CASE STUDIES IN NAVIGATING DEQ's

NON-CRITERIA POLLUTANT CONTROL STRATEGY (NCPCS)

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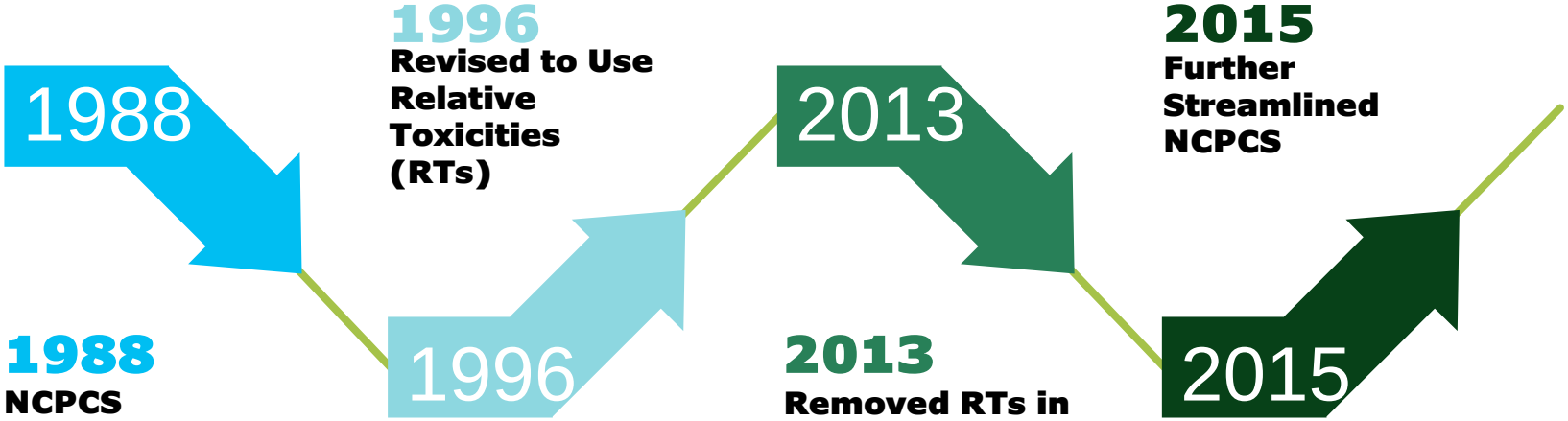
AGENDA

01 HISTORY AND NCPCS 101

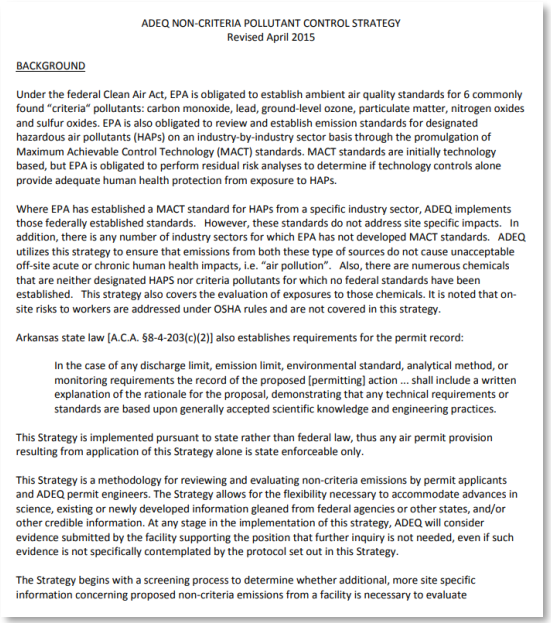
02 NCPCS CASE STUDIES

03 RISK ASSESSMENT CASE STUDIES

01 NCPCS History



NCPCS BACKGROUND



ADEQ NON-CRITERIA POLLUTANT CONTROL STRATEGY
Revised April 2015

BACKGROUND

Under the federal Clean Air Act, EPA is obligated to establish ambient air quality standards for 6 commonly found "criteria" pollutants: carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen oxides and sulfur oxides. EPA is also obligated to review and establish emission standards for designated hazardous air pollutants (HAPs) on an industry-by-industry sector basis through the promulgation of Maximum Achievable Control Technology (MACT) standards. MACT standards are initially technology based, but EPA is obligated to perform residual risk analyses to determine if technology controls alone provide adequate human health protection from exposure to HAPs.

Where EPA has established a MACT standard for HAPs from a specific industry sector, ADEQ implements those federally established standards. However, these standards do not address site specific impacts. In addition, there is any number of industry sectors for which EPA has not developed MACT standards. ADEQ utilizes this strategy to ensure that emissions from both these type of sources do not cause unacceptable off-site acute or chronic human health impacts, i.e. "air pollution". Also, there are numerous chemicals that are neither designated HAPS nor criteria pollutants for which no federal standards have been established. This strategy also covers the evaluation of exposures to those chemicals. It is noted that on-site risks to workers are addressed under OSHA rules and are not covered in this strategy.

Arkansas state law [A.C.A. §8-4-203(c)(2)] also establishes requirements for the permit record:

> In the case of any discharge limit, emission limit, environmental standard, analytical method, or monitoring requirements the record of the proposed [permitting] action ... shall include a written explanation of the rationale for the proposal, demonstrating that any technical requirements or standards are based upon generally accepted scientific knowledge and engineering practices.

This Strategy is implemented pursuant to state rather than federal law, thus any air permit provision resulting from application of this Strategy alone is state enforceable only.

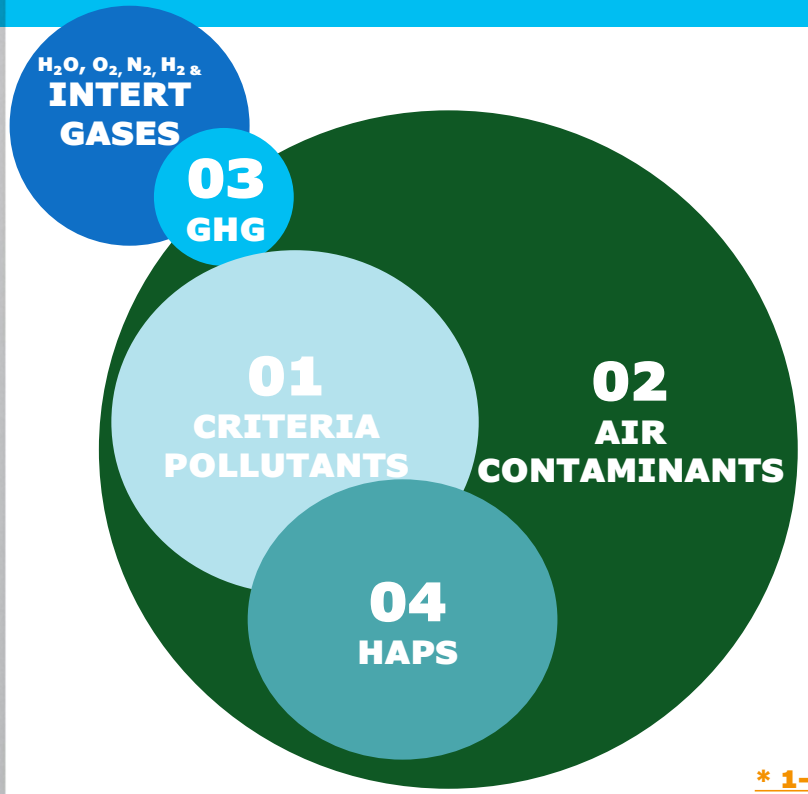
This Strategy is a methodology for reviewing and evaluating non-criteria emissions by permit applicants and ADEQ permit engineers. The Strategy allows for the flexibility necessary to accommodate advances in science, existing or newly developed information gleaned from federal agencies or other states, and/or other credible information. At any stage in the implementation of this strategy, ADEQ will consider evidence submitted by the facility supporting the position that further inquiry is not needed, even if such evidence is not specifically contemplated by the protocol set out in this Strategy.

The Strategy begins with a screening process to determine whether additional, more site specific information concerning proposed non-criteria emissions from a facility is necessary to evaluate

https://www.adeq.state.ar.us/air/permits/pdfs/non_criteria_strategy.pdf

1. **DEQ Required Application Review**
   Stationary source cannot cause air pollution
2. **State Only**
   Implemented pursuant Reg. 18 and AR state law
3. **DEQ Flexiblity**
   Screening methodology not a regulation or policy
4. **Permit Limits**
   Impacts which pollutants have listed permit limits

WHAT POLLUTANTS ARE COVERED?



01 CRITERIA POLLUTANTS

Particulate Matter (PM, PM_{10}, $PM_{2.5}$)
Sulfur Dioxide (SO_2)
Oxides of Nitrogen (NO_x)
Volatile Organic Matter (VOC)
Lead (PB)

02 Air Contaminants

Any solid, liquid, gas, or vapor or any combination thereof. The following shall not be considered air contaminants: water vapor, oxygen, carbon dioxide, nitrogen, hydrogen, and inert gases.

03 Greenhouse Gas (GHG)

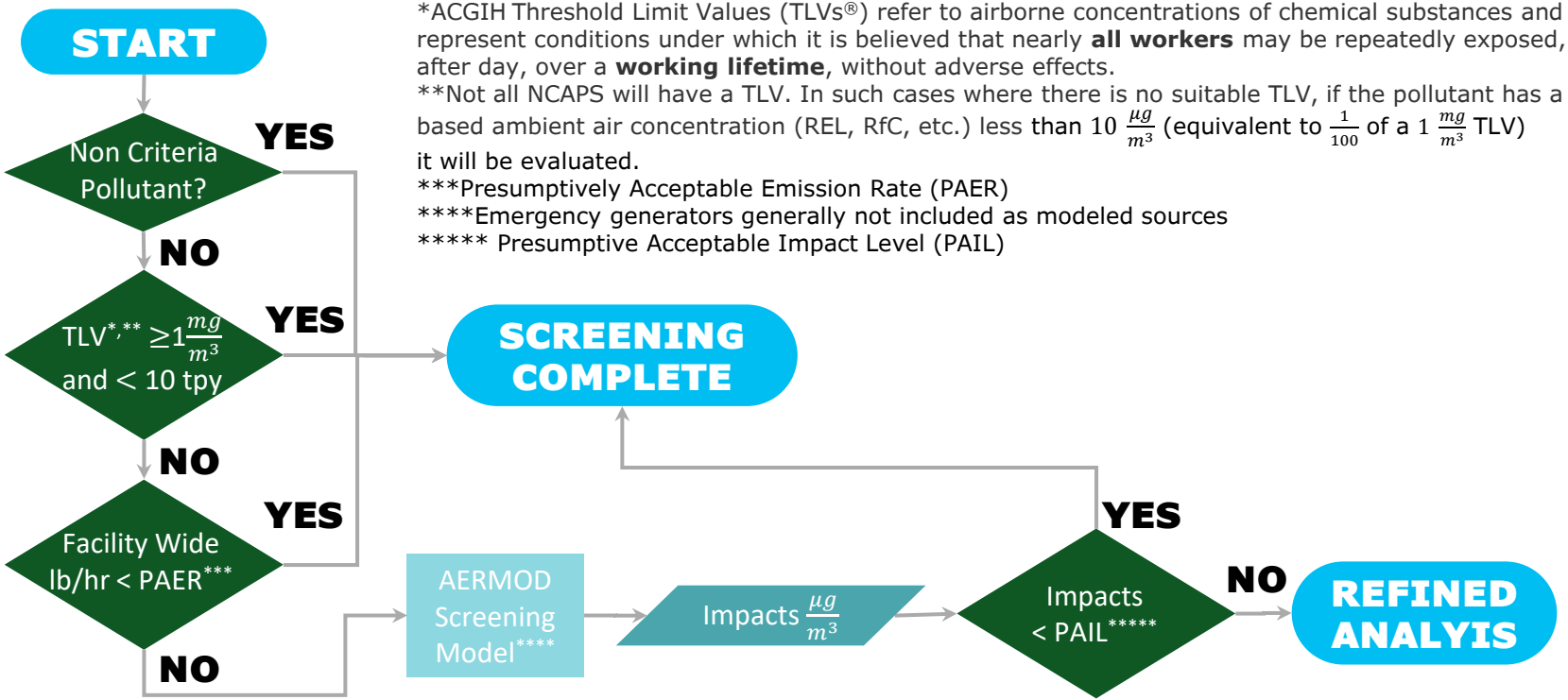
Carbon Dioxide (CO_2)
Methane (CH_4)
Nitrous Oxide (N_2O)
Fluorinated GHG

04 Hazardous Air Pollutants (HAPs)

List of 189* specific compounds or classes of compounds. Formaldehyde, Chlorine, Heavy Metals/Metal Compounds, etc.

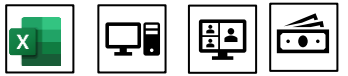
* 1-bromopropane was listed as a HAP on January 20, 2022

NCPCS SCREENING



*ACGIH Threshold Limit Values (TLVs®) refer to airborne concentrations of chemical substances and represent conditions under which it is believed that nearly **all workers** may be repeatedly exposed, day after day, over a **working lifetime**, without adverse effects.
**Not all NCAPS will have a TLV. In such cases where there is no suitable TLV, if the pollutant has a health based ambient air concentration (REL, RfC, etc.) less than 10 $\frac{\mu g}{m^3}$ (equivalent to $\frac{1}{100}$ of a 1 $\frac{mg}{m^3}$ TLV) it will be evaluated.
***Presumptively Acceptable Emission Rate (PAER)
****Emergency generators generally not included as modeled sources
***** Presumptive Acceptable Impact Level (PAIL)

NCPCS REFINED ANALYSIS OPTIONS



1. Refined Modeling
Use refined modeling to predict lower concentrations

2. Revised Emissions
Revise emission rate estimates

3. Risk Assessment
Use alternative risk assessments to develop site-specific presumptively acceptable impact levels

4. Additional Control
Propose additional control of emissions of contaminants/pollutants of concern

5. Operating Scenarios
Propose alternative operating scenarios that result in lower modeled concentrations

6. Ambient Monitoring
Install ambient air monitors at appropriate locations

7. Permit Emissions Limits
Accept emissions limitations in a permit that result in lower modeled concentrations

8. Property Line Generally, all facility property can be excluded if there is no general public access. Other impacted areas, such as roads, rivers and other uninhabited areas may be excluded on a case-by-case basis.

02 NCPCS CASE STUDIES

OVERVIEW

CHALLENGE

SOLUTION

RESULT

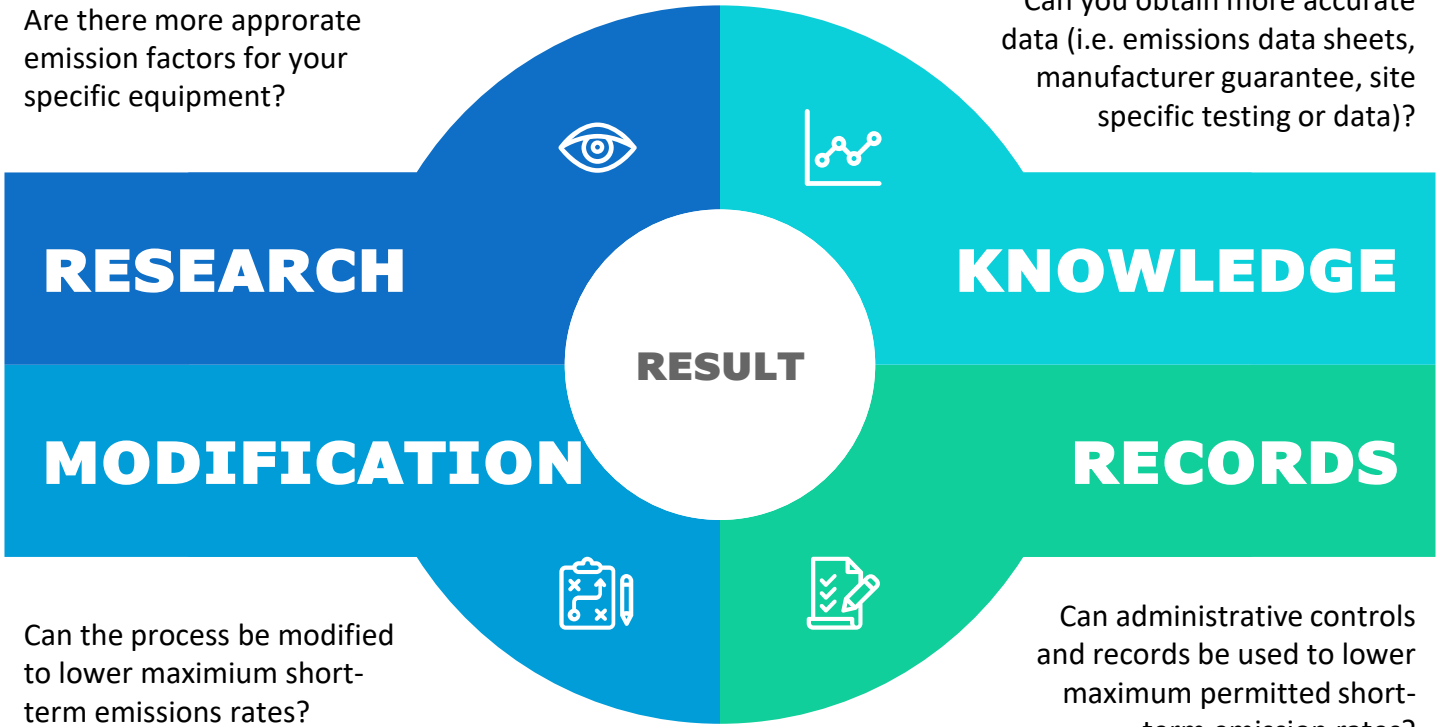
REFINED MODELING

	INDUSTRY	CHALLENGE	SOLUTIONS	CONCLUSION
CASE STUDY 01	Roofing and Asphalt Plant	Weather Capped Stacks from Roofing Building	Installed Rain Sleeves to All for Vertical Lift	Small Capital Cost to Emission Point can have Large Impacts
CASE STUDY 02	Chemical Plant	Equipment Leaks Fugitive HAPs	Refined Volume Source Based on Actual Location of Equipment	Look at the Underling Assumptions in Your Source Parameters
CASE STUDY 03	Lumber Mill	Continous Kiln Doors Fugitive HAPs	Defined Sources Using Methods for EPA's PCWP MACT Risk Review	Look Outside of AR for Best Practices for Modeling Novel Sources

REVISED EMISSIONS

Are there more approrate emission factors for your specific equipment?

Can you obtain more accurate data (i.e. emissions data sheets, manufacturer guarantee, site specific testing or data)?



Can the process be modified to lower maximium short-term emissions rates?

Can administrative controls and records be used to lower maximum permitted short-term emission rates?

OPERATING SCENARIOS PAINTING CASE STUDY

OVERVIEW

Client wanted permitted ability to infrequently paint steel beams outdoors

CHALLENGE

Fugitive emissions from volume sources model poorly

SOLUTIONS

Daily limit on gallons of paint per a day and only from 6 AM to 6 PM

RESULTS

Passed NCPCS but daily gallon limit restricted operations

OPERATING SCENARIOS PAITING CASE STUDY

2015 NCPCS

Challenge

- During last Title V renewal was challenged to give additional operational flexibility while keeping compliance “simple”

Givens

- Facility tracked as applied coating usage and HAP content per MACT
- Only one pollutant emitted above 10 tpy
- Can plan and manage production runs

Solution

- Limit operations below PAER and limit pollutant emissions and gallons of usage

For each HAP or other NCAP with a TLV less than 1 mg/m^3 or that was emitted in excess of 10 tpy on a 12-month rolling basis by the previous month, the permittee shall not exceed the daily emission limit for painting operations as determined by the following equation. TLV values shall be obtained from the American Conference of Governmental Industrial Hygienists 2020 booklet titled Threshold Limit, Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs). [Reg.18.1004 and Ark. Code Ann. § 8-4-203 as referenced by Ark. Code Ann. §§ 8-4-304 and 8-4-311]

Daily HAP/NCAP emission limit for painting operations (lb/day) =
HAP/NCAP TLV (mg/m^3) * 0.11 * 24 (hr/day)


Smiths Bayou
Pastoria
RECEPTORS?

03

RISK ASSESSMENT CASE STUDIES

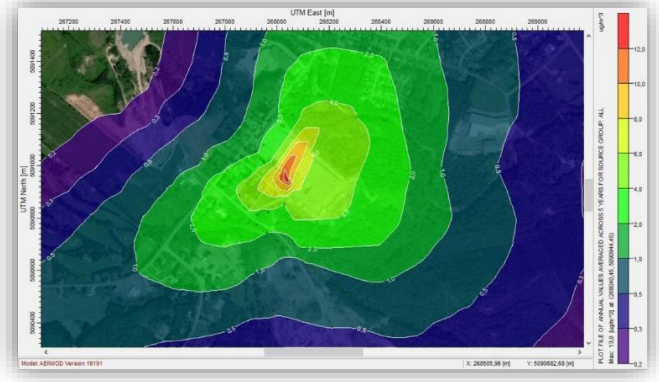


Photo Credit: Experts-conseils, Avizo. “Atmospheric Dispersion Modeling.” *Wikipedia*, 12 May 2020, commons.wikimedia.org/wiki/File:R%C3%A9sultat_de_mod%C3%A9lisation_de_dispersion_atmosph%C3%A9rique_-_Avizo_Experts-Conseils.png.

RISK ASSESSMENT

Noncarcinogenic (acute and/or chronic) risk

- For noncarcinogenic effects, exposure thresholds are set to a level without an appreciable risk of deleterious effects to sensitive receptors during a lifetime

Carcinogenic (typically chronic) risk (if applicable)

- For carcinogenic effect, there is no “safe” exposure threshold
  - Increased cancer risk of 1 in 1 million or greater is considered a negligible increased risk
  - Increased cancer risks that range between 1 chance in 1 million to approximately 1 chance in 10 thousand to be generally acceptable

Environment

- May need to include analysis on impacts to plant, animal life, and/or to property

EPA'S EXPOSURE GUIDELINESE

Risk characterization is the final step in the risk assessment process that

- Integrates the individual characterizations from the hazard identification, dose response, and exposure assessments
- Provides an evaluation of the overall quality of the assessment and the degree of confidence the authors have in the estimates of risk and conclusions drawn
- Describes risks to individuals and populations in terms of extent and severity of probable harm
- Communicates results of the risk assessment to the risk manager
- Particularly critical to full characterization of risk is a frank and open discussion of the uncertainty in the overall assessment and in each of its components

WOOD FIRED COMBUSTION BERYLLIUM CASE STUDY

NEW TLV
Probable Human Carcinogen

Original application was submitted using previous year's TLV values. New TLV was significanlty lower to reflect that beryllium compounds are a probable human carcinogen

CHALLENGES
Exhausted Most Solutions

Project was very time sensitive. Already exhausted most NCPCS refined analysis options to get passing models for acrolein and formaldehyde

SOLUTIONS
To the Research!

With Berlylium compounds toxicology is well reasearched. EPA and several other state agencies have set "safe" standards

BERYLLIUM CASE STUDY
SIMPLE RISK ASSESSMENT

ALTERNATIVE STANDARDS

Reviewed Literature

- Reviewed toxicology information, EPA's IRIS database (gold standard), and other states with standards

Ran Additional Models

- Ran additional model runs to include all averaging periods with standards

Conclusion

- Risk assessment showed fence line modeled impacts were well below all known health-based standards. DEQ determined that there was sufficient evidence that the project would not cause air pollution.

Carcinogenic Risk

Source	Standard	Annual Averaging Period	Target
Idaho Department of Environmental Quality	AACC[1]	4.2E-3 µg/m^3	Acceptable, Cancer Risk
California Environmental Protection Agency	IUR[2]	4.0E-4 µg/m^3	1 in 1,000,000 increased cancer risk
EPA	AUR[3]	4.0E-4 µg/m^3	1 in 1,000,000 increased cancer risk
Worst Case Carcinogenic Screening Threshold	--	4.2E-4 µg/m^3	
Modeled Results	--	1.6E-4 µg/m^3	1 in 2,625,00 increased cancer risk

Noncarcinogenic (acute and chronic)

Source	Standard	Averaging Period (µg/m^3)			Target
		1-hour	24-hour	Annual	
Texas Commission on Environmental Quality	ESL	2.0E-2	--	2.0E-3	Health
California Environmental Protection Agency	REL	--		7.0E-3	Chronic, non-cancer
EPA	RfC	--	2.0E-2	--	Sensitive, noncancerous
Worst Case Noncarcinogenic Health Standards	--	2.0E-2	2.0E-2	2.0E-3	
Modeled Impacts		5.47E-3	1.09E-3	1.60E-4	
% of Standards		27%	5%	8%	

RISK ASSESSMENT
KILN CASE STUDY

OVERVIEW
Previous Owner Permitted New Kiln at Unobtainable Stack Capture Efficiency

CHALLENGE
No Method to Reduce Modeled Impacts
Nearby Industrial Site
Uncertainty in Standards

SOLUTIONS
Evaluated Risk for Industrial and Public Groups
HEM3 (now HEM4) Model

RESULTS
With Accurate Stack Info
Public Group had Negligble Risk
Industrical Group had Acceptable Risk

THANKS!

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