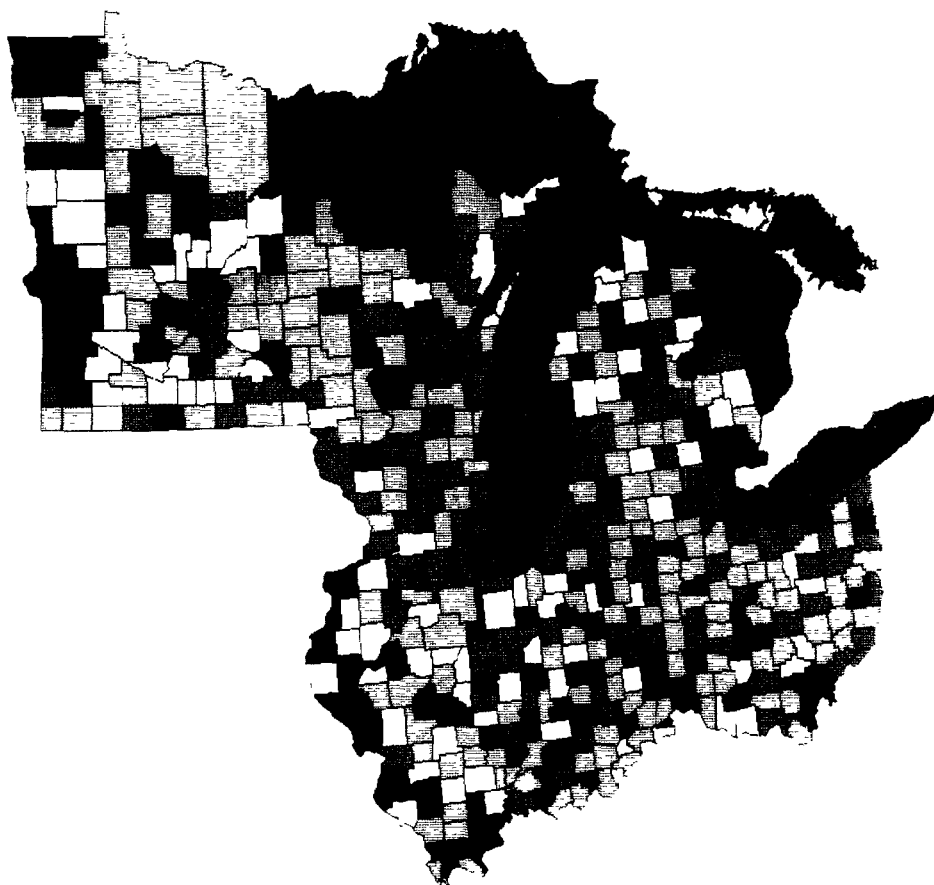


THE USE OF GEOGRAPHIC INFORMATION SYSTEMS (GIS)  
TO INTEGRATE AND ANALYZE  
TOXIC RELEASE INVENTORY (TRI) DATA



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United States Environmental Protection Agency  
Region V, Environmental Sciences Division  
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U.S. Environmental Protection Agency  
Region 5, Library (PL-12J)  
77 West Jackson Boulevard, 12th Floor  
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to Analyze and Integrate  
Toxic Release Inventory (TRI) Data.

January 1990

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## COMPLETED PROJECTS

Geographic Information Systems (GIS) technology has been used with Toxic Release Inventory (TRI) data for a variety of purposes in Region V of the U.S. Environmental Protection Agency. The purpose and the products are briefly described below.

1. Purpose: The display of tabular TRI data in a readily understood graphic format.

Product: The map entitled TOXIC CHEMICAL RELEASES TO EACH TRI MEDIUM BY COUNTY simply displays data that are usually presented as many pages of columnar numbers.

2. Purpose: The integration of data from TRI and other independent databases.

Products: (A) The map entitled TOXIC CHEMICAL RELEASES, TOXIC IMPAIRED WATERSHEDS AND SUPERFUND SITES uses three completely independent databases from three different regulatory programs to define the "Toxic Hot Spots" in Region V. (B) The map entitled TOXIC RELEASE INVENTORY -CARCINOGENIC CHEMICALS uses many independent sources of data on the carcinogenicity of chemicals to assign all the TRI chemicals a carcinogenicity. The map displays the releases of those TRI carcinogens in Region V.

3. Purpose: The integration of program specific data and TRI data to enhance program decision-making capabilities.

Product: The map entitled BASINS WITH 304(1) LISTED WATERS / TRI SURFACE WATER RELEASES uses TRI data to help water program managers evaluate the validity of the state's lists of toxic-impaired waterbody segments as required by the Clean Water Act.

4. Purpose: The analysis of media specific data for chemicals of particular interest.

Product: A final report, Analysis of Toxic Release Inventory (TRI) Data on Two Carcinogenic Chemicals, Dichloromethane and Chromium, in Michigan, was distributed in August 1989.

The TRI data used for these analyses are for calendar year 1987. They were downloaded from the Toxic Release Inventory System (TRIS) database on EPA's IBM 3090 to dBaseIII files in May 1989 by EPA's Office of Toxic Substances. The dBaseIII files were widely distributed to EPA offices, states and the public. Several chemicals were delisted since these data were originally submitted. All chemicals delisted prior to November 1, 1989 were excluded from the analyses that resulted in the attached maps. Thus, these maps display the most current TRI data available as of November 1, 1989.

The Superfund site data were retrieved from the WASTELAN database, which includes the CERCLIS database, on September 29, 1989. These databases are dynamic and are maintained by the U.S. EPA Region V Waste Management Division.

The 304(1) list of waters impaired by toxic pollutants in Region V was published in the June 5, 1989 Federal Register. The watersheds containing the "short list" waterbodies were mapped.

The carcinogenicity of the TRI chemicals was evaluated using many different resources. Roadmaps, a dBaseIII package developed by EPA's Office of Toxic Substances summarizes data from the U.S. EPA, the National Toxicology Program, the International Agency for Research on Cancer, and GENETOX (an on-line database). The Integrated Risk Information System database (IRIS) is a mainframe compilation of references on chemical risk; IRIS was used to screen all TRI chemicals. The Toxic Chemical Release Inventory Reporting Package for 1988 provided the Occupational Safety and Health Administration's "de minimus" values indicating the carcinogenicity of all TRI chemicals. Two further references were also used in the evaluation: International Agency for Research of Cancer (1985), IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man, V. 1-36; and U.S. Department of Health and Human Services (1985), National Toxicology Program Fourth Annual Report on Carcinogens.

Each of the accompanying maps was designed as a poster and therefore the text on each map explains the map's origin and utility in greater detail than presented above.

Those EPA offices that are Arc/Info sites may be interested in the computer programs (AMLs) that produced these maps. The AMLs and a description of the enhancements necessary to the TRI database are attached as Appendix I and are in GISMD's Tube Driver's Tips-#5. All of the Tube Driver's Tips are available on GISNET, an E-Mail bulletin board.

#### ONGOING PROJECTS

Region V's Geographic Information Systems Management Office (GISMD) is working on several additional projects using TRI data.

- A. A multi-media, multi-chemical risk assessment of the Great Lakes Area of Concern in Ashtabula County, Ohio will use chemical specific TRI data.
- B. Regional import and export of TRI toxic chemicals will be determined using nationwide TRI data. A proposal for funding this project has been submitted to the Office of Pesticides and Toxic Substances.
- C. A cooperative study on earthquake emergency response specifically for TRI facilities is being discussed with the Federal Emergency Management Administration (FEMA).

**TOXIC CHEMICAL RELEASES  
TO EACH TRI MEDIUM  
BY COUNTY**

**TOXIC CHEMICAL RELEASES,  
TOXIC IMPAIRED WATERSHEDS  
AND SUPERFUND SITES**

**TOXIC RELEASE INVENTORY -  
CARCINOGENIC CHEMICALS**

## **APPENDIX I**

## Appendix I

### OUTLINE PROCEDURE FOR TOXIC RELEASE INVENTORY DATA MAPPING ON A COUNTY SUMMARY LEVEL USING ARC/INFO

BARRY BOLKA AND JOHN SCHNEIDER

USEPA REGION V, ESD, GISMO

These operations lead to the creation of an ARC/INFO coverage with county and state boundary topology and a polygon attribute table containing TRI media release data aggregated to county level totals. We assume the existence of the county coverages, available on GRIDS. The TRI data source is the dBase III+ version of TRI organized by state. The flat, or ASCII files are created by dBaseIII+ and uploaded to the Prime by Kermit. A file of county names and FIPS codes is also needed, since the TRI dBase files only contain county names, not FIPS codes. The TRI dBase files also do not contain a field for State, but it can be derived from the first two characters of the EPA ID field.

1. Define an INFO template matching the structure in the TRI dBase flat files.
2. Load TRI dBase flat files into INFO using the template. The TRI dBase files are by state. The TRI INFO files created here may be left organized by state, or appended (CAUTION! see step 11).
3. Use ARC: ADDITEM! to add items for TOTAL, TOTAL-OFFSITE, FIPS-ST, FIPS-CO, and STCO (FIPS-ST+FIPS-CO) to TRI\_INFO.
4. In INFO, SELECT TRI\_INFO and CALC TOTAL = FUGITIVE-A + STACK-A + WATER + ... , and CALC TOTAL-OFF = TOTAL - OFFSITE.
5. Create (or get from AIRS) a table of county names vs. FIPS-ST and FIPS-CO. Load the file into INFO, and sort it by FIPS-ST and FIPS-CO to speed up the RELATE to be performed.
6. In INFO, SELECT TRI\_INFO, and do an INFO RELATE on county name in TRI\_INFO to the table in [5]. WARNING! TRI has some bad spellings of county names!
7. CALC FIPS-ST = \$1FIPS-ST and FIPS-CO = \$1FIPS-CO into the TRI\_INFO database.
8. CALC STCO = FIPS-CO + ( FIPS-ST \* 1000) into TRI\_INFO.
9. The TRI\_INFO database is ready to be aggregated to county level.

10. At this point, do any cleanup operations on the TRI\_INFO database, e.g. delete or flag any chemicals that are delisted, add flags for carcinogenic chemicals, create subsets for specific chemicals of interest, or delete records with obviously defective data.
11. The ARC: STATISTICS command will be used to create an INFO database [TRISUM\_INFO] summarizing the TRI media releases at the county level:

```

STATISTICS <TRI_INFO> <TRISUM_INFO> {STCO}
SUM <media_item_name1>
SUM <media_item_name2>
.
.
.
SUM <media_item_nameN>
END
N
N

```

NOTE! The ARC: STATISTICS command is limited to 500 occurrences of the {case\_item}, so if you have more than 500 counties in your Region or State, the TRI INFO database will have to be broken down into multiple files before running STATISTICS.

12. Make an ARC: COPY of the polygon coverage of the county and state borders from U.S.G.S., make sure there is an item called STCO in the coverage .PAT file defined the same as STCO in the TRISUM\_INFO database. This will be used for a RELATE.
13. Do an ARC: ADDITEM to the COUNTY TRI.PAT file to add the TRISUM\_INFO database items SUM-TOTAL [TOTAL], SUM-WATER [WATER], SUM-OFFSITE [OFFSITE], etc.
14. In INFO, select COUNTY TRI.PAT and do an INFO RELATE on STCO between the COUNTY TRI.PAT and the TRISUM\_INFO database.
15. In INFO, CALC TOTAL = \$1SUM-TOTAL, CALC OFFSITE = \$1SUM-OFFSITE, etc. to create a modified COUNTY\_TRI.PAT with all the required TRI items.
16. Now create lookup tables and key files for each TRI media that you wish to display with a shaded map.
17. Once these TRI data are loaded into INFO; and the other necessary coverages, look-up tables, key files and plot files have been created, the following AML produces a map of TRI data by medium and by county.

```

/* TRI-MEDIA.CAL1.AML
/* JOHN SCHNEIDER & BARRY BOLKA 22JAN90 USEPA-R5-ESD-GISMD 886-0880
/* AML TO PLOT TRI DATA BY MEDIUM BY COUNTY.  RUN FROM ARC PLOT

/* THIS AML IS DESIGNED TO PRODUCE MAPS ON THE CALCOMP 5845XP.  IF A
/* DIFFERENT PLOTTER IS USED THE LOOK-UP TABLES, KEY FILES AND
/* PLOTS MUST BE ALTERED FOR THAT DEVICE.  THE CALCOMP1 SHADESET WILL
/* DRAW ONLY THE FIRST 256 COLORS ON A TEK 4325.  IF A 4207 IS USED
/* FEWER OF THE COLORS WILL BE SEEN ON THE TERMINAL

/* COVERAGES USED: R5NOSHORE, GL-OL-4, R5CO ALL, GL4-ARCS
/* R5NOSHORE = REGION 5 OUTLINE WITHOUT THE GREAT LAKES SHORELINE
/* GL-OL-4 = THE GREAT LAKES POLYGON
/* GL4-ARCS = THE GREAT LAKES SHORELINE IN REGION 5
/* R5CO ALL = COUNTY BOUNDARIES IN ALL REGION 5 STATES
/* WITH TRI ATTRIBUTES BY COUNTY

/* LOOK-UP TABLES USED (MUST BE IN THE SAME DIRECTORY AS AML):
/* GL-OL-4.CAL1.LU = USED TO SHADE THE GREAT LAKES BLUE
/* TOTAL.CAL1.SL.LU = CREATES A STOPLIGHT COLORED PLOT FOR THE TOTAL
/* EMISSION PER COUNTY USING THE CALCOMP 5845XP
/* OTHER LOOK-UP TABLES WITH THE SAME SUFFIX .CAL1.SL.LU WORK SIMILARLY
/* FOR THE ITEM IN THE PREFIX.  THESE INCLUDE TOTAL-OFF., OFF., STACK.,
/* FUGITIVE., WATER., POTW., INJECTION., AND LAND.

/* PLOTS USED: NEWLOGO.CAL1.PLT = A PLOT OF THE GISMD LOGO FOR 5845XP
/* TEXT.PLT = THE TEXT TO APPEAR ON THE MAP ALREADY IN A PLOT FILE

/* KEY FILES USED: SL.KEY = STOPLIGHT COLORED KEY FOR THE 5845XP

/* SET PATHNAMES FOR ALL COVERAGES AND PLOTS USED
&ECHO &O1
&S .P1 := SSCOV\ST OUTLINE
&S .P2 := BBOLKA\MISC
&S .P3 := JSCHIED\TRI\ESRI\MAPS

/* DRAW THE BORDERS AND BOXES TO CONTAIN NINE MAPS AND A TEXT BLOCK
/* PAGESIZE DESIGNED FOR GATEFOLD IN A BOUND REPORT
PAGESIZE 16.5 11
TEXTSET CARTO.TXT
SHADESET CALCOMP1.SHG
TEXTSY 135
TEXTSI .1
LINESY 4
BOX 0 0 16.5 11
LINESY 12
BOX 1.18 0 16.5 11
LINE 4.84 0 4.84 11
LINE 8.50 0 8.50 11
LINE 12.16 0 12.16 11
LINE 1.18 3.66 12.16 3.66

```

```

LINE 1.18 7.32 12.16 7.32
/* DRAW MAP OF TOTAL TRI EMISSIONS BY COUNTY
MAPLIMITS 1.18 7.32 4.84 11
MAPE %.P1%R5NOSHORE %.P1%GL-OL-4
POLYGONSHADES %.P3%R5CO_ALL TOTAL TOTAL.CAL1.SL.LU
LINESY 21
ARCS %.P1%R5NOSHORE
LINESY 1
POLYGONSH %.P1%GL-OL-4 GL-OL-4-ID GL-OL-4.CAL1.LU
ARCS %.P1%GL4-ARCS
LINESY 1
POLYS %.P3%R5CO_ALL

/* DRAW MAP OF TOTAL EMISSIONS MINUS OFFSITE TRANSFERS
MAPLIMITS 4.84 7.32 8.5 11
MAPE %.P1%R5NOSHORE %.P1%GL-OL-4
POLYGONSHADES %.P3%R5CO_ALL TOTAL-OFF TOTAL-OFF.CAL1.SL.LU
LINESY 21
ARCS %.P1%R5NOSHORE
LINESY 1
POLYGONSH %.P1%GL-OL-4 GL-OL-4-ID GL-OL-4.CAL1.LU
ARCS %.P1%GL4-ARCS
LINESY 1
POLYS %.P3%R5CO_ALL

/* DRAW MAP OF TOTAL OFFSITE TRANSFERS
MAPLIMITS 8.5 7.32 12.16 11
MAPE %.P1%R5NOSHORE %.P1%GL-OL-4
POLYGONSHADES %.P3%R5CO_ALL OFFSITE OFF.CAL1.SL.LU
LINESY 21
ARCS %.P1%R5NOSHORE
LINESY 1
POLYGONSH %.P1%GL-OL-4 GL-OL-4-ID GL-OL-4.CAL1.LU
ARCS %.P1%GL4-ARCS
LINESY 1
POLYS %.P3%R5CO_ALL

/* DRAW MAP OF STACK AIR EMISSIONS
MAPLIMITS 1.18 3.66 4.84 7.32
MAPE %.P1%R5NOSHORE %.P1%GL-OL-4
POLYGONSHADES %.P3%R5CO_ALL STACK-A STACK.CAL1.SL.LU
LINESY 21
ARCS %.P1%R5NOSHORE
LINESY 1
POLYGONSH %.P1%GL-OL-4 GL-OL-4-ID GL-OL-4.CAL1.LU
ARCS %.P1%GL4-ARCS
LINESY 1
POLYS %.P3%R5CO_ALL

```

```

/* DRAW MAP OF FUGITIVE AIR EMISSIONS
MAFLIMITS 4.84 3.66 8.5 7.32
MAPE %.P1%R5NOSHORE %.P1%GL-OL-4
POLYGONSHADES %.P3%R5CO_ALL FUGITIVE-A FUGITIVE.CAL1.SL.LU
LINESY 21
ARCS %.P1%R5NOSHORE
LINESY 1
POLYGONSH %.P1%GL-OL-4 GL-OL-4-ID GL-OL-4.CAL1.LU
ARCS %.P1%GL4-ARCS
LINESY 1
POLYS %.P3%R5CO_ALL

```

```

/* DRAW MAP OF DISCHARGES TO WATER
MAFLIMITS 8.5 3.66 12.16 7.32
MAPE %.P1%R5NOSHORE %.P1%GL-OL-4
POLYGONSHADES %.P3%R5CO_ALL WATER WATER.CAL1.SL.LU
LINESY 21
ARCS %.P1%R5NOSHORE
LINESY 1
POLYGONSH %.P1%GL-OL-4 GL-OL-4-ID GL-OL-4.CAL1.LU
ARCS %.P1%GL4-ARCS
LINESY 1
POLYS %.P3%R5CO_ALL

```

```

/* DRAW MAP OF TRANSFERS TO POTWS
MAFLIMITS 1.18 0 4.84 3.66
MAPE %.P1%R5NOSHORE %.P1%GL-OL-4
POLYGONSHADES %.P3%R5CO_ALL POTW POTW.CAL1.SL.LU
LINESY 21
ARCS %.P1%R5NOSHORE
LINESY 1
POLYGONSH %.P1%GL-OL-4 GL-OL-4-ID GL-OL-4.CAL1.LU
ARCS %.P1%GL4-ARCS
LINESY 1
POLYS %.P3%R5CO_ALL

```

```

/* DRAW MAP OF UNDERGROUND INJECTIONS
MAFLIMITS 4.84 0 8.5 3.66
MAPE %.P1%R5NOSHORE %.P1%GL-OL-4
POLYGONSHADES %.P3%R5CO_ALL INJECTION INJ.CAL1.SL.LU
LINESY 21
ARCS %.P1%R5NOSHORE
LINESY 1
POLYGONSH %.P1%GL-OL-4 GL-OL-4-ID GL-OL-4.CAL1.LU
ARCS %.P1%GL4-ARCS
LINESY 1
POLYS %.P3%R5CO_ALL

```

```

/* DRAW MAP OF DISPOSALS TO LAND
MAPLIMITS 8.5 0 12.16 3.66
MAPE %.P1%R5NOSHORE %.P1%GL-OL-4
POLYGONSHADES %.P3%R5CO_ALL LAND LAND.CAL1.SL.LU
LINESY 21
ARCS %.P1%R5NOSHORE
LINESY 1
POLYGONSH %.P1%GL-OL-4 GL-OL-4-ID GL-OL-4.CAL1.LU
ARCS %.P1%GL4-ARCS
LINESY 1
POLYS %.P3%R5CO_ALL

```

```

/* PLOT THE GISMD LOGO INTO THE TEXT AREA
PLOT %.P2%NEWLOGO.CAL1.PLT BOX 12.3 .25 16.25 3.25

```

```

/* WRITE TITLE, AMLPATH & INITIALS IN TEXT AREA
TEXTQ CONSTANT
TEXTSI .2
MOVE 14.25 10.50
TEXT 'TOXIC CHEMICAL RELEASES' CC
MOVE 14.25 10.20
TEXT 'TO EACH TRI MEDIUM' CC
MOVE 14.25 9.90
TEXT 'BY COUNTY' CC
MOVE 16.18 .15
TEXTSY 135
TEXTQ CONSTANT
TEXTSI .06
TEXTSL 10
TEXT 'JPS, BJB 12DEC89' CR
MOVE 12.4 .15
TEXT 'USCHEID TRI TRI-MEDIA.CAL1.AML' CL

```

```

/* WRITE A TITLE ON EACH MAP
TEXTSY 135
TEXTQ CONSTANT
TEXTSI .15
MOVE 3.01 10.83
TEXT 'TOTAL EMISSIONS' CC
MOVE 6.67 10.83
TEXT 'TOTAL MINUS OFFSITE' CC
MOVE 10.33 10.83
TEXT 'OFFSITE TRANSFERS' CC
MOVE 3.01 7.15
TEXT 'STACK AIR EMISSIONS' CC
MOVE 6.67 7.15
TEXT 'FUGITIVE AIR EMISSIONS' CC
MOVE 10.33 7.15
TEXT 'DISCHARGES TO WATER' CC

```

```

MOVE 3.01 3.49
TEXT 'TRANSFERS TO POTWS' CC
MOVE 6.67 3.49
TEXT 'INJECTED UNDERGROUND' CC
MOVE 10.33 3.49
TEXT 'LAND DISPOSAL' CC

/* CREATE A KEY
TEXTSY 135
TEXTSI .10
LINESY 1
KEYPOS 13.4 4.15
KEYSEP .1 .1
KEYBOX .2 .2
KEYSHADE SL.KEY
MOVE 14.25 4.35
TEXTSI .125
TEXT 'POUNDS RELEASED IN 1987' CC

```

```

/* PLOT THE TEXT. THE TEXT IS A SEPARATE PLOT FILE BECAUSE TEXT SHRINKS
/* WHEN IT IS TURNED INTO A PLOT FILE, DOING THIS FIRST ALLOWS FULL
/* CONTROL OVER THE POSITIONING OF THE TEXT
PLOT TXT.PLT BOX 12.41 3.8 16.75 9.45

```

```

&ECHO &OFF

```

```

/*THIS IS THE END OF THE AML
/*THE STRUCTURE OF THE FILES REQUIRED BY THE AML FOLLOWS

```

```

/*LOOK-UP TABLE STRUCTURE IN INFO

```

```

/*
/* DATAFILE NAME: GL-OL-4.CAL1.LU
/* 2 ITEMS: STARTING IN POSITION 1
/* COL ITEM NAME WIDTH OPUT TYP N.DEC ALTERNATE NAME
/* 1 GL-OL-4-ID 4 5 B -
/* 5 SYMBOL 3 3 I -
/* SPECNO GL-OL-4-ID SYMBOL
/* 1 1 0
/* 2 2 0
/* 3 3 0
/* 4 4 0
/* 5 5 0
/* 6 6 0
/* 7 7 0
/* 8 8 0
/* 9 9 0
/* 10 10 821
/* 11 11 821
/* 12 12 821
/* 13 13 821
/*

```

```

/* DATAFILE NAME: TOTAL.CAL1.SL.LU
/* 2 ITEMS: STARTING IN POSITION 1
/* COL ITEM NAME WIDTH OPUT TYP N.DEC ALTERNATE NAME
/* 1 TOTAL 12 12 I -
/* 13 SYMBOL 3 3 I -
/* SRECNO TOTAL SYMBOL
/* 1 1 830
/* 2 1000 732
/* 3 10000 19
/* 4 100000 30
/* 5 1000000 75
/* 6 10000000 168
/* 7 100000000 232
/* 8 1000000000 288
/*

```

```

/* DATAFILE NAME: TOTAL-OFF.CAL1.SL.LU
/* 2 ITEMS: STARTING IN POSITION 1
/* COL ITEM NAME WIDTH OPUT TYP N.DEC ALTERNATE NAME
/* 1 TOTAL-OFF 12 12 I -
/* 13 SYMBOL 3 3 I -
/* SRECNO TOTAL-OFF SYMBOL
/* 1 1 830
/* 2 1000 732
/* 3 10000 19
/* 4 100000 30
/* 5 1000000 75
/* 6 10000000 168
/* 7 100000000 232
/* 8 1000000000 288
/*

```

/\*THE RELATIVE LOOK-UP TABLES ARE SIMILAR WITH DIFFERENT ITEM NAMES

```

/*
/*SLAKEP IS A SYSTEM FILE
/**.830
/* 0
/**.732
/* 1 - 1000
/**.19
/* 1,001 - 10,000
/**.30
/* 10,001 - 100,000
/**.75
/* 100,001 - 1,000,000
/**.168
/* 1,000,001 - 10,000,000
/**.232
/*10,000,001 - 100,000,000
/**.288
/* OVER 100,000,000
/*

```

/\*R5CO\_ALL PAT FILE STRUCTURE

/\* DATAFILE NAME: R5CO ALL.PAT

/\* 20 ITEMS: STARTING IN POSITION 1

/\* COL ITEM NAME WIDTH OPUT TYP N.DEC ALTERNATE NAME

1	AREA	4	12	F	3	
5	PERIMETER	4	12	F	3	
9	R5CO_ALL#	4	5	B	-	
13	R5CO_ALL-ID	4	5	B	-	
17	PERMIN1	6	6	I	-	
23	LWCODE	2	2	C	-	
25	PERAJ2	6	6	I	-	
31	PERMIN2	6	6	I	-	
37	CITY	1	1	I	-	
38	STCO	5	5	I	-	
43	FUGITIVE-A	10	10	I	-	
53	STACK-A	10	10	I	-	
63	WATER	10	10	I	-	
73	INJECTION	10	10	I	-	
83	LAND	10	10	I	-	
93	POTW	10	10	I	-	
103	OFFSITE	10	10	I	-	
113	TOTAL	12	12	I	-	
125	TOTAL-OFF	12	12	I	-	
137	CO-SQ-I	10	10	N	3	
** REDEFINED ITEMS **						
17	S	6	6	I	-	
21	PBLN	8	8	C	-	
21	FIPS-ST	2	2	I	-	
34	FIPS-CO	3	3	I	-	

/\* PARTIAL LIST OF R5CO ALL.PAT

/\*

/\*

AREA	= -8.61728E+11
PERIMETER	= 11188570.000
R5CO_ALL#	= 1
R5CO_ALL-ID	= 1
PERMIN1	= 0
LWCODE	=
PERAJ2	= 0
PERMIN2	= 0
CITY	= 0
STCO	= 0
FUGITIVE-A	= 0
STACK-A	= 0
WATER	= 0
INJECTION	= 0
LAND	= 0

```

/* POTW                =          0
/* OFFSITE              =          0
/* TOTAL                =          0
/* TOTAL-OFF            =          0
/* CO-SQMI              =      0.000
/*
/*
/* AREA                 =4.609424E+09
/* PERIMETER            = 374,197.100
/* R5CO ALL#            =      2
/* R5CO ALL-ID          =      2
/* PERMIN1              =     27
/* LWCODE               =L
/* PERAJ2               =     92
/* PERMIN2              =     77
/* CITY                 =0
/* STCO                 =27077
/* FUGITIVE-A          =          0
/* STACK-A              =    120000
/* WATER                =          0
/* INJECTION            =          0
/* LAND                 =          0
/* POTW                 =          0
/* OFFSITE              =          0
/* TOTAL                =    120000
/* TOTAL-OFF            =    120000
/* CO-SQMI              =   1779.699
/*
/*
/*                      3
/* AREA                 =2.839766E-09
/* PERIMETER            = 232,471.200
/* R5CO ALL#            =      3
/* R5CO ALL-ID          =      3
/* PERMIN1              =     27
/* LWCODE               =L
/* PERAJ2               =     92
/* PERMIN2              =     69
/* CITY                 =0
/* STCO                 =27069
/* FUGITIVE-A          =          0
/* STACK-A              =          0
/* WATER                =          0
/* INJECTION            =          0
/* LAND                 =          0
/* POTW                 =          0
/* OFFSITE              =          0
/* TOTAL                =          0
/* TOTAL-OFF            =          0
/* CO-SQMI              =   1096.434
/*
/*PAT FILE CONTINUES FOR FULL NUMBER OF RECORDS

```