount of household wastes generated	1
Poultry litter utilization	1
Develop biodegradable products	1
TVA should deal with the issue of mud/sediment quality at the bottom of TVA lakes and watershed rivers	1
Public and commercial education about waste management	1
Oversight and long-term planning assistance to help ensure that there is logical planning, then help provide reasonable solutions to problems incurred	1
Used tires	1
Used tire for fuel research	1
Utilization of wood waste and alternatives for landfilling of sawdust	1
Reduction of ozone precursor emissions and ozone formation	1
Develop a comprehensive integrated system to manage solid waste	1
Research into methods to "densify" recyclable materials (and materials destined for landfills) should vastly reduce the transportation costs associated with this	1
Municipal waste composting	1

SHORT-TERM RESEARCH NEEDS

Long-term and short-term are the same; solutions are needed now	4
Technology to identify and assist in the disposal of household chemicals and wastes	3
Public and commercial education regarding waste management	3
Oil separation, recycling, and disposal methods	3
R&D and pilot projects currently underway to utilize waste tires needs to be accelerated	3
Ways to utilize used tires (other than landfilling)	1
TVA could provide help with "used tire for fuel" research	1

Develop a shredder for heavy equipment tires	1
Accessible funding for local governments to deal with waste issues	2
Help with uses for wood waste/sawdust other than landfilling	2
Document the costs associated with remediation, especially for small operators	1
Use experience in technology transfer and demonstration to introduce practices developed by others	1
Develop a system to store remediation technology data on CD ROM so that it can be easily cataloged and retrieved	1
Create a mobile water quality laboratory	1
Create a wetlands inventory using spacelab and aerial photography	1
Perform a market study on recycled paper	1
Develop a process to stabilize incinerator ash so the loop can be closed on recycling	1
Have TVA designated as the agency with the lead role in the cleanup of all Superfund sites in the Valley	1
Technical help with local problems	1
Need "Amnesty Day Program"	1
Local municipalities and regional planning agencies need assistance in discussions with consultants and entrepreneurs to sort out facts from claims	1
Technology to recycle or utilize batteries and oil and aid in their collection and disposal	1
Dickenson County needs help with wetlands research regarding leachates	1
Russell County needs immediate help with separation of municipal bulk debris, (yard waste), from materials that must be landfilled	1
Help with environmental site assessments and evaluations of cleanup options	1

APPENDIX K INDUSTRIAL DEVELOPMENT ASSOCIATIONS

Executive Summary

Over 50 industrial development associations (IDAs) were identified within the 201 county TVA region. Based on discussions with other contact coordinators and several of the Valley Resource Center's Manufacturing Development Representatives, 10 IDAs were selected for interviews. One Chamber contact was made on behalf of the contact coordinator responsible for Chambers, and that visit is included in this report.

This report summarizes information gathered in those visits. The questions addressed by the IDA representatives included what they consider to be the biggest problems in their area, the source of those problems, the waste group that gives the most concern, current disposal methods, causes for the most "heartburn," and interest in a forum to address waste concerns and issues. The most common response for "biggest problem" was wood/cellulosic wastes. These wastes include cardboard, pallets, sponges, sawdust, paper, and pulp liquor. Contaminated sites from closed facilities was mentioned by over half of the interviewees as a problem.

Approximately 0.10 FTEs were required to complete the IDA portion of the first phase of the project.

INDUSTRIAL DEVELOPMENT ASSOCIATIONS

INTRODUCTION

This report summarizes information gathered in visits to Industrial Development Associations (IDAs) within the Tennessee Valley. Over 50 IDAs were identified within the 201 county TVA region. Based on discussions with other contact coordinators and several of the Valley Resource Center's Manufacturing Development Representatives, 10 IDAs were selected for interviews. Sometimes the IDA was located within the local Chamber of Commerce; therefore, overlaps between IDA and Chamber contacts were coordinated with the contact coordinator responsible for Chambers. A list of IDAs visited, contact names, TVA representatives making the visits, and date of the visit are given in Attachment 1.

The questions addressed by the IDA representatives included what they consider to be the biggest problems in their area, the source of those problems, the waste group that gives the most concern, current disposal methods, causes for the most "heartburn," and interest in a forum to address waste concerns and issues. Responses are summarized in the data analysis below. A summary of responses and frequency of response are given in Attachment 2.

BIGGEST PROBLEMS

Wood/cellulosic wastes were cited by almost every contact as a problem. These wastes include cardboard, pallets, sponges, sawdust, paper, and pulp liquor. Contaminated sites from closed facilities was mentioned by over half of the interviewees as a problem. Several Superfund sites are located throughout the Tennessee Valley. These sites require extensive cleanup before the facilities can be sold or leased. A comment was made that it is sometimes easier to shut down a company than to bring it into compliance.

Other problems cited were Subtitle D regulations (costs, landfill siting, landfill space), used tires, heavy metals, nonattainment (air), medical wastes, generator liability, recycling, and CFC alternatives.

SOURCE

Industries generating these wastes include chemical plants, textile/apparel/carpet, meat/poultry processing, medical facilities, automotive, metal fabrication, and wood-related industries (pulp/paper mills, pallets, sawmills/logging, cabinets, furniture, and newspapers).

WASTE GROUP THAT GIVES THE MOST CONCERN

The most common response to the question regarding "waste group that gives the most concern" was industrial waste. Other responses included municipal, hazardous/toxic (especially with regard to heavy metals), agricultural, residential (yard wastes), and nonpoint source pollution.

CURRENT DISPOSAL METHODS

Every interviewee cited landfilling as the main disposal method. Other disposal methods include incineration, wastewater treatment, and recycling. Large companies often have their own landfills and wastewater treatment facilities; small companies often need education and financial assistance regarding disposal options. Recycling programs are affected by lack of education (i.e., homeowners need more education regarding the advantages of proper waste disposal) and by cost (i.e., recycling expenses might be reduced if homeowners separated recyclables rather than separating it at transfer stations; also, often there is no established market for recyclable products). Hazardous waste is transported (usually out of the region, often out of state) to hazardous waste facilities for treatment and disposal.

CAUSES FOR THE MOST "HEARTBURN"

Half of the interviewees cited Federal mandates without proper funding or cost considerations as a source of heartburn. Also mentioned were high disposal costs, landfill alternatives, the "not-in-my-backyard" philosophy regarding landfills, general regulations and bureaucracy, and wood wastes.

INTEREST IN FORUM

The majority of the interviewees indicated that there is a need for a forum to discuss waste problems with experts. Fields/areas that should be represented on such an expert panel include recycling, alternative processes, disposal costs and alternatives, and solid waste disposal.

SUMMARY AND CONCLUSIONS

Several wastes were cited as problems throughout the Tennessee Valley. These include wood/cellulosic wastes, used tires, heavy metals, and medical wastes. It was noted during the interviews that alternative processes that result in zero discharges should be developed, not

just minimization and recycling of waste products. Also, TVA/NFERC should address both research and market aspects, i.e., markets should exist or else be developed for recycled products.

Most of the contacts expressed an interest in the assessment project and a willingness to cooperate. Many viewed this as a first step in a Valley-wide cooperative effort in addressing waste-related issues.

Attachment 1 (Appendix K)
INDUSTRIAL DEVELOPMENT ASSOCIATIONS

Contacts

ALABAMA

Contacts: Tommy Ed Roberts, Executive Director, and Tom Hill, Assistant Director;
Morgan County Economic Development Association, Decatur
Visitors: Regina Schmidlkofer and Harry McClure
Date: June 11, 1993

Contacts: Forrest Wright, Executive Director, and Susie Heird,
Assistant Director; Shoals Industrial Development
Authority, Florence
Visitors: Regina Schmidlkofer and Harry McClure
Date: June 10, 1993

KENTUCKY

Contact: Van Andrew Hoy, Vice President/Operations; Greater
Paducah Economic Development Council, Paducah
Visitors: Regina Schmidlkofer and Larry Gullett
Date: June 30, 1993

MISSISSIPPI

Contact: Charles Gulotta, Executive Director; Corinth-Alcorn County Industrial
Development Association, Corinth
Visitor: Joe Phillips
Date: May 19, 1993

NORTH CAROLINA

Contact: Richard Stiles, Economic Development Specialist; Asheville Economic
Development Commission, Asheville
Visitors: Regina Schmidlkofer and Larry Gullett
Date: July 14, 1993

TENNESSEE

Contacts: Jim Anderson, Director; Northeast Tennessee Valley Regional Industrial Development Association, Blountville

Mike Stitt, TVA

Jack Lawson, Sullivan County Industrial Commission

Ralph Davis, Tysinger, Hampton, and Partners

Carroll Gouge, Tennessee Department of Economic-Community Development
Local Planning

Michael McKinney, Baker, Worthington

Tom Green, EMPE, Inc.

Lamar Wright, Bristol, Tennessee, Electric System

Sam Acquaviva, Watauga Industries

Keith Mulligan, Elizabethton/Carter County Economic Development Commission

Phil Pindzola, City of Johnson City

Tom Olterman, Tennessee Department of Economic-Community Development

Visitors: Regina Schmidtkofer and Larry Gullett

Date: July 12, 1993

Contact: Stuart C. Gilbert, Coordinator; Maury County Economic Development
Commission, Columbia

Visitors: Regina Schmidtkofer and Harry McClure

Date: June 15, 1993

Contacts: Sami Dietrich, Executive Director; Dyersburg Chamber
of Commerce, Dyersburg

Joe Adams, Mayor, City of Newbern

Tom Burgess, City Engineer, City of Dyersburg

Bob Jones, Environmental Task Force Chairman and Director, Upward Bound,
Dyersburg State Community College

Ricky Leo, Dyersburg Fabrics

Glen Ray, Colonial Rubber Works

Harold Sartain, Technical Manager, Bekaert Dyersburg Steel Cord Company

Jerry Wiley, Public Works Director, City of Newbern

Visitors: Regina Schmidtkofer and Tom Henne

Date: July 26, 1993

Contact: Alf Barnette, Executive Vice President; West Tennessee Industrial Association,
Jackson

Visitors: Regina Schmidtkofer and Larry Gullett

Date: June 28, 1993

Contacts: Steve Wolfe, Director of Economic Development, Kingsport Chamber of
Commerce, Kingsport

B. R. (Rusty) Wilkerson, Jr., Director of Public Works, City of Kingsport

Nadine H. Shipley, Pretreatment Coordinator, City of Kingsport
Daniel A. Wankel, Environmental Manager, City of Kingsport

Visitors: Regina Schmidtkofer and Larry Gullett

Date: July 13, 1993

Contacts: Henry Heurkamp, Executive Director, Franklin County Industrial Development
Board, Winchester

Gary C. Ledbetter, Existing Industries Consultant, State of Tennessee

Yvonne Stewart, City of Cowan

Visitors: Regina Schmidtkofer and Claude Breed

Date: July 20, 1993

Attachment 2 (Appendix K) DATA ANALYSIS

Responses and Frequency of Response

BIGGEST PROBLEMS

fiber "tuft," lint, and dyes -	1
Subtitle D regulations	
costs -	4
landfill siting -	3
landfill space -	4
NIMBY philosophy -	4
underground storage tank regulations -	1
solid waste disposal -	1
packing material -	1
used tires -	4
wood/cellulosic wastes -	9
construction waste -	1
ag runoff -	1
water	
limited supply -	1
discharge limitations -	1
soft water, requiring additives	
that cause corrosion problems -	1
lead content -	1
treatment facilities	
screenings/sludge/grit -	1
sewage sludge -	1
wastes that damage the facilities -	2
low quality due to discharges/illegal dumping -	1
sludge -	1
solvents -	1
contaminated sites from closed facilities -	6
scrap steel -	1
metal shavings -	1
dross from aluminum smelting -	1
nonattainment (air) -	3
lack of air monitoring stations -	1
generator liability -	3
recycling (lack of programs, costs, etc.) -	2
heavy metals -	4
medical wastes -	3
CFC alternatives -	2

lack of education regarding regulations -	1
adverse publicity from environ. groups -	1
fly ash -	1
markets for recyclable products -	1
municipal waste disposal costs -	1
nonpoint source pollution -	1
chemical cleansers -	1
volume of solid waste -	1
residential waste -	1
printing ink/solutions -	1
plating solutions -	1

SOURCES OF THOSE PROBLEMS

chemical plants
textile/apparel/carpet industry
meat/poultry processing
medical facilities
automotive
metal fabrication
wood-related industries (pulp/paper mills, pallets,
sawmill/logging, cabinets, furniture, newspapers)

WASTE GROUP THAT GIVES MOST CONCERN

municipal -	2
industrial -	4
hazardous/toxic -	1
agricultural -	1
residential -	1
nonpoint source pollution -	2

CURRENT DISPOSAL METHODS

landfill -	10
incineration -	1
wastewater treatment facilities -	2
recycle -	4

-- it was noted that most large industries handle their own wastes; they often have their own landfill and/or wastewater treatment facility

CAUSES FOR THE MOST "HEARTBURN"

illegal dumping -	1
high disposal costs -	2
high volume of waste -	1
landfills	
federal laws without cost considerations -	5
lack of space -	1
alternatives -	2
NIMBY philosophy -	2
animal litter -	1
lack of water sources -	1
solvents -	1
contaminated sites from closed facilities -	1
regulations and bureaucracy -	3
perception regarding large industries as	
major polluters -	1
availability of free material due to	
recycling by other industries -	1
wood wastes -	2
styrofoam -	1
used tires -	1
educating and developing markets	
for new technologies -	1

INTEREST IN FORUM

yes -	8

TOPICS TO BE COVERED

reducing disposal costs -	2
solid waste disposal -	2
legislation without available funding -	1
disposal alternatives -	1
international environmental problems -	1
TQM -	1
waste management--	1
recycling -	3
equipment -	1
packing materials -	1
alternative processes for zero discharges -	3

APPENDIX L

TVA GENERATING GROUP

Executive Summary

TVA employees in Fossil & Hydro Environmental Affairs, Nuclear Power Environmental Protection, the TVA Waste Management Team, and Colbert Fossil Plant were interviewed to acquire information about current and anticipated problems with waste management and disposal in the Generating Group and information about R&D that might solve those problems. This report summarizes the information gathered in the interviews.

The lack of a uniform set of processes to deal with the frequently changing state and federal regulations that must be considered when handling and disposing of waste materials is a source of most problems mentioned. The most frequently mentioned noncombustion waste materials that are sources of waste management and disposal problems in the Generating Group are waste oils (including PCB-contaminated oils and oily rags), asbestos, and municipal wastes. A major problem in managing combustion wastes is the need for TVA to devote increasing amounts of land to fly ash storage.

Technical assistance needs that were mentioned include assistance in the identification of processes by which wastes that are now sent to landfills can be reclaimed and recycled. R&D is needed to identify and develop bioremediation technology for treating waste diesel fuel, transformer oils, spent solvents, etc. Fossil plants need methods to deal with waste ash and FGD sludge other than the present approach of storage on site.

TVA GENERATING GROUP

This report summarizes information obtained about waste management problems and R&D needs in TVA's Generating Group. Information sources were staff members of two work groups that are responsible for ensuring compliance of TVA's generating plants with environmental regulations, members of the TVA Waste Management Team, and the environmental engineer at Colbert Steam Plant. These were interviewed in person or by telephone to obtain their opinions about current and anticipated waste management problems and R&D that might provide solutions to the problems. Attachment 1 lists the interviewees and dates of the contacts. Questions asked to assess problems and R&D needs are given in Attachment 2.

In addition to information obtained from TVA personnel, literature on current R&D programs of the Electric Power Research Institute (EPRI) was reviewed to identify waste/environmental problems that are considered important by other electric utilities. Results from the TVA assessments are congruous with R&D needs identified in the EPRI literature. Thus, solutions found by R&D on TVA problems could have applications elsewhere in the nation.

BIGGEST PROBLEMS

The absence of a uniform set of processes for waste management and the assortment of frequently changing state and federal regulations that must be considered in deciding how to handle and dispose of waste materials were sources of most problems mentioned. One person interviewed expressed the opinion that waste management was like aiming at a moving target.

Information about specific materials that cause significant waste management problems is tallied in Attachment 3. Several noncombustion and combustion waste management and waste-related environmental problems were identified.

Noncombustion wastes: The most frequently mentioned material-specific waste problems in the Generating Group concerned the management of waste oils (including PCB-contaminated oils and oily rags), asbestos, and municipal wastes. Less frequently mentioned problems concerned the disposal of lighting wastes (fluorescent tubes, ballasts, mercury vapor lamps) and outdated chemicals. Major concerns about problems with noncombustion wastes involved processes for waste management and disposal rather than with technological issues.

The TVA-wide Waste Management Team has identified waste oils and oily rags, waste lumber, and municipal wastes as three important nonhazardous wastes which will be addressed by their waste minimization program. Their priorities were based on the quantities of these wastes that are generated in TVA and the relatively strong likelihood that processes can be implemented to minimize the amounts of these waste materials that are produced.

Combustion wastes: The major problem in this category is the need for TVA to devote increasing amounts of land to fly ash storage. Solid wastes that will be produced by future flue gas emission controls will increase the problem by adding to the quantities of solid wastes that must be stored.

Aqueous wastes drained from coal yards and ash piles/ponds can be dealt with at the present, but future regulations might be more restrictive, depending upon provisions of the Clean Water Act renewal.

MOST HEARTBURN

Noncombustion wastes: Lack of consistent, uniform practices for disposal, reclamation, and/or recycle of municipal wastes in TVA facilities was identified as a major concern by all groups.

Those involved with nuclear operations must deal with a tremendous amount of information to track environmental regulations that identify what waste management practices are permissible.

Combustion wastes: The storage of high volume wastes (fly ash, bottom ash, FGD sludge) at fossil plant sites consumes large amounts of land. Relief of storage demands by increased marketing of combustion ash to concrete manufacturers is hindered by the elevated and highly varied levels of uncombusted carbon which make TVA fossil plant ashes less acceptable than ash produced by TVA's competitors.

ANTICIPATED PROBLEMS

Waste reduction goals of sanitary landfill operators will restrict the amounts of waste that TVA can dispose of by this route.

At the time of the interviews with Fossil & Hydro Environmental Affairs staff, a ruling was expected from EPA on whether or not utility coal combustion wastes would be classified as hazardous wastes. A ruling that combustion ash must be treated as a hazardous waste would create a serious waste ash management problem at TVA's fossil plants. On August 9, 1993, the EPA announced it had concluded that regulation of wastes from utility combustion of coal under Subtitle C of RCRA is inappropriate. EPA will consider these wastes during an ongoing assessment of industrial nonhazardous wastes under RCRA Subtitle D, and plans to make a final regulatory determination by April 1998.

Disposal of low-level radioactive wastes will be affected by the expected closure of a disposal site in Barnwell, SC. No replacement site was identified at the time of the interviews.

Meeting Clean Air Act requirements in the future could present problems. Multiple technologies may be needed to deal with provisions for SO₂, NO_x, and air toxics. New technologies might be

needed to deal with waste management problems that are introduced by actions to comply with the act.

Phaseout of CFC's will require that substitutes be available.

Clean Water Act revision might restrict concentrations of contaminants that are permitted in releases to the river. This will require improved water treatment technology.

TECHNICAL ASSISTANCE AND R&D NEEDS

Short-term needs:

All plants need help in identifying ways to handle wastes that are now sent to landfills and in finding routes for moving wastes into reclamation and recycle processes.

Nuclear needs assistance in identifying ways for treating mixed wastes to render them nonhazardous.

Generating staff needs help in evaluating technical merits of claims by outside vendors who are marketing waste treatment and environmental remediation technologies to TVA.

Long-term needs:

All plants need bioremediation technology for treating waste diesel fuel, transformer oils, spent solvents, etc.

Fossil plants need methods to deal with waste ash and FGD sludge other than the present approach of storage on site.

All of Generating Group needs R&D to help meet changing environmental regulations, such as those mentioned in the section on Anticipated Problems.

Attachment 1 (Appendix L)
TVA GENERATING GROUP

Contacts

Organization: Fossil & Hydro, Environmental Affairs
Contacts: Janet Watts, Gary Downer, Bob Harris
Interviewers: George Kennedy and Mary Jim Beck
Date: July 7, 1993

Organization: Nuclear Power, Environmental Protection
Contacts: Betsy Eiford-Lee, J. R. Griggs, and Brian Williamson
Interviewers: George Kennedy, David Nichols, and Paul Bernauer
Date: July 15, 1993

Organization: Fossil & Hydro, Colbert Fossil Plant
Contact: Chris Killen, Environmental Engineer
Interviewers: George Kennedy and Byron Parker
Date: July 28, 1993

Organization: TVA Waste Management Team (Resource Group, Technology Advancements)
Contact: Sandra Schulte (Telephone interview)
Interviewer: George Kennedy
Date: July 22, 1993

Organization: TVA Waste Management Team (Resource Group, Technology Advancements)
Contact: Patty West (Telephone interview)
Interviewer: George Kennedy
Date: June 8, 1993

Attachment 2 (Appendix L)
TVA GENERATING GROUP

Interview Questionnaire

Organization:

Contacts:

Visitors:

Date:

1. What waste management problems most seriously inhibit continued improvements in efficiency at TVA's generating plants and/or restrict continued growth in generating capacity? Please describe details about a few significant problems. (Nature of the problems? What type wastes? Quantities? Locations? What operating and/or environmental constraints? How is the problem being dealt with at present?)
2. What single waste management problem causes the most "heartburn" at a fossil/hydro/nuclear plant?
3. What do you anticipate during the next 5 years in the way of new or revised national and state waste management and environmental regulations that will significantly impact TVA's generating plants?
4. In what areas do you believe technical assistance (short-term solutions/existing technology) and research and development (longer-term solutions/new technology) are most needed to help solve waste management problems TVA's generating plants?
5. Are you currently supporting outside (i.e., non-TVA organization) R&D on waste management and/or site remediation technologies? If yes, how did you select the problem area to investigate and the organization to conduct the R&D?

Attachment 3 (Appendix L)
TVA GENERATING GROUP

Responses to Question 1: Important Waste Management Problems

Type of Waste Material	Frequency
Waste oils, oil spills, oily rags	4
Asbestos disposal	3
Municipal wastes	3
Combustion ash wastes	2
Lighting wastes	2
Lumber/wood wastes	2
PCB-contaminated wastes (soils, oils)	2
Spent chemical reagents, solvents	2
Empty drums	1
Mixed wastes (radioactive & hazardous)	1
SO2 scrubber wastes	1
Soils contaminated from leaking UST's	1
Spent antifreeze solution	1

APPENDIX M TVA POWER DISTRIBUTORS

Executive Summary

The 160 power distributors that supply electricity to the seven state TVA region are customers of the four TVA Customer Service Areas (North, South, East, & West). Each area is overseen by a Vice President, who in turn, has Customer Service Center (CSC) Managers who are responsible for the distributors in their area. These four areas also have collateral duty employees who serve as area environmental coordinators. The information contained in this report came from the CSC managers, their staffs, and area environmental coordinators.

After discussions with CSC personnel the following areas were the most frequently mentioned concerns:

1. Contaminated soils at substations. (PCB & non-PCB)
2. Creosote pole disposal and liability.
3. Fluorescence lighting disposal. (PCB-ballast & Mercury in tubes)
4. Containment for substations.
5. Solvent replacements.
6. Electromagnetic fields

All TVA-owned substations are under contract with TVA's Muscle Shoals Hazardous Waste Storage Facility for disposal of contaminated soil and equipment. However, distributor owned substations have to contract with private industry for their disposal. Other areas of environmental concern that were noted are: above- and below-ground storage tanks, CFC's, paints, asbestos, erosion control, herbicide and pesticide use, and storm water runoff. Electromagnetic fields (EMF) appear to be the next big problem.

Approximately 0.20 FTEs were required for the TVA Power Distributors portion of the first phase.

TVA POWER DISTRIBUTORS

TVA's Customer Service Areas (North, South, East, & West) are responsible for the 160 power distributors in the TVA region. The Vice President of each area has Customer Service Center (CSC) Managers and staff that are responsible for a specific number of distributors in their CSC area. In two CSC areas employees have been assigned collateral duty as environmental coordinators and the other two areas have full-time employees that report directly to the Vice President. Information gathered from these employees is contained in this report.

BIGGEST PROBLEM

The majority of respondents said PCB and other hydrocarbon contaminated soil, along with the resulting runoff is the "biggest problem." However, others look at electromagnetic fields as the next big concern.

SOURCE

Substations and their accompanying right-of-way (ROW) are the main areas of concern. These substations are either owned wholly by TVA or the distributor, or their ownership is shared.

MOST HEARTBURN

PCB and other hydrocarbon contaminated soil and equipment.

CURRENTLY BEING DONE

All TVA-owned or partially-owned substations are under contract with TVA's Muscle Shoals Hazardous Waste Facility for disposal of PCB-contaminated soil and equipment. Power distributors who own their substations have to contract with private industry for disposal.

The Customer Group has initiated an Environmental Compliance Assurance Program that will help address their waste problems and emphasize environmental stewardship. This program is intended to formalize and unify their approach to environmental regulatory issues, training, procedures, self-assessments and record-keeping.

**Attachment 1 (Appendix M)
TVA POWER DISTRIBUTORS**

Contacts

TVA CUSTOMER SERVICE

NORTH AREA

Customer Service Center Managers

Roland H. Streeter, Nashville, Tennessee
Myron N. Callaham, Bowling Green, Kentucky
Gerald R. Kruspe, Murfreesboro, Tennessee

Environmental Coordinator

Danny N. Sapp, Vice President Staff (full-time)

CSC Staff

Cindy McDermott, Murfreesboro, Tennessee

SOUTH AREA

Customer Service Center Managers

H. Harold Williams, Huntsville, Alabama
Michael L. Nabors, Muscle Shoals, Alabama

Environmental Coordinators

Bob Rickard, Jim Daly and Craig Linhoss (collateral duty)

CSC Staff

Jim Brooks, Huntsville, Alabama

EAST AREA

Customer Service Center Managers

Francis I. Cable, Chattanooga and Cleveland, Tennessee
Eddie L. Tramel, Johnson City, Tennessee
Esther R. Ruffner, Knoxville, Tennessee

Environmental Coordinator

Billie R. Long (collateral duty)

CSC Staff

Tom Axley and Charles Muse, Johnson City, Tennessee

WEST AREA

Customer Service Center Manager

Don Dickerson, Memphis and Jackson, Tennessee

Van M. Wardlaw, Tupelo, Mississippi

Terry N. Kemp, West Point, Mississippi

Environmental Coordinator

Robert E. Henning, Vice President Staff (full-time)

CSC Staff

Robert Sullivan and David Lucky, Memphis, Tennessee

Jimmy Young, West Point, Mississippi

[Contacts Made By Keith Rylant and Sara Hines (Nashville)]

Attachment 2 (Appendix M)
TVA POWER DISTRIBUTORS

DATA SUMMARY
Response and Frequency of Response

Waste Material

PCB -	15
Fluorescence lighting -	10
Creosote poles -	6
Solvent replacement -	8
Substation containment -	5
Electromagnetic fields -	4
Hydrocarbon spills -	12
Herbicides/pesticides -	3
Asbestos -	4
Paints -	5
Refrigerants -	3
Batteries -	2
Acids -	1
Antifreeze -	1
Erosion control -	2
Waste wood -	2
Storage tanks -	1
Storm water run-off -	3

APPENDIX N CHAMBERS OF COMMERCE

Executive Summary

Six Chambers of Commerce within the seven states served by TVA were visited as a part of the first phase of the Industrial Waste Needs Assessment Project. The Nashville Chamber was also contacted and they referred us to a report prepared by the state of Tennessee which outlines waste problems and disposal methods in various regions across the state. Information from that report has been summarized in the report of visits to Industrial Development Agencies. Approximately 171 chambers of commerce were identified within the TVA service area. It was determined that a cross section of Chambers should be interviewed.

This report summarizes information gathered during the visits. Most of those interviewed indicated that their major concern was nonhazardous wastes to landfills. The individuals interviewed were in some cases the professional staff of the Chambers and in other cases were individuals from industry that are members of chamber environmental subcommittees.

There is a great deal of frustration about the increasingly complex issues surrounding waste and the environment. Most of the individuals feel as though they get very little assistance from governmental organizations and they are suspicious of assistance from some in the private sector (they are concerned that the private sector is just trying to sell something rather than help them).

Most of the Chambers recognize the need for more accurate information and would welcome TVA involvement in an effort to educate their members. Only one individual felt that environmental and waste problems were not a concern to industry within their area.

Approximately 0.1 FTEs were required for the Chamber of Commerce portion of the first phase.

CHAMBERS OF COMMERCE

This report summarizes, by topic, information gathered by visits to six Chambers of Commerce located within the TVA region. Attached is a list of the Chambers of Commerce visited and those interviewed, the TVA representatives that made the visits, and the date of the visit.

MOST COMMON WASTE PROBLEM

Most of those interviewed indicated that nonhazardous wastes to landfills was the most common waste problem they encountered. They also are concerned about the regulations related to siting of new landfills and the costs associated with closing existing landfills. Among the specific wastes going to the landfill were wood wastes, used tires, packing materials, plastics, and carpet trimmings. Other specific items listed as common problems were waste water, sewage sludge, spent bleach, and medical wastes.

SOURCE

The industries generating these wastes include carpet manufacturing and support industries, food processing, clothing manufacturing, paper producers, chemical producers, distribution services, and hospitals.

MOST "HEARTBURN"

The most common response was that the volume of solid waste caused the most heartburn. However, other wastes which were consistently named as a concern were used tires, and solvents.

Those that we talked with expressed a lot of frustration with some societal issues surrounding waste and the environment such as the NIMBY philosophy, abandonment of old vehicles and farm equipment, illegal and unregulated dumping on private property, and environmental laws which are passed with no consideration as to costs.

CURRENTLY BEING DONE

Most indicated that large companies are able to handle their environmental and waste problems either by pretreatment of waste water or determining proper disposal of other wastes.

There was a great deal of concern about small companies that do not have the same in-house resources. In response to this some chambers have established subcommittees to provide information through seminars particularly directed to small companies.

There was some knowledge about the CIS program in Tennessee; but overall, there is little understanding about how waste reduction assistance programs operate among Chambers of Commerce staff and the members we interviewed.

Comments

The following are comments made by some of those contacted:

- The rising cost of disposal is leading some to illegally dump their waste materials.
- We have no city or county recycling program due to poor economics and lack of markets.
- TVA should provide educated responses to laws during the comments phase of implementation with regard to economic impact.
- TVA people have been helpful in the original work to site and permit a new landfill in their area.
- Consulting assistance programs which do not provide financial assistance to the company or industry are nothing more than "lip service".
- One chamber director felt that there was a lot of attention directed at waste issues from universities that want something to study but he does not consider waste problems to be a big issue.
- TVA should do more with burning tires, MSW, and other forms of cogeneration as well as to look for ways to eliminate wastes rather than store and treat wastes.
- There has been discussion in some parts of the country about banning carpet from landfills and this will impact the industry located in Dalton, GA.
- TVA should help in the transition from "the reactionary phase to the proactive phase" with regard to responding to environmental issues and problems.

Most of the contacts were pleased that TVA was concerned about waste issues. There appears to be little information about existing waste reduction assistance programs that are currently available. Also, there is a great deal of frustration about the increasingly complex issues surrounding waste generation, handling, disposal and regulation. Most of those we interviewed were eager for information. However, since the waste issues are so broad they sometimes feel overwhelmed and don't want to wade through a large amount of information; but they would like assistance with their specific problems.

Attachment 1 (Appendix N)
CHAMBERS OF COMMERCE

Contacts

ORGANIZATION Bowling Green, KY Chamber of Commerce
CONTACT: Martin Jones, Director of Existing Industries
TVA VISITORS: Darwin Bridges, Pat Ligon, and Rick Starks
DATE: July 21, 1993

ORGANIZATION: Dyersberg, TN Chamber of Commerce
CONTACTS: Sami Dietrich, Executive Director
Joe Adams, Mayor, Newbern, TN
Tom Burgess, City Engineer, Dyersberg
Bob Jones, Environmental Task Force Chairman and
Director, Upward Bound, Dyersberg State Community College
Ricky Leo, Dyersberg Fabrics
Glen Ray, Colonial Rubber Works
Harold Sartain, Technical Manager, Bekaert Dyersberg
Steel Cord Company
Jerry Wiley, Public Works Director, City of Newbern
TVA VISITORS: Regina Schmidtkofer and Tom Henne
DATE: July 26, 1993

ORGANIZATION Community Development Foundation, Tupelo, MS
CONTACT: Harry A. Martin, President, CDF
TVA VISITORS: Steve Seale and Kathy Isom
DATE: July 19, 1993

ORGANIZATION: Dalton, GA. Chamber of Commerce
CONTACTS: Stephen Zegler, Vice-President of Manufacturing, Collins and Aikman and
Environmental Affairs Committee, Chair, Chamber of Commerce
Miles L. Wright, Director of Engineering, Collins and Aikman
Joyce C. Lamb, Technical Services Department, Shaw Industries and
past chair of the Environmental Affairs Committee, Chamber of Commerce
Terry Lamb, Environmental Laboratory Technician
TVA VISITORS: Steve Seale and Kathy Isom
DATE: July 16, 1993

ORGANIZATION Kingsport, TN. Chamber of Commerce

CONTACTS: Steve Wolfe, Director of Economic Development, Kingsport
Chamber of Commerce

B.R.(Rusty) Wilkerson, Jr., Director of Public Works, City of Kingsport

Nadine H. Shipley, Pretreatment Coordinator, City of Kingsport

Daniel A. Wnakel, Environmental Manager, City of Kingsport

TVA VISITORS: Regina Schmidtkofer and Larry Gullett

DATE: July 13, 1993

ORGANIZATION: Memphis, TN. Chamber of Commerce

CONTACTS: Bob Williford, Project Manager, Governmental Affairs,
Chamber of Commerce

Richard W. Lutey, II, Manager, Environmental Affairs, Buckman

Laboratories and Chair, Environmental Sub-Committee of the Chamber

TVA VISITORS: Tom Henne and Kathy Isom

DATE: July 7, 1993

APPENDIX O

STATE ENVIRONMENTAL REGULATORY AGENCIES

Executive Summary

Seven state environmental regulatory agencies in the seven states served by TVA were identified for visits. The seven states include Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia. All seven of these state agencies were visited as part of the first phase of the Industrial Waste Needs Assessment Project.

This report summarizes information gathered from these visits. The topics addressed include what representatives from these organizations consider to be the biggest waste problems in their area, what are the source of those problems, what problems give the most "heartburn", what is currently being done to handle these problems, and what research project would they like to see conducted.

Approximately 0.7 FTEs were required for this portion of the first phase.

STATE ENVIRONMENTAL REGULATORY AGENCIES

This report summarizes, by category, information gathered by visits to six state environmental regulatory agencies in six of the seven states served by TVA (North Carolina was covered under the Waste Reduction Assistance Program visits). The seven categories include air, water, groundwater, waste, underground storage tanks (USTs), hazardous waste, and other. The topics addressed for each category include what representatives from these agencies consider to be the biggest waste problems in their state, the sources of those problems, what is currently being done to handle these problems, what they believe gives the most "heartburn", and what research projects would they like to see conducted.

Attached is a list of the state environmental regulatory agencies visited with the representatives contacted, the TVA representatives making the visits, and the date of the visit. Also attached is a summary of responses to the topics listed by category.

AIR

Biggest Problems

The noted problems include a need for modeling data to show impacts of airborne toxins on ecosystems, monitoring/measurement for nonparticulates (especially low levels of chemicals), need for fugitive emission control technologies, ways to monitor emissions from incineration of solid wastes (tires, wood waste, etc.), ozone.

Also noted was a need for a "clearinghouse" of available methods for determining air toxic emission levels.

Source

The sources were coal-fired power plants and automobiles.

Currently Being Done

Current work includes the Southern Appalachian Mountain Initiative (SAMI)(representatives from eight states to develop a management plan for the region) and Georgia Tech and EPA are studying causes of ozone.

Most "Heartburn"

Areas which caused the most "heartburn" were the unavailability of an accurate model to show the impact of regulatory strategies, a need for alternate disposal methods/reuse for solid wastes to reduce open burning, ozone, mercury from power plants, and lack of fugitive emission control technologies.

One Research Project

Recommended research projects include studies for nonparticulate fugitive emission control technologies, biofiltration control technologies, mercury from power plants, ozone, and modeling existing data.

WATER

Biggest Problems

The most frequently noted item was a need for more specific, cost-effective ways to identify and control nonpoint source pollution (NPS). Another frequent concern was disposal of grease trap waste. (Note: grease trap waste was a solid waste concern also). Other problems include thermal pollution from power plants, a need for modeling around impoundments for temperature profiles and dissolved oxygen, water quality procedures/protocol for dissolved metals in surface water, better overall indicators of water 'cleanliness', and constructed wetlands (municipal and home) which cannot meet discharge limits.

Source

Sources include agricultural and farm-based runoff, industrial and municipal water treatment facilities, thermal pollution from power plants, and sand and gravel mining.

Currently Being Done

The only noted item was that state regulatory agencies have the responsibility to develop standards and procedures to regulate toxic materials in surface water.

Most "Heartburn"

Areas which caused the most "heartburn" include assessment of NPS pollution, dissolved metals, and grease trap waste. Other areas noted were thermal pollution, boat marina wastes (untreated sewage from pleasure boats), and a need for cost effective ways to solve bacteriological contamination from unsewered residential and small community areas.

One Research Project

Recommended research projects include defining analytical methods for determining the toxic portion of the metal limits for aquatic toxicity (with techniques that are less cumbersome and less expensive than current techniques), determine disposal options for grease trap waste, determine better ways to identify and control nonpoint source pollution, and decrease thermal pollution from power plant and water treatment facilities.

GROUNDWATER

Biggest Problems

The noted problems were fecal coliform, TCE from heavy industrial areas, metals leaching from soils, decreasing supply of clean groundwater, need for in situ bioremediation process, and contamination from past operations at isolated sites.

Source

Various industries were considered to cause groundwater problems. No particular industry was noted.

Currently Being Done

None noted.

Most "Heartburn"

None noted.

One Research Project

Recommended research projects include studies on distribution systems for suitable effluents and on a localized low pH groundwater in middle Tennessee.

SOLID WASTE

Biggest Problems

Several of the problems dealt with a need for disposal/reuse alternatives of various wastes such as grease trap waste, sludge waste, wood waste, tires, carpet scraps, yard waste, contaminated soils (usually with hydrocarbons), poultry wastes, and fly ash from power plants. A noted potential future problem was the ability (cost, timing) of existing landfills to comply with new regulations (monitoring, liners). Also, there was concern that some existing landfills will close and not be replaced, due to the costs of new landfills, therefore decreasing the landfill space available. Landfilling of recyclable items was noted. Other problems noted were a need for affordable remediation for small businesses, in situ and Karst terrain remediation technologies, and mixed waste recycling.

Source

Sources were small businesses, restaurants, coal-fired plants, small-to-medium-size furniture manufacturers, and carpet industry.

Currently Being Done

Current work includes research on fly ash through EPRI and others, research on bioremediation on contaminated soils, energy production with carpet scraps, municipal composting, and solidification of grease trap waste for landfilling.

Most "Heartburn"

None noted.

One Research Project

Several of the recommended research projects dealt with landfill issues such as determine the life of landfill liners, definitive answer on dry tomb versus wet cell technology, develop composting or other technologies to decrease the volume of landfill wastes. Other recommendations include help industries design pollution prevention and recycling into their processes and develop in situ and Karst terrain remediation technologies.

UNDERGROUND STORAGE TANKS (USTs)

Biggest Problems

The most frequently noted problem was disposal options for soil contaminated with petroleum products. Other items noted were problems with abandoned tanks, a need for remediation techniques with an endpoint definition for remediation, and a need for modeling technologies with total hydrocarbons.

Source

Sources are located in urban and rural areas.

Currently Being Done

Current solutions include forming consortiums (which have not seemed to be able to come up with viable solutions), research on plasma arc at Georgia Tech, and field modeling of underground transport of contaminants being conducting by TVA and Columbus Air Force Base. Some remediation sites are handled on a case-by-case basis.

Most "Heartburn"

The most frequently noted "heartburn" was a need for treatment of contaminant in place. Cost effective remediation techniques with an endpoint definition for remediation were noted also.

One Research Project

The recommended research projects were the same as the most frequent "heartburn" as well as treatment of contaminant in place.

HAZARDOUS WASTE

Biggest Problems

The biggest problems were siting new waste facilities, dealing with treatment of leachate and leachate quality control, feasible in situ treatment methods, and methods for removal of dense, non-aqueous phase compounds in groundwater.

Source

In one state, slag high in salt from aluminum smelters was a problem.

Currently Being Done

For the dense, non-aqueous phase compounds in groundwater, EPA is conducting research in Ada, OK. Polynuclear aromatic hydrocarbons are being incinerated or stabilized with concrete.

Most "Heartburn"

Siting studies for new waste facilities, especially in Karst terrain, and help with liner installation and maintenance were listed as causing the most "heartburn".

One Research Project

The research projects include the items causing the most "heartburn" as well as removal techniques for dense, non-aqueous phase compounds in groundwater.

OTHER

The topics listed under this category deal with education and information exchange issues. Education of the general public and small businesses in how to properly recycle materials and assistance for these groups in the form of "amnesty days" were recommended. Information exchange between the various state regulatory agencies was recommended to encourage uniform actions on various regulations and to exchange useful information on existing technologies and ideas.

The attitude of the majority of contacts was receptive and cooperative. Most contacts expressed interest in receiving feedback on the outcome of the assessment.

Attachment 1 (Appendix O)
STATE ENVIRONMENTAL REGULATORY AGENCIES

Contacts

ALABAMA

Organization: Alabama Department of Environmental Management (ADEM)

Contacts: Leigh Pegues (pronounced pehGEES), Director
Marilyn Elliott, Chief, Permits and Services Division
Charles Horn, Chief, Water Division
Gerald Hardy, Chief, Engineering Services Branch, Land Division
Larry Brown, Chief, Industrial Section, Engineering Services Branch, Air Division
Mark Summers, Engineering Services Branch, Land Division

Visitors: Carl Cole, Debbie Craft, Bob Mitchell

Date: May 25, 1993

GEORGIA

Organization: Georgia Department of Natural Resources

Contacts: Tim Cash, Hazardous Waste Branch
Michael Creason, Industrial Wastewater Program
Ronald Methier, Air Protection Branch
John Taylor, Land Protection Branch

Visitors: Debbie Craft, Tim Holt

Date: August 12, 1993

KENTUCKY

Organization: Kentucky Department of Environmental Protection

Contacts: Jack Wilson, Chief, Water Division
John Hornback, Chief, Air Division
Pat Haight, Chief, Waste Division
David Morgan, Waste Division

Visitors: Carl Cole, Tom Foster

Date: August 10, 1993

MISSISSIPPI

Organization: Mississippi Department of Environmental Quality

Contacts: Charles Chisolm, Director, Office of Pollution Control
Bill Barnett, Chief, Groundwater Division
Sam Mabry, Chief, Hazardous Waste Division
Glenn Odom, Environmental Engineer, Municipal Facilities Section
Randy Reed, Chief, Water Quality Assessment
Barry Royals, Chief, Surface Water Division
Thomas Whitten, Director, Waste Reduction/Waste Minimization

Visitors: Debbie Craft, Les Tate

Date: July 15, 1993

NORTH CAROLINA

Covered under Waste Reduction Assistance Program interviews.

TENNESSEE

Organization: Tennessee Department of Environment and Conservation (TDEC)

Contacts: Kenneth Bunting, Administrator, Bureau of Environment
Gordon Caruthers, Division of Water Supply, Ground Water Management Section
Charles Head, Division of Underground Storage Tanks
Kent Taylor, Division of Ground Water Protection
John W. Walton, Air Pollution Control Division
Clinton W. Willer, Division of Superfund
Paul Davis, Water Pollution Control
Tom Tiesler, Division of Solid Waste Management

Visitors: Debbie Craft, Bob Mitchell, Steve Seale

Date: June 29, 1993

VIRGINIA

Organization: Virginia Department of Environmental Quality

Contacts: Bill Woodfin, Deputy, Operations
Bernie Caton, Deputy, Policy, Budget, and Administration
Keith Buttleman, Deputy, Public and Intergovernmental Affairs
Bob Burnley, Chief, Water Division
Pam Faggert, Chief, Air Division
Wladimir Gulevich, Waste Division
Hassan Vakili, Waste Division

Visitors: Carl Cole, Steve Diamond

Date: July 21, 1993

Attachment 2 (Appendix O)
STATE ENVIRONMENTAL REGULATORY AGENCIES

Survey Summary

(NOTE: State responses are indicated in the first column by first letter of state name)

AIR

Biggest Problems

- A Fugitive emission control technologies (nonparticulate)
- A Biofiltration control technologies
- G Ozone - need an attainment plan
- G South Appalachian Mountain Issue (SAMI)
- G Air toxic emissions need research and a "clearinghouse" of available methods for determining levels
- K Reduce open burning - reuse/recycling of pallets, tires, wire
- M Monitoring/measurement for nonparticulates
- M Monitor low levels of chemicals
- M Define and predict emissions from incineration of wood waste, tires, cement kilns (which burn whole tires), etc.
- V Modeling data to show translation of airborne toxics to impacts on ecosystems

Source

- V Coal-fired power plants
- V Automobiles

Currently Being Done

- G Ozone - GA Tech and EPA studying causes
- V Southern Appalachian Mountain Initiative (SAMI) -representatives from eight states to develop a management plan for the region

Most "Heartburn"

- A Fugitive emission control technologies
- A Biofiltration control technologies
- G Ozone
- G Global warming
- K Management practices for poultry wastes (especially dead birds)
- K Alternative disposal methods/reuse of wood wastes, tires, etc.
- K Better air quality controls on TVA's Paradise Unit 3
- T Mercury from power plant stacks
- V Unavailability of an accurate model to show the impact of regulatory strategies
- V Valid models for translating existing air contaminant data to environmental impact such as stream acidification

One Research Project

- A Fugitive emission control technologies (nonparticulate)
- A Biofiltration control technologies
- G Ozone studies
- T Mercury from power plant stacks
- V Modeling existing data

WATER

Biggest Problems

- AGMT NPS - need more specific, cost effective answers; need better ways to control/identify
- MT Grease trap waste
- A Thermal pollution from power plants, water treatment facilities
- G Need better modeling to determine effects of impoundments on temperature profiles
- G Wastewater compliance (industry and municipal) - metals limits for aquatic toxicity
- G Low dissolved oxygen around impoundments such as hydro dams
- M Ammonia toxicity resulting from industrial wastewater, concern that EPA levels are stringent due to lack of sufficient MSand and gravel mining causes increased sediment load and turbidity
- M Waste water from poultry industry - overloading municipal sewers
- M Municipal disinfection: potential danger of overchlorination in small towns
- Wetlands:
  - M municipal wastewater
  - K home wastewater
- T Land application of sludges
- T Physical loss of streams due to filling in with dirt
- T Better overall indicators of water 'cleanliness' info.
- V Water quality procedures/protocol for dissolved metals in surface water

Source

- A Agricultural and farm-based
- A Water treatment facilities, industrial and municipal
- A Thermal pollution from power plants
- M Sand and gravel mining

Currently Being Done

- V States have responsibility to develop standards and procedures to regulate toxic materials in surface water

Most "Heartburn"

- AGK Assessment of nonpoint source problems in surface and groundwater
- MT Grease trap waste
- A Boat marina wastes (untreated sewage from pleasure boats)
- A Thermal pollution

- G Trouble meeting metal limits for aquatic toxicity
- K Cost effective approaches to solve bacteriological contamination from unsewered residential and small community areas
- K Application on nonpoint source models to watersheds in different physiographic regions
- V Dissolved metals issue
- V Procedures/protocol for determining dissolved metals in surface water

One Research Project

- A Non-point source (NPS) contamination
- A Thermal pollution from power plants, water treatment facilities
- Metal limits for aquatic toxicity:
  - G 1. Analytical techniques (less cumbersome and less expensive)
  - GV 2. Analytical methods for determining the toxic portion
- T Grease trap waste

GROUNDWATER

Biggest Problems

- M Withdrawal of groundwater and surface waters (i.e. decreasing supply of clean water)
- M Contamination usually caused by past operations at isolated sites
- M Need bioremediation process for in situ treatment
- T Fecal coliform
- T Heavy industrial areas - TCE
- T Metals leaching from soils, lead seals and lead soldered welds

Source

- T Various industries.

One Research Project

- T Distribution systems for effluent
- T Localized low pH groundwater in middle TN

SOLID WASTE

Biggest Problems

- A Affordable remediation technologies for small businesses
- A Mixed wastes recycling
- A Karst terrain remediation
- A n situ remediation technologies
- G Scrap from carpet industry

G Rural landfills, tend to have one major customer which occupies up to 50% of the landfill space - the local industry in the area, different wastes depending on the local industry

G Landfilling recyclable items

G Grease traps

M Discarded tires

M Wood waste from furniture manufacturers

M Yard waste compost needs source of nitrogen

M Sludge disposal or reuse

T Landfills required to update monitoring

V Power plant wastes (fly ash)

V Contaminated soils (usually with hydrocarbons)

V Poultry wastes

Source

A Small businesses

G Carpet industry

G Restaurants

M Small to medium size furniture manufacturers.

V Coal-fired power plants.

V Contaminated soils at incineration facilities are located in major traffic corridors.

Currently Being Done

G Carpet scraps - various groups have looked into energy production but nothing substantial has come of the efforts

G Grease trap waste - two plants in Atlanta are solidifying and sending to landfill

G Municipal composting - in Europe; in Sevierville,

TN V Fly ash - Research through EPRI and others

V Bioremediation of contaminated soils - research

One Research Project

A Affordable remediation technologies for small businesses

A Mixed wastes recycling

A Karst terrain remediation

A In situ remediation technologies

G Definitive answer on which type landfills is better - dry tomb or wet cell

G Determine length of life for landfill liners

G Composting or other technology for waste material going to landfills

M Help industries design pollution prevention and recycling into their processes

V Power plant wastes

UNDERGROUND STORAGE TANKS (USTs)

Biggest Problems

- KM Contaminated soil from USTs (petroleum)
- G Need modeling technologies with total hydrocarbons
- M Abandoned tanks
- T Remediation techniques
- V Endpoint definition for remediation of petroleum hydrocarbon contamination from leaking underground storage tanks (LUSTs)

Source

- T Urban and rural areas

Currently Being Done

- M TVA and Columbus AFB - field modeling of underground transport of contaminants: gas, etc.
- T Consortiums
- T Georgia Tech -research on plasma arc
- V LUST remediation - case by case basis

Most "Heartburn"

- MT Treatment of contaminant in place
- K Cost-effective remediation techniques for LUSTs
- V Endpoint definition for LUST remediation

One Research Project

- T Treatment of contaminant in place

HAZARDOUS WASTE

Biggest Problems

- G Dense, non-aqueous phase compounds in groundwater
- G Feasible in-situ treatment methods of hazardous wastes
- T Siting new waste facilities
- T Leachate quality control, treatment of leachate
- T Aluminum smelters produce slag high in salt

Source

- T Aluminum smelters

Currently Being Done

- G Dense, non-aqueous phase compounds in groundwater - research by EPA in Ada, OK
- G Polynuclear aromatic hydrocarbons (PAH) - incinerate or stabilize with concrete

Most "Heartburn"

- T Siting studies (particularly in Karst topographies)
- T Help with liner installation and maintenance

One Research Project

- G Removal techniques for dense, non-aqueous phase compounds in groundwater
- T Siting studies (particularly in Karst topographies)
- T Help with liner installation and maintenance

OTHER**Biggest Problems**

- A Standardized Graphical Information System (GIS) for Region IV states
- G Education of the general public in how to properly recycle materials

Most "Heartburn"

- A Education and demonstration of existing technologies
- A Small business technical assistance (paint and solvent disposal, etc.)
- A Amnesty days

One Research Project

- A Standardized Graphical Information System (GIS) for Region IV states
- M Expand technology transfer
- M Information exchange with other states