Kennecott Mine
7 Air Toxics Emitted

Carcinogens

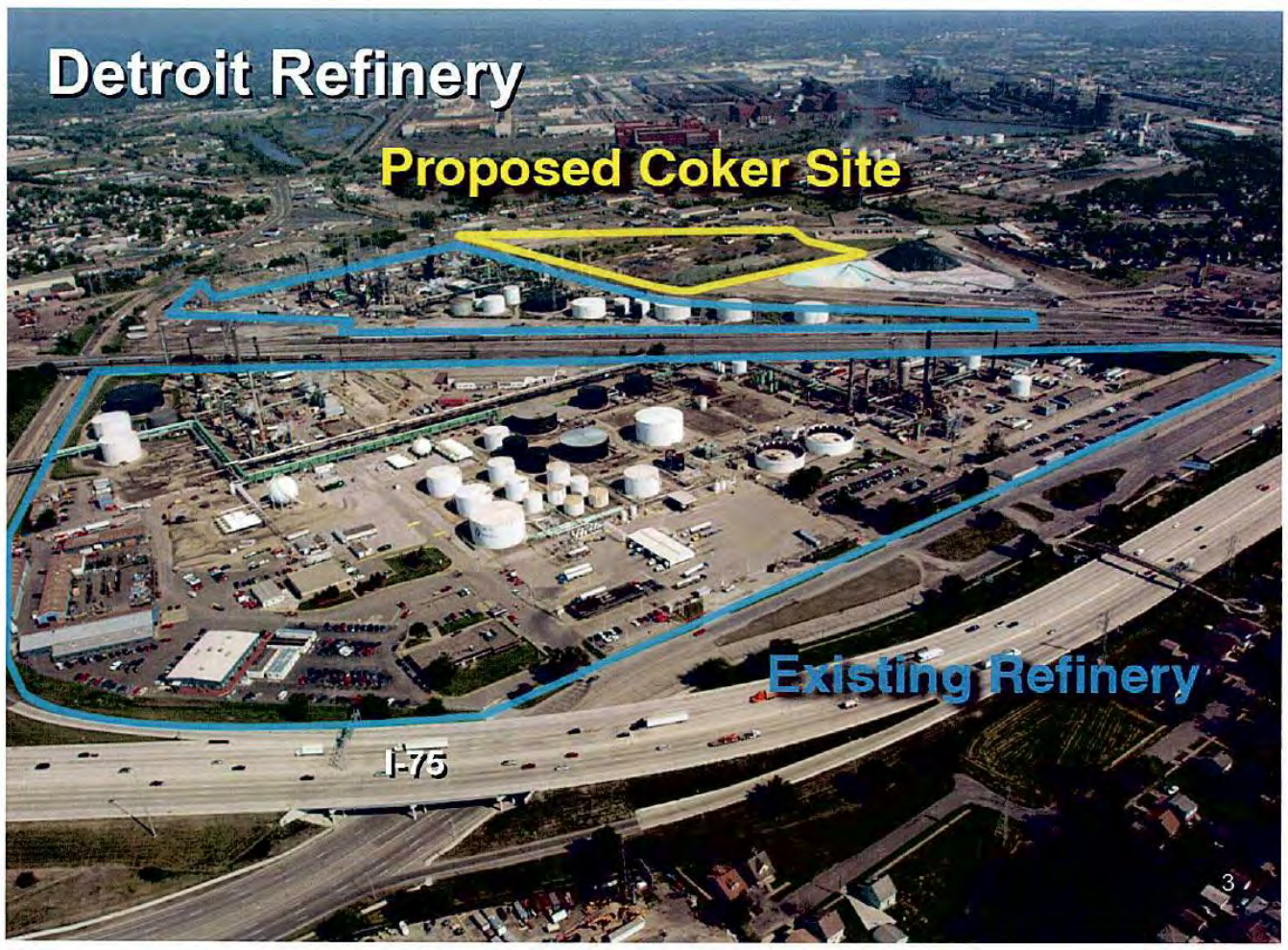
- ***Arsenic***
- ***Nickel***

Non-Carcinogens

- **Ammonia**
- ***Cobalt***
- **Copper**
- ***Manganese***
- **Sulfuric acid**

HAPs are shown in yellow *italics.*

Marathon Refinery Expansion



Marathon Refinery Expansion

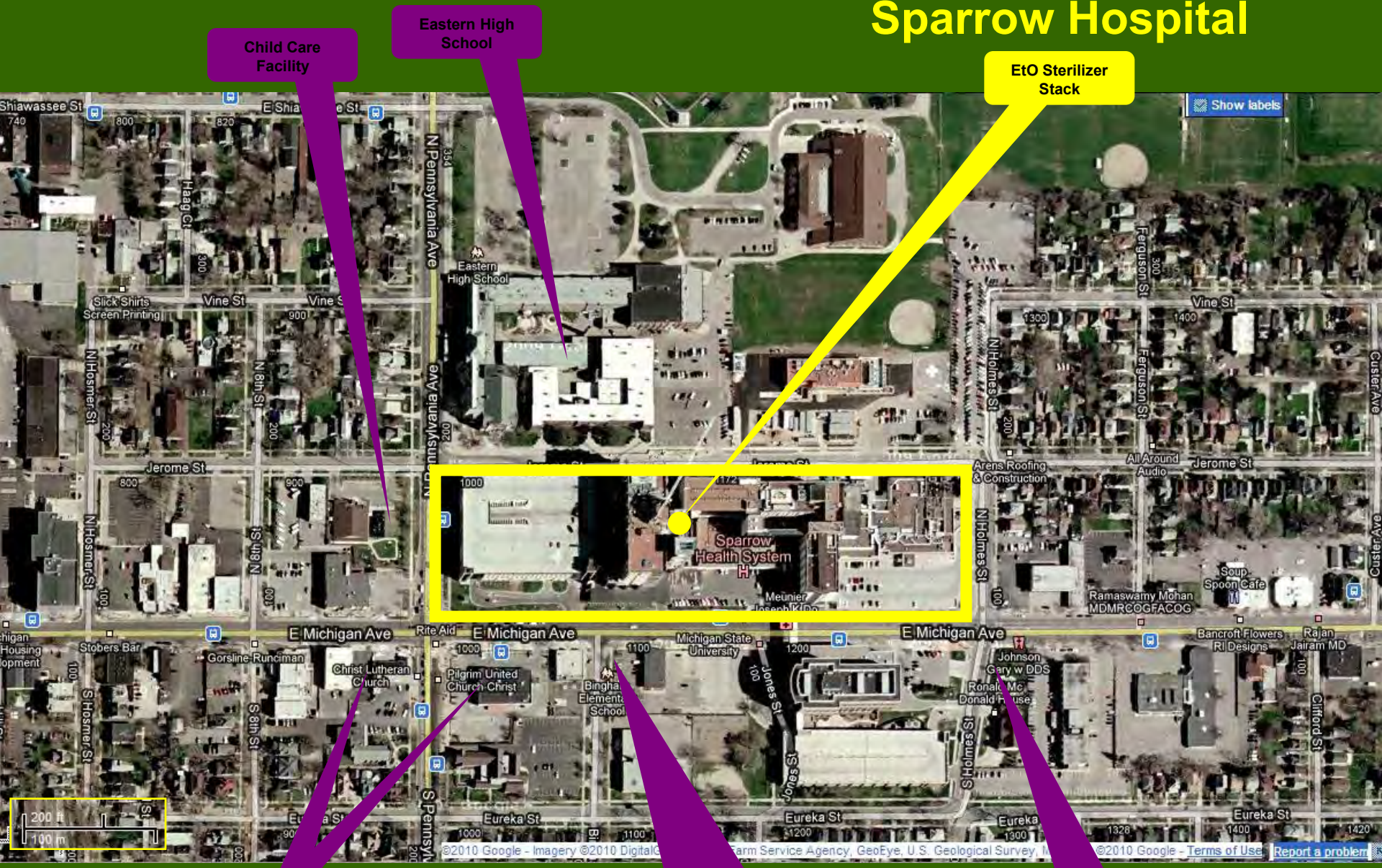
- $1.8 Billion Expansion
- Largest private project in history of Detroit
- Federal Technology Requirements applied
- No federal health risk assessment
- Highly controversial
- Permit issued
- Permit was not appealed

Marathon Refinery Expansion
88 Air Toxics Emitted
Including these carcinogens:

- *1,3-Butadiene*
- *Benzene*
- Gasoline
- *Naphthalene*
- *Carbonyl Sulfide*
- *Arsenic*
- *Chrysene*
- *Dichlorobenzene*
- *Formaldehyde*
- *Chromium VI*
- *Naphthalene*
- *Nickel*
- *Acetaldehyde*
- *7,12-Dimethylbenz(a)anthracene*
- *Benzo(a)anthracene*
- *Benzo(a)pyrene*
- *Benzo(b)fluoranthene*
- *Benzo(g,h,i)fluoranthene*
- *Beryllium*
- *Cadmium*
- *Dibenzo(a,h)anthracene*
- *Indeno(1,2,3-cd)pyrene*
- *Polycyclic aromatic hydrocarbons*
- *3-Methylchloranthrene*

HAPs are shown in yellow *italics.*

Sparrow Hospital



Ethylene Oxide (EtO)

- Known human carcinogen
- Mutagenic
- Irritating to eyes, nose & throat
- Causes toxicity to the nervous system & reproductive system
- Designated by EPA as one of the 33 air toxics presenting greatest threat to public health in urban areas

Federal Requirements

- Technology Standards for commercial and hospital sterilizers
- Does not require control
- Health risk assessment done for *commercial* sterilizers only (emissions of 10 tons/year or more)
- No health risk assessment done for *hospital* incinerators. Sparrow uses < 1 TPY EtO.

Michigan's Experience

- Permitting EtO sterilizers since 1979
- EtO sterilizers located next to homes, schools, & child care facilities
- Hospital configurations often have air intakes & EtO exhausts co-located which reintroduces EtO into the hospitals
- Cancer risks from uncontrolled EtO sterilizers is 1 in 1,000 for nearby residents (100 – 1000 times higher than what is considered "safe")
- 1997 General Permit developed - requires add-on control (99.9% reduction in emissions)
- 28 General Permits issued – Average time 8 days

Answers to the Permitting Questions

From the Public

- Is it safe for my children? YES
- Would you live here? YES

From the Companies

- What are the limits we must meet? LEVELS ARE READILY AVAILABLE
- Will you support our project? YES

Michigan's Air Toxics Program in concert with the federal program provides certainty and assurance.

Questions?

2. Previous AQD Air Toxics Rules Initiatives

The AQD air toxics program has a long history of utilizing stakeholder workgroup input to develop and revise the program.

The current initiative is the next step in the process.

We can benefit from an understanding of how and why the program evolved to its current form.

1981 Final Report of the Special Air Advisory Committee (SAAC) to the MI Air Pollution Control Commission

- "A Proposed Framework for Processing Air Quality Permit Applications for New Emission sources of Non-Criteria Pollutants."
- SAAC members were from academia and industry (Dow Chemical, Upjohn).
- Charge: determine if a problem exists with regard to air emissions of non-criteria pollutants; if so, make recommendations.

SAAC (1981) recommendations

- It is prudent to develop some guidelines (regardless of whether or not a “problem” can be argued to exist)
- Calculate acceptable ambient concentrations (AAC) of air toxics using occupational Threshold Limit Values (TLVs) or a toxicity model
- Perform dispersion modeling to calculate stack limits
- Apply framework to new sources only
- Supplement existing federal or state regulations; don’t duplicate

SAAC (1981) recommendations

- For a continuous emission source, 2.4% of the TLV is an appropriate AAC beyond applicant's boundary (i.e., TLV/42)
- Impacts of intermittent emissions should not exceed 10% of the TLV in any 8 hr workday, and never (1 hr or less) exceed 80% of the TLV
- If lacking a TLV, use a toxicity model and the best available mammalian toxicity data
- If modeled impact exceeds the AAC (NOT rigid values), initiate discussions; there may be adequate concern to deny the permit.

SAAC (1981) recommendations

- For each chemical substance, there is a limit to the concentration that can be inhaled without producing biological effects
- Did not recommend a discrete set of air toxics for regulation
- In cases where the toxicity database is minimal, the AACs are not rigorously defensible from a purely scientific point of view

SAAC (1981) recommendations

- Air toxics emission impacts that are 0.04 µg/m3 or less can be considered "trace" and be exempt from requirements for toxicity data
- A dilution factor matrix screens sources that may require dispersion modeling
- Emissions of carcinogens should be handled on a case-by-case basis; utilize an expert panel. An acceptable cancer risk target was not discussed.

Final Report of the Michigan Air Toxics Policy Committee (MATPC) (1989)

A Proposed Strategy for Processing Air Quality Permit Applications for New Emission Sources of Toxic Air Pollutants

- Impetus: increasing awareness and concern for air toxics emissions, shortcomings of the federal program, and the MI system for review was not in rules.
- Charge: develop a strategy/rules to control and abate air toxics emissions from new and existing sources in MI.
- Members: academia, industry, MDPH, MEC, MCC, SEMCOG, MMA, WCHD

MATPC (1989) Recommendations

- Focus *first* on new/modified sources
- Strategy should include requirements for both control technology and health assessment
- Some sources should be exempted from the rules and the permitting process
- The control technology requirement (T-BACT) should apply to all air toxics except 41; conditions for exemptions
- The health assessment requirement should apply to a large discrete list composed of available lists (n~ 1200), plus other contaminants of concern at a specific site.

MATPC (1989) Recommendations

- Acceptable cancer risk targets: 1E-6 (IRSL); 1E-5 (SRSL) (based on demonstrated achievability, and, acceptability per AQD and APCC)
- Provisions for case-by-case analysis; screening methods may not provide for adequate protection, or, may be overly protective.
- Methods for deriving SLs.
- Trace concept: default ITSL = 0.04 µg/m3
- Intermittent emissions: averaging.

MATPC (1989) Recommendations

- SLs ≠ ambient standards
  - Ambient standard : levels above considered safe, levels below considered unsafe.
  - SLs should be protective of public health, and allow the regulatory process to proceed. SLs are regulatory tools; not exact lines.
- ITSLs from occupational exposure levels (OELs): OEL/100.
- Recommended use of EPA's uncertainty factors (UFs) and modifying factors (MFs), and methods to derive ITSLs from limited data.

Air Toxics Rule Development

- AQD's air toxics rules promulgated on 4/17/92
  - Complemented the air toxics regulatory program of the 1990 Clean Air Act Amendments (CAAA)
  - Adopted the recommendations of the 1989 MATPC report, with the notable exception of the list of air toxics subject to the health based risk assessment.

Air Toxics Rule Development

- Draft rules with the "list of lists" defining the air toxics subject to the health risk assessment requirement (1200+), plus other air toxics on a case-specific basis, did not provide the certainty desired by the regulated community (based on comments received on the draft rules).
- Final rules (with industry support): health risk assessment for all TACs; informational lists of SLs for TACs; establish a Scientific Advisory Panel to review and make recommendations on the TAC SLs.
- The SAP (1992-1996) provided key guidance to AQD on several TAC issues. They did not recommend restricting the TAC list.

Air Toxics Subcommittee (1997)

- "A New Regulatory Framework for Control of Toxic Air Pollutants"
- The ATPC was established by AQD and the AQD's Air Advisory Group (AAG) in 1995, as a subcommittee of the AAG.
- Members from AQD, industry, consulting, Wayne County, SEMCOG, and a citizen rep.
- Charge: to provide AQD with advice on air quality policy related issues that have raised concerns.

Air Toxics Subcommittee (1997)

- Evaluated concerns with the air toxics rules:
  1. Should the health risk assessment be based on a finite list of compounds?
  2. Appropriateness of exposure assumptions and other assumptions used in the health screening analysis
  3. Should the AQD provide lists of chemicals for which the toxics review is only partially completed or under current review?
  4. Development of a SL outside of permit review
  5. Should applicants be required or allowed to propose a new/revised SL?
  6. How to define best available data for SLs
  7. Use mutagenicity data to establish UFs and SLs?
  8. Conformance with the federal CAA (T-BACT)

ATS (1997) Recommendations

1. Should the health risk assessment be based on a finite list of compounds? No, but take other steps (next slide)
2. Exposure assumptions and other assumptions used in the health screening analysis. See slide for Recommendations.
3. Should the AQD provide lists of chemicals for which the toxics review is only partially completed or under current review? Yes (done)
4. Development of a SL outside of permit review? Yes. (worked into AQD's prioritization for new/updated SLs)
5. Should applicants be required or allowed to propose a new/revised SL? Yes, allowed (not required).
6. How to define best available data for SLs. Use EPA guidance.
7. Use mutagenicity data to establish UFs and SLs? No.
8. Conformance with the federal CAA (T-BACT). Yes (done).

ATS (1997) Recommendations

1. Should the health risk assessment be based on a finite list of compounds?

A finite list is not recommended (i.e., no change).

Establish a "de minimis" exemption from the SL requirement for low emissions of non-high concern noncarcinogens (done; R226a).

Establish a new AER matrix (done; R227(1)(a)).

Replace the Dilution Factor Matrix with the AIR matrix (done; R227(1)(b)).

Do a "hot spots" study of SW Detroit (done; AQD's DATI studies of 2005 and 2010; EPA's NATA studies)

ATS (1997) Recommendations

2. Exposure assumptions and other assumptions used in the health screening analysis.

Industrial areas should have 10-fold higher IRSLs and SRSLs. (done; R225(3); plus public roads)

Change default ITSL from 0.04 to 0.1 µg/m3 (done; R232(1)(i)).

Clarify case-by-case approaches (R228, R226(d)). Summary of R226(d) decisions available; criteria for conducting R228 assessments not available.

AQD should evaluate possible expansion of industrial scenario assumptions for noncarcinogens (done on a case-by-case under R226(d)).

Questions?

ORR Environmental ARC (2011)

Air Quality Subcommittee: Air Toxics Rules recommendations (paraphrased):

1. Rescind part of R224 (T-BACT): VOCs and R702
2. Limit R225 to modifications with >10% increase in Hazard Index
3. Exempt from R225 sources with MACTs
4. Exempt from R225 clean fuels
5. Exempt from R225 pollution control projects
6. Limit R225 to the HAPs list
7. Make R225 limits consistent with other states
8. R225 should not be used to require stack tests as emissions research
9. Rescind R228