

Strategic Toxic Air Reduction (STAR)

Where are we and why are we here?

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The Beginning ...

- 1996 – West County Community Task Force (WJCCTF or Task Force) established by Jefferson County Health Department
 - Membership of Task Force
 - Citizens from West County neighborhoods
 - 4 Rubbertown industries
 - Metropolitan Sewer District
 - Air Pollution Control District
 - Health Department
 - University of Louisville
 - EPA Region 4

The Outcome ...

- 1996 – Task Force adopted Action Agenda identifying issues of concern, including ...
Air pollution from Rubbertown areas
- First action item
Air toxics monitoring study

Project Components and Timeframe

- **1996-2000** - Task Force studied and discussed air pollution – 1st step – monitoring study
- **2000** - Quality Assurance Project Plan (QAPP)
- **2000-2001** – Monitoring
- **2001-2002** – Sample analysis
 - Risk assessment work plan
- **2002-2003** – Risk management plan
 - Risk assessment report

West Louisville Air Toxics Study

WLATS

- 1-Year Monitoring Study
April 2000 to April 2001
- Monitored for:
 - 83 Volatile Organic Compounds (TO-15)
 - 63 Semi-Volatile Organic Compounds
 - Formaldehyde, HCl, HF
 - 20 Metals

CHEMICAL	CAS	CHEMICAL	CAS	CHEMICAL	CAS
Freon 22 (ClF2Methane)	75456	Methyl Cyclohexane	108872	2,2-Dichloropropane	594207
Freon 12 (Cl2F2Methane)	75718	trans-1,3-Dichloropropene	10061026	1,2- Dichloroethane	107062
Chloromethane	74873	1,1,2-Trichloroethane	79005	1,1,1-Trichloroethane	71556
Freon 114 (Cl2F4Ethane)	76142	Toluene	108883	1,1- Dichloropropene	563586
Vinyl Chloride	75014	1,3-Dichloropropane	142289	Benzene	71432
1,3- Butadiene	106990	Methyl Butyl Ketone	591786	Carbon Tetrachloride	56235
Bromomethane	74839	Dibromochloromethane	124481	Cyclohexane	110827
Chloroethane	75003	1,2- Dibromoethane	106934	Dibromomethane	74953
Acetone	67641	Tetrachloroethene	127184	1,2-Dichloropropane	78875
Freon 11 (Cl3Fmethane)	75694	1,1,1,2 - Tetrachloroethane	79345	Ethyl Acrylate	140885
Acrylonitrile	107131	Chlorobenzene	108907	Bromodichloromethane	75274
1,1-Dichloroethene	75354	Ethylbenzene	100414	Trichloroethene	79016
Methylene Chloride	75092	(m and /or p) Xylene	108383/106423	Methyl Methacrylate	80626
Methyl Acetate	79209	Bromoform	75252	cis-1,3-Dichloropropene	10061015
Freon 113 (Cl3F3Ethane)	76131	Butyl Acrylate	141322	Methyl Isobutyl Ketone	108101
Carbon Disulfide	75150	Styrene	100425	1,3,5-Trimethylbenzene	108678
Trans-1,2-Dichloroethene	156605	1,1,2,2-Tetrachloroethane	79345	tert-Butylbenzene	98066
1,1-Dichloroethane	75343	o-Xylene (1,2-Dimethyl Benzene)	95476	1,2,4-Trimethylbenzene	95636
Methyl T-Butyl Ether (MTBE)	1634044	1,2,3-Trichloropropane	96184	1,3-Dichlorobenzene	541731
Methyl Ethyl Ketone	78933	Isopropylbenzene	98828	1,4-Dichlorobenzene	106467
Chloroprene(2-Cl-1,3-Butadiene)	126998	Bromobenzene	108861	sec-Butylbenzene	135988
cis-1,2-Dichloroethene	156592	o-Chlorotoluene	95498	p-Isopropyltoluene	99876
Hexane	110543	n-Propylbenzene	103651	1,2-Dichlorobenzene	95501
Chloroform	67663	p-Chlorotoluene	106434	n-Butylbenzene	104518
1,2,4-Trichlorobenzene	95636	1,2,3-Trichlorobenzene	87616	1,2-Dibromo-3-chloropropan	96128
Naphthalene	91203	Hexachlorobutadiene	87683		

West Louisville Air Toxics Study

WLATS

- Results - 2003:
 - 17 carcinogens with risk greater than one in one million (1×10^{-6})
 - 1 chemical with Hazard Quotient (HQ) of 13.9 (Trivalent Chrome not identified in the study as a carcinogen)

EPA-4 Air Toxics

Relative Risk Screening Analysis

- 2002 - EPA Region 4 released toxics characterization report finding Jefferson County was the **Number One** county in risk of exposure to toxic air pollutants in the 736 counties in 8 states of Region 4. This ranking was based on...
 - CDC morbidity/mortality
 - TRI risk screening
 - EPA NATA data
 - Population density
 - Population age (<18, >65)

Key Elements

- Necessary support
 - Public
 - Mayoral and legislative
 - Board

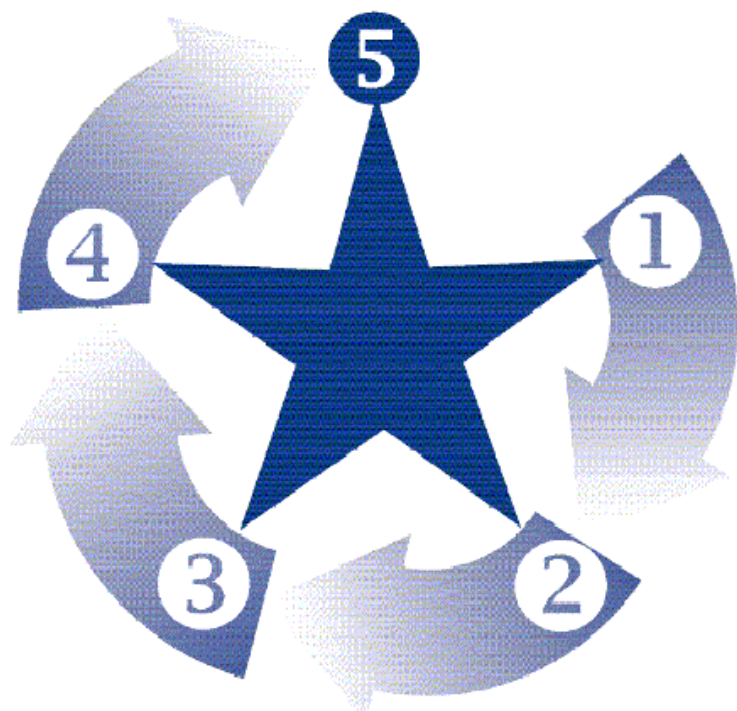
Key Elements

- Contributing factors
 - Delay of EPA toxics programs
 - MACT/Residual risk
 - Mobile sources
 - Area sources - 112(k)
 - Selective industry resistance to voluntary action



STAR Program

Strategic Toxic Air Reduction



- 1 Emissions levels**
- 2 Release points**
- 3 Modeling**
- 4 Reduction plan**
- 5 Compliance**



- First draft – September 16, 2004
 - Over 60 meetings, 1300 in attendance
 - 200+ page informal comment/response document
- Proposed – January 14, 2005
 - 350 page formal comment/response document
- Adopted – June 21, 2005
Effective – July 1, 2005

STAR Program Highlights

- Focused, strategic plan to significantly reduce toxics in our air
- Requires submittal of more detailed toxics emissions information
- Establishes a framework for determining environmental acceptability of toxics
- Requires approximately 215 companies to assess and address targeted toxic emissions (originally)
 - Currently about 100
- Requires the District to assess and address other toxic emissions

What Compounds?

- Category 1 – 18 WLATS
- Category 2 – 19 RSEI (EPA-4 ATRRSA)
- Category 3 – 33 Urban Air Toxics
- Category 4 - 187 HAPs

- Toxic Air Contaminant (TAC) defined as any compound ... District has authority to address

What Sources are Regulated?

- New/Modified and Existing
 - Title V and FEDOOP (synthetic minor)
 - All processes (unless de minimis)
- Minor, Area, Non-road Mobile, and Mobile sources
 - Regulation 5.30 – District to develop proposed Report and Plan of Action by 6-07
- Background concentrations ... Not addressed

What is Acceptable?

- Carcinogens – Cancer Risk Goals
 - **1×10^{-6}** – Single process / Single TAC
 - **3.8×10^{-6}** – All New processes / All TACs /
Single company
 - **7.5×10^{-6}** – All processes / All TACs /
Single company
 - **10×10^{-6}** – All processes / All TACs /
multiple companies

What is Acceptable?

- Noncancer risk – Hazard Quotient (HQ)
Goals
 - **1.0** HQ – Single process / single TAC
 - **1.0** HQ – All New processes / Single TAC /
single company
 - **1.0** HQ – All processes / Single TAC /
Single company
 - **1.0** HQ – All processes / Single TAC /
Multiple companies

Compliance Dates

Category 1 and 2 TACS

- Existing sources (extension allowed)
 - Title V – 2008 (+ 6 months) / 2010 (+ 1 Yr)
 - FEDOOP – 2010 (+ 1 Yr) / 2011 (+ 1 Yr)
- Minor, Area, Non-road Mobile, and Mobile sources
 - 2012

Additional District Authority

- Acute effects
- Synergistic or additive effects
- Non-inhalation routes of exposure
- Non-listed TACs

2008

- Deadlines approaching
- Director, Assistant Director, business manager and engineering manager all leave APCD
- STAR permits drafted and public noticed
 - New permit type not connected to new equipment or standard operating permit
- October 2008, I began working as Engineering Manager

2008 (Continued)

- STAR permits never issued
 - Legal concerns
 - No application submitted, much confusion regarding submittals and requirements
 - Many companies had intended to demonstrate no permit conditions needed
 - District had converted demonstration into specific permit limits
 - Companies were unable to meet draft permit limits

2009

- Permitting focus shifted to Title V issuance
 - Cumulative and specific STAR limits not included
- Construction permits included limits based on TAC emissions emitted by construction project
 - Not plant-wide review
- District worked through several iterations of permit limits
 - Settled on emissions rates per process/process equipment per TAC

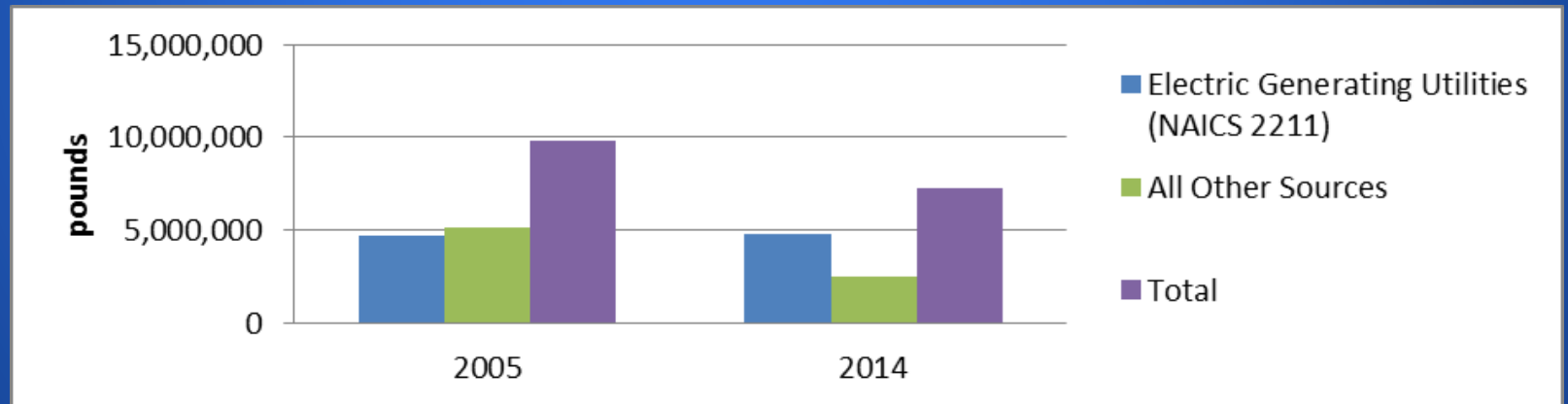
2013 Regulation change

- In 2013, Air Pollution Control Board approved regulatory change to STAR language
 - Clarified that any demonstration made other than existing limits and uncontrolled potential will become a permit limit
 - Limits need to demonstrate compliance with risk goals

**Ten Years Later: STAR
&
Louisville Air Toxics**

Total Air Toxics

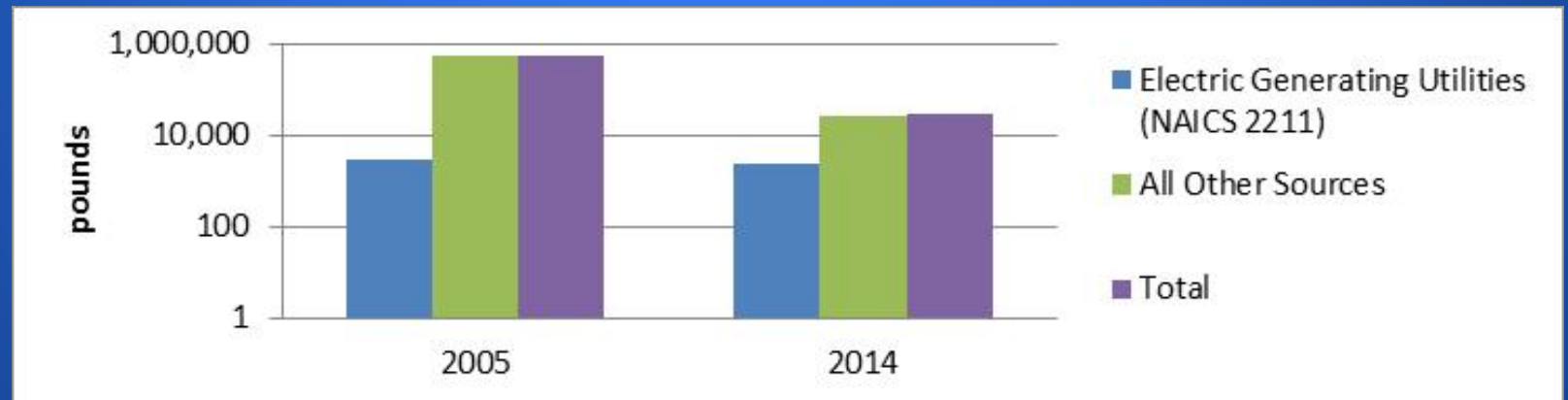
Jefferson County, Ky. Sources	2005 Air Releases in Pounds	2014 Air Releases in Pounds	% Change
Electric Generating Utilities (NAICS 2211)	4,710,016	4,753,327	1% Increase
All Other Sources	5,141,564	2,497,341	-51% Decrease
Total	9,851,580	7,250,668	-26% Decrease



Source: EPA Toxics Release Inventory

Category 1 Air Toxics

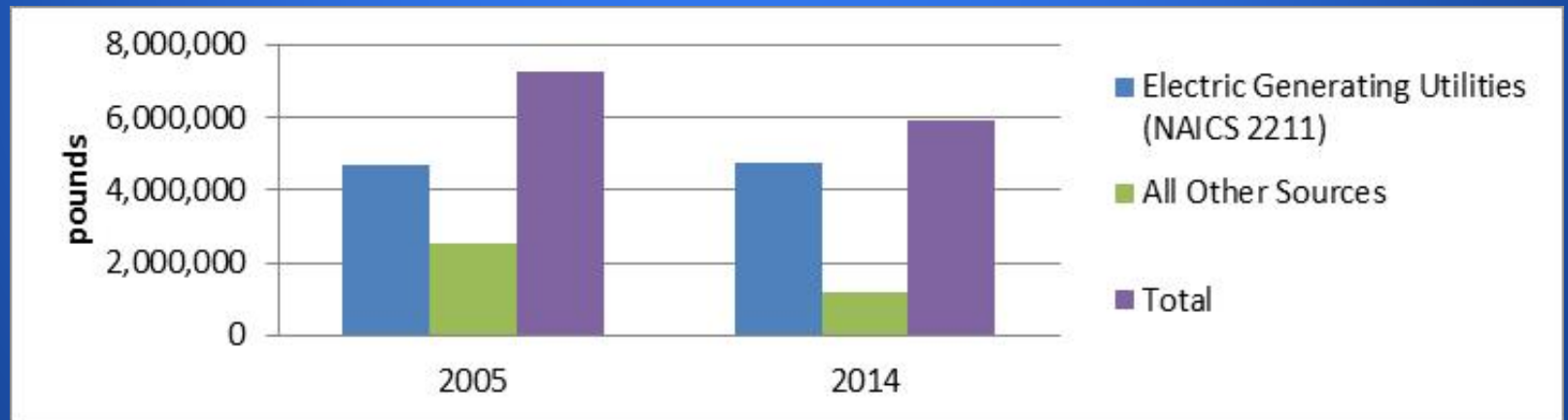
Jefferson County, Ky. Sources	2005 Air Releases in Pounds	2014 Air Releases in Pounds	% Change
Electric Generating Utilities (NAICS 2211)	3,112	2,471	-21% Decrease
All Other Sources	548,389	26,836	-95% Decrease
Total	551,501	29,307	-95% Decrease



Source: EPA Toxics Release Inventory

Category 2 Air Toxics

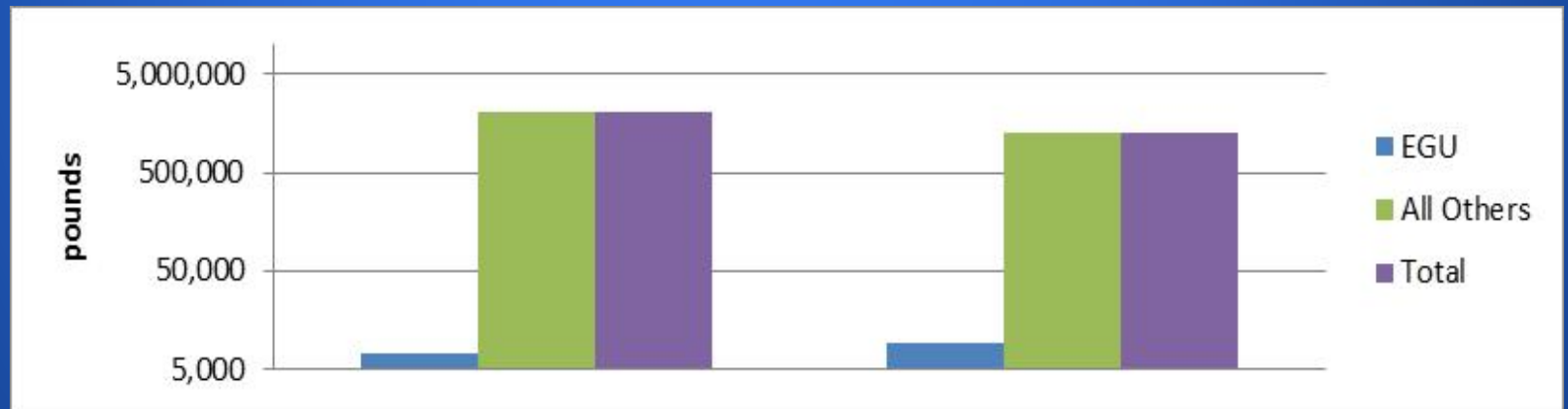
Jefferson County, Ky. Sources	2005 Air Releases in Pounds	2014 Air Releases in Pounds	% Change
Electric Generating Utilities (NAICS 2211)	4,699,509	4,741,600	1% Increase
All Other Sources	2,549,340	1,209,276	-53% Decrease
Total	7,248,849	5,950,876	-18% Decrease



Source: EPA Toxics Release Inventory

Category 3 & 4 TACs

Jefferson County, Ky. Sources	2005 Air Releases in Pounds	2014 Air Releases in Pounds	% Change
Electric Generating Utilities (NAICS 2211)	7,395	9,256	25% Increase
All Other Sources	2,043,835	1,261,229	-38% Decrease
Total	2,051,230	1,270,485	-38% Decrease



Source: EPA Toxics Release Inventory

Issues Seen

- Modeling parameters wrong
 - Equipment off property
 - Equipment listed as elevated
- EA Demo maximum emissions don't match PTE maximum emissions
- EA demo maximums being exceeded in actual emissions

Suggestions

- Back calculate emissions allowable from STAR goals
 - May require multiple scenarios demonstrated to balance different TAC emissions
- Break down process/process equipment as much as is reasonable to lower risk per process/process equipment
 - May be able to achieve de minimis per process/process equipment instead of large risk across production line
 - Insignificant activities are automatically de minimis
 - 5 tpy criteria, 1,000 lb. single HAP

Suggestions (continued)

- Verify that numbers presented as maximum match across application forms
 - Emissions Inventory should be compared to STAR demonstration every year
- If EA demonstration based on emissions below **uncontrolled** potential, understand that emission rates will become permit terms
 - Controlled potential will become a limit