October 2, 2023

Submitted via tox@tceq.texas.gov

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Re: Sunset Management Recommendation 1.2: Commission Vote on Acceptable Level of Health-Based Risk

Dear Dr. Lange:

We appreciate this opportunity to provide written comments to Texas Commission on Environmental Quality (TCEQ) about its proposed response to Sunset Management Recommendation 1.2.

Overview

It is a positive step that the TCEQ Executive Director proposes to set a target cancer risk level of 1 in 100,000 (1×10^{-5}) and wants to officially adopt a final policy for setting screening levels that are used in TCEQ's air permitting program and compared to ambient air monitoring data.

This proposed action is intended for TCEQ to gain greater transparency for TCEQ's decision-making processes and fulfill its charter:

> *The Texas Commission on Environmental Quality strives to protect our state's public health and natural resources consistent with sustainable economic development. Our goal is clean air, clean water, and the safe management of waste.*

However, there are multiple concerns about the proposed action:

1) TCEQ is not addressing the entirety of Management Recommendation 1.2 from the Sunset Advisory Commission Staff Report.
2) Recent assessment of existing health risks in Texas is overly optimistic
3) The proposed action does not address all scientific and toxicology issues to protect human health.
    a) Proposed Risk Threshold of 1×10^{-5}
    b) Failure to Consider Cumulative Cancer Risks
    c) No Consideration of Childhood Exposure and Risks
    d) Use of Outdated Air Dispersion Model: ISCST3
    e) No Proposed Action to Evaluate Non-Cancer Risks

Each of these concerns will be discussed in detail below.

1) <u>TCEQ is not Addressing the Entirety of Management Recommendation 1.2 from the Sunset Advisory Commission Staff Report</u>

TCEQ stated in the Background section of this proposed action:

> *Management Recommendation 1.2 from the report states "[d]irect TCEQ's commission to vote in a public meeting on the acceptable level of health-based risk used in the development of toxicity factors for permitting and other regulatory actions." The referenced "acceptable level of health-based risk" **is interpreted to mean** the acceptable individual-chemical excess cancer risk, or target risk level, used in permitting and other regulatory actions.*

TCEQ appears to have copied verbatim the briefly summarized Management Recommendation 1.2 as described in the Executive Summary on page A1:

> *Direct TCEQ's commission to vote in a public meeting on the acceptable level of health-based risk used in the development of toxicity factors for permitting and other regulatory actions.*

Page 15 of the Sunset Advisory Commission Staff Report, however, provides more detail and identifies **<u>seven</u>** specific issues of concern.

Staff-Created Guidelines for Determining Toxicity Factors

- TCEQ defines "significant excess risk level" for continuous lifetime exposure as an increase in risk of 1 x 10^{-5} for carcinogens.
- TCEQ interprets "air pollution" to mean the agency can only permit for "direct" effects of air pollution (i.e., direct inhalation or skin contact).
- TCEQ limits permitting to emissions of one chemical at one site, relying on the agency's air modeling and monitoring to account for other factors in air quality.
- TCEQ classifies health effects as non-adverse, less serious, transitional (i.e., between less serious and serious), or as serious effects.
- TCEQ allows an external scientific peer review of an individual toxicity factor if significant public interest exists and resources are available.
- TCEQ will review chemicals with limited toxicity data during the permitting process, setting a default or generic level if toxicity data is uncertain or unreliable.
- TCEQ will calculate conservative health-based toxicity factors to protect against adverse effects.

Figure 1. Seven Issues Identified by Sunset Advisory Committee Under Management Recommendation 1.2

The Sunset Advisory Commission makes the observation that:

> *However, the commission **has not established many other standards** related to acceptable risk to guide program implementation across the agency, **instead delegating that authority to staff as illustrated in the textbox**.*

CONCERN: It appears that this proposed action by TCEQ only addresses the first item identified in the Sunset Advisory Commission Staff Report. It is not clear when or whether TCEQ will address the remaining items on the list per Recommendation 1.2 from the Sunset Advisory Commission or whether there are additional standards which are anticipated for future review and approval.

2) Recent Assessment of Existing Health Risks in Texas is Overly Optimistic

Texas leads the nation in several metrics related to air quality and needs to have policies and regulatory oversight which are appropriate to protect the health of 30 million Texans, given the large number and different types of regulated industries which operate within the state and emit air pollutants.

Table 1. Number and Type of Air Permits in Texas in 2022[1]

Type of Permit	Number in 2022	Percentage of Texas Total
Major Emissions	1,948	69%
Minor Emissions	629	22%
No Classification in ICIS	188	7%
Other		
Synthetic Minor Emissions	48	2%
Emissions classification unknown	6	<1%
TOTAL	2,819	

Table 2. Number of Facilities with Title V Air Permits by State in 2022[2]

Rank	State	Number of Facilities with Title V Operating Permits	Percentage of National Total
1	Texas	1,948	14.7%
2	California	1,106	8.3%
3	Louisiana	649	4.9%
4	Indiana	575	4.3%
5	Ohio	495	3.7%

[1] Data taken from: "Analyze Trends: EPA/State Air Dashboard" accessed at: https://echo.epa.gov/trends/comparative-maps-dashboards/state-air-dashboard
[2] Ibid

Table 3. Number of Facilities with Toxic Release Inventory (TRI) Identification Numbers in 2022[3]

Rank	State	Number of Facilities Reporting Air Emissions to TRI	Percentage of National Total
1	Illinois	1,323	6.2%
2	Ohio	1,319	6.2%
3	Texas	1,190	5.6%

According to USEPA's AirToxScreen Mapping Tool, Texas has several large geographic areas where the **excess cancer risk is over 50 in a million** from the emission of carcinogens as shown in dark blue.

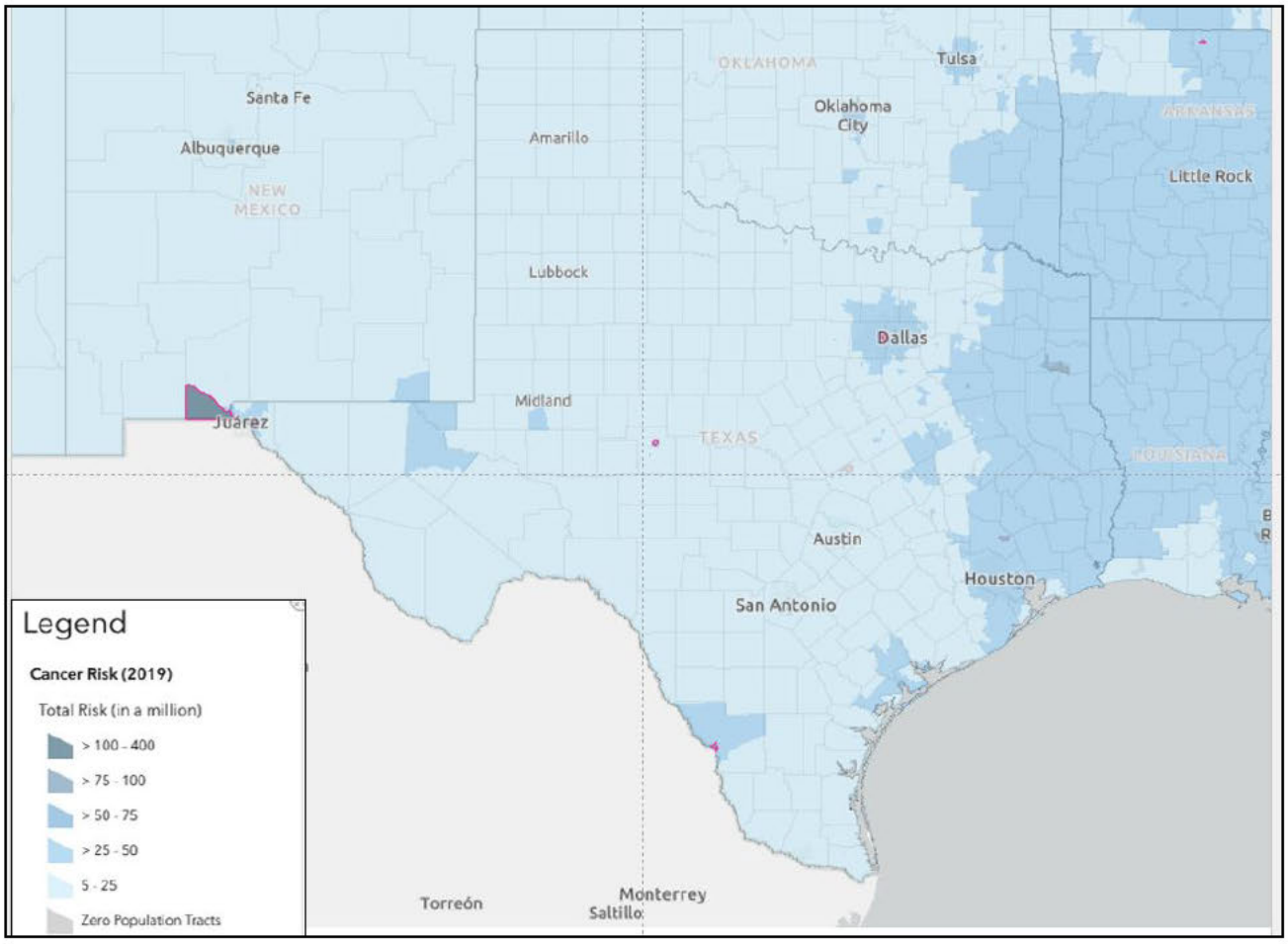

Figure 2. Excess Cancer Risk in Texas (2019)[4]

[3] Source: USEPA ECHO Website accessed at: https://echo.epa.gov/facilities/facility-search
[4] USEPA's AirToxScreen Mapping Tool accessed at: https://experience.arcgis.com/experience/a2eea9c204004158a85a18371d6883bc

More concerning are several areas near the Gulf of Mexico with a concentration of industrial facilities where the **excess cancer risks are above 100 in a million**.

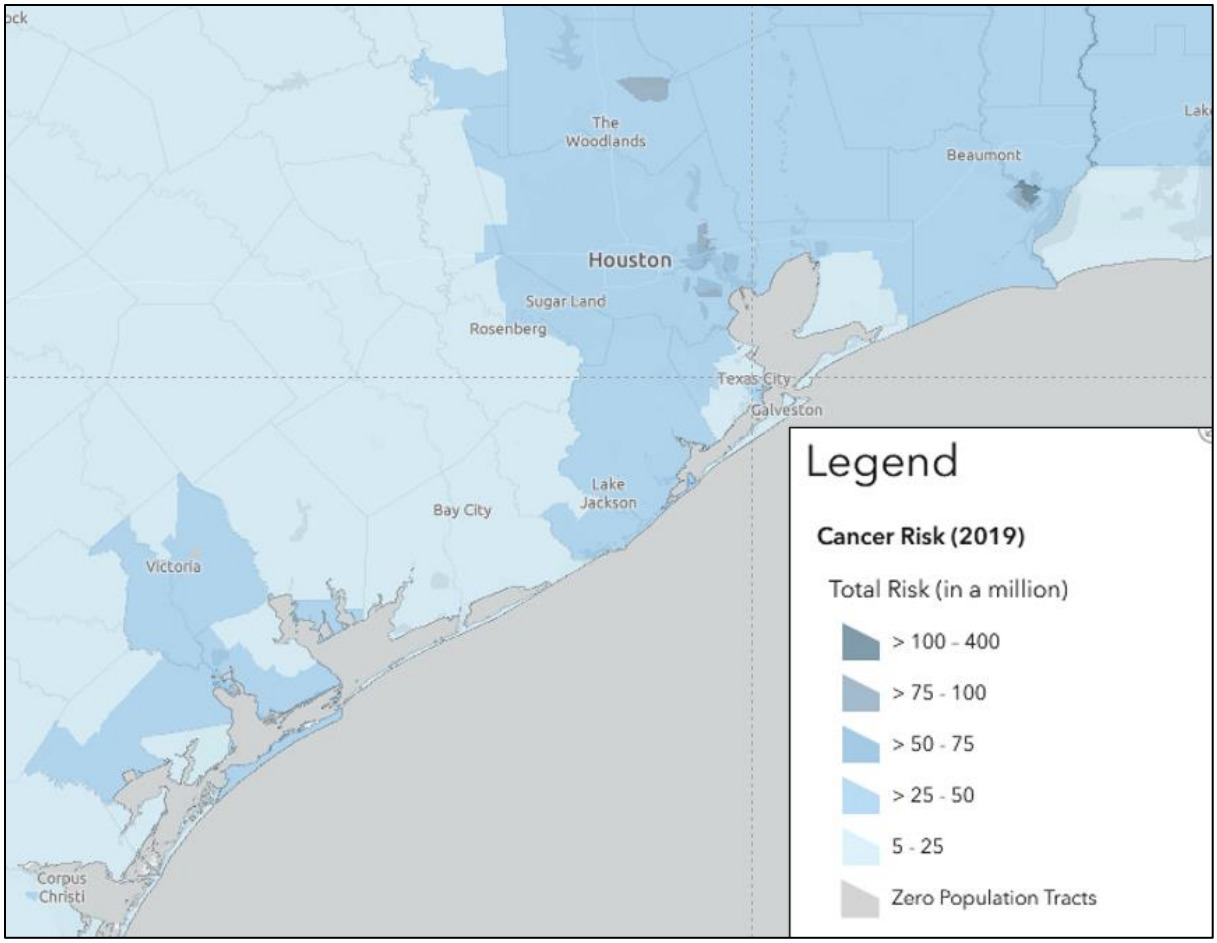

Figure 3. Excess Cancer Risk Along Texas Gulf Coast[5]

Local residents in some areas have recognized these increased risks and taken matters into their own hands. Two complaints were filed from Harris County with the United States Environmental Protection Agency (USEPA) External Office of Civil Rights which allege that:

- *TCEQ administers a program **… because it unjustifiably creates and perpetuates a disproportionately high pollution burden** on racial and ethnic minorities, Limited English Proficient ("LEP") people, and low-resource people*.[6]

[5] USEPA's AirToxScreen Mapping Tool accessed at: https://experience.arcgis.com/experience/a2eea9c204004158a85a18371d6883bc

[6] 05RNO-22-R6, Complaint Under Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d, 40 CFR Part 7, April 4, 2022.

- *TCEQ … **failed to conduct a protectiveness review to ensure that what the Agency was doing was good science and would not have an adverse effect on public health.** In short, our state environmental protection agency should be doing more to protect the Impacted Communities and fenceline LEP populations where CBPs are prolific in Houston, Texas—not less. **This issue is not just about a state agency being able to issue permits, but about protecting public health**.*[7]

These complaints are not in isolation. University of Texas's Department of Epidemiology and Institute for Health Policy wrote a paper in 2015 which summarized the air quality situation in Harris County very accurately:

> *The good news is that air quality in Houston is better today than it was 10 years ago and much better than it was 30 years ago. **The bad news is that it's still not good enough and is not improving fast enough**, especially for sensitive and vulnerable populations living in close proximity to major emission sources.*[8]

As further evidence of excess cancer risks within Texas, City of Houston recently allocated $5 million to relocate residents away from four different cancer clusters near a railyard contaminated with creosote.[9] City officials say the contamination has reached the groundwater near two historically Black neighborhoods, Fifth Ward and Kashmere Gardens.

The Sunset Advisory Commission Staff Report had a harsh description of TCEQ's reputation and effectiveness among the public. There was a specific comment on page 13 which captures these sentiments very well:

> *Sunset staff noted a concerning degree of general public distrust and confusion focused on TCEQ and its ability to effectively regulate in the public interest. **Some community stakeholders and environmental advocates see TCEQ as a mere extension of industry, rubber stamping new and expanded facilities, seeming to ignore potential health impacts or public concerns.***

Lastly, TCEQ published its Environmental Health Update in March 2023 to provide data on cancer rates in each TCEQ region and by county.[10] It is encouraging to see that state-wide, Texas has one of the lowest cancer incidence rates in the nation. However, the report identifies multiple counties and regions where this is **not** true. TCEQ should strive to protect **all** Texans, especially where there are pockets of industrial activity which pose unacceptable risk.

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[7] 06RNO-22-66, Complaint Pursuant to Title VI of the Civil Rights Act of 1964 by Impacted Communities Against the Texas Commission on Environmental Quality for Actions Related to a Rulemaking Amendment to the Concrete Batch Plant Standard Permit, May 17, 2022.
[8] K. Sexton and S. Linder, "Houston's Novel Strategy to Control Hazardous Air Pollutants: A Case Study in Policy Innovation and Political Stalemate", Environmental Health Insights, 2015:9(S1) accessed at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4310685/
[9] Houston approves $5M to Relocate Residents Living Near Polluted Union Pacific Rail Yard (US News, Sept 27, 2023) accessed at: https://apnews.com/article/houston-relocates-residents-polluted-neighborhood-cancer-2cbf90418dc6911191b46c8ac529040b
[10] TCEQ Environmental Health Update, March 2023 accessed at: https://www.tceq.texas.gov/downloads/toxicology/publications/environmental-health-update-gi-450.pdf

When county and population data are added to TCEQ's Environmental Health Update, the conclusions are less rosy per Table 4. TCEQ provided detailed data in its report on 63 counties.

The average cancer incidence rates per 100,000 were found to be **higher than the United States average** for many locations and Texas residents:

- 32 counties which corresponds to 51% of the counties listed in TCEQ's report;
- 3.26 million residents out of a total state-wide population of 30 million.
    - **This corresponds to 11% of all Texans.**

Table 4. Texas Counties and Residents with Average Cancer Rates Higher than National Average

TCEQ Region	TCEQ Region Name	Number of Counties Included in Evaluation	Names of Counties with Cancer Incidence Rate Higher than US Avg	Population Per 2022 Census Data	Percentage of Texas Population
1	Amarillo	1	Potter	115,645	0.4%
2	Lubbock	0		0	0.0%
3	Abilene	0		0	0.0%
4	Dallas-Fort Worth	5	Parker, Kaufman, Johnson, Hood, Wise	2,634,063	8.8%
5	Tyler	1	Smith	241,922	0.8%
6	El Paso	0		-	0.0%
7	Midland	1	Martin	5,217	0.0%
8	San Angelo	0		-	0.0%
9	Waco	0		0	0.0%
10	Beaumont	1	Orange	84,934	0.3%
11	Austin	0		-	0.0%
12	Houston	2	Chambers, Liberty	153,280	0.5%
13	San Antonio	0		-	0.0%
14	Corpus Christi	1	Aransas	24,944	0.1%
15	Harlingen	0		-	0.0%
16	Laredo	0		-	0.0%
TOTALS		12		3,260,005	10.9%

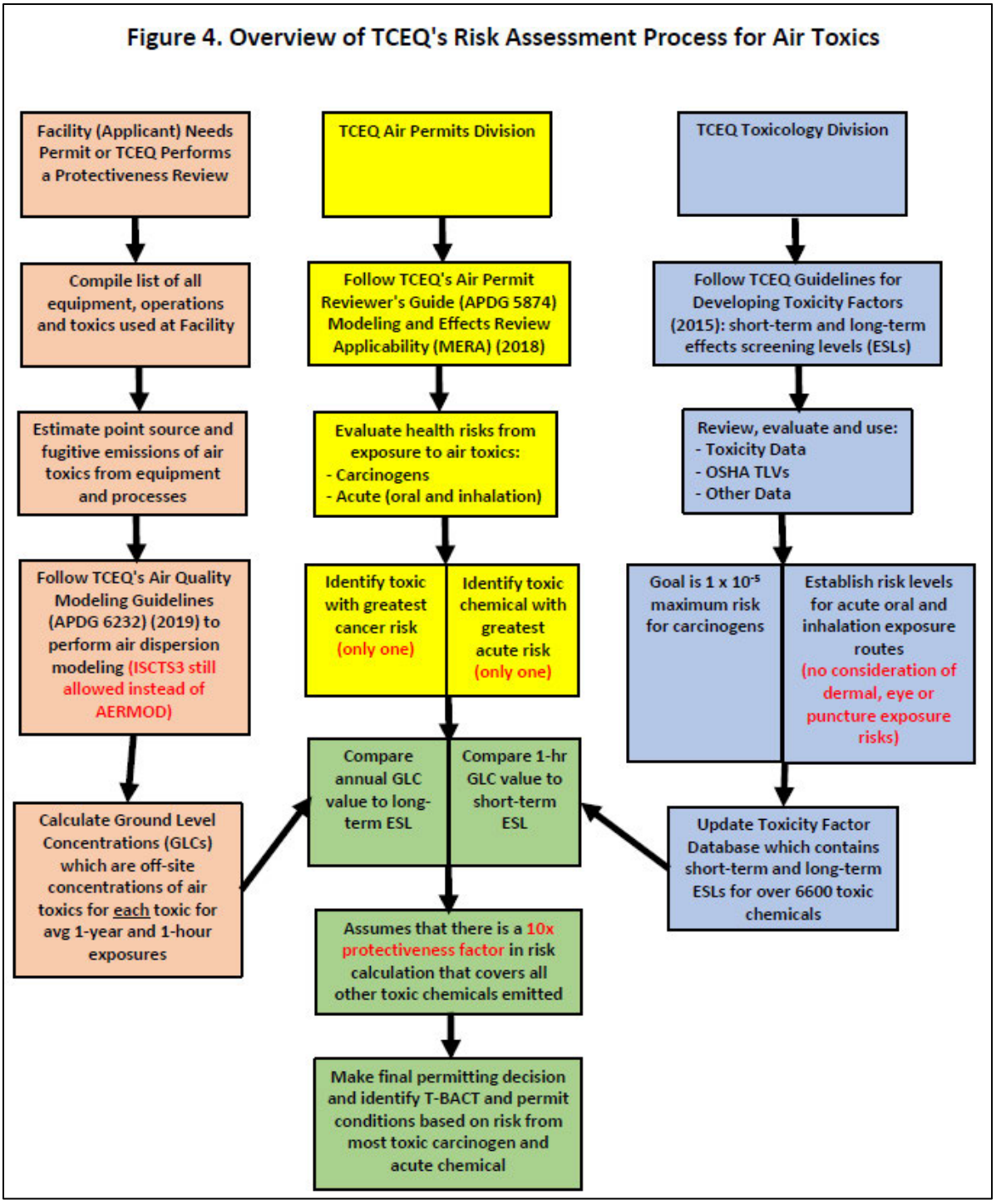
CONCERN: There are multiple studies and other sources of data which demonstrate that a substantial number of Texans' health is not being adequately protected by TCEQ's current policies and guidelines, despite claims made in TCEQ Environmental Health Update, March 2023.

3) Proposed Action Does Not Address All Scientific and Toxicology Issues

In this section, TCEQ's proposed risk threshold of 1×10^{-5} is discussed. It should be noted that this risk threshold cannot be considered in isolation. There are several other scientific and toxicology issues

which must also be addressed by TCEQ that are related and integral to how risk is identified and evaluated during regulatory and permitting decisions. Figure 4 is a high-level overview of this process. The items identified in red font are the items not addressed in the proposed action, but are discussed below.

Figure 4. Overview of TCEQ's Risk Assessment Process for Air Toxics



a) **Proposed Risk Threshold of 1 x 10^{-5}**

We agree that TCEQ's proposed threshold of 1 x 10^{-5} is the center of USEPA's suggested logarithmic range (1 x 10^{-6} to 1 x 10^{-4}) and is a reasonable starting point. However, it would be prudent for TCEQ to adopt a more protective standard under certain circumstances. TCEQ's goal should be to reduce the health risk for the 3.26 million Texans who are currently exposed to an excess cancer risk which is higher than the national average per the discussion and data provided in Section 2.

We propose a 2-tier approach that considers the "sustainable economic development" component of TCEQ's charter. It is recognized that Toxics Best Available Control Technology (T-BACT) sometimes has the potential to be expensive, depending on the requirement. Therefore, a tiered approach to risk assessment is suggested:

- 1 x 10^{-6} for new construction without T-BACT
- 1 x 10^{-5} for units constructed with T-BACT

This approach of using different risk levels for various permitting and decision-making scenarios is consistent with other states and jurisdictions: Oregon[11], New Jersey[12] and California[13].

CONCERN: When TCEQ makes decisions about acceptable risk levels in permitting and regulatory decisions, staff must consider whether T-BACT will be required. TCEQ's policy should more explicitly describe acceptable risk levels with and without T-BACT.

b) Failure to Consider Cumulative Cancer Risks

TCEQ's current policies and procedures to evaluate cancer risk are focused on identifying the impact from each carcinogen on an individual basis and not all carcinogens emitted from a facility. TCEQ's approach underestimates the health risk by failing to calculate the total risk from a facility because TCEQ's methodology does not require summation of the risk from all carcinogens emitted. The Sunset Commission identified this same issue as Bullet #3 in Figure 1.

TCEQ states in its Air Permit Reviewer Reference Guide[14] that:

> *The Modeling and Effects Review Applicability (MERA) evaluation must be conducted for each chemical species individually (except in cases where the Toxicology Division has developed an ESL[15]*

[11] Recommended Procedures for Toxic Air Contaminant Health Risk Assessments (Oregon Department of Environmental Quality, Oct 2022) accessed at: https://www.oregon.gov/deq/aq/cao/Documents/CAO_HRAProcedures.pdf

[12] Guidance on Preparing a Risk Assessment for Air Contaminant Emissions (New Jersey Department of Environmental Quality, 2018) accessed at: https://dep.nj.gov/wp-content/uploads/boss/technical-manuals/1003.pdf

[13] South Coast Air Quality Management District (SCAQMD) Rule 1401 (revised 2017) accessed at: http://www.aqmd.gov/docs/default-source/rule-book/reg-xiv/rule-1401.pdf

[14] Air Permit Reviewer Reference Guide (APDG 5874) Modeling and Effects Review Applicability (MERA), March 2018 accessed at: https://www.tceq.texas.gov/assets/public/permitting/air/Modeling/guidance/airquality-mod-guidelines6232.pdf

[15] For each chemical, TCEQ has developed a Effects Screening Level (ESL). These numbers are screening levels used in TCEQ's air permitting process to evaluate air dispersion modeling's predicted impacts. ESLs are used to evaluate

for a blend such as gasoline) and must include all emission point numbers (EPNs) in the project with an increasing allowable emission rate of that chemical species.

In the proposed action, TCEQ continues to adhere to this approach:

Consistency within and across agency programs and/or rules helps provide clarity and avoid continuous debate with external parties about what level of excess risk should be considered acceptable (e.g., for each chemical in an environmental medium). Used in conjunction with a chemical's toxicity factor (e.g., inhalation unit risk factor) to calculate a health-protective media concentration (e.g., in ambient air), the TRL of 1 in 100,000 (1 x 10^{-5}).

With no scientific basis or technical justification, TCEQ makes a sweeping and subjective statement that the risk posed when there are multiple carcinogens would be covered by a protective factor of 10.

Accounts for potential exposure to multiple carcinogens while remaining below the upper end of EPA's acceptable risk range (1 in 10,000 or 1 x 10^{-4})

Other states (California, Oregon and New Jersey) require evaluation of the risk from all carcinogens emitted, not simply each chemical emitted on an individual basis. An example is provided below from California[16] which shows how the risk should be summed for each toxic chemical emitted from a facility to give a more accurate calculation of cancer risk:

Air Toxics Hot Spots Program Guidance Manual **February 2015**

TABLE I.5 HYPOTHETICAL FACILITY INHALATION 30-YEAR CANCER RISK

Substance	Cancer risk* (chances per million)
Ammonia	N/A*
Arsenic	11
Benzene	310
Chlorine	N/A**
Chlorobenzene	N/A**
2,3,7,8-TCDD (dioxin)	326
Nickel	11
Total Facility Inhalation Cancer Risk	**658**

* The calculated numbers in each step are rounded and the rounded numbers were used in succeeding calculation steps in this example.

** N/A: Inhalation cancer potency factor is not applicable.

the potential for effects to occur as a result of exposure to concentrations of constituents in the air. Accessed at: https://www.tceq.texas.gov/toxicology/esl

[16] Air Toxics Hot Hots Program, Risk Assessment Guidelines, Appendix I (OEHHA, 2015) accessed at: https://oehha.ca.gov/media/downloads/crnr/2015gmappendicesgj.pdf

California has an excellent definition of Individual Excess Cancer Risk[17]:

> *The theoretical probability of an individual person developing cancer as a result of lifetime exposure to carcinogenic substances. The **Individual Excess Cancer Risk is calculated by summing** the potential cancer risks due to both inhalation and non-inhalation routes of exposure, generally at the off-site point of maximum impact. This "individual" is the maximally exposed individual (MEI).*

CONCERN: We urge TCEQ to consider the summation of risk from all toxic chemicals emitted from a facility for comparison to the risk threshold of $1x10^{-5}$, not just the risk from individual carcinogens. Summation will avoid unscientific and subjective risk assessments and provide a more accurate assessment of total risk.

c) No Consideration of Childhood Exposure and Risks

TCEQ is not proposing any actions or policies to consider childhood exposures to carcinogens and risks to this sensitive population.

Advances in science have shown that early-life exposures to air toxics contribute to an increased lifetime risk of developing cancer, or other adverse health effects, compared to exposures that occur in adulthood. USEPA[18], Oregon and California[19] have recognized that infants and children are more vulnerable when exposed to carcinogens because of their lower body weights and longer exposure times. Accordingly, new protocols have been developed for estimating and evaluating risk for this vulnerable population.

These updated risk assessment methodologies incorporate the most recent data on childhood and adult exposure to air toxics, along with other exposure related refinements. For some sources of hazardous air pollutant (HAP) emissions, use of the newer risk assessment methodologies will result in higher estimated potential cancer risk than would have been calculated with the adult-only risk assessment methodology. In California, it is estimated that the new residential potential inhalation cancer risk from the new methodology will be approximately 1.5 to 3 times higher than was estimated using the previous adult-only methodology.[20]

CONCERN: We urge TCEQ to re-evaluate and expand its risk assessment methodology to more accurately identify and address cancer risks posed to infants and children who are sensitive populations.

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[17] ibid

[18] A Framework for Assessing Health Risk of Environmental Exposures To Children (USEPA, 2006) accessed at: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=158363#Download

[19] Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for the Preparation of Health Risk Assessments (California Office of Environmental Health and Hazard Assessment [OEHHA], 2015) accessed at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

[20] Frequently Asked Questions Related to the OEHHA Guidelines accessed at: https://ww2.arb.ca.gov/resources/documents/frequently-asked-questions-related-oehha-guidelines

d) Use of Outdated Air Dispersion Model: ISCST3

TCEQ continues to allow the use an outdated and simplistic air dispersion model to calculate exposure concentrations when making some regulatory and policy decisions.[21] As of December 2006, the American Meteorological Society/USEPA Regulatory Model with Plume Rise Model Enhancements (AERMOD-PRIME; hereafter referred to as "AERMOD") replaced the Industrial Source Complex Short Term Version 3 (ISCST3) as the USEPA-preferred regulatory model.

TCEQ used ISCST3 for the Protectiveness Review of Concrete Batch Plants and admitted in April 2023[22] that:

> *The ISCST3 model **handles surface characteristics simplistically**, using either rural or urban dispersion coefficients. Using EPA's refined dispersion model, AERMOD, would have required considering site-specific surface characteristics.*

A Technical Paper published in 2008[23] compared TCEQ's use of ISCST3 vs. AERMOD. The authors at that time included Bryan Shaw (Commissioner at TCEQ), William Faulkner (Research Associate at Texas A&M) and Tom Grosch (Manager of Software and Data Services at Trinity Consultants). The authors concluded:

> *The results of this paper point to the sensitivity of AERMOD to small changes in wind speed and surface roughness when predicting downwind pollutant concentrations. In situations in which AERMOD is used to determine whether PM concentrations exceed NAAQS at the property line of a facility, **small changes in these variables may affect the distance within which NAAQS concentrations are exceeded by several hundred meters**.*

Basically, the authors are saying that concentrations of air pollutants can vary by several hundred meters when the more accurate air dispersion model (AERMOD) is used.

Multiple public commenters complained in June 2023 about TCEQ's continued use of ISCST3 as being outdated and failing to provide and an accurate air quality assessment during the Proposed Amendments to the Air Quality Standard Permit for Concrete Batch Plants and Protectiveness Review:

- Paula Blackmon, Chairwoman Committee on Environment and Sustainability and Councilmember District 9, City of Dallas, June 13, 2023
- Lone Star Legal Aid, June 14, 2023 representing:
  - Super Neighborhood 48 Trinity / Houston Gardens;
  - Progressive Fifth Ward Community Association; and

[21] TCEQ Interoffice Memorandum, Concrete Batch Plant Standard Permit Protectiveness Review, Modeling Report (Feb 2023) accessed at: https://www.tceq.texas.gov/downloads/permitting/air/nsr/nsr-stakeholders/22033-oth-nr-cbpsp23-4-modelingreport.pdf

[22] Proposed Amendments to the Air Quality Standard Permit for Concrete Batch Plants Texas Commission on Environmental Quality (TCEQ, April 2023) accessed at: https://www.tceq.texas.gov/downloads/permitting/air/nsr/nsr-stakeholders/22033-oth-nr-cbpsp23-3-techbckgrnd.pdf

[23] Sensitivity of Two Dispersion Models (AERMOD and ISCST3) to Input Parameters for a Rural Ground-Level Area Source (Journal of Air & Waste Management Association, 2008) accessed at: https://www.tandfonline.com/doi/abs/10.3155/1047-3289.58.10.1288

  - Dyersforest Heights Civic Club.
- Christina Schwerdtfeger, PhD, Retired Environmental Consultant, June 14, 2023
- Joint Letter submitted by Seven Environmental Advocacy Groups on June 14, 2023:
  - Texans for Responsible Aggregate Mining (TRAM);
  - Air Alliance Houston;
  - Public Citizen;
  - Environmental Defense Fund;
  - Lone Star Chapter Sierra Club; and
  - Environment Texas.
- Jeffrey Robinson, Branch Manager, USEPA, Region VI, Air Permits, Monitoring, and Grants Branch on June 14, 2023.

USEPA Region VI described the technical and policy reasons why TCEQ should stop using ISCST3 and use AERMOD:

> *Please note that ISCST3 is no longer EPA's preferred air dispersion model. The AERMOD modeling system was formally adopted as the preferred dispersion modeling in November 2005, replacing ISC3. AERMOD incorporates more current state-of-the-art modeling techniques that* ***replace the antiquated model algorithms contained in ISC3****. Specifically, AERMOD contains new or improved algorithms for:*
>
> *1) dispersion in both the convective and stable boundary layers;*
> *2) plume rise and buoyancy;*
> *3) plume penetration into elevated inversions;*
> *4) computation of vertical profiles of wind, turbulence, and temperature;*
> *5) the urban nighttime boundary layer;*
> *6) the treatment of receptors on all types of terrain from the surface up to and above the plume height;*
> *7) the treatment of building wake effects;*
> *8) an improved approach for characterizing the fundamental boundary layer parameters; and*
> *9) the treatment of plume meander.*
>
> *For these reasons, we believe that AERMOD is a more appropriate modeling system for modeling potential impacts from emissions authorized by the CBP SP and* ***recommend that the protectiveness review of the permit is reevaluated*** *using EPA's preferred dispersion model (AERMOD).*

In summary, it is essential that the concentrations derived from TCEQ's air dispersion models are realistic and accurate because TCEQ uses these values to make its risk decisions.

RECOMMENDATION: TCEQ should set a policy that ISCST3 can no longer be used in permitting and regulatory decisions and that AERMOD must be used.

e) No Proposed Action to Evaluate Non-Cancer Risks

TCEQ states in its proposed action:

> *The referenced **"acceptable level of health-based risk" is interpreted to mean the acceptable individual-chemical excess cancer risk**, or target risk level, used in permitting and other regulatory actions.*

By limiting the scope of its response to the Sunset Commission, TCEQ is ignoring non-cancer risks which are just as important and consequential to human health as cancer risks when making permitting and regulatory decisions. It should be noted that some toxic chemicals can have immediate and life-threatening acute consequences depending on the exposure route.

The Sunset Commission identified this same issue as Bullets #2 and #4 in Figure 1.

TCEQ currently uses the short-term ESL to evaluate exposure to individual chemicals in order to identify acute risks. TCEQ's methodology only considers the impact of individual chemicals[24] and does not consider their effect on target organ systems. This methodology underestimates the non-cancer risks from exposure to toxic chemicals.

USEPA and other states use a "Hazard Index" with a non-cancer risk threshold of 1.0:

> ***Hazard Quotient (HQ):** The estimated ground level concentration divided by the reference exposure level for a single substance and a particular endpoint.[25]*
>
> ***Hazard Index (HI):** The sum of individual acute or chronic hazard quotients (HQs) for each substance affecting a particular toxicological endpoint.[26]*

Below is an example[27] showing a careful and quantitative assessment of acute exposure by non-cancer chemicals on specific organ systems. In the example below, the eyes and respiratory system may have adverse acute health impacts because the HI > 1.0.

[24] Air Permit Reviewer Reference Guide (APDG 5874) Modeling and Effects Review Applicability (MERA), March 2018 accessed at: https://www.tceq.texas.gov/assets/public/permitting/air/Modeling/guidance/airquality-mod-guidelines6232.pdf
[25] Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for the Preparation of Health Risk Assessments (California Office of Environmental Health and Hazard Assessment [OEHHA], 2015) accessed at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf
[26] Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for the Preparation of Health Risk Assessments, Appendix J (California Office of Environmental Health and Hazard Assessment [OEHHA], 2015) accessed at: https://oehha.ca.gov/media/downloads/crnr/2015gmappendicesgj.pdf
[27] ibid

TABLE I.7 INDIVIDUAL HAZARD QUOTIENTS AND TOTAL HAZARD INDEX FOR ACUTE EXPOSURE

Substance	Immune System	Reproductive/ Development	Hematologic System	Nervous System	Cardiovascular System	Respiratory System	Eye
Ammonia						0.6	0.6
Arsenic		0.2		0.2	0.2		
Benzene	0.02	0.02	0.02				
Chlorine						0.7	0.7
Chlorobenzene							
2,3,7,8-TCDD (dioxin)							
Nickel	0.4						
Total Acute Hazard Index*	**0.42**	**0.22**	**0.02**	**0.2**	**0.2**	**1.3**	**1.3**

* The total hazard index is the sum of the rounded individual hazard quotients for each target organ

In this example, an HQ of one was not equaled or exceeded for any individual substance. However, an HI (the sum of the hazard quotients for each target organ) of one was exceeded for the respiratory system and eyes. Exceeding a hazard index of one may indicate that there is the potential for adverse acute health impacts at this receptor location. The District and OEHHA should be consulted when a hazard index exceeds one (see Section 8.3).

Once the HI is calculated for each receptor location from the air dispersion model, a map with isopleths (showing risk levels at each location) can be created.

Below is an example of a map showing the off-site HI values for a facility located in Oregon[28] showing the non-cancer risks. The areas which are colored in lime green, yellow and orange are those which have HI values > 1.0 and pose substantial risk. This is a good example of the methodology and rigor that TCEQ can and should apply to permitting and regulatory decision-making.

[28] Recommended Procedures for Toxic Air Contaminant Health Risk Assessments (Oregon Department of Environmental Quality, Oct 2022) accessed at: https://www.oregon.gov/deq/aq/cao/Documents/CAO_HRAProcedures.pdf

Figure 4. Example of Map From Oregon Showing Off-Site Noncancer Acute Impacts as Hazard Index

CONCERN: TCEQ's current methodology for using short-term ESLs to evaluate non-cancer risks is very limited and underestimates the risk from exposure to acute chemicals. It fails to consider the impact of multiple chemicals on impacted individuals and that there may be multiple exposure routes and target organs.

RECOMMENDATION: TCEQ should adopt and use the Hazard Index (HI) methodology with a threshold of 1.0 for each affected target organ system. This would provide better identification and protection against non-cancer risks during permitting and regulatory actions.

SUMMARY

Texas has many positive economic aspects[29] for residents and businesses:

> *Texas offers an attractive environment for manufacturing activity. The state has an extensive supply chain network of airports, seaports, interstate highways and railways; it is the U.S. leader in international exports of manufactured goods. The state's abundant natural resources give it inherent strengths as a producer of energy-related products.*

With this substantial manufacturing and industrial capacity, however, there is an enormous use of toxic chemicals which pose cancer and non-cancer health risks for residents. Per our calculations in Table 4, we showed that 3.26 million Texans live in counties where the cancer risk is higher than the national average. In addition, Texas is getting a reputation as "among the 10 worst states for the environment."[30] The personal finance site WalletHub determined:

> *Texas' overall ranking is an abysmal No. 41, making it one of the least green places in America.*

It is against this backdrop that we urge TCEQ to consider more carefully its response to Management Recommendation 1.2 from the Sunset Advisory Commission Staff Report. Risk assessment is a complex and nuanced field with multiple areas for policy decisions. TCEQ should embrace the latest science and analysis methods for performing risk assessments and not limit itself to solely adopting 1 $x10^{-5}$ as a risk threshold.

CONCLUSION

In closing, we very much appreciate the opportunity to provide comments on TCEQ's proposed action and we kindly request that our technical comments be given due consideration. We also express our willingness to further engage with TCEQ, should you require additional information, clarification, or collaborative opportunities to address the concerns raised in our comments.

Thank you for your attention to this matter. We look forward to a productive and fruitful collaboration with TCEQ and appreciate the opportunity to contribute to the decision-making process.

Sincerely,

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Retired Environmental Consultant

Michael Spano / Craig Wright

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[29] Texas Comptroller, Texas Regional Manufacturing Overview accessed at: https://comptroller.texas.gov/economy/economic-data/manufacturing/2020/

[30] Culture Map Austin, "New Report Lands Texas Among 10 Worst States for the Environment", April 19, 2019 accessed at: https://austin.culturemap.com/news/city-life/04-19-19-texas-worst-for-environment-least-green-states-wallethub/